6th Congress of the International Pediatric Transplant Association Abstracts

Poster Showcase: Solid Organ Transplantation from Around the World

Abstract# 1

ETHNIC DIFFERENCES IN RENAL TRANSPLANT ACCESS AND OUTCOME IN NEW ZEALAND CHILDREN. Tonya Kara, William Wong, Maxwell C. Morris, Jane Ronaldson, Penelope Weston. *Paediatric Nephrology, Starship Children's Health, Auckland, New Zealand.*

PURPOSE: Racial disparities in renal transplantation have been described in many populations. Non European ethnic minorities appear to be over represented in end stage kidney disease (ESKD) in several countries and poorer outcomes post transplant are also documented. New Zealand (NZ) has three main cultural groups: NZ European (NZE), NZ Maori (NZM) and Pacific Islanders (PI). Maori and Pacific people appear to be over represented in the adult ESKD population, with fewer being transplanted but this has not been examined in the paediatric population. We know that some forms of ESKD occur more commonly in NZM and PI children. The aim of this study was to review whether the same issues regarding transplant were occurring in NZ children.

METHOD: Retrospective review of the first 25 years of the national renal transplant program at Starship Children's Hospital from 1982 to the end of 2006. The sample population was identified from ANZDATA, hospital records and databases.

RESULTS: Maori made up 31.8% of those with ESKD, but only 14.6% of the country's children. Pacific Island children made up 6.9% of NZ children but 11% of those with ESKD, and NZE children 55% with ESKD but 68% of the country's children.

Of those transplanted however 63% were NZE, 26% were NZM and 11% PI. NZE receive 63% of live donor grafts, PI 5% and NZM 31%, whereas with deceased donors, NZM receive 50%, NZE 45%, and PI 5%.

Waiting time on dialysis was not significantly different for ethnicity or donor source. However 94% of pre emptive transplantation were in NZE, with 6% in NZM. Mean graft survival over the whole time period was 9.6 yrs (84 days to 8660) in NZE, 6.97yrs (284 days to 9370) NZM and 3.62 yrs (115 days to 2774)PI.

CONCLUSION: Maori and Pacific children are overepresented in the ESKD population yet under represented in the transplant population. Maori children receive more deceased donor grafts, with decreased graft survival and pre emptive transplant essentially only occurs in European children. Reasons for these disparities need to be explored, but include causes of ESKD and greater numbers receiving deceased donor transplants.

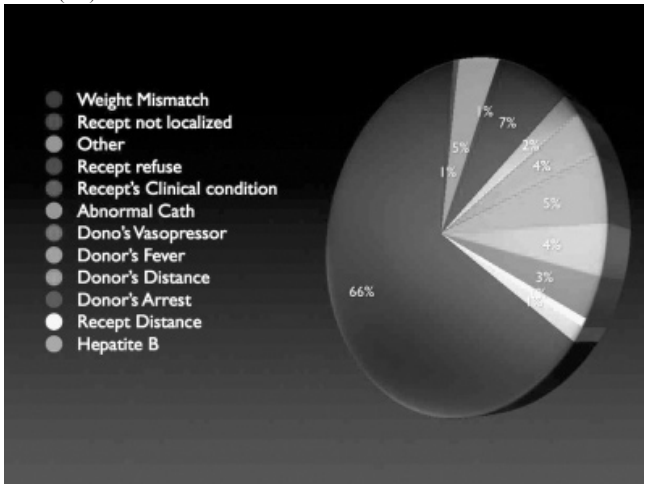
Abstract# 2

DEMOGRAPHIC FEATURES OF THE FIRST PEDIATRIC HEART TRANSPLANTATION CENTER IN BRAZIL. Alexandre S. Cauduro,[1] Estela Azeka,[2] Carla Tanamati,[1] Marcelo B. Jatene.[1] *[1]Pediatric Cardiac Surgery Unit, Heart Institute of Sao Paulo University School of Medicine, Sao Paulo, Brazil; [2]Pediatric Cardiology Unit, Heart Institute of Sao Paulo University School of Medicine, Sao Paulo, Brazil.*

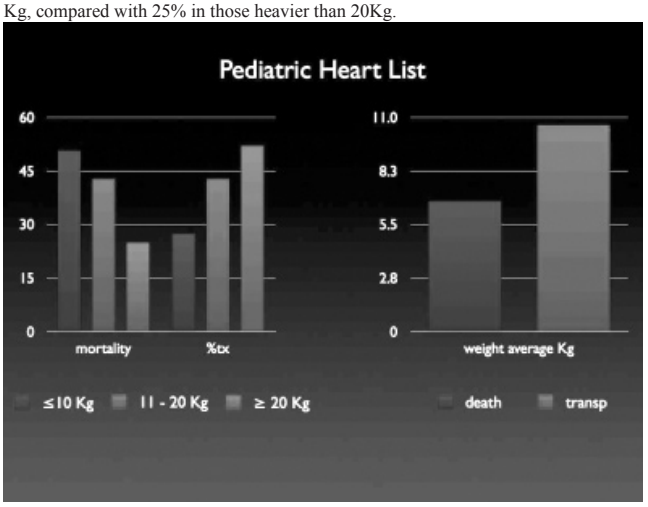
PURPOSE: Heart transplant's demographics data.

METHOD: We reviewed the acquired data from the period between 1997 and 2010.

RESULTS: From 1992 until july 2010 we performed 88 heart transplants and listed 184 patients since 1997.Of those 621 potential donors between 0 and 20 years old offered,428 were refused (69%) and 193 (31%) were used either by the adult and pediatric heart transplant team. 70% comprise patients older than 10 years. Between 1997 to july 2010 we had 67 potential pediatric receipts whom had any kind of refusal. We had 160 potential donors refusals for those receipts. An average of 2,38 refusal per potential receipt. The major cause of donor's refusal was obviously weight mismatch (66%). The poor clinical condition (7%), donor's fever (5%), donor's distance (4%), donor's catecholamine level usage (4%), donor's arrest (3%) and other not specified causes (5%) were the most relevant causes.



In our system we have high waiting list mortality rate(50,7%) in those patients less 10 Kg, compared with 25% in those heavier than 20Kg.



CONCLUSION: The receipt's weight is a strong risk factor for mortality in the waiting list and we have still faced off with a high donor's refusal and a shortage of very young donors. New strategies as ABO incompatible transplant and a better care of the possible donors could improve the transplant's rate.

Abstract# 3

OUTCOMES OF LISTING FOR PAEDIATRIC HEART TRANSPLANTATION IN SWEDEN – A COMPLETE 21 YEAR NATIONAL FOLLOW-UP. Håkan Wåhlander,[1] Rolf Bennhagen,[2] Thomas Gilljam,[1,3] Thomas Higgins Higgins.[2] *[1]Division of Paediatrics, Department of Clinical Sciences, The Queen Silvia Children´s Hospital, Göteborg, Sweden; [2]Division of Paediatric Cardiology, Department of Paediatrics, Lund University Hospital, Lund, Sweden; [3]Department of Cardiology, Institute of Medicine, Göteborg University, Göteborg, Sweden.*

PURPOSE: To evaluate, on a national basis, the outcome in the first generation of children with end-stage heart disease due to cardiomyopathy (CMP) or congenital heart defects (CHD) to which heart transplantation was presented as an option.

METHOD: Retrospective review of all Swedish children younger than 18 years (average population 1.84 million) listed for heart transplantation after introduction of brain death criteria in Sweden, January 1, 1989 to December 31, 2009.

RESULTS: 135 children median age 6.5 years (range 0.03 -17.6 years) were listed for heart transplantation. 74 children (54.8%) had CMP and 61 (45.2%) had CHD. 34 (25.2%) were younger than one year at time of listing. Since 11 patients improved and were de-listed, follow-up data was based on 124 patients. Total waiting list mortality was 30.6 % (44.4% in infants). 82 children were transplanted after a median waiting time of 57 days (0 to 585 days). At median post-transplant follow-up of 5.9 years (0.03 to 20.1 years), mortality was 18/82 (22%) and actuarial survival was 92.4% at one year, 82.1% at 5 years, 76.2% at 10 years, and 57.9% at 15 years. Survival after listing was 63.9% at one year, 58.5% at 5 years, 52.3% at 10 years and 39.5% at 15 years. Post-transplant complications included rejections in 34.1%, malignancies in 12.2%, renal failure in 8.5%, coronary artery vasculopathy in 6.1% and re-transplantation in 4 patients (4.9%). Among 64 survivors 84.3% were considered to have an *excellent* or *good* functional class whereas, in 15.7%, there were important complications considered to affect prognosis.

CONCLUSION: In this early experience, a high waiting-list mortality and some post-transplant attrition precluded more than half of children with end-stage heart disease to reach adulthood. In spite of the occurrence of post-transplant complications, functional class in survivors was generally good.

Abstract# 4

GROWTH IN HEIGHT AND WEIGHT OF THE FIRST SIX PEDIATRIC KIDNEY TRANSPLANT IN ALGERIA. Smail Acimi,[1] Jalla-Eddine Al-Ahmar,[2] Fatima Mekki.[3] *[1]Hospital of Canastel, University of Oran, Oran, Algeria; [2]CHU of Sid Bel Abbes, University of Sid Bel Abbes, Sidi Bel Abbes, Algeria; [3]CHU of Sid Bel Abbes, University of Sid Bel Abbes, Sidi Bel Abbes, Algeria.*

PURPOSE: Evaluate the growth in height and weight of the first six pediatric kidney transplant in Algeria.

METHOD: Our sample includes six children who had kidney transplants between July 2006 and October 2007. All of them have been transplanted from living donors. Age, weight, and causes of chronic renal failure for the six children are reported

below: 1st Male: 09 years, 17 kg, posterior urethral valves. 2nd Female: 11 years, 23 kg, glomerulonephritis. 3rd Female: 13 years, 29 kg, vesicoureteral reflux (VUR). 4th Male: 14yrs, 25kg, posterior urethral valves. 5th Male: 14yrs, 27kg, vesicoureteral reflux (VUR). 6th Male: 14yrs, 30kg, vesicoureteral reflux (VUR).
RESULTS: The mean follow-up for these patients was 62 months (50–66 months). One of these grafted kids (a child of a nomadic family) has stopped the immunosuppressant three months after transplantation and used, instead, a local plant, which has caused an acute rejection and, as a result, a loss of the graft. With the other kids, the results were deemed satisfactory in 4 of them. The corticosteroid, in 2 kids, was reduced to every other day. The growth in height and weight recovered to normal levels (even some excess in weight in the case of one girl.
CONCLUSION: The first kidney transplant pediatric patients in Algeria are now adults. This allows us to evaluate the impact of the graft on the growth in height and weight of these patients.

Abstract# 5

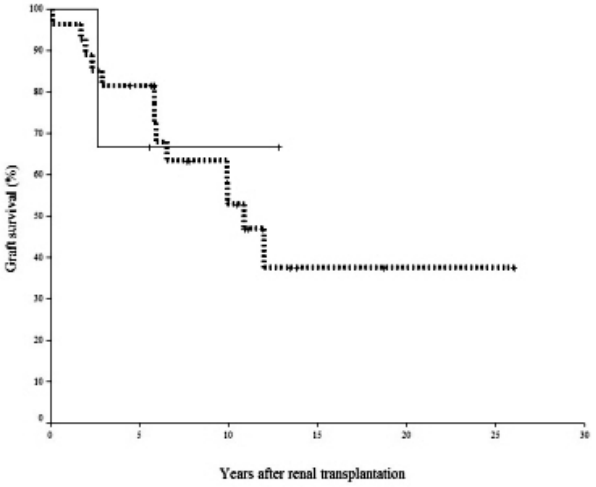
ABO INCOMPATIBLE PEDIATRIC KIDNEY TRANSPLANTATION IN JAPAN. Atsushi Aikawa,[1] Kota Takahashi,[2] Kazuhide Saito.[2] *[1]Nephrology, Toho University, Tokyo, Japan; [2]Urology, Niigata University, Niigata, Japan; [3]Urology, Surgery and Nephrology, Renal Group, Japan Association of ABO Incompatible Transplantation, Niigata, Japan.*
PURPOSE: The purpose of this study is to investigate long-term outcomes of ABO incompatible (ABOi) pediatric kidney transplantation (Tx) in Japan.
METHOD: We collected the data of 111 children (≤18 y/o) from the data base of Japan Association of ABOi Tx and analyzed the patient and graft survival rates and complications. Plasmapheresis or exchange underwent as preconditioning, however it was not routinely done post-Tx. Immunosuppression was consisted of azathioprine, steroid and cyclosporine or tacrolimus with splenectomy (Sp) before 2000. Azathioprine was replaced by mycophenolate mofetile and basiliximab was introduced after 2000. Rituximab (RTX) has been used in 16 recipients instead of Sp since 2005. We compared the outcomes between 111 pediatric and 1538 adult (≥19 y/o) recipients. We also compared the outcomes between the subgroups (splenectomy (n=95) and non-splenectomy using rituximab (n=16)). Patient and graft survival rates were calculated by Kaplan-Meier method.
RESULTS: Five of 23 children with graft loss had uncontrollable rejection including 2 hyperacute rejection. No children had PTLD. Six children died due to sepsis (n=2), PC pneumonitis (n=1), cardiac failure (n=1), HCV hepatitis (n=1) and drowned (n=1). Patient /graft survival rates of 111 children were 99.1/95.5% at 1 year, 94.0/85.7% at 5 years and 94.0/76.1% at 10 years. In contrast, patient /graft survival rates of 1538 adults were 96.5/91.8% at 1 year, 91.9/82.7% at 5 years and 87.2/65.1% at 10 years. ABOi pediatric kidney Tx showed significantly the better outcomes than ABOi adult kidney Tx ($p<0.05$). Patient /graft survival rates of 95 children with Sp were 100/95.8% at 1 year, 98.8/92.4% at 3 years. While patient /graft survival rates of 16 children using RXM without Sp were 93.8/93.8% at 1 year and 3 years. There was no difference of the outcomes between the children with Sp and those using RXM without Sp.
CONCLUSION: ABOi kidney Tx should be considered as a good option for the children with CKD stage IV or V.

Abstract# 6

THE OUTCOME OF INDUCTION THERAPY ON GRAFT SURVIVAL AMONG PEDIATRIC KIDNEY TRANSPLANT PATIENTS: A SINGLE CENTER EXPERIENCE. Christine S. Caringal, Zenaida L. Antonio, Ma. Angeles G. Marbella, Ofelia D.R. De Leon. *Department of Pediatric Nephrology, National Kidney and Transplant Institute, Quezon City, Metro Manila, Philippines.*
PURPOSE: 1) To know the outcome of induction therapy on graft survival in pediatric renal transplant patient.
2) To determine the rejection rate of those with induction and without induction therapy.
METHOD: This is a retrospective case-control study. Data were collected from the Philippine Renal Disease Registry and patient charts. Fischer's test and odds ratio were used at 95% confidence interval.
RESULTS: Mean age of patients is 12.38±3.669. Male to female ratio is 2:1. Forty one patients are Filipino while 9 patients are from other countries. The primary renal diseases are as follows: Glomerulonephritis, clinical (56%), Diffuse Proliferative Glomerulonephritis (8%), IgA Nephropathy (6%), and Focal Segmental Glomerulosclerosis (6%). Forty-one patients were on dialysis prior to kidney transplantation while 9 patients were not. Among those on dialysis, 53.6% of them were on peritoneal dialysis while 46.3% were on hemodialysis. Induction therapy was given in 86% of patients. Induction therapy used were as follows: Daclizumab (21 patients or 42%), Alemtuzumab (15 patients or 30%), and Basiliximab (6 patients or 12%). Fourteen patients or 28% underwent graft rejection within 1 year post-transplantation. Rejection rate for patients who received induction therapy was 30%. Rejection rate for those not given induction therapy was 14%. Induction therapy was not statistically significant in determining graft survival.
CONCLUSION: Induction therapy does not predict graft survival within 1 year post-transplantation among pediatric kidney transplant patients.

Abstract# 7

THE EXPERIENCE OF KIDNEY TRANSPLANTATION IN PEDIATRIC VESICOURETERAL REFLUX PATIENTS IN TAIWAN. Cheng-Hsu Chen,[1,2,3] Chi-Hung Cheng,[1,3] Ming-Ju Wu,[1,3] Tong-Min Yu,[1,2] Ya-Wen Chuang,[1] Shih-Ting Huang,[1] Kuo-Hsiung Shu.[1,3] *[1]Division of Nephrology, Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan; [2]School of Medicine, College of Medicine, China Medical University, Taichung, Taiwan; [3]School of Medicine, College of Medicine, Chung Shan Medical University, Taichung, Taiwan.*
PURPOSE: Ureterovesical reflux (UVR) is one of the causes of end-stage renal disease (ESRD) in children. The renal transplantation (RTx) is the choice of management. We reviewed our experience to evaluate the safety and efficacy of pediatric RTx in UVR patients.
METHOD: Between 1982 and 2010, a total of 30 RTx were performed in children younger than 18 years, UVR were the reasons for end-stage renal failure in 3 children (10%). The cause of UVR included: two meningomyelocele with neuropathic bladder and one posterior urethral valve.
RESULTS: The 1- and 5-year graft survival rates in UVR recipients were 100% and 66.7%, compared with 96.3% and 81.5% for other children recipients.



The patient survival was also not significant difference. The 3 recipients suffered from recurrent urinary tract infection, and one deteriorated to ESRD 2.6 year after RTx. The 1- and 5-year serum creatinine (Cr) levels were 1.3±0.1 and 3.2±1.6 in UVR recipients, and 1.5±0.7 and 2.1±1.6 in other recipients (P=0.581 and 0.278). The rejection rates within and over 6-month were 1 (33.3%) and 2 (66.7%) in UVR recipients *vs.* 7 (26.9%) and 17 (65.4%) in others (P=0.636 and 0.733). Two of UVR recipients had self-catheterization for the neurogenic bladder.
CONCLUSION: Though the allograft and patient survival rate were no different between the groups, the trend of progressive renal dysfunction due to recurrent UTI should be serious evaluation in UVR recipients.

Abstract# 8

FOCAL SEGMENTAL GLOMERULOSCLEROSIS IN PEDIATRIC KIDNEY TRANSPLANTATION – 30 YEARS EXPERIENCE. Roxana Cleper,[1] Irit Krause,[1] Nathan Bar Nathan,[2] Eytan Mor,[2] Raphael Halevy,[3] Irith Weissman,[4] Amit Dagan,[1] Maya Mor,[2] Miriam Davidovits.[1] *[1]Institute of Nephrology, Schneider Children's Medical center, Petah Tiqva, Israel; [2]Department of Transplantation, Beilinson Hospital, Rabin Medical Center, Petah Tiqva, Israel; [3]Pediatric Nephrology Clinic, Haemeq Medical Center, Afula, Israel; [4]Department of Pediatric Nephrology and Dialysis, Western Galilee Hospital, Nahariya, Israel.*
PURPOSE: Focal Segmental Glomerulosclerosis(FSGS) is the cause of 11-14% of pediatric ESRF (end stage renal failure) and recurs in the transplanted kidneys at a high rate with a 30-50% attending risk for graft loss. As pathophysiological mechanism for recurrence is ill-defined, diverse therapeutic protocols have been tried.
We review our experience with FSGS in pediatric kidney transplantation.
METHOD: The National Israeli Kidney Ttransplant Registry was searched for all pediatric (<21yrs) kidney transplantations (KT) with a diagnosis of FSGS.
RESULTS: 51 KT from a total of 425 (12%) were performed in 43 patients aged 3-20yrs with FSGS during 1/1980-1/2010. 18 patients with proven genetic/ familial/ syndromic causes of FSGS were excluded from analysis. Data were irretrievable for 5. 20patients(8females, 12 males) aged 3-20yrs, median 13.2yrs, received 24grafts: 4living-donor. FSGS recurred in 12patients(60%).15/26(62.5%) grafts. Patients with FSGS recurrence were significantly younger at ESRF onset than those without: 11.1 vs

16.4yrs. 2 patients receiving living donor grafts received preemptive plasmapheresis: in one patient FSGS recurred. FSGS recurrence presenting symptom was: signifcant proteinuria: in 4/10pts and early graft dysfunction in 6/10.
FSGS recurrence therapy consisted of plasma exchange in 9/12pts with full remission in 4/9 and partial response in 2/10. Therapy was unsuccessful in 3 patients 1 with recurrent transplant.
CONCLUSION: Early graft dysfunction or failure should raise suspicion for recurrent FSGS in patients with native kidney disease. Plamsapheresis institued early in conjunction with cyclosporine therapy and ppossibly antiCD20 monoclonal antibodies might achieve full remission.

Abstract# 9

IMPROVED 10-YEAR GRAFT SURVIVAL OVER 30 YEARS OF PEDIATRIC KIDNEY TRANSPLANTATION: A NATIONAL CENTER EXPERIENCE.

Miriam Davidovits,[1] Roxana Cleper,[1] Nathan Bar Nathan,[2] Irit Krause,[1] Maya Mor,[2] Eytan Mor.[2] *[1]Institute of Nephrology, Schneider Children's Medical Center of Israel, Petah Tiqva, Israel; [2]Department of Transplantation, Rabin Medical Center, Beilinson Hospital, Petah Tiqva, Israel.*

PURPOSE: New immunosuppressive agents have significantly improved the short-term graft survival in kidney transplantation lately while long-term graft function has been hampered by ongoing immunological and non-immunological mechanisms.
We analysed our national center results with the aim to determine the change in short-term and long-term graft survival of our pediatric kidney-transplant recipients over 30years and define predictors for outcome.
METHOD: 425 kidney transplants were performed between 1/1981 -12/2010 in Israel. We used our computerized database- the National Israeli Kidney Transplant Registry- reported to the CTS (Collaborative Transplant Study) and compared 1,5 and 10 yr graft survival rates between the three decades: 1981-1990, 1991-2000, 2001-2010. Results were reported for the whole group and in two recipient' age groups: <6 years and 6-18years. Graft Survival rates were compared using Kaplan Meier method with Log-Rank test.
RESULTS: Of 425 transplants 89% were a 1st graft, 9.6%- 2nd graft and 1.4%- 3rd graft. There were 176 living-donor and 276 deceased-donor transplants. The overall 1, 5 and 10 years graft survival was 88.5%, 75.8% and 61.8%, respectively. Improved graft survival was observed with each decade for 1year: 77%→91%→91%, 5years: 64.7%→75.7%→80% - and 10 years: 43.9%→66→73.8 ($p< 0.01$ between 1st and 2nd and 3rd decades, $p< 0.05$ between 2nd and 3rd decades). Significantly improved 10-year graft survival was observed with: living- vs deceased-donor graft :82.9% vs 72.1%; number of grafts: 76% vs 69.3% for 1st vs >1 grafts and donor age: 79.3% vs 63.7% for < 50 years or >50yrs old. Pretransplantation dialysis duration and recipient age:< 6 or >6years were not found to affect long-term graft survival.
CONCLUSION: Short- and long-term pediatric kidney transplantation outcome have improved over time. Better results can be expected with first elective living-donor transplantation or with young deceased donor' grafts.

Abstract# 10

RENAL TRANSPLANTATION: EXPERIENCE FROM A DEVELOPING COUNTRY.

A. Gulati,[1] P. Hari,[1] A. Sinha,[1] S. Guleria,[1] A. K. Dinda,[1] R. N. Srivastava,[2] A. Bagga.[1] *[1]All India Institute of Medical Sciences, New Delhi, India; [2]Indraprastha Apollo Hospital, New Delhi, India.*

PURPOSE: Retrospective analysis of characteristics and outcomes of renal transplantation at a single centre.
METHOD: Records of patients who underwent renal transplantation during 1996-2010 were reviewed for cause of end stage renal disease,complications and outcome. Post-transplant immunosuppression consisted of cyclosporine, azathioprine and prednisolone during 1996-2003; tacrolimus, mycophenolate mofetil and prednisolone used later.
RESULTS: Of 53 patients (55 transplantations), 44 were boys. Mean (SD) age at transplantation was 13.8 (4.4) years; mean weight and height SDS were -2.25 and -3.52 respectively. Underlying etiology included reflux nephropathy (14), chronic glomerulonephritis (3), hypoplasia/dysplasia (4), obstructive uropathy (7), vasculitis (6), cystic kidneys (4), FSGS (6), neurogenic bladder (1), HUS (1), neonatal AKI (1), and unknown causes (6). Donors were living related in 51 [mother (41), father (9), sister (1)], living unrelated (2) and cadaveric (2). Median duration of prior hemodialysis (44) and peritoneal dialysis (8) were 4 and 11 mo respectively. Mean (SD) follow up duration after transplantation was 4.8 (2.8) yrs. At last follow-up, weight and height SDS were -2.11 and -3.18 respectively. Eighteen episodes of acute rejection (32.7%) occurred; 16 responded to methylprednisolone pulses; 2 were steroid resistant rejections.Post-transplant complications included urinary tract infections (13;23.6%), CMV disease (8; 14.5%), tuberculosis (4;7.2%); diabetes mellitus (4;7.2%), PTLD (2;3.6%) and graft vessel stenosis (1;1.8%). Mean (SD) creatinine at last follow up was 1.38 (0.69) mg/dl. Graft loss occurred in 10 (18.1%); vascular complications (2), chronic allograft nephropathy (5), sepsis (2) and disease recurrence (1). Graft survival at 1, 3 and 5 years was 91.1, 88.2, 80.4% respectively and the corresponding respective patient survival rate was 95.3, 92.3 and 87.9%.
CONCLUSION: Despite the challenges of renal transplantation in a country with limited resources, it is a feasible mode of renal replacement therapy, associated with satisfactory long-term outcomes.

Abstract# 11

OUTCOME OF CHILDREN WHO LOST THEIR RENAL TRANSPLANTS: A SINGLE CENTER EXPERIENCE 2003-2010.

Leonard C. Hymes, Sandra G. Amaral, Barry L. Warshaw. *Emory University School of Medicine and Children's Healthcare of Atlanta, Atlanta, USA.*

PURPOSE: The outcome of children with failed renal transplants were evaluated for factors that predicted the likelihood for receiving a 2nd transplant.
METHOD: All children who suffered graft loss from 2003-2010 at Children Healthcare of Atlanta were retrospectively analyzed for age, gender, race, cause of graft failure, 1st graft survival, panel reactive antibodies (PRA), and retransplantation status.
RESULTS: 45 children suffered graft loss from 2003- 2010, age 4-20 years (median 17 years), 32 deceased donor transplants (71%), 30 females (67%) and 24 African Am (53%). 1st transplant survival was 0 to 17 years (median 3 years). Causes of graft failure included 34 patients with rejection, 4 with recurrence of nephrotic syndrome (NS), 4 with BK virus nephropathy (BKVN) and 3 with renal artery thrombosis (RAT). 17 patients (38%) were retransplanted (ReT) at 2 to 34 mo after graft loss (median 8 mo) with 11 deceased and 6 living donors, accounting for 9% of all transplants from 2003-2010. A lower proportion of females were ReT compared to males (23% vs. 62%, $p<.007$). ReT included 11/34 patients with rejection, 3/4 with BKVN, 3/3 with RAT and 0/4 with NS. There were 2 patient deaths occurring after graft loss (5%). 24 patients were transferred to an adult dialysis unit after graft failure; 16% were ReT compared to 62% who remained at the pediatric facility ($p<.003$). ReT patients had longer 1st graft survival (median 7 years) and exceeded 3 years in 14/17 patients vs. 10 /28 patients not ReT (median 2 years, $p<.0002$). ReT patients had an increased prevalence for low HLA antibody sensitization (PRA < 30%) compared to patients who were not ReT (13 vs. 5 patients, $p<.002$). Dialysis modality (HD or PD) was similar and there were no age or racial differences in the ReT and not ReT groups.
CONCLUSION: Children with failed renal transplants were more likely to be ReT if the cause of 1st graft failure was not rejection or recurrence of NS, PRA was < 30% and 1st graft survival exceeded 3 years. Patients transferred to an adult dialysis facility and females were less likely to be ReT.

Abstract# 12

THE EFFECT OF HLA MISMATCHES ON GRAFT SURVIVAL AMONG PEDIATRIC KIDNEY TRANSPLANTS AT THE NATIONAL KIDNEY AND TRANSPLANT INSTITUTE.

Claire Angelie U. Imbisan, Zenaida L. Antonio, Myrna B. Rosel, Ma. Angeles G. Marbella, Ofelia R. De Leon, Violeta M. Valderrama. *Pediatric Nephrology, National Kidney and Transplant Institute, Quezon City, Philippines.*

PURPOSE: Determine the effect of HLA mismatches and DR match on graft survival at 7 days, 1 and 2 years, among pediatric kidney transplants at the National Kidney and Transplant Institute from 2005-2009. To determine the impact of immunosuppresants on the number of HLA mismatch in relation to graft survival at the designated period.
METHOD: Retrospective study. Medical records and data from the Renal Disease Control Program, were reviewed among 0-16 years old. Data collected included age, sex, height, native kidney disease, date of transplant, donor source, cold ischemia time, PRA, HLA mismatches, DR match, postoperative creatinine at 7 days, 1 and 2 years, rejection episodes, and immunosuppressants. Estimated GFR was computed using the Schwartz formula. Outcome is expressed as graft survival defined by estimated GFR >15 ml/min/1.73m^2. Survival analysis employed Kaplan Meir method. Association of different variables used the chi -square test. Excluded were patients with incomplete records and with PRA > 50%.
RESULTS: Thirty four patients were included in the study. Results showed a significantly inverse correlation between the number of HLA mismatches and graft survival at 7 days (correlation coefficient -0.356 significant at 0.05). No correlation was seen at 1 and 2 years. Association of DR matches with graft survival showed no significant correlation at 7 days, 1 and 2 years. However in the second year, there was a trend towards graft survival with higher number of DR matches. Graft survival at 24 months was 85%, and mean survival time is noted to be at 23.04 months. No significant correlation was noted between HLA mismatches and DR matches with rejection episodes as well as with the use of immunosuppressants on graft survival.
CONCLUSION: No significant correlation was seen between HLA mismatches and DR match as well as the use of immunosuppressants in relation to the number of mismatches on graft survival.

Abstract# 13

PAEDIATRIC RENAL TRANSPLANTATION: 20-YEAR EXPERIENCE IN SINGAPORE. Yew Weng Perry Lau,[1] S. Mahmud,[1] Kar Hui Ng,[1,2] Wee Song Yeo,[1] K. Prabhakaran,[3] Hui Kim Yap.[2]
[1]Shaw-NKF-NUH Children's Kidney Centre, University Children's Medical Institute, National University Hospital, Singapore, Singapore; [2]Paediatrics, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore; [3]Paediatric Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore.

PURPOSE: Renal transplantation is the preferred treatment for children with end-stage renal failure. Paediatric renal transplantations were initiated in Singapore in 1989. We aimed to examine outcomes over 20 years from 1989 to 2009.

METHOD: We retrospectively examined the renal registry database at the Shaw-NKF-NUH Children's Kidney Centre. Crude patient and graft survival rates were calculated using Kaplan-Meier survival analysis and log-rank test used to determine survival differences.

RESULTS: Forty-four renal transplants were performed at our centre. Another four local patients with overseas transplants were included. The proportion of living donor (LD) transplants was 64.6%. Structural abnormalities (41.6%) were the commonest aetiologies. Median age at transplant and waiting time were 14.3 and 2.3 years respectively. LD transplant recipients were younger (12.7yrs vs 15.8yrs) and had a shorter waiting time (1.8yrs vs 5.8yrs) than deceased donor (DD) recipients. Overall patient survival rates were 95.7%, 92.7%, 85.6%, and 74.9% at one, five, ten, and fifteen years respectively. There were four deaths, of which three were infection-related. Graft survival rates at one, five, ten, and fifteen years for LD and DD transplants were 100%, 89.7%, 75.9%, 75.9% and 87.8%, 70.3%, 56.2%, 37.5% respectively, and were significantly higher in LD transplants. The main cause of graft loss was rejection following non-adherence. Multivariate analysis showed male gender, acute tubular necrosis and late acute rejections as predictors of graft failure.

CONCLUSION: Graft survival rates for LD transplants in Singapore were comparable to North American rates, although DD transplant rates were slightly worse, probably a reflection of the prevailing transplant policies.

Abstract# 14

ESTABLISHMENT OF A PAEDIATRIC RENAL TRANSPLANT SERVICE IN TUNISIA. Mignon I. McCulloch,[1] Anil Vaidya,[2] Saoussen Abroug,[3] W. Sahtout,[3] Achour Abdellatif".[3] *[1]Paediatric Nephrology, Evelina Children's Hospital, Guy's & St. Thomas' NHS Trust, London, United Kingdom; [2]Surgery, Oxford Radcliffe Hospital, Oxford, United Kingdom; [3]Urology & Nephrology, Hopital Universitaire Sahloul, Sousse, Tunisia.*

PURPOSE: The development of a new Paediatric Transplant program in Sousse, Tunisia as result of collaboration with International Society of Nephrology (ISN) Sister program.

METHOD: Retrospective review of 5 paediatric living related renal transplant recipients over a successive 5 day period in June 2010. Medical and surgical complications were noted.

RESULTS: 5 dialysis dependent paediatric patients with aged 8-14.3years (median 9yrs) and body mass of 20-22kg. (median 20kg) were transplanted. Waiting times were 0.7-8.3years (median 3.2yrs). Causes of renal failure included nephronopthisis, renal cystic disease, glomerulosclerosis, dysplasia and reflux(2). The donor operations were done open; the recipients had intraperitoneal placement of the grafts on the right common iliac artery with venous drainage into the inferior vena cava.

Immunosuppression included Basiliximab, Tacrolimus, Mycophenolate Mofetil and Steroids.

Medical complications included diarrhoea, lymphocoele/fluid collection, and haemolytic uraemic syndrome, requiring conversion to Ciclosporin.

One patient developed post operative renal dysfunction due to a large subcapsular hematoma requiring emergent surgical evacuation with resultant normal renal function. No donor complications were encountered.

At 6 months post transplant, all patients have local follow-up with normal renal function.

CONCLUSION: New paediatric transplantation programs are possible with the combined support of International Renal programs (ISN Sister program) using experienced transplant surgeons and paediatric nephrologists, working together with units where successful adult renal transplant programs already exist. Extensive local team work in Sousse, Tunisia including adult and paediatric staff make establishment of such a program possible with favourable results.

Abstract# 15

TECHNIQUE OF RENAL TRANSPLANT IN RECEPIENTS BELOW THE WEIGHT OF 15 kg. Syed M. Raza, Ahmed Chaballout, Ibrahim S. Ahmadi, Shahid A. Khan, Asad Basir. *Surgery/Renal Transplant, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia.*

PURPOSE: To see the outcome of graft survival with the new technique of anastomosis of renal vessels.

METHOD: Retrospective cohort study.

Renal trasplant surgry was started in 1981 and till Dec 2009 total of 266 pediatric transplants were done.Our cut off age for pediatric group is14 years.

Total of 69 renal transplants were done from 1986 till 2009 Dec with body weight of less than 15Kg.Out of this 17 transplants were done from1986 till 1999 Dec by anastomosing renal vein to external iliac or common iliac vein and renal artery to external iliac artery.From Jan 2000 the anastomosis technique was modified by anastomosing renal vein to inferior vena cava,renal artery to common iliac artey after local application of pappaverin.All transplants were done retroperitoneally on right side.

Data was entered on SPSS 15.0 and anlysed.

RESULTS: Of the 17 cases done before 2000 two recepients lost the graft because of vascular thrombosis(11.7%).

With the modified technique no graft is lost among the 52 cases operated upon. One patient developed renal artery stenosis that was delt by balloon angioplasty.

CONCLUSION: By anastomosing the renal vessels with modified technique has shown superior results when compared to the previously used technique in preventing the graft by vascular thrombosis.

Renal transplant in pediatric age group is known to have higher rate of complications notably vascular complications and to perform transplant on patients below the weight of 15Kg you need dedicated and experienced surgeons.

Abstract# 16

PEDIATRIC RENAL TRANSPLANTATION IN CALI COLOMBIA. EXPERIENCE IN A SINGLE CENTER. Jaime M. Restrepo,[1] Eliana Manzi,[1] Luis A. Caicedo.[1] *[1]Pediatric Nephrology, Fundacion Valle del Lili, Cali, Valle, Colombia; [2]Clinical Research Unit, Fundacion Valle del Lili, Cali, Valle, Colombia; [3]Transplant Unit, Fundacion Valle del Lili, Cali, Valle, Colombia.*

PURPOSE: The main renal replacement therapy for children with chronic kidney disease is the kidney transplantation. New immunosuppressive therapy has improved the graft and patient survival. In Colombia the tendency is to enhance the availability to get this treatment despite the long wait lists and increasing burden of CKD in the general population. We show our experience in a single center at Cali, Colombia.

METHOD: We made a review of 108 patients <18 years old from our transplant unit database during the period 1993-2010. The analysis was done by age group, etiology, type of immunosuppression, complications, graft and patient survival, acute and chronic rejection.

RESULTS: 108 pediatric patients 56 (52%) males, mean age 12 +/- (1,2-17,9) age distribution 14(15%) <6 years old, 36(38%) 6-12 years old and 58(60%) 12-18years old. Most had LD 66(61%) and CD 41(39%). Pathologies leading to CKD were congenital uropathy 51(47%), FSGS 13(12%), SLE 4(4%), unknown cause 7(6%) and others 8(7%). Dialysis therapy was in 83(87%) patients. There were three immunosuppressive regimens: 1. CsA-Azt-Steroids n=28; 2. CsA-MMF-Steroids n=41; 3. TAC-MMF-Steroids n=35. Main complications were UTI, CMV, Varicela, BK virus, Herpes, pneumonia, peritonitis, sinusitis and surgical wound.

Total acute rejection was 21% (By regimen 1:26%, 2:18% and 3:20%); Hyperacute rejection n=3; chronic rejection 31(30%). Two patients had de novo DM, recurrence of FSGS was 12(13%) most of them recurred and were treated properly.

Graft and patient survival at 1, 2 and 5 years were 83%, 77%, 64% and 95%, 95%, 93% respectively. The patients <6 years old had the best 5-year graft survival (75%).

CONCLUSION: We have improved our scheme of treatment through the years, decreasing the AR events from 28% to 17%, and CMV infection with proper prophylaxis. At present the possibility to treat the recurrence of FSGS is a real option. The group <6years-old has a better graft and patient survival, supported by the increased experience in the pediatric care units.

Abstract# 17

EVALUATION OF THREE INMUNOSSUPRESIVE REGIMES AT A PEDIATRIC KIDNEY TRANSPLANTATION CENTER: 1993-2010. Jaime M. Restrepo,[1] Luis A. Caicedo,[2] Eliana Manzi.[3] *[1]Pediatric Nephrology, Fundacion Valle del Lili, Cali, Valle, Colombia; [2]Transplant Unit, Fundacion Valle del Lili, Cali, Valle, Colombia; [3]Clinical Research Unit, Fundacion Valle del Lili, Cali, Valle, Colombia.*

PURPOSE: Outcomes of kidney transplantation have improved during the last 20 years with the advent of new inmunosupresors specially with calcineurin inhibitors's arrival. There have been 3 classical treatment regimes used up to now: 1.Cyclosporine, Azathioprine, Steroids. 2.Cyclosporine, MMF, Steroids 3. Tacrolimus, MMF, Steroids. We show our experience with the 3 regimes during 1993-2010.

METHOD: We reviewed the data of 104 patients <18 years old from our Transplant Unit database, in order to compare graft and patient survival, Acute Rejection-AR, Viral infections (CMV, BK Virus) and malignancy among the 3 regimes and the impact of induction therapy used.

RESULTS: Graft and patient survival among regimes are in the table 1.

AR, Graft and Patient Suvival

	Survival (%)						Acute rejection
	1-year		2-year		5-year		3 months
Regimen	Graft	Patient	Graft	Patient	Graft	Patient	%
First (n=28)	80	96	76	96	63	90	26
Second (n=41)	84	95	77	95	62	95	18
Third (n=35)	94	100	94	100	81	100	20

Third regime has significative graft($p < 0.0001$) and patient($p < 0.006$) survival over the other 2 regimes. Graft survival with induction in the third regime, was less (77%) than without induction (100%). No significant difference was found in graft and patient survival using induction. AR among the 3regimes are in Table 1 ($p= 0.09$). Third regime had 17% AR with induction therapy and 25% without induction. There were 6 patients (7%) with CMV in the first and second regimes and none in the third regime. There were 2BKV infections in the third regime. No malignancy was found in any of the patients.

CONCLUSION: Third regime remains up to the present as the main treatment in pediatric kidney transplantation. The tendency to have worse graft and patient survival with induction therapy in the third regime is probably due to the high risk immunological conditions proper to these patients. There is a significative reduction of AR from the first regime to the third regime and no presence of CMV infection in the third regime due to CMV prophylaxis.

Abstract# 18

PEDIATRIC RENAL TRANSPLANTATION: EXPERIENCE IN INTENSIVE CARE MANAGEMENT. FUNDACION VALLE DEL LILI, CALI, COLOMBIA. Jaime M. Restrepo,[1] Gaston E. Castillo,[2] Yessica A. Bravo,[2] Eliana Manzi,[3] Angie Cañas,[2] Maria P. Duque,[2] Maria C. Gonzalez.[4] *[1]Pediatric Nephrology, Fundacion Valle del Lili, Cali, Valle, Colombia; [2]PICU, Fundacion Valle del Lili, Cali, Valle, Colombia; [3]Clinical Research Unit, Fundacion Valle del Lili, Cali, Valle, Colombia; [4]Transplant Unit, Fundacion Valle del Lili, Cali, Valle, Colombia.*

PURPOSE: The new skills in transplant surgery run on parallel to the appearance of pediatric intensive care units, which allow to improve the care of organ transplantation during de first days postransplant. We described the medical events in PICU.

METHOD: We reviewed the charts of 96 patients who went to kidney transplantation during 1995 -2010 in order to evaluate fluid management, central pressure venous, use of inotropics and surgical time in O.R. We assessed over fluid, inotropic therapy, vascular complication, hypertension, acute rejection, and immunosuppressive therapy in PICU.

RESULTS: The mean age was 12 +/- 4. LD were 54 (57%), the mean body weight was 30 kg+/- 12. The median volume administered was 75 cc/kg (i.q range 52-100). Most of patients 50 (54%) required inotropic therapy in the intraoperative management. In 10 children < 6 years old the graft was placed intra abdominal. The mean initial CVP was 7.4 +/-4, and final CVP 12 +/-4. The median surgical time 172 minutes (i.q range 130-190). In PICU 31 (33%) was over fluid, 54(58%) had controlled hypertension; 23 (25%) uncontrolled hypertension;14 (15%) became anuric and 22 (24%) required dialysis. Myocardial dysfunction 13(14%), Vascular complication 12(13%) Acute tubular necrosis 24(26%), Acute rejection 13(14%), Hyponatremia 7 (7%), cerebrovascular events 8 (8%). Infection in 25 patients (27%) most of them from urinary tract 25%, respiratory tract 22%. Patients with hypomagnesemia, hypertension and high levels of calcineurin inhibitors are more likely to do seizures.

CONCLUSION: The serie shows that main complications in post trasnplantation at PICU was similar as the literature describes. Uncontrolled hypertension 25% and UTI related to doble J catheter led in to the bladder were the more relevant events.

Abstract# 19

DESENSITATION IN RENAL TRANSPLANTATION: A PEDIATRIC EXPERIENCE. Paulina C. Salas, Viola M. Pinto, Jean Grandy, Rodrigo Iñiguez, Begoña Corta. *Nephrology Department, Hospital Exequiel Gonzalez, Santiago, Region Metropolitana, Chile.*

PURPOSE: Renal transplantation (Tx) is the modality of choice for renal replacement in children with ESKD. However sensitized kidney recipients have increased significantly and in this group of children renal transplantation rate are extremely low. Curently new therapies that modulate antiHLA antibodies such as intravenous inmune globuline (IVIG), Plasmapheresis(PP) and Rituximab have improved their transplantation's chances.

To report the outcome of the sensitized patients that have been transplanted under IVIG protocol since 2006 until now.

To report the immunologic post transplant monitoring of these patients in order to prevents graft damage.

METHOD: Sensitized patients in waiting list for deceased donors received 2gr/kg o IVIG a month for 3 month. At month 4° PRA and HLA antibodies were monitorized. If they come down patients were included in a medical urgency list for transplantation. After transplantation they received timoglobuline and prophylactic PP. Maintenance immunosupresors: Prenisone, MMF and TAC. Donor specific alloantibody (DSA) were monitorized wih luminex technique.

RESULTS: Between May 1992-Decembre 2010, 140 patients underwent kidney Tx in our department. 9 highly sensitized, CDC PRA more than 40%. Two of them have went into pretransplant desensitation with IVIG and these are the results.

Demografic and immunologic Data

Patient	1	2
Tx Age years	16	17
Etiology ESRD	unknown	unknown
Follow up months	24	13
Sensitation mecanism	previous tx	previous tx
In vitro inhibition %	35	71,4
PRA pre desensitation %	100	80
PRA post desensitation %	93	65
FCXM pre tx	-	LB (+)
HAR post TX	2	2
Creatinine 6-12-18-24 m mg/dl	0,5-0,5-0,4-0,5	1,7-1,6
Infections	none	Polioma virus

CONCLUSION: Protocols for desensitation with IVIG has become sucessfull in lower antiHLA antibodies to allow transplantation in this group of patients.

The highly sensitized patients should be closely monitorized because they have and increase risk of AMR.

The same therapies for desensitation can be used with good oucome in the post transplant period to treat AMR.

Abstract# 20

RENAL TRANSPLANTATION IN PORTUGUESE PEDIATRIC UNITS – LONG TERM SURVIVAL. Ana Sandes,[1] Ricardo Fernandes,[1] Rosário Stone,[1] Conceição Mota,[2] António Henriques,[2] Margarida Almeida.[1] *[1]Unidade de Nerfrologia, Departamento da Criança e da Família, Centro Hospitalar Lisboa Norte, Lisboa, Portugal; [2]Unidade de Nefrologia, Serviço de Pediatria, Centro Hospitalar do Porto, Porto, Portugal.*

PURPOSE: Renal transplantation (RT) with living donor is the treatment of choice for children with end-stage renal disease. In Portugal, pediatric RT began in the '80s, but studies of long-term survival are scarce. This study examines the survival of patients and grafts from Portuguese pediatric units.

METHOD: Cohort study based on data from the Instituto Lusotransplante about patients undergoing RT in pediatric renal transplant units in Portugal, from January 1984 (date of the first pediatric RT) until 31 December 2009. Patient and graft survival was analyzed by Kaplan-Meier methods. We investigated the influence of various factors using the rank test and Cox regression analysis.

RESULTS: 189 RT were performed in patients under 19 years: 87 females, 10 retransplantations and 12 with living donor. There were 47 graft failures. The cumulative survivals of grafts from deceased donors at 1, 5, 10, 15 and 20 years post-transplant were 92.1%, 84.5%, 71.5%, 56.1% and 37.4% respectively, and for living donors 100% at 1 and 5 years post-transplant. Chronic graft injury was the cause of failure in 57% grafts. There were six deaths, and patient survival at 5 and 20 years was 97.6% and 95.4%, respectively. Cardiovascular and infectious causes were responsible for 67% of deaths. At the time of transplantation, 3.7% of patients were younger than 5 years and 6% were preemptive transplantations. In univariate analysis, the cumulative survival of grafts was higher in patients with less than 3 HLA mismatch, in patients with less than 2 yeas on dialysis, in children with uropathy and in patients transplanted in recent decades; no statistically significant results were found using multivariate analysis.

CONCLUSION: We emphasize the limited number of living donors, preemptive transplantations and transplanted children under 5 years, aspects that deserve a reflection and the implementation of new strategies.

Abstract# 21

PREDICTORS OF SOMATIC GROWTH AFTER RENAL TRANSPLANTATION AMONG PEDIATRIC PATIENTS AT NATIONAL KIDNEY AND TRANSPLANT INSTITUTE. Malou S. Valdez, Zenaida L. Antonio, Ma. Angeles G. Marbella, Myrna B. Rosel, Ofelia D. De Leon, Violeta M. Valderrama. *Department of Pediatric Nephrology, National Kidney & Transplant Institute, Quezon City, Philippines.*

PURPOSE: To determine the somatic growth of all pediatric patients who underwent renal transplantation from the year 2001 to 2009 at National Kidney and Transplant Institute.

METHOD: Review of all patients from 2001 to 2009 who underwent renal transplantation was made. The following data were collected: Age at transplant, duration of renal replacement therapy, gender, height at time of transplant, +/- use of prednisone, type of donor and graft function. The height of every patient from 1,3, and 5 years post transplant was noted and was analyzed if there was improvement in height after renal transplantation. Patients were divided as to age(years) on time of transplant, namely those who either had transplant at less than 12 years old and more than 12 years old and correlation to the different factors were made. Mann-Whitney test was used to see if there was significant difference from initial height and height after different graft years.

RESULTS: There were 44 post KT patients from National Kidney and Transplant Institute that were included in the study. Dividing the patients into two groups, namely those who underwent kidney transplant at age less than 12 years old and more than 12 years old. After 3 years from renal transplant, there was note of significant increase in height for those patients who underwent renal transplant before twelve years old. Due to the small population, the author was not able to correlate final adult height with other factors like gender, renal replacement therapy, type of donor, number of rejection episodes and use of prednisone.
CONCLUSION: It was observed that recipients of the younger age group (less than 12 years old) have a significant increase in growth after 3 to 4 years from transplant with a median growth of 10 cm and p value of 0.001.

Abstract# 22

HIGHLY SUCCESSFUL THERAPY OF EARLY FSGS RECURRENCE POST KIDNEY TRANSPLANT (TXP): A SINGLE CENTER EXPERIENCE.

Shefali Vyas, Isabel Roberti. *Pediatric Nephrology and Transplantation, Saint Barnabas Medical Center, Livingston, NJ, USA.*

PURPOSE: The management of children with FSGS pre and post kidney txp remains a challenge. Post txp FSGS recurrence can be as high as 40% and compromises graft survival. We report our single center experience of FSGS recurrence post txp and the excellent outcome of aggressively treated early recurrence.
METHOD: Review of all pediatric kidney transplants done since 1995 revealed 21 with the diagnosis of FSGS. Eight of those (38%) had FSGS recurrence and were compared to the 13 who did not. Patient data such as age, gender, race, time to ESRD, native nephrectomy, age at time of txp, time on dialysis, graft source, induction therapy, and graft function were compared. Native nephrectomies were done if nephrotic range proteinuria persisted after ESRD.
Patients with FSGS recurrence were reviewed for time to FSGS relapse, therapy and outcome. Remission was defined by urine protein/creatinine <0.2.
RESULTS: We found no differences between the 2 groups of patients with (N=8) and without FSGS recurrence (N=13) regarding: age, gender, race, time to ESRD, time on dialysis, graft source, age at txp, induction therapy or previous native nephrectomy. Time to recurrence was 1-3 days post txp in 6 patients ("early recurrence") and after the 4th mth in 2 ("late recurrence"). **All patients with "early recurrence" had prompt remission** with steroids, CIN, MMF and plasmapheresis (PP); time to remission: 5 to 20 days. The # of PP treatments varied from 10 to 48 (mean=17). The 2 patients with "late recurrence" failed to respond to PP and progressed to ESRD - p=0.03. **At last f/u visit (mean time> 3yrs):** 8/13 (61.5%) without FSGS recurrence and 5/8 (62%) with FSGS recurrence had normal GFR and UA. **Graft loss in patients with FSGS recurrence**: 2 from 'late recurrence" and 1 from late AR (non compliance).
CONCLUSION: Children with early FSGS recurrence post txp promptly respond to PP and have no deleterious long term impact on graft outcome. Native kidney nephrectomy in children with severe proteinuria prior to txp facilitates the diagnosis of "early FSGS recurrence". Late FSGS recurrence still portend poor prognosis and remains a challenge.

Abstract# 23

ARTERIAL BLOOD PRESSURE AFTER PEDIATRIC LIVER TRANSPLANTATION IN ONE CENTER (CHILE).

Marlene Aglony, Andrea Vogel, Juan Cristobal Gana, Humberto Soriano, Juan Carlos Pattillo, Paulina Dellepiane. *Pediatrics, Pontificia Universidad Catolica de Chile, Santiago, Chile.*

PURPOSE: Arterial hypertension is frequent in children with immunosuppressive treatment like anticalcineurinics after solid organ transplantation and is a known risk factor for cardiovascular end-organ damage. The aim of this study was to evaluate the blood pressure in liver transplant recipients with casual blood pressure (CBP) measurement.
METHOD: Cross-sectional study of 7 children with a stable liver allograft on tacrolimus (4 males) attending at the liver clinic in our institution. We determined CBP in a standarized form with oscillometric technique and measured serum creatinie to calculate glomerular filtration rate with the Schwartz Formula.
RESULTS: All patients had normal renal function and were eutrophic. All the children were on generic tacrolimus and 2 of them were additionally on other immunosuppressive because of previous rejection episode (ID 5: prednisone and mofetil mycophenolate; ID 7: prednisone). CBP was normal in 85.6% of the patients. One patient was pre-hypertensive, but his blood pressure is declining with prednisone withdrawal. No patients were treated with antihypertensives.

Patient characteristics

Patient ID	Age(yr)/ gender	Primary hepatic disease	Donor source/ Time post transplant(mo)	Tacrolimus doses(mg/ kg/day)/ levels	Estimated clearance(ml/ min/1.73m)	Syst/Diast CBP
1	2/F	BA	L/19	0.26/3.3	262.6	N/N
2	3/F	Hepatoblastoma	L/15	0.12/5.6	128.6	N/N
3	2/M	Alagille	L/12	0.42/4.8	152.6	N/N
4	7/M	ALF	L/9	0.21/4.4	166.4	N/N
5	13/M	ALF	C/6	0.23/10.3	269.5	PH/PH
6	1/M	BA	C/3	0.28/5.0	185.0	N/N
7	4/F	ALF	C/5	0.26/9.1	330.0	N/N

F: female; M: male; BA:biliary atresia; ALF:acute liver failure; L:living; C:cadaveric; N:normal; PH:pre-hypertensive.

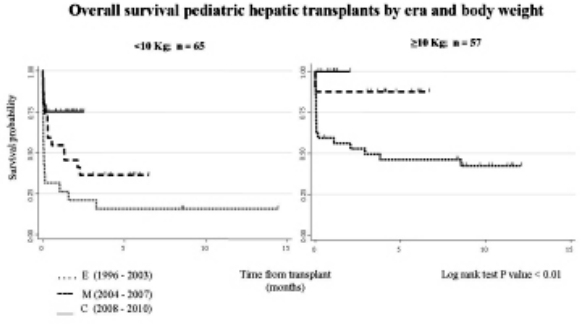
CONCLUSION: We did not found hypertensive patients with CBP among our liver transplanted children using tacrolimus. The blood pressure values were independent of the tacrolimus levels. We plan to follow this patients with ambulatory blood pressure measurement to rule out masked hypertension.

Abstract# 24

IMPROVING OUTCOMES FOR CHILDREN WITH LIVER TRANSPLANT THROUGH A COLLABORATIVE PROGRAM IN CALI, COLOMBIA.

Maria Teresa Agudelo,[1] Luis Armando Caicedo,[1] Jorge Ivan Villegas,[1] Oscar Ramirez,[1] George Mazariegos,[2] Rakesh Sindhi.[2] *[1]Solid Organ Transplant Unit, Fundación Valle del Lili, Cali, Valle, Colombia; [2]T. Starzl Transplantation Institute, Children's Hospital of UPMC, Pittsburgh, PA, USA.*

PURPOSE: Improving outcomes in pediatric liver transplantation is a challenge for less developed countries. We began in 2008 a collaboration between UPMC and FVL. We describe post-transplant overall survival (OS) during different eras of our program.
METHOD: All Ptes since 07/1996 and <18 yrs of age were included. Three months follow-up were made. 1 Pte was lost in the follow-up. Retransplanted were included in the analysis. Program phases were defined as early (E) (96-03), middle (M) (04-07) and collaborative eras (C) (08-10). Collaboration was based in 1-2 program site visits/yr, and monthly telemedicine case review. K-M and Cox regression was performed.
RESULTS: 135 transplants were performed in 124 Ptes. In the E, M and C eras' 53, 38 and 33 patients were done. A statistically significant decreasing trend of age among each era as well as for weight, was found. 60.5% were biliary atresia and 39.5% live donor. Ptes <10Kg OS by era was 16% (CI95%: 4, 35), 36% (CI95%: 17, 56), 75% (CI95%: 53, 88) at 24 months, respectively. Ptes ≥10Kg was 42% (CI95%: 25, 59), 88% (CI95%: 59, 97), 100% at 24 months. The increase in survival related to different eras was maintained after adjusting for age, body weight, gender, type of donor and type of graft.



CONCLUSION: We show steady improvements in survival in different eras of our program. Our collaborative effort seems to partially explain these results. This was more evident in patients <10 kg of body weight. We suggest that for early development transplantation programs, a collaborative effort with an experienced center in the field will avoid preventable deaths and quickly improve clinical results.

Abstract# 25

COMBINED LIVER/KIDNEY TRANSPLANTATION IN ARAB CHILDREN.

Ali I.M. Al Mehaidib,[1] Wajeeh M. Al Dekhail,[1] Hamad A. Al Mojalli.[1] *[1]Pediatrics, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia; [2]Pediatrics, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia; [3]Pediatric, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia.*

PURPOSE: To review our experience with combined living related liver transplantation followed up at king faisal specialist hospital & research center.
METHOD: A retrospective study where the medical charts of patients who received combined liver and kidney transplantations between 1995 and 2010 are reviewed. Clinical data including age, sex, clinical diagnosis, immunosuppresive therapy and transplant outcome are reviewed.

RESULTS: Five patients who received combined liver/kidney transplant were identified. Their current ages range between 5-22 years. One patient with polycystic kidney disease received cadaveric kidney transplant at 2 year of age and cadaveric liver transplant at 11 years of age due to congenital hepatic fibrosis,he received a second cadaveric kidney transplant at 17 years of age.one patient received combined cadaveric kidney/ liver transplant at 12 years of age for primary sclerosing cholangitis and interstitial kidney fibrosis.Three patients with primary oxalosis received living related liver transplantation followed few months later with kidney transplants. All patients are receiving tacrolimus as long term immunesuppressive therapy.All patients are having normal growth and development.
CONCLUSION: The outcome of combined liver/kidney transplantation is comparable to isolated liver or kidney transplantation.

Abstract# 26

SIROLIMUS IN PEDIATRIC LIVER TRANSPLANTATION: A SINGLE-CENTER EXPERIENCE. Cigdem Arikan,[1] Gulnar Veliyeva,[1] Sema Aydogdu,[1] Onur Duygu,[2] Murat Zeytun,[2] Murat Kilic.[2] *[1]Pediatric GI & Hepatology, Ege University School of Medicine, Izmir, Turkey; [2]Liver Transplantation, Kent Hospital Organ Transplantation Center, Izmir, Turkey.*
PURPOSE: Sirolimus is a promising immune suppressive agent, with the potential to reduce calcineurin inhibitor associated side effects. This study is sought to review the experience using sirolimus in pediatric liver transplant recipients.
METHOD: Database and medical charts of all pediatric liver transplant recipients receiving sirolimus were reviewed.
RESULTS: Twenty three patients received sirolimus during January 2003 -2010 December. Median time of sirolimus introduction was 5.6 years (2 day to 8.2 years) post-transplant. Four patients were on steroids, 14 on tacrolimus (FK), 2 on FK and mycophenolate mofetil (MMF), 3 on cyclosporine A. The indications were; posttransplant lymphoproliferative disease (PTLD; n = 4), nephrotoxicity (n = 5), hepatocellular carcinoma(n=2), hepatoblastoma (n=2), Kaposi sarcoma (n = 1), Hodgkin lymphoma (n=1) and food allergy (n=8). The average dose of sirolimus was 0.25 mg/ kg to maintain a target level of 5 to 15 mug/liter. The median duration of follow-up was 26 months (6-62 mo). There were no episodes of acute rejection during transition to sirolimus. Renal dysfunction showed improvement which assessed by GFR and renal tubuler functions after the employment of sirolimus therapy and stayed within normal limits during the follow-up. Patients with food allergy showed symptomatic improvement as well as serum level IgE decreased significantly after sirolimus induction. Side effects included hyperlipidemia (n=4, 25%), abdominal pain (n=2, 8.3%), mouth ulcers (n=1, 4.2%), anemia (n=2, 8.3%), reactive airway disease (n=2, 8.3%). Resolution of adverse effects occurred with dose reduction.
CONCLUSION: Sirolimus was found to be a valuable immunsuppressive agent for the management of significant renal dysfunction and calcineurin inhibitor side effects. These results support the need for prospective studies of the role of sirolimus in preventing food allergy in pediatric liver transplant recipients.

Abstract# 27

LIVER TRANSPLANTATION IN POLISH CHILDREN WITH α1-ANTITRYPSIN DEFICIENCY. Agnieszka Bakula,[1] Piotr Socha,[1] Joanna Pawlowska,[1] Piotr Kalicinski.[2] *[1]Dpt. Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland; [2]Dpt. Pediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland.*
PURPOSE: α1-antitrypsin deficiency (α1-ATD) is the second indication for LTx in children, after biliary atresia. The course of liver disease due to α1-ATD (Pi ZZ) is unpredictable. The aim of the study was to evaluate the clinical presentation, liver tests in children with α1-ATD requiring LTx.
METHOD: We studied 76 children with α1-ATD (PiZZ), admitted to our hospital from 1978 to 2008. We analyzed laboratory parameters of cholestasis, hepatitis, liver insufficiency and clinical symptoms of liver dysfunction, such as ascites, oesophageal varices, oesophageal bleeding in the group of transplanted children.
RESULTS: LTx was performed in 14 children (10 boys, 4 girls): 2 infants and 12 pts aged 10-17 y. All the children presented with neonatal hepatitis, 5 pts had atresia-like symptoms, (2 pts were treated with hepatoportoenterostomy because of biliary atresia). The onset of symptoms was from 1 to 6 weeks of age. Signs of liver insufficiency (INR:1,35-1,72, albumin: 16,8-30,9 g/dl) were recorded already in 2 infants before 7th month of age, in children transplanted later- between 4th and 17th years of age. Oesophageal varices were observed in 13/14 pts: 12/13 pts between 7th month and 11th years; variceal bleeding in 7 pts- in 6/7 at the ages between 6th and 11th years. The indications for LTx were as follows: liver failure presenting with hipoalbuminaemia, coagulopathy not responsive to vit K in all patients, accompanying with ascites in 6 pts, persistant jaundice in 2 pts, variceal bleeding in 3 pts, hypersplenism and oesophageal varices treated with sclerotherapy or endoscopic binding in 3 pts.
CONCLUSION: Our centre experience suggests that the indication for LTx in α1-ATD should be portal hypertension with oesophageal varices and deteriorating liver function with clear signs of liver insufficiency which usually does not appear until the age of 10 years. α1-ATD may progress rapidly in the early life in selected cases in whom Ltx is indicated.

Abstract# 28

OUTCOME OF CHILDREN AFTER LIVER TRANSPLANTATION: EXPERIENCE AT A CHILDREN HOSPITAL. Anna V. Degtyareva, Anna A. Puchkova, Marina B. Albegova, Michail I. Pykov, Ludmila V. Pavlushkina. *Pediatric, Filatov Children Clinical Hospital, Moscow, Russian Federation.*
PURPOSE: To determine the outcomes of children after liver transplantation (LT).
METHOD: Since 1997 to 2010 LT was performed in 46 pts 4.5 months-14 years. Within 1 year of age-24 pts, aged 1-2 years-10 pts, older than 2 years-12 pts. Observation in our hospital was started 1-3 months after surgery. Indication for LT in 30 pts was biliary atresia, in 5 pts Alagille syndrome, 3 pts had PFIC type 2, 1 patient-PFIC2 and HCC, 2 pts had GSD type 1b, 2 pts-PFIC type 3, 3-cryptogenic biliary cirrhosis. LRLT performed in 38 pts, cadaveric transplantation in 8 pts. Re-transplantation received 2 pts. As a basic immunosuppressive therapy all pts take tacrolimus (TAC).
RESULTS: 13 pts (28%) had 17 episodes of graft dysfunction which was caused by nonspecific infectious disease 10.0±6.6 months after LT. Symptomatic and/or antibacterial therapy and TAC dose reduction contributed to recovery of the LFT's. 12 pts (26%) had 15 episodes of rejection: in 9 pts during the first 2 years after LT (18.0±6.5 months), in 3 pts 2,5-8.4 years after LT. Increasing dose of TAC and/or prednisolone pulse therapy contributed to the LFT's normalization. 7 pts (15%) had PTLD in age 25.2±4.4 months of life, 16.6±3.9 months after LT. One patient developed Burkett's lymphoma, he received chemotherapy, achieved remission within a year. Later, in connection with relapsed lymphoma, the child died. Portal vein stenosis was diagnosed in 6 pts 10.6±2.3 months after LT. These children was less than 1 year of age at the time of the LT. All pts underwent reconstructive surgery to fully recover venous patency. In 2 pts noted the development of biliary strictures, in connection with which it was performed reconstructive surgery, fully restored patency of the bile ducts. Survival of pts after LT: 97.8% (45 of 46. Life expectancy of pts after LT: more than 10 years-5 pts, from 5 to 9 years-18 pts, from 2 to 4 years-16 pts, from 1 to 2 years-3 pts and at least a year-3 pts.
CONCLUSION: Careful monitoring of patients after LT allows identify complications in the early stages, their timely cure and identifies a high survival rates.

Abstract# 29

LIVER TRANSPLANTATION FOR HEREDITARY TYROSINEMIA: A SINGLE CENTER EXPERIENCE. Seyed Mohsen Dehghani, Ali Bahador, Saman Nikeghbalian, Heshmatollah Salahi, Seyed Ali Malek-Hosseini. *Shiraz Transplant Research Center, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran.*
PURPOSE: Hereditary tyrosinemia is a rare inherited metabolic condition which leads to a fatal multisystemic disease in childhood if remain untreated.
The treatment of choice in patients who developed cirrhosis or liver mass is liver transplantation because the risk for the development of hepatocellular carcinoma is very high. The aim of this study is to evaluate the children with tyrosinemia who underwent liver transplantation at Shiraz Transplant Center.
METHOD: Between January 2007 and June 2010, 25 children with hereditary tyrosinemia type 1 and cirrhosis or multiple hepatic nodules that not response to nitizinone underwent orthotopic liver transplantation.
The diagnosis of tyrosinemia was confirmed by measurement of serum or urine succinylacetone.
RESULTS: There were 14 (56%) female and 11 (44%) male with a median age of 3.8 years. Twenty of 25 patients (80%) had received livers from living donors (first-degree relatives, 10 from fathers, 9 from mothers, and one from paternal uncle) and five patients (20%) received livers from deceased donors. Eight patients developed acute rejection that managed by methylprednisolone pulse therapy. Four patients died one developed lymphoma and another three patients because of bacterial sepsis.
CONCLUSION: As the best of our knowledge this is the largest series of children with tyrosinemia who underwent liver transplantation and this procedure in our patients resulting in clinical and biochemical improvement in those who not response to medical therapy.

Abstract# 30

PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION: A SINGLE CENTER STUDY OF 42 CONSECUTIVE CASES. Turan Kanmaz, Yucel Yankol, Cihan Karatas, Nesimi Mecit, Taner Orug, Ozlem Durmaz, Koray Acarli, Munci Kalayoglu. *Organ Transplantation Center, Memorial Hospital, Istanbul, Turkey.*
PURPOSE: Pediatric patients listed as candidates for liver transplantation frequently die while awaiting transplant. Here we present the outcomes of 42 consecutive pediatric living donor liver transplants performed in our center to show that the results are comparable with deceased donor transplantation data.
METHOD: 260 adult and pediatric liver transplants were performed at our center between Dec 2006 and Jan 2011. Of these, 40 pediatric patients who received living donor liver transplants were retrospectively analyzed. These results were compared with pediatric deceased donor liver transplantation data.
RESULTS: 42 liver transplantations were performed in 40 children; 58% were female, 42% were male, and mean age was 5.4 years. Biliary atresia (n=6), progressive familial

intrahepatic cholestasis (n=6), and homozygous familial hypercholesterolemia (n=6) were the most common causes of liver disease. Living donor liver transplantation was performed in all recipients. Arterial reconstruction was performed under an operating microscope in most cases. Duct-to-duct biliary anastomosis was preferred in anatomically favorable cases. Post-operative technical complications included biliary leak or stricture (9.5%), portal venous thrombosis or stenosis (7.1%), and hepatic arterial thrombosis (4.7%). Mean hospital stay was 15 days. Mean follow-up after transplantation was ten months. One-year and three-year patient survivals were 92.5% and 88.1%, respectively. There were no serious post-operative complications in the living donors.
CONCLUSION: Living donor liver transplantation in pediatric patients is a safe alternative to deceased donor transplantation. It is becoming the most frequent treatment option of end-stage liver disease in pediatric patients in our center given the paucity of pediatric deceased donor organs.

Abstract# 31

PEDIATRIC INTESTINAL TRANSPLANT IN ARGENTINA. EXPERIENCE AT A SINGLE CENTER. María I. Martínez,[1] Carolina Rumbo,[1] Adriana Fernández,[1] Julio Trentadue,[2] Gabriel E. Gondolesi.[1] *[1]Unidad de Transplante Intestinal, Fundación Favaloro, Ciudad Autónoma de Buenos Aires, Argentina; [2]Pediatría, Fundación Favaloro, Ciudad Autónoma de Buenos Aires, Argentina.*
PURPOSE: To describe the characteristics of the pediatric population that received intestinal transplantation (ITX) in this center, and their evolution.
METHOD: This is a descriptive study including 16 patients that received any type of intestinal transplant between March 2006 and December 2010. Data was taken from electronic bases and include patients' demographics, nutritional support (NS), complications and survival.
RESULTS: Eigth male, median age at ITX: 6.6 years (r 0.75-12.5), time of intestinal insufficiency (II) pre ITX 3.9 years (r 0.75-12). Etiology of II: short gut syndrome n14, intractable diarrhea n1 and irresecable tumor n1. Type of ITX: isolated intestine n13, combined liver and intestine n2, multivisceral n2 (1 with kidney). ITX indications: lack of venous access n7, parenteral nutrition associated liver disease n4, severe recurrent dehydration n2, catheter related sepsis n3, 1 re-Tx due to chronic rejection. NS post-ITX: enteral nutrition (NE) started X 14.2 days (r5-52) after ITX and parenteral nutrition (PN) discontinued X 84.7 days (r26-232) after ITX. Complications 10/16 had acute moderate or severe rejection, 12 re-laparotomies, 1 tumor and 8 severe infections. In the survivor group mean follow up post ITX is 893 ±462 days. NS 9 patients are free of PN, 5 restarted PN (4 temporarily [2 acute rejection, 1 seclerosing peritonitis,1 (during infectious intercurrence]); 1 during chronic rejection, 7 are on complementary EN. Six patients died (X 318 ±486 days post-ITX). One-year survival (Kaplan Meier) is 68% for patient and graft; three- year survival is 68% for patient, 61% for the graft. In the isolated intestinal transplantation group (n13) survival is one year 75% for patient and graft and three year survival is 75% for patient and 67% for graft.
CONCLUSION: ITX in this group allowed nutritional autonomy and mid term survival reaching results comparable to international transplant centers.

Abstract# 32

IDIOPATHIC HYPEREOSINOPHILIC SYNDROME AFTER PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION FOR A INFANT WITH PROGRESSIVE CHOLESTATIC LIVER FAILURE. Hideaki Okajima, Toshinori Sakai, Shuji Nobori, Masahide Matsuyama, Masahiko Okamoto, Norio Yoshimura. *Organ Transplant and General Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan.*
PURPOSE: Hypereosinophilic syndrome (HES) occurs commonly in men with the age between 20 and 50 yr old. Here we report a infant with progressive cholestatic liver failure who presented HES after living donor liver transplantation.
METHOD: Patient was 4 months old boy who need liver transplantation for liver failure due to progressive cholestatic liver disease. His body weight was 6 kg. Pre-transplant serum bilirubin marked 80 mg/dl and PT-INR was 3.35. Living donor liver transplantation using left lateral segment from his father was preformed. During transplant operation, his conditions was stable. Tacrolimus and steroids were administered as immunosuppressants.
RESULTS: Post transplant course was uneventful first 3 weeks. With tapering dose of steroids, white blood counts began to increase with increasing eosinophiles. % eosinopliles reached 70 of white blood cells that marked 27600/micro-L on day 45. Anti-coagulant therapy and mineral corticoids began to administer on day 45 and dose of glucocorticoid increased from 1 mg/day to 2 mg/day on day 51. After increasing steroids, % eosinopliles decreased with stable liver functional tests and when he discharged % eosinopliles was 10% of white blood cells.
CONCLUSION: HSE is reported as a risk factor of thrombosis after liver transplantation. When HES occurred, anti-coagulant therapy is necessary and increase dose of steroids are effective treatment for HES after liver transplantation.

Abstract# 33

ACUTE LIVER FAILURE IN TURKISH CHILDREN: ETIOLOGY, PROGNOSTIC FACTORS, AND OUTCOME. Figen Ozcay,[1] Ferda Ozbay Hosnut,[1] Oguz Canan,[1] Eda Karadag Oncel,[1] Hamdi Karakayali,[2] Gokhan Moray,[2] Mehmet Haberal.[2] *[1]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey.*
PURPOSE: We investigated prognostic factors and survival rates of ALF with different etiologies in Baskent University Hospital, Ankara, a referral center in central Anatolia.
METHOD: 67 patients w'th ALF between 2000-2009 were included. PRISM and PELD scores and encephalopathy grades were calculated. Patients were classified in 2 groups: who survived with supportive therapy (group I) and who died or underwent LT (group II).
RESULTS: Ages of the patients (M/F 37/30) were between 11 days-17 years (median 73 months). Viral-bacterial infections were the most detected cause 46/67 (69%);among them, hepatitis A was the leading cause 20/46 (43%). 9 (13%) had metabolic diseases (6 fulminant Wilson disease,1 tyrosinemia,1 fatty acid oxidation defect,1 neonatal hemochromatosis). 8(12%) had toxic etiology: amanita phalloides (5), 1 isofluran, 1 atomoxetine, and 1 yellow phosphorus ingestion.
There were 23 patients (34%) in group I and 44 (66%) in group II.In group II,20 patients died and 24 underwent LT.PRISM scores within first 24 hours were lower in group I(12.6±6.6), than in group II (18±10.3) ($p<.05$). Group II had more prolonged PT, INR ($p<.001$),and aPTT ($p<.05$) values, and significantly higher levels of total and direct bilirubin, ammonium, and lactate (17.2±12 vs 27±13; 12.1±8.7 vs 17.5±10.7; 81.6±40.9 vs 105.7±49.8;and 3±2.3 vs 4.8±3.8, $p<0.05$).On logistic regression analysis,hepatic encephalopathy grade III-IV (odds ratio 18.58, 95% CI 3.5-96),high total bilirubin (OR 1.1 95% CI 1.1-1.21), prolonged PT (OR 1.07, 95% CI 1.05-1.13) were related with death or LT). ROC analysis didn't indicate a cut-off value to predict poor prognosis for any of the parameters above.
CONCLUSION: 5 LT patients died. Overall 47 (70%) survived with supportive therapy or LT.ALF due to hepatitis A (55%) and toxic reasons (75%) were found to have higher survival rates. Higher PRISM, PELD scores were related with poor prognosis. Progressing hepatic encephalopathy has been a good predictor of death or LT.

Abstract# 34

POST-TRANSPLANTATION FOLLOW-UP OF PATIENTS WITH PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS. Emilia I. Panteleeva, Christo Z. Zhelev, Penka G. Janeva, Mila Z. Baicheva. *Clinic of Gastroenterology, University Pediatric Hospital, Sofia, Bulgaria.*
PURPOSE: Progressive familial intrahepatic cholestasis (PFIC) refers to a heterogeneous group of severe biliary transport disorders that present with cholestasis early in life, leading to cirrhosis and requiring a liver transplantation (LTx). The aim of the study is to review the demographic, clinical and laboratory findings of 4 patients with PFIC and to assess the impact of LTx on their physical and mental development. The indications for LTx were related to an end-stage liver disease and a poor quality of life.
METHOD: This is a retrospective study of 4 patients with PFIC (3 girls and 1 boy), aged 10 months – 20 years, liver transplanted between October, 1994 – December, 2010.
RESULTS: The patients were referred for evaluation of a severe cholestasis, intensive pruritus and recurrent wheezing and cough. Two of the patients were diagnosed as PFIC type 1 at the age of 14 and 5 months respectively. The other two were diagnosed as type 3 at an older age - 2 and 4 years (y) respectively. Liver disease in a sibling was found in both patients with PFIC 3. All the children suffered a bone disease and a growth failure. The course of the liver disease in children with type 1 was much more severe and deleterious than in those with type 3. PFIC 1 children were transplanted at the age of 3 y and 8 months, PFIC 2 – at a later age – 5,6 and 8 y, respectively. Three years after the LTx the patients showed a remarkable catch-up growth. The growth velocity was between 4,9 cm/y and 12,3cm/y. The correspondent height Standard Deviation Scores (SDS) ranged between -0.7/-0.8 and -3.78/-1.14. The wheezing and cough were successfully treated by LTx. At present all the children are alive with a normal stature and excellent school performance.
CONCLUSION: PFIC accounts for 10% of Bulgarian liver transplanted children. Our patients with type 1 needed LTx at an earlier age. In a short time after LTx the growth, physical and mental development as well as the quality of life of all the patients have greatly improved. We have not observed any serious post-LTx complications as cited by other authors.

Abstract# 35

GASTROINTESTINAL COMPLICATIONS POST LIVER TRASPLANTION IN PEDIATRIC PATIENTS. Elena Pestana,[1] Dafne Del Valle,[1] Jorge Landaeta,[1] Tomoaki Kato,[2] Pedro Rivas,[1] Luzmila Aguero,[1] Ruben Castillo,[1] Damelys Marin.[1] *[1]Programa Metropolitano Trasplante Higado, Caracas, Venezuela; [2]NewYork-Presbyterian/ Columbia Hospital, New York, USA.*
PURPOSE: We evaluated clinical characteristics and laboratory of patients with gastrointestinal complications and therapeutic interventions to resolve them.

METHOD: Retrospective study included all pediatric patients undergoing liver transplantation in the period 2005 to 2010.
RESULTS: 13 patients had gastrointestinal complications.
Clinical presentations were upper and lower gastrointestinal bleeding 8; Abdominal pain 1, jaundice 3 and ascites 1. Complications occurred in the first 7 days after transplantation.
8 patients with gastrointestinal hemorrhage, 4 of the patients remained under observation and self-limited without any therapeutic intervention. 4 patients received esomeprazole in a continuous infusion and Sandostatin, 4 underwent upper and lower gastrointestinal endoscopy, 2 underwent single balloon enteroscopy and capsule endoscopy. Endoscopic findings were Grade I varices and hypertensive gastropathy with no evidence of active or recent bleeding. One patient had Dieulafoy lesion in the 3rd portion of duodenum which was resolved with hemostasis with thermal coagulation and hemoclips. One patient underwent surgery and intestinal anastomosis was perfomed. 1 patient with abdominal pain had a duodenal perforation. 3 patients had biliary complications, 1 had biliary leakage after hepatic artery thrombosis, 1 had anastomoses biliary stenosis in the immediate postoperative period and 1 patient had biliary stenosis, 9 months after transplantation, which underwent ERCP and a biliary stent was placed. 1 patient presented refractory ascites resulting in chyloperitoneum.
No correlation could be established as a risk factor for the laboratory tests prior to transplantation, pre-transplant PELD, nor previous episodes of gastrointestinal bleeding previous transplantation.
CONCLUSION: Gastrointestinal complications after liver transplantation are frequent in our series of pediatric patients.
Most of them occurred in the immediate and mediate postoperative period after liver transplantation.

Abstract# 36

LIVER TRASPLANT PEDIATRIC IN VENEZUELA. EXPERIENCE 5 YEARS.

Elena Pestana,[1] María Conchita Díaz,[1] Dafne Del Valle,[1] Tomoaki Kato,[2] Pedro Rivas-Vetencourt,[1] Damelys Marin,[1] Ruben Castillo,[1] Luzmila Aguero,[1] Manuel De Guglielmo.[1] *[1]PMTH, Caracas, Venezuela; [2]Presbyterian/Columbia Hospital, New York, USA.*

PURPOSE: The aim is to present our 5 years experience of pediatric liver transplant program.
METHOD: A retrospective study included all pediatric patients undergoing liver trasplantation in the period 2005 to 2010
RESULTS: A total of 30 patients, ages varying between 1 to 17 years old (mean age 8.41 ± 4.81 years) were studied and transplanted. Mean follow up was 39± 38,3 months.
Indications for PLTx were: extrahepatic biliary atresia n=13, progressive family intrahepatic cholestasis n=3, 5 autoimmune hepatitis, 2 congenital hepatic fibrosis, 1 alpha1-antitrypsin deficiency, 2 Alagille syndrome and 4 cryptogenic cirrhosis.
Patients had a PELD score between -4 and 27. Patients with low PELD score where associated with Hepatopulmonary and Hepatorenal Syndrome and Severe Portal Hypertension.
28 patients underwent living donor liver transplantation and 2 were transplanted from cadaveric donors. The average length of stay in intensive care was 34.35 ± 11.17 days, there was no statistically significant relationship between PELD and the length of stay in PICU.
The immunosuppressive scheme used was cyclosporine-prednisone in 3 patients and tacrolimus-prednisone in 27 patients.
6 patients developed acute rejection that was treated with steroid bolus with complete resolution of graft dysfunction. 1 developed chronic rejection and was started on sirolimus and tacrolimus with one result. The most common pulmonary complication was right pleural effusion (n=16); arterial stenosis was present in 4 patients which resolved successfully with stenting.
13 patients had hypertension, during the first 6 months after liver transplant. 2 patients died during the first 2 months after transplantation for causes not related to graft dysfunction. We used the Kaplan Meier survival for calculating survival which was 93.3 globally.
CONCLUSION: PLTX is a valuable therapeutic option for the treatment of terminal, progressive and irreversible liver disease in Caracas, Venezuela, even though is not a complication free procedure, our results are encouraging.

Abstract# 37

NEW ALTERNATIVES IN THE TREATMENT OF ACUTE LIVER AND RENAL FAILURE IN WILSON DISEASE.

Claudia Sánchez,[1] Camila Sánchez,[1] Silvia Malenicka,[2] Jorge Ferraris,[1] Daniel D'Agostino.[1] *[1]Pediatric Gastroenterology, Hepatology Division, Liver and Intestinal Transplant, Hospital Italiano, Buenos Aires, Capital Federal, Argentina; [2]Pediatric Gastroenterology, Karolinska University Hospital, Stockholm, Sweden.*

PURPOSE: Acute liver and renal failure may be a manifestation of Wilson disease and in this condition liver transplantation is the only remaining therapeutic option. PROMETHEUS, is a new method for removal of protein-bound toxins in patients with fulminant Wilson disease. It is a liver support system in which albumin-bound substances are directly removed from blood by special adsorber. In a simultaneous step, high-flux hemodialysis is performed. In addition, the manifestations of renal impairment in this disease are varied. Since the diverse manifestations of renal impairment appear in different periods of the disease, misdiagnosis is not rare.
METHOD: A 15-year-old teenager girl with Wilson disease presented with acute liver failure and oligo-anuric renal failure. The diagnosis was suspected clinically and confirmed with chemical and pathologic studies.
RESULTS: Hemodialysis was performed as an alternative excretory pathway for copper. PROMETHEUS was used on 2 consecutive days for 6 h peritransplant, no treatment-related complications were noted. The patient was LTx on day 2 after she arrived, with a reduced size cadaveric liver. She received induction with metilprednisolone, Basiliximab (day 0 and 4), Thymoglobulin during the first 4 days, and Sirolimus (trough levels 5,7-10,8ng/ml). Renal failure resolved post-OLT requiring hemodialysis until day 5 after LTx. On day 10, prograf was initiated (trough levels 5,3-9,8ng/ml).
CONCLUSION: Acute Wilson disease with renal failure is a unique entity in acute liver failure syndrome. PROMETHEUS is a novel option first used in Argentina in a pediatric patient with acute liver failure as successful bridge to LTx. The immunosuppressive scheme should be adapted to the patient's condition.

Abstract# LB1

MECHANISM OF DONOR-SPECIFIC B-CELL TOLERANCE AFTER ABO-INCOMPATIBLE INFANT LIVER TRANSPLANTATION.

Yasushi Fuchimoto,[1] Yohei Yamada,[1] Minoru Tababe,[1] Ken Hoshino,[1] Kentarou Matsubara,[1] Naoki Shimojima,[1] Masahiro Shinoda,[1] Hideaki Obara,[1] Osamu Itano,[1] Sigeyuki Kawachi,[1] Yuko Kitagawa,[1] Hideki Ohdan,[2] Yasuhide Morikawa.[1] *[1]Department of Surgery, Keio University School of Medicine, Tokyo, Japan; [2]Department of Surgery, Devision of Frontier Medical Science, Programs for Biomedical Research, Graduate School of Biomedical Sciences, Hiroshima University, Hiroshima, Japan.*

PURPOSE: ABO-incompatible liver transplantation is often performed because of organ shortage. Production of anti-donor blood type antibodies (Abs) is suppressed following ABO-incompatible liver transplantation in most cases, while non anti-donor blood type Abs still persist. This phenomenon suggests the development of donor blood type antigen-specific B-cell tolerance. Previous reports of B-cell tolerance following ABO-incompatible transplantation were limited to infant heart transplantation. We investigated the mechanism of development of such B-cell tolerance after ABO-incompatible infant liver transplantation using in-vivo humanized mouse models.
METHOD: We studied 4 recipients (A to O in 2, B to O in 2 cases) aged around 1 year old when they received the grafts. In order to investigate the immune responses to the donor blood type antigens, we inoculated the peripheral blood mononuclear cells (PBMCs) of the recipients into NOD-SCIDγ-null mice (human PBMC-NOG mice) and immunized the mice with the donor blood type antigens. Flow cytometry was performed for phenotyping to confirm the human cell engraftment and ELISA for detection of the human anti-A Abs, anti-B Abs and total immunoglobulin produced in the mice.
RESULTS: All mice were successfully engrafted with the human PBMCs as determined by FACS and ELISA. In the mice inoculated with the PBMCs from recipients and immunized with the donor blood type antigens, no anti-donor blood type human Abs were detected despite the production of human immunoglobulins against other antigens.
CONCLUSION: In this study, we provide evidence of B-cell tolerance to blood group antigens. Deletion is the primary mechanism of suppression of antibody production in infant liver transplantation as well as heart trasnplantaion.

Abstract# LB2

EFFECTS OF CRYOPRESERVATION ON THE MECHANICAL TENSILE PROPERTIES OF CADAVERIC ILIAC VESSELS.

Stephen KY Chang,[3] Chun Siong Lee,[1] LiangJing Yang,[1] Tao Yang,[2] Chee Kong Chui,[1] Wah Wah Hlaing.[3] *[1]Department of Mechanical Engineering, National University of Singapore, Singapore, Singapore; [2]Institute of Infocomm Research, Singapore, Singapore; [3]Division of Hepatobiliary and Pancreatic Surgery, Liver Transplant Program, Department of Surgery, National University Health System, Singapore, Singapore.*

PURPOSE: Vascular graft is an important resource in transplantation. Through cryopreservation, the biochemical degradation is hypothetically halted indefinitely. However, the effect of long term cryopreservation on the mechanical properties of biological tissue is not fully known. The purpose of this study is to examine the mechanical stress-strain properties of 12 pairs of cadaveric iliac vessels that were cryopreserved for up to a year.
METHOD: Twelve pairs of cadaveric iliac arterial vessels were harvested. One vessel from each pair was tensile tested immediately while the other vessel was cryopreserved in 10% Dimethyl sulfoxide within -150°C liquid nitrogen for up to a year. Every month, one of the cryopreserved vessels would be thawed for tensile testing. The samples were pulled at 2.5mm/s strain rate up to a maximum of 0.7 strain.
RESULTS: From the stress-strain curves of the tensile test conducted, linear approximations of the tensile modulus (stiffness) in the low strain and high strain regions were derived. Comparison of the tensile moduli in both strain regions between the fresh and cryopreserved pairs showed that the tensile moduli did not vary significantly over varying durations of cryopreservation. Additionally, the occurrence of atherosclerosis as

shown in the histological evidence of some sample pairs correlated with increased strain energy when comparing the fresh sample to its corresponding cryopreserved other.
CONCLUSION: Varying duration of cryopreservation did not significantly change the mechanical tensile properties of cadaveric iliac vessels. However, external factors such as atherosclerotic depositions appear to be affected by cryopreservation.

Abstract# LB3

MANAGEMENT OF ANASTOMOTIC AND NON-ANASTOMOTIC BILIARY STRICTURES AFTER PEDIATRIC LIVER TRANSPLANTATION. Feiko Klaver, Erik J. van dre Jagt, Robert J. Porte, Rene Scheenstra, Frank A.J.A. Bodewes. *Pediatrics, UMCG, Groningen, Groningen, Netherlands; Radiology, UMCG, Groningen, Netherlands; Hepato-Pancreato-Biliary Surgery and Liver transplantation, UMCG, Groningen, Netherlands.*

PURPOSE: Post transplantation biliary strictures can be managed by either non-surgical treatment (NST) or reconstructive surgical treatment (ST). Currently it is not possible to predict if patients are more likely to respond to NST or will need surgical intervention regardless NST. Therefore aim of this study is to evaluate in a pediatric liver transplant population outcome and predictive factors for successful NST for biliary strictures.
METHOD: We retrospectively studied the prevalence, management and complications of biliary strictures after pediatric liver transplantation in the period between January 1990 and June 2009. All biliary imaging studies were systematically reviewed and classified in a blinded manner. Successful NST was defined as recovery of cholestatic biochemistry, without the necessity for ST or retransplantation. Risk factors analyzed in relation to treatment outcome included recipient, transplantation and biliary stricture type and severity and treatment related variables.
RESULTS: 233 liver transplantations were performed in 185 children. Biliary strictures were reported in 34 grafts (14.6%). In 6 cases (24%) the NST was successful. Success rates of NST were lower in the group with AS compared to the group with NAS (15% vs. 36%). During a median follow-up of 8.9 years (range 0.9-18.5) no mortality or severe complications occurred after NST. None of the analyzed variables was associated with better outcome of NST.
CONCLUSION: Based on our results we can conclude that NST is an effective first-line treatment for children with biliary strictures after pediatric liver transplantation, with minimal complications. But in 75% of the children in our transplant group surgical intervention was inevitable, so surgical intervention in an early stage could spare these children the complications and impact of non-surgical treatment methods. NST was more likely to be unsuccessful in patients diagnosed with solitary AS.

Kidney 1: Therapy and FSGS

Abstract# 38

CORTICOSTEROID FREE MAINTENANCE IMMUNOSUPPRESSION IN PEDIATRIC RENAL TRANSPLANTATION: AN OPTN DATABASE ANALYSIS. Sharon M. Bartosh,[1] Wida Cherikh.[2] *[1]University of Wisconsin, Madison, WI, USA; [2]United Network for Organ Sharing, Richmond, VA, USA.*

PURPOSE: Increasingly pediatric (ped) transplant (tx) programs are offering corticosteroid (CS) -free immunosuppression (IS) to children receiving kidney (kid) tx due to long term complications of CS. Published reports are limited by small patient (pt) numbers. The purpose of this preliminary analysis is to determine whether children discharged from the tx hospitalization (hosp) on no maintenance CS have comparable pt and graft (gft) outcomes compared to children discharged on CS.
METHOD: Ped kid tx between 2000 and 2005 with at least 8 days survival were included and stratified by donor type and whether CS was reported as a discharge medication from initial tx hosp. Log-rank p-values were used to compare Kaplan-Meier pt and gft survival rates for CS vs no-CS groups for deceased donor (DD) and living donor (LD) tx.
RESULTS: The study cohort had 2401 LD and 2009 DD tx. 18.4% of LD and 10.4% of DD tx were discharged on no CS. There were no differences in unadjusted pt or gft survival based on CS use at discharge at 1 through 7 yrs. There appears to be no difference in mean or median creatinine at discharge or 1 yr post tx comparing children discharged on or off CS. Of those LD donor recipients discharged on no CS, 26.7% were reported to be on CS at 1 yr post tx. Of those DD recipients discharged on no CS, 30.8 % were reported to be receiving CS 1 yr post tx. Of those LD recipients discharged on CS 89.1% were maintained on CS at 1 yr post tx. Of those DD recipients discharged on CS, 93.8% were maintained on CS at 1 yr post tx.
CONCLUSION: The majority (85%) of children receiving kid tx in the USA are discharged from the tx hosp on CS. Overall, 91.3% of children are being maintained on CS-based IS 1 yr post tx. Approximately 30% of children, discharged on a CS-free regimen, are receiving CS 1 yr post tx. Children discharged from the tx hosp on no CS do not have significantly different unadjusted short term pt survival, gft survival or serum creatinine. Longer follow up and a risk- adjusted analysis will be necessary to assess potential late effects of CS-free IS in ped kid tx recipients.

Abstract# 39

STEROID WITHDRAWAL IMMUNOSUPPRESSION IN FGF23/ KLOTHO AND IGF-I/IGFBP3 AXIS IN PEDIATRIC KIDNEY TRANSPLANTATION. Angela Delucchi,[1] Hector Dinamarca,[1] Francisco Cano,[1] Viola Pinto,[2] Paulina Salas,[2] Magdalena Gonzalez,[3] Veronica Mericq,[4] German Iñiguez,[4] Daniel Hevia,[3] Luis MIchea.[3] *[1]Pediatric Nephrology, Calvo Mackenna Children´s Hospital, Santiago, Chile; [2]Pediatric Nephrology, Exequiel Gonzalez Hospital, Santiago, Chile; [3]Biomedical Science Institute, Molecular Cell Studies, University of Chile, Santiago, Chile; [4]IDIMI, University of Chile, Santiago, Chile.*

PURPOSE: Growth impairment is a challenge in CKD in children, successful renal transplant improves growth; NAPRTCS reports 75% Z score less than -1.88.GH resistance, low IGF-I, and free IGF-I reduction are associated. FGF23-Klotho axis has emerged as the most important Ca-P homeostasis regulator where low Klotho and high FGF23 levels play important roles in bone metabolism. Steroids inhibit pulsing GH secretion, IGF-I bioactivity suppressing 1α-hydroxylase expression in bone. Our aim was to know steroid withdrawal effects in FGF23-Klotho and IGF-I/IGFBP3 levels in pediatric kidney recipients.
METHOD: A prospective, randomized, multicenter protocol in patients aged 2-15 years on TAC, MMF and steroid withdrawal; SW (n=9) and steroid control; SC (n=6). IGF-I/ IGFBP3 and FGF23-Klotho levels were determined at start and after 1 year postTx. Informed consent was obtained according to prevailing ethical standards of the country The data were assessed by regression for repeated measures, estimated by mixed models, mean, student-t, Mann-Whitney, Wilcoxon test; significance $p<0.05$.
RESULTS: Height z-score significantly improved after 1 year postTx SW;-1.07±-0.53 vs. SC; -2.05 ±-0.52 (p:0.01). A significant decrease in FGF23/Klotho levels was seen only in SW (p: 0.05). A significant positive variation in IGF-I was found in SW 81.7±18.4 vs.SC 21.2±24.0 (p: 0.03). No significant changes in delta IGFBP3 were found between groups. An inverse correlation between FGF-23 levels and growth was observed.
CONCLUSION: These results indicate that steroids may cause a deleterious effect on growth and bone metabolism. Steroid withdrawal improves the linear growth possibly due to less GH resistance; improving IGF-I and FGF23-Klotho axis normalization. This research was funded by Fondecyt Grant # 1080166.

Abstract# 40

A NORMAL SERUM ALBUMIN LEVEL IS THE ONLY DETERMINANT FOR RESPONSE TO RITUXIMAB IN RECURRENT FOCAL SEGMENTAL GLOMERULOSCLEROSIS: A SYSTEMATIC REVIEW. Carlos E. Araya, Eduardo H. Garin, Richard E. Neiberger, Vikas R. Dharnidharka. *Pediatric Nephrology, University of Florida, Gainesville, FL, USA.*

PURPOSE: Recurrence of primary FSGS in the allograft occurs in 30 to 50% of cases and is associated with early graft failure. Therapies are not well established and in many cases fail to induce remission. Rituximab has been used in recurrent FSGS with variable success.We analyzed the existing literature in children and adults with recurrence of FSGS treated with rituximab to determine factors associated with a response to treatment.
METHOD: We retrieved reports of rituximab use in recurrent FSGS. Analyses were performed with Chi-Square testing or Fisher's exact test for categorical variables and Mann-Whitney test for non-normally distributed variables. Variables with p value <0.10 in univariate analysis for a relationship with development of a primary outcome were entered into multivariate logistic regression analysis.
RESULTS: 34 renal transplant patients (16 pediatric) were treated with a mean of 3 rituximab doses (range 1-6). By univariate analysis for two outcomes (no response to therapy vs any response to therapy), a lower number of rituximab infusions ($p = 0.008$) and a normal serum albumin level ($p = 0.039$) were associated with a higher frequency of response to rituximab therapy. The patients who improved with therapy were younger at the time of transplant (19.2 vs 28.5 years), but this did not reach statistical significance ($p = 0.095$). By univariate analysis for 3 outcomes (no response, partial and complete remission) a lower number of rituximab infusions ($p=0.03$), shorter time to rituximab treatment from relapse ($p = 0.02$), and normal serum albumin ($p = 0.007$) were associated with a higher frequency of achieving remission. In multivariate analyses only a normal serum albumin level was significantly associated with a positive response to rituximab therapy ($p = 0.007$).
CONCLUSION: Adjuvant therapy with rituximab for recurrence of FSGS may be beneficial in only a small subgroup of patients and the response will likely be evident after the initial medication doses. A normal serum albumin is the main determinant of response.

Abstract# 41

MAINTENANCE OF RENAL FUNCTION UNDER ECULIZUMAB DESPITE DISCONTINUATION OF PLASMA EXCHANGE AFTER A THIRD TRANSPLANTATION FOR ATYPICAL HEMOLYTIC UREMIC SYNDROME ASSOCIATED WITH A *CFH* MUTATION.

Jean-Claude Davin,[1,2] Jaap W. Groothoff,[1] Frederique J. Bemelman,[3] Antonia H. Bouts.[1] *[1]Pediatric Nephrology, Emma Children's Hospital/ Academic Medical Centre, Amsterdam Z-O, Netherlands; [2]Pediatric Nephrology, Queen Fabiola Academic Children's Hospital/ULB, Brussels, Belgium; [3]Nephrology, Academic Medical Centre, Amsterdam Z-O, Netherlands.*

PURPOSE: Relapses after transplantation (Tx) occur in > 70% of patients (with graft lost in 93%) with *CFH* mutation-associated atypical hemolytic uremic syndrome (aHUS). Although long-term prophylactic plasma exchange (PPE) and combined liver-kidney transplant have prevented graft loss caused by recurrence, both techniques are limited by possible severe complications. Eculizumab,a high-affinity humanized monoclonal antibody that binds to C5,prevents generation of C5a and the membrane attack complex, is proposed to prevent aHUS relapse.

METHOD: A girl with a *CFH mutation (*c.3572C_T, Ser1191Leu)-associated HUS did not recover from this first episode and lost 2 transplants by recurrence. At 17 years, she underwent the third kidney Tx under pre- and postoperative prophylactic PE (PPE). Postoperatively, she developed a brain infarct (due to severe cerebral arteries stenoses) from which she progressively recovered. When PPE frequency was reduced from twice to once weekly 4 months post transplant, she developed a severe aHUS relapse treated successfully by daily PE followed by PPE twice weekly. Because of severe allergic reactions to plasma, PPE was stopped and eculizumab was introduced ten months after transplant (pl. creat. stable at 131mcmol/L) according to the company protocol and pursued indefinitely at the dosage of 1,200 mg IV/ 2weeks.

RESULTS: 24 months later, pl. creat. is 130 mcmol/L. Complication: menigococcus sepsis at months 16 after treatment initiation despite vaccination. Complete recovery under antibiotics.

CONCLUSION: Eculizumab allows PPE interruption after Tx in plasma dependent CFH mutation-associated aHUS. Meninghococcus sepsis may occur despite vaccination and continuous AB prophylaxis may be required.

Abstract# 42

PROTEOSOME INHIBITOR BORTEZOMIB FOR TREATMENT OF DONOR SPECIFIC ANTIBODY (DSA) ASSOCIATED ACUTE REJECTION (AR) IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS.

Dechu P. Puliyanda,[1] Monica Gin,[3] Chih Hung Lai,[2] Nancy Reinsmoen,[2] Drew Cutler,[3] Elaine Kamil,[1] Shobha Sahney.[3] *[1]Pediatric Nephrology, Cedars Sinai Medical Center, Los Angeles, CA, USA; [2]HLA Laboratory, Cedars Sinai Medical Center, Los Angeles, CA, USA; [3]Pediatric Nephrology, Loma Linda University Children's Hospital, Loma Linda, CA, USA.*

PURPOSE: Significance of DSA post tx is unclear. Bortezomib(BZ)(Velcade®) has effect on plasma cells and reduces DSA. 4 pts with AR and high DSA (>2000MFI) were treated with BZ with other AR therapies. We report on follow up of these patients(pts).

METHOD: 4 pts [mean age 13 years (11-18), presented with increase in serum creatinine (scr) (baseline 1.8mg/dl, at presentation 3.3mg/dl) at 15 mths (1.8 – 37.3mths) post tx. Biopsy showed AR, ¾ pts had C4d+. Immunodominant DSA (iDSA), the highest DSA pre BZ, was Class II >2000 MFI. All pts received IVIG and Rituximab; 3 also received PP. BZ (1.3mg/m2, single push) was given on Day 1, 4, 7, and 11. One pt required 2nd cycle of BZ 3.5 months after 1st cycle due to 2nd C4d+ AR. Pts were monitored for side effects(s/e) and followed for mean of 7.3 mths. DSA was quantified serially using single antigen beads.

RESULTS: No acute s/e were seen during administration of BZ. Post BZ complications were yeast esophagitis(1), headache(2), BK Nephropathy(1);1 pt had anemia, leukopenia, hematuria, neuropathic pain following 2nd cycle of BZ. All s/e were successfully treated. CMV and EBVwere not seen. Reduction of DSA to <2000MFI was seen in ¾ pts with highest decline in iDSA (mean 5717 to 1481 MFI). DSA rebounded 12 days to 6 mths following treatment in 2/3 patients checked. Despite reduction in DSA in 3 pts, 2 pts suffered graft loss. In 2 pts scr decreased by mean of 1.2mg/dl.

CONCLUSION: BZ is associated with low incidence of infusion related s/e. With PP, IVIg and Rituximab, BZ decreased DSA in majority of pts. The highest decrease was in iDSA. However, DSA rebounded. Despite decrease in DSA in 3 pts, 2 had graft loss. 1 pt's scr stabilized despite no change in DSA. Long-term clinical trials are needed to delineate significance of DSA and role of BZ in transplantation.

Abstract# 43

RITUXIMAB, INTRAVENOUS IMMUNOGLOBULIN, PLAMAPHERESIS? HOW TREAT CHRONIC ANTIBODY-MEDIATED KIDNEY REJECTION?

Anne Maisin,[1] Marie-Alice Macher,[1] Michel Peuchmaur,[2] Georges Deschenes,[1] Caroline Suberbielle,[3] Veronique Baudouin.[1] *[1]Nephrology, Robert Debre, Paris, France; [2]Anatomopathology, Robert Debre, Paris, France; [3]Laboratoire d'histocompatibilite, Saint Louis, Paris, France.*

PURPOSE: Our ability to diagnose chronic antibody-mediated rejection (CAMR)has improved. However,the outcome of CAMR is uncertain.We studied retrospectively our results with the use of antiCD20 antibody and IVIG alone or in combination with plasmapheresis.

METHOD: Eleven pediatric kidney transplanted patients,developed CAMR according to Banff '07criteria,6 months to 15 years after transplantation.It was their first transplantation.Seven patients received IVIG(2g/kg every 3 weeks,4 times),and one dose of antiCD20(375 mg/m² body surface area)(Group A).Four patients had a combination of IVIG,antiCD20 and plasmapheresis(group B).DSA levels were detected by Luminex single antigen (Luminex SA).All the patients had DSA class 1 and/or 2 score 6-8 mean intensity of fluorescence(MFI).

RESULTS: The mean follow up was 11 months (group A) and 16 months (group B). Mean glomerular filtration rate dropped during the six months before CAMR,(25% group A,28% group B),and then stabilized or improved after treatment in 4 patients(group A) and in 2 patients(group B).All the patients experienced a complete depletion of circulating CD20+cells.In group A,DSA level decreased to score 4 or remain unchanged in 3 patients, persisted at a lower level in 4 patients.In group B, DSA level decreased in 3 patients.Six patients (group A) and 3 patients (group B)showed positive staining for C4d in more than 50% of peritubular capillary with a score of peritubular capillaritis ranging from 0 to 3.C4d staining disappeared in 5 patients(group A) and in 3 patients(group B)and remain unchanged in 3 patients whose had the highest degree of transplant glomerulopathy.

CONCLUSION: A decrease in DSA level, and in C4d staining is demonstrated in the two group of treatment.Plasmapheresis does not seem to reverse prononced glomerumopathy in renal allograft.The goal could be,in case of mild proteinuria or slight increase of creatininemia to monitor more precisely DSA, to perform biopsy and treat CAMR at an early stage.

Abstract# 44

RECURRENCE OF FOCAL SEGMENTAL GLOMERULOSCLEROSIS (FSGS) IN CHILDREN AFTER RENAL TRANSPLANTATION: A SINGLE CENTER EXPERIENCE.

Hobart J. Baluarte,[1,2] Jo Ann Palmer,[1] Sonya Lopez,[1] Kevin Meyers.[1,2] *[1]Department of Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, PA, USA; [2]Department of Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, PA, USA.*

PURPOSE: Plasmapheresis (PP) has been used with variable success for treatment of recurrent FSGS. We studied the effect of PP in FSGS patients (pts) with recurrent proteinuria after transplantation, and compared patient characteristics and outcomes in pts with FSGS with and without recurrence of proteinuria.

METHOD: Between 1993-2010, 295 renal transplants were performed at our institution, including 55 pts with biopsy proven FSGS. The immunosuppression was thymoglobulin, tacrolimus, steroids, and mycophenolate mofetil. Recurrence was defined by spot urine protein to creatinine (Pr/Cr) ratio >1.0, and remission by Pr/Cr <1.0. PP was performed via a central line with a Cobe Spectra, removing 1-1.5 x plasma volume. PP was daily for three treatments, and every other day, depending on response.

RESULTS: Twenty one pts had recurrence of proteinuria within 1 to 47 days (mean 7) following transplantation. Mean age at transplantation was 14.6 ± 3.4 years, 38% males, 47% Caucasians and 43% recipients of LD grafts. All 21 pts received PP after recurrence, of those, 15 achieved a remission after 2-72 cycles of PP (mean 16). PP was discontinued when they went into remission. Among the 15 pts who went into remission, 10 have maintained good graft function (eGFR 62-118 ml/min/1.73m2) with no recurrence 9-114 months post transplant, and the other 5 pts lost their grafts due to acute/chronic rejection in relation to non-adherence. Among the 6 pts who did not respond to PP, 4 lost their graft and the other 2 have a functioning graft with nephrotic range proteinuria (urine Pr/Cr ratios 3.8-19, respectively). Allograft survival was greater in those pts with FSGS that did not recur, compared to those that recurred (P value <0.038).

CONCLUSION: In our experience institution of PP appears to be effective to treat recurrent FSGS post-transplantation. Allograft survival was greater in those pts with FSGS without recurrence, compared to those that recurred.

Abstract# 45

OUTCOME OF KIDNEY TRANSPLANTATION IN CHILDREN WITH NEPHROTIC SYNDROME-FSGS USING NOVEL TREATMENT: PLASMAPHERESIS-PL- AND HIGH DOSE OF CYCLOSPORINE -CyA. Jaime M. Restrepo, Gaston Castillo, Manzi Eliana, Badiel Marisol. *Pediatric Nephrology and Transplantation, Fundación Valle del Líli, Cali, Valle, Colombia.*

PURPOSE: Recurrence of Focal Segmental Glomerulosclerosis- FSGS – after kidney transplantation-KTx- is 50 %. PL treatment is used adding high dose of CyA, as effective protocol to treat this recurrence. We report our single center experience.

METHOD: We reviewed records from 13 pts who went to 14 KTx with primary FSGS(1998-2010). In living donors-LD- we used PL #3 and CyA IV previous to KTx. The recurrence was defined as a serum albumin level < 3.0 grs/lt and urine Prot/creat ratio > 1. The treatment: PL every day #4, then every other day, CyA at high dose to mantain CyA serum levels C2 on the proper range, CP - 1-2 mgrs/kg/day for 2 months and regular steroids. Total remission was defined as urine Prot/creat ratio < 0.5 and serum albumin level > 3 grs/lt.

RESULTS: The recipients mean age was 13.1 years(4.7- 19).There were 8(57%) CAD-KTx and 6(43%) LD KTx. The recipients from LD started with 3 PL and CyA IV previous to KTx, and continued with CyA, CP and steroids until complete remission of proteinuria. 5/6(83%) went to remission in the LD group.7/8 (87.5%) recipients from CAD had recurrence. They went to protocol treatment (CyA, CP, steroids); 2/7 (28.5%) died in the first week; 4/7 (57%) went to remission, and 1/7 (14.5%) failed. 12/13 pts had recurrence recieving induction with anti-IL2 and thymoglobulin. The initial median urine Prot/creat ratio was 7.9 IQ range 4.45- 11.85; 12/13 required PL. The 3 months post KTX median urine Prot/creat ratio was 0.3 i.q range 0.25- 0.6. There were 2 acute rejections; 6/13 had Acute Tubular Necrosis-ATN. 3 months post KTx median serum creatinine was 1.1 i.q 0.82-1.8. 4/6 LD recipients didn´t have complications, while 5/7 CAD recipients did have them.

CONCLUSION: 1. Response to FSGS´s treatment, based in PL and high dose of CyA is effective. Total remission was in 9/13 (70%).2. The level of urine Prot/creat ratio seems to be less in the recurrence when using pre KTx PL and CyA i.v.3. These pts were less likely to do ATN 4. In our population, NS –FSGS has a high recurrence.

Abstract# 46

RECURRENT PEDIATRIC FOCAL SEGMENTAL GLOMERULOSCLEROSIS AFTER TRANSPLANTATION: REVISITING THE RISK FACTORS. Hee Gyung Kang,[1] Se Eun Lee,[1] Il Soo Ha,[1] Hae Il Cheong,[1] Sang Joon Kim.[2] *[1]Pediatrics, Seoul National University Children's Hospital, Seoul, Korea; [2]Surgery, Seoul National University School of Medicine, Seoul, Korea.*

PURPOSE: To investigate the risk factors and the prognosis of recurrence in primary focal segmental glomerulosclerosis (FSGS) of childhood.

METHOD: Retrospective review of the medical records of 35 renal transplants in 31 children with primary FSGS at our institution between 1990 and 2009.

RESULTS: The children with primary FSGS presented at the median age of 5.2 years with nephrotic syndrome (NS, n=26) or asymptomatic urinary abnormality (n=5), and received kidney allografts in 6.5 years. FSGS recurred in 16 allografts immediately after transplantation, only in those that had presented with NS. The risk factors of recurrence were the age of onset > 5 years and progression to end stage renal disease within 6 years but not sooner than 18 months. Other characteristics such as gender, mesangial hypercellularity or proportion of sclerotic glomeruli on the pathology of the native kidney,duration of dialysis, age of transplantation, donor source, induction therapy or the choice of calcineurin inhibitor were of no significance.

Complete remission (CR) was achieved in 10 patients and sustained in 8 patients, who had presented with NS younger than 4 years old, and started treatment earlier (median 2 days vs. 4.5 days after recurrence) than those who did not achieve sustained CR. While recurrence had an adverse effect on the long-term survival of the grafts with a 10 year survival rate of 36.7% (vs. 78.6% for non-FSGS children at our institutiion), sustained CR reversed the adverse effect of recurrence.

CONCLUSION: In our experience, the recurrence rate of Korean pediatric FSGS after transplantation was not different from that of another ethnicity. Interestingly, rapider progression, < 18 months, did not predict recurrence and persistent CR improved the outcome of recurrent FSGS. As modifiable factors, initiation of treatment would improve the survival. To verify these findings and identify those who have the risk of recurrence and resistance to treatment after transplantation, an international cooperative study would be necessary.

Heart 1: Ongoing Challenges - Antibodies and Allograft Vasculopathy

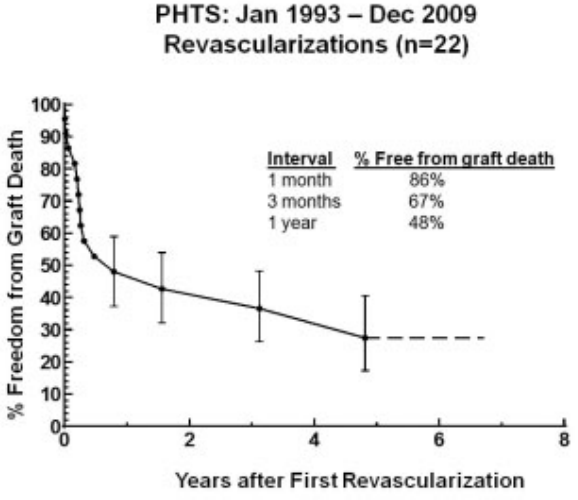
Abstract# 47

OUTCOMES AFTER CORONARY ARTERY REVASCULARIZATION PROCEDURES FOR ALLOGRAFT VASCULOPATHY IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. Aamir Jeewa,[1] Clifford Chin,[2] Elfriede Pahl,[3] Andrew M. Atz,[4] Michael P. Carboni,[5] Margaret A. Tresler,[6] David C. Naftel,[6] Rose J. Rodriguez,[7] Tina Allain-Rooney,[1] Anne I. Dipchand.[1] *[1]The Hospital for Sick Children, Toronto, Canada; [2]Stanford University, Stanford, USA; [3]Children's Memorial Hospital, Chicago, USA; [4]MUSC Children's Hospital, Charleston, USA; [5]Duke University Medical Center, Durham, USA; [6]University of Alabama at Birmingham, Birmingham, USA; [7]Morgan Stanley Children's Hospital of New York Presbyterian, New York, USA.*

PURPOSE: Coronary allograft vasculopathy (CAV) is a cause of graft loss after heart transplant (HTx). In adult patients, percutaneous revascularization procedures (PRP) have variable success with high restenosis rates & no impact on graft survival. The aim of this study was to examine PRP in pediatric HTx recipients.

METHOD: Registry-based, prospective multicenter (35 institutions) data was used to examine PRP and their impact on outcomes in patients listed <18 yrs old who received a 1st HTx between 1993-2009 (n=3,156).

RESULTS: 46 PRPs were done in 22 patients at 14/35 centers. Mean age at HTx was 8.6y (± 6.9y); mean donor age was 15.9y (0.7 to 48.7y). Mean time to first PRP was 5.3y (±2.9y). Artery: Left anterior descending (46%), right coronary (20%), circumflex (17%) or other coronaries (17%); PRP consisted of 15 (33%) balloon angioplasties; 29 (63%) stent implantations and 2 other PRPs. Freedom from graft loss post-PRP was 86%, 67% and 48% at 1, 3 and 12 mos (Fig 1).



CONCLUSION: In pediatric HTx patients, use of PRP for CAV was rare, likely related to procedural feasibility and amenability of the lesions to intervention. Despite technically successful interventions, graft loss occurred in 52% within 1 year post-procedure, thus concurrent re-listing for HTx in these patients should be considered.

Abstract# 48

DONOR SPECIFIC ANTIBODIES (DSA): CAN THEY PREDICT C4D STAINING AND ANTIBODY MEDIATED REJECTION (AMR)? David M. Peng,[1] Robert J. Boucek,[1] Yuk M. Law,[1] Mariska S. Kemna,[1] Karen Nelson,[2] Paul Warner.[2] *[1]Pediatrics, University of Washington/Seattle Children's Hospital, Seattle, WA, USA; [2]Puget Sound Blood Center, Seattle, WA, USA.*

PURPOSE: The utility of DSA in surveillance for AMR in pediatric heart transplant recipients is controversial. We hypothesize that DSA is predictive of C4d positive biopsy and clinical AMR.

METHOD: The records of 59 recipients (median age at transplant 1.9 yrs, range 0.04-17.6 yrs) transplanted between 10/2005 and 10/2010 were retrospectively reviewed for all DSA performed within 24 hours of endomyocardial biopsy (EMB; n=155.) DSA were determined by single antigen solid phase assay. Using a receiver-operating characteristic plot (AUC = 0.79), we set our threshold for a DSA+ to be a median fluorescence intensity (MFI) of >6000. C4d+ was defined as >25% of endothelial cells stained by immunohistochemical methods in formalin-fixed EMB samples. We also examined the association between patients with DSA+ and the presence of hemodynamically compromising AMR (grade O, C4d positive EMB).

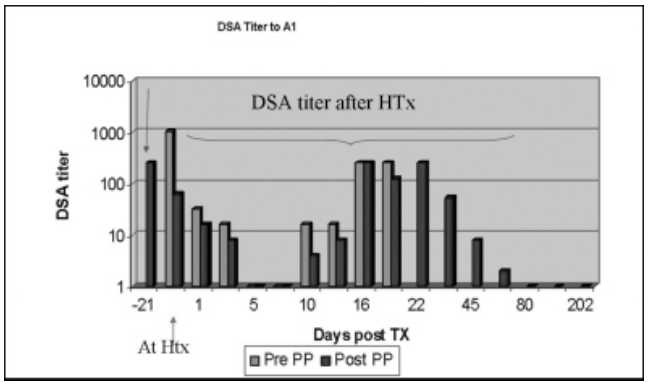
RESULTS: The median duration of follow up was 2.7 yrs with an average of 2.6 paired biopsy-DSA determinations per patient. A total of 11 patients had DSA+, 6 had AMR, and 11 biopsies were C4d+. DSA+ correlated with C4d+ ($p<0.0001$) with a negative predictive value of 96%, positive predictive value of 53%, specificity of 93% and sensitivity of 63%. An association was also found between DSA+ and AMR ($p=0.0005$): 5/6 patients with AMR were DSA+ while 6 other DSA+ patients never presented with AMR.
CONCLUSION: Using a DSA threshold of >6000 MFI, a high specificity and negative predictive value for C4d staining was observed. DSA+ was also associated with the presence of AMR. This retrospective review of DSA in pediatric heart recipients justifies a prospective analysis of the predictive value of DSA-based surveillance for AMR.

Abstract# 49

UTILITY OF ROTATIONAL CORONARY ANGIOGRAPHY FOR PEDIATRIC HEART TRANSPLANT RECIPIENTS. Steven Zangwill,[1] Todd Gudausky,[1] Gail Stendahl,[1] Kathryn Tillman,[1] Andrew Pelech,[1] Stuart Berger.[1] [1]*Children's Hospital of Wisconsin, Milwaukee, USA;* [2]*Medical College of Wisconsin, Milwaukee, USA.*
PURPOSE: Graft vasculopathy (GV) is one of the greatest obstacles to long term survival for cardiac transplant recipients. It affects > 1/3 of patients within ten years and is the most frequent cause of death 5 years or more post transplant. It is common to use annual surveillance coronary angiography to screen for GV. Rotational angiography (RA) is a newer technique where the cine camera swings in a 270° frontal plane arc during angiography and has significant advantages over standard biplane imaging (BiP). We transitioned to RA after moving to a new hybrid catheterization laboratory. We herein report our experience comparing RA to BiP in our pediatric transplant recipients.
METHOD: A retrospective review of 28 catheterizations in which RA was used to detect GV in transplant recipients at Children's Hospital of Wisconsin was performed. Calculated cine radiation exposures for RA patients were compared to studies using BiP imaging. We also compared procedure times, complications, contrast use and number of acquired cine frames for the same patients (where available) using BiP.
RESULTS: RA required significantly less cine radiation exposure than BiP (5239 vs 20192 mGy/cm2, $p=0.026$). There was no significant difference in procedure times, contrast exposure or complications (none). Using RA, we obtained 80 frames per left coronary and 56 for the right coronary. Mean BiP frames per injection included 330 (165X2) for the left and 302 (151X2) for the right coronary.
CONCLUSION: RA allows for lower radiation exposure levels than BiP imaging for coronary angiography in pediatric heart transplant recipients. These patients have repeated studies over time and are well served by minimizing exposure. Further, RA is technically simpler requiring only a single camera and decreasing the need to reposition the patient's arms for angiography. Finally, a single injection using standard BiP allows for visualization of a coronary in 2 static views (frames) whereas a standard RA can provide 80L/56R discrete views of each vessel respectively with less irradiation.

Abstract# 50

UTILITY OF DONOR SPECIFIC ANTIBODY TESTING IN PEDIATRIC HEART TRANSPLANTATION. Katheryn Gambetta, Tambur Anat, Pahl Elfriede. *Children's Memorial Hospital, Chicago, IL, USA.*
PURPOSE: Development of donor specific antibodies (DSA) has been associated with antibody mediated rejection (AMR), development of transplant coronary artery disease (TCAD), and decreased graft survival in heart transplantation(Htx). Experience with DSA testing in pediatric Htx is limited. We examined the utility of DSA testing in pediatric Htx in three clinical scenarios.
METHOD: We performed a retrospective review of patients for whom we utilized serial DSA testing (flow cytometry, one Lambda ®). DSA titers have been obtained in the following settings: highly sensitized patients after HTx, recipients with symptoms of heart failure, and asymptomatic recipients with abnormal hemodynamics.
RESULTS: DSA titers were obtained from 12 highly sensitized patients with pre Htx PRA > 40%, 6 patients with symptomatic graft failure, and 15 asymptomatic patients with abnormal hemodynamics. Of sensitized patients, 10 had congenital heart disease (CHD) and two had cardiomyopathy. Post Htx, DSA titers guided duration of plasmapheresis and decision to augment therapy. Figure 1 demonstrates DSA titers in highly sensitized patient.



Among the 6 symptomatic recipients, 5 had elevated DSA and AMR. All had underlying cardiomyopathy. Two developed TCAD. Fifteen asymptomatic children with abnormal hemodynamics at surveillance catheterization had DSA testing - four had AMR with elevated DSA. Of the four, three had CHD. Serial DSA testing guided therapy in all patients diagnosed with AMR.
CONCLUSION: Serial monitoring of DSA titers are useful to monitor highly sensitized patients and to diagnose and manage AMR. Patients with cardiomyopathies appear to develop DSAs as frequently as patients with CHD, even if not sensitized. Serial DSA testing may be useful for continued immunologic monitoring especially in children with abnormal hemodynamics, graft failure and TCAD.

Abstract# 51

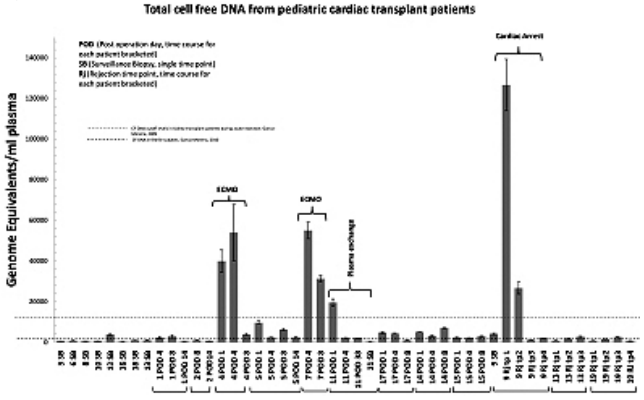
EARLY POST-TRANSPLANT ENDOVASCULAR INTERVENTIONS IN PEDIATRIC HEART RECIPIENTS. S. Kristen Sexson Tejtel, Mariska Kemna, Robert Boucek, Gordon A. Cohen, Yuk Law, Troy A. Johnston. *Pediatric Cardiology, Seattle Children's Hospital, Seattle, WA, USA.*
PURPOSE: Residual anatomic lesions post-heart transplant (HT) may compromise early graft function and recovery yet few reports describe its occurrence. We report our experience with early endovascular interventions (INTs) in the pediatric HT population.
METHOD: A retrospective cohort study of all HT recipients between 12/2002 and 10/2009 with follow-up to 12 months.
RESULTS: Of 57 patients reviewed (median age 12 mos), 21 had cardiomyopathy (CM) and 36 congenital heart disease (CHD), of which 28 were single ventricle (SV). One patient with CM and 15 with CHD (13 SV) required INT. Ten required INT within 1 month, 4 between 1-6 and 2 between 6-12 mos. Patients required INT at different sites and times at same site: 6 required 1 INT, 6 required 2, and 4 required 3-10 totaling 56 INTs. Thirty two INTs (11 patients) were for stenosis of the pulmonary arteries, SVC (11, 6 patients), aorta (4), and IVC (1), with 1 atrial septal defect closure. The non-INT group had a median weight of 9 kg (3-76.2), and age 2.25 yrs (0-17.6) versus 9 kg (3.8-43) and 1yr (0-12.9) for the INT group. Preoperative mechanical ventilation, inotropic support, hospitalization, donor ischemic time, recipient weight, length, or donor/recipient weight ratio were not associated with INT. Diagnosis of CHD, particularly SV, was associated with need for INT ($chi2=3.8$, $p=0.05$). Post-HT length of stay in CICU and ward was significantly longer in those requiring INT (CICU-median 57, range 8-191 days, ward-median 24, range:0-268) compared to non-INT (CICU-median 9, range:2-81 and floor-median 12, range:0-61). Of 5 deaths, 4 had INT (all CHD) with 1 death related to the procedure. At 12 month follow-up, serum creatinine, GFR, and shortening fraction were not different between INT and non-INT groups.
CONCLUSION: INT occurred in 28% of patients. Vascular obstructive lesion was the most common indication, especially in SV. HT for CHD increases the need for INT. Residual lesions, although successfully relieved by INT, can increase morbidity and must be considered in the pediatric HT recipient with CHD.

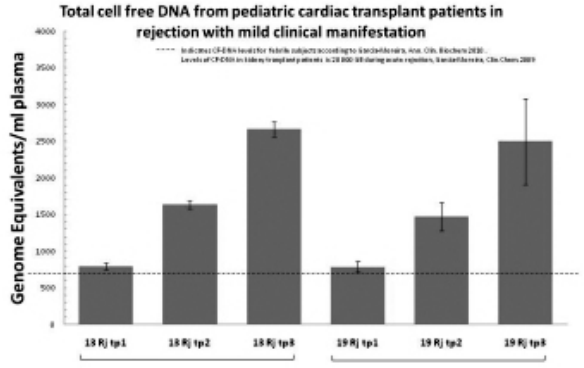
Abstract# 52

QUANTIFICATION OF CIRCULATING CELL-FREE DNA IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. C. Castleberry, M. Hidestrand, A. Tomita-Mitchell, H. Liang, G. Stendahl, R. Hoffmann, S. Harris, B. Shames, J. Tweddell, S. Zangwill, M. Mitchell. *Medical College of Wisconsin, Milwaukee, WI, USA.*
PURPOSE: CF-DNA has been shown to be elevated in rejection in heart and renal transplant (Tx) pts and correlate with improvement in cardiac function in myocarial infarction. We developed a rapid, highly sensitive quantitative approach to measure total CF-DNA and evaluate total CF-DNA as a novel biomarker for cellular injury.
METHOD: Plasma samples from pediatric Tx pts were prospectively collected during routine catheterization (cath), post-Tx, and during rejection. DNA was extracted by a process optimized for short fragments. Total CF-DNA concentration was determined by quantitative real time PCR.
RESULTS: 47 samples were collected from 19 pts, 8 at cath, 8 post Tx, and 3 with rejection. CF-DNA was isolated in all samples. Very high levels of CF-DNA were found

in 4 pts (3 post Tx and 1 severe rejection) and correlated with ECMO (N=2), plasma exchange (N=1), and cardiac arrest (N=1) (Fig1). At cath, pts had low CF-DNA levels. 2 pts with mild biopsy proven rejection had elevated CF-DNA and developed higher levels with hemodynamic compromise requiring treatment (Fig2).

CONCLUSION: CF-DNA correlates with major clinical events and is detectable at low levels in asymptomatic pts. These levels rise during rejection such that elevation of total CF-DNA itself is a potential rejection biomarker. Quantification of donor specific CF-DNA may also be possible and may be an earlier and more specific indicator of myocardial insult.





Abstract# 53

MEASUREMENT OF CORONARY FLOW VELOCITY AND CORONARY FLOW RESERVE DURING STRESS ECHOCARDIOGRAPHY IN PEDIATRIC HEART TRANSPLANT PATIENTS. Warda S. Toma, Derek G. Human, Astrid M. De Souza, Lindsey D. Williams, A.J. Hollinger, James E. Potts, George G.S. Sandor. *Children's Heart Centre, British Columbia Children's Hospital, Vancouver, BC, Canada.*

PURPOSE: Coronary flow velocity (CFV) and coronary flow reserve (CFR) by transthoracic Doppler echocardiography represents a novel non-invasive tool for assessing coronary allograft vasculopathy (CAV) in adult heart transplant patients. However, no data currently exists describing the pattern of CFV or CFR in pediatric heart transplant patients (PHTP) using non-invasive imaging during stress. In this pilot study, we sought to assess the feasibility of using this technique to measure CFV and CFR during stress testing in PHTP.

METHOD: Measurements of resting and peak CFV and CFR (peak CFV/resting CFV) were obtained from Doppler measurements performed during semi-supine cycle exercise (SSCE) (n= 8) or dobutamine stress (DSE) (n=10) testing in a total of 14 PHTP. In 3 of these patients, 2 coronary arteries were examined during a single test. The findings were correlated with each patient's rejection status obtained from their myocardial biopsy histopathology reports and coronary artery status imaged by angiography. A normal CFR value was defined as >2 times the resting value.

RESULTS: CFV and CFR were measured in the LAD (n=4), left main (n=11), RCA (n=3) and circumflex (n=3) arteries. Resting and peak CFV were 0.27 ± 0.12 m/s and 0.65 ± 0.26 m/s, respectively. The CFR was 2.54 ± 0.75. No patient had evidence of acute rejection on biopsy or CAV by coronary angiography. However, four patients had a CFR<2: two of these patients had a low workload and 1 had poor images during SSCE; 1 patient had a normal DSE. All but one patient had a normal stress test; this patient having abnormal wall motion at rest.

CONCLUSION: We were able to measure CFV and CFR using SSCE and DSE echocardiography in PHTP. CFR indicated no evidence of CAV in 17/18 tests. The measurement of CFR may have clinical utility as a non-invasive, inexpensive and technically simple tool in assessing CAV in PHTP. However, as there were no cases of rejection nor CAV, further studies are warranted to determine the utility and predictive accuracy of this tool.

Abstract# 54

THE EFFECT OF SIROLIMUS ON CARDIAC ALLOGRAFT VASCULOPATHY IN PEDIATRIC HEART TRANSPLANT RECIPIENTS USING INTRAVASCULAR ULTRASOUND. Micheal A. Kuhn,[1] Douglas D. Deming,[1] Leonard L. Bailey,[2] Richard E. Chinnock.[1] *[1]Pediatrics, Loma Linda University Children's Hospital, Loma Linda, CA, USA; [2]Cardiothoracic Surgery, Loma Linda University Children's Hospital, Loma Linda, CA, USA.*

PURPOSE: Sirolimus attenuates the effects of cardiac allograft vasculopathy (CAV) in adults. Early data at our institution suggested that this effect was also true in pediatric heart transplant recipients. The purpose of this study was to retrospectively re-evaluate the effects of sirolimus on our pediatric patients with intravascular ultrasound (IVUS) evidence of CAV.

METHOD: Since 2002, all patients with IVUS evidence of CAV (Stanford Class 3 or 4) were started on sirolimus. IVUS was serially obtained at the annual catheterization. Maximal intimal thickness (MIT), intimal index (II), and Stanford Classification (SC) were calculated from the IVUS prior to initiation of therapy and compared to the calculations from the latest IVUS. The sirolimus group (n = 20) was compared to a historical group of patients (n = 16) who had IVUS evidence of CAV. The incidence of graft loss was compared between the two groups. All results are given as mean ± SD. IVUS changes were compared using Student's t-test. Kaplan-Meier analysis was used to compare outcomes between the two groups. A p-value < 0.05 was considered significant.

RESULTS: The length of time on sirolimus was 5.5 ± 2.5 years. In the sirolimus group, MIT was unchanged at 0.37 ± 0.04 vs. 0.33 ± 0.02 mm, p = NS. II was unchanged at 0.13 ± 0.005 vs. 0.16 ± 0.01, p = NS. In the historical group, MIT increased signficantly from 0.37 ± 0.5 vs. 0.57 ± 0.18 mm, p = 0.034 and II increased significantly from 0.15 ± 0.008 vs. 0.02 ± 0.01, p = 0.004. In the sirolimus group, SC was unchanged in 2 pts, increased in 5 pts and decreased over time in 9 pts. KM analysis showed a divergence between the two groups with worse outcome in historical group. This divergence was not statistically significant (p = 0.22).

CONCLUSION: After medium term follow-up, sirolimus appeared to attenuate and in some patients reduced the degree of CAV in pediatric heart transplant recipients. In some patients the use of sirolimus had little or no effect.

Abstract# 55

DOES DONOR SPECIFIC ANTIBODY HLA CLASS MATTER IN PEDIATRIC HEART TRANSPLANTATION? Katheryn Gambetta, Anat Tambur, Elfriede Pahl. *Children's Memorial Hospital, Chicago, IL, USA.*

PURPOSE: Development of donor specific antibodies (DSA) has been associated with antibody mediated rejection (AMR), coronary allograft vasculopathy (CAV), and decreased graft survival in heart transplantation (HTx). Experience with DSA testing in pediatric Htx recipients is limited.

METHOD: We performed a retrospective review of 34 patients for whom we applied serial DSA testing (flow cytometry, one Lambda ®). DSA titers have been obtained in the following three scenarios: 1) highly sensitized patients after HTx, 2) recipients with heart failure (HF), and 3) asymptomatic recipients with abnormal hemodynamics.

RESULTS: GROUP 1- DSA titers were obtained from sera of 12 highly sensitized patients with pretransplant PRA > 40%; of these, 10 had congenital heart disease and 2 had cardiomyopathy. AMR occurred in 7. All had abnormal hemodynamics, positive C4D stain, and edema on biopsy. All had multiple DSA of both HLA class I and class II with majority against class II. In 5 of 7 patients, DSA to DQ class was the highest.

GROUP 2 - Among 7 recipients with HF, 5 had elevated DSA with AMR on biopsy. Two recipients without elevated titers had cellular rejection. Cardiomyopathy was reason for Htx in all. Patients with elevated DSA had antibodies to HLA class II only - 4 with majority of DSA to DQ7, one with greatest DSA to DP6, and one with greatest DSA to DR12. CAV developed in three patients with DSA to DQ7.

GROUP 3 - DSA testing in 15 asymptomatic children with abnormal hemodynamics at surveillance catheterization was obtained. Four had AMR with positive C4D stain and 4 had cellular rejection. One patient had elevated DSA to multiple class I and class II HLA alleles with highest titers to DR class. This patient developed graft dysfunction and required tricuspid valve replacement.

CONCLUSION: DSA can develop in children with underlying cardiomyopathy and congenital heart disease with similar frequency. Presence of DSA to HLA class II, especially to DQ and DR correlates with AMR, CAV, and graft dysfunction more than DSA to HLA class I. Targeted and serial monitoring of DSA titers may be useful for long term management and immunologic monitoring of children post Htx.

Immunosuppression 1

Abstract# 56

FIVE YEAR EXPERIENCE USING SIROLIMUS-BASED, CALCINEURIN INHIBITOR-FREE IMMUNOSUPPRESSION IN PEDIATRIC RENAL TRANSPLANTATION. Leonard C. Hymes, Barry L. Warshaw. *Pediatrics, Emory University School of Medicine and Children's Healthcare of Atlanta, Atlanta, GA, USA.*

PURPOSE: From December 2003 to December 2008, we employed a protocol for withdrawing tacrolimus (TAC) and converting to sirolimus (SRL) in a cohort of low-risk renal pediatric transplant recipients. We report our experience in these children with respect to graft survival, acute rejection episodes, renal function and adverse events.

METHOD: All patients received basiliximab induction and TAC, mycophenolate mofetil and prednisone. Criteria for conversion to SRL included first transplants without histologic evidence for acute rejection (AR) on 3 month surveillance biopsies. Patient exclusion criteria included AR prior by surveillance biopsies, Polyoma (BK) virus nephropathy, a history of nephrotic syndrome, or multiple organ transplants.

RESULTS: 51 of 137 patients who received transplants from December 2003 to December 2008 met criteria for conversion to SRL: Age 11±3 year, 30 males (59%), 20 deceased donor recipients (39%), 20 Caucasians (39%) and 22 African Americans (43%). SRL was discontinued in 11 children (20%) because of adverse events within 12 months after conversion, predominantly for aphthous ulcers. Among the remaining 40 patients, actuarial graft survival was 91% at 5 years. AR occurred in 13% of patients within 1 year after conversion. The cumulative incidence of AR increased to 30% by 3 years but then remained stable at years 4 and 5. GFR was unchanged from the time SRL was started to 36 months post transplant: 71±18 ml/min vs.72±18 ml/min, p = .76. Complications during SRL treatment included aphthous ulcers (30%), viremia with BK virus (20%), Epstein Barr virus (13%), and cytomegalovirus (3%), proteinuria (7%), elevated cholesterol (7%), diabetes mellitus (2%), thrombocytopenia (2%), erectile dysfunction (2%) and lymph edema (2%).

CONCLUSION: Our experience with SRL-based immunosuppression demonstrates that a CNI-free regimen can be successful in lower risk patients meeting our selection criteria. Renal function was well preserved with SRL. Aphthous ulcers and BK viremia were the most prevalent adverse events.

Abstract# 57

DIFFERENTIAL SUPPRESSION OF NFAT-REGULATED GENES IN RESPONSE TO CYCLOSPORINE IN PEDIATRIC *VS.* ADULT RENAL TRANSPLANT RECIPIENTS. Heiko Billing,[1] Claudia Sommerer,[2] Thomas Giese,[3] Stefan Meuer,[3] Burkhard Toenshoff,[2] David Czock.[4] *[1]University Children's Hospital Heidelberg, University Hospital Heidelberg, Heidelberg, Germany; [2]Institute of Immunology, University Hospital Heidelberg, Heidelberg, Germany; [3]Division of Nephrology, University Hospital Heidelberg, Heidelberg, Germany; [4]Institute of Clinical Pharmacology, University Hospital Heidelberg, Heidelberg, Germany.*

PURPOSE: Many drug targets and metabolizing enzyme are developmentally regulated during childhood (Kearns GL, NEJM 349, 2003). This is particularly relevant for drugs with a narrow therapeutic index such as immunosuppressants. We investigated a potential developmental regulation of nuclear factor of activated T-cells (NFAT)-regulated genes in response to cyclosporine (CsA) in pediatric *vs.* adult renal transplant recipients.

METHOD: We analyzed in a prospective study of 184 renal allograft recipients in the maintenance post-transplant the expression of the NFAT-regulated genes IL-2, INF-gamma and GMCSF in PMA/ionomycin-stimulated peripheral blood lymphocytes by quantitative real-time PCR before intake of CsA (C_0) and 2 hrs. thereafter (C_2). Patients were stratified according to age: <18 y, n=31; 18-59 y, n=98; >60 y, n=55.

RESULTS: The median CsA-C_2 concentration in children and adolescents was significantly (P<0.01) lower (289 µg/L [25-75% percentile, 236-430]) than in adults (456 µg/L [339-580] and 524 µg/L [461-674]), respectively. The residual NFAT expression (25%, 14% and 11%, p<0.01) was correlated inversely with the corresponding CsA-C_2-concentrations. By multiple linear regression analysis we observed a 23% stronger inhibition (p<0.01) of residual IL-2 expression in relation to CsA in the group < 18 years, while the suppression of INF-g, GMCSF or entire NFAT in response to CsA was comparable.

CONCLUSION: The observed age-dependency of residual IL-2 expression indicates, after correction for CsA concentration effects, a significantly stronger suppression of IL-2 in patients <18 years, indicating a higher sensitivity towards CsA only of this particular cytokine. The overall suppression of NFAT-regulated-gene expression in response to CsA was comparable among age groups.

Abstract# 58

THE IMPACT OF TACROLIMUS AS RESCUE THERAPY IN CHILDREN USING DOUBLE IMMUNOSSUPRESSIVE REGIMEN AFTER HEART TRANSPLANTATION. Klébia M.P.C. Branco, Estela Azeka, Marcelo Jatene, Evelinda Trindade, Filomena R.B.G. Galas, Ludhmila A. Hajjar, Luiz Benvenuti, Arlindo Riso, Carla Tanamati, Juliano Penha, José O.C. Auler Junior, Edmar Atik. *Pediatric Cardiology, Heart Institute (InCor) University of São Paulo Medical School, São Paulo, Brazil.*

PURPOSE: The aim of this study was to evaluate the clinical outcome of children undergoing heart transplantation who required conversion from a cyclosporine-based steroid free therapy to a tacrolimus-based immunosuppressive regimen.

METHOD: We performed a prospective observational cohort study in 28 children who underwent conversion from a cyclosporine-based steroid free therapy to a tacrolimus-based therapy for refractory or late rejection or intolerance to cyclosporine.

RESULTS: There was complete resolution of refractory rejection episodes and adverse side effects in all patients. The incidence rate (x100) of rejection episodes before and after conversion was 7.98 and 2.11, respectively (p = <0.0001). A significant incidence of cardiac allograft vasculopathy after conversion to tacrolimus was found (p = 0.004). When comparing patients on tacrolimus to patients who remained on cyclosporine, there was a significant decrease in the incidence of rejection (p = 0.001), and infectious episodes (p = 0.002) in patients using tacrolimus. Patients converted to tacrolimus had lower neurological complications, hirsutism and gingival hyperplasia, but higher prevalence of anemia. There was a 25% mortality rate in patients using tacrolimus after a mean period of 60 months after conversion. Patients using tacrolimus showed greater survival rate when compared to patients taking cyclosporine.

CONCLUSION: Tacrolimus is effective as rescue therapy for refractory rejection and is a therapeutic option for pediatric patients.

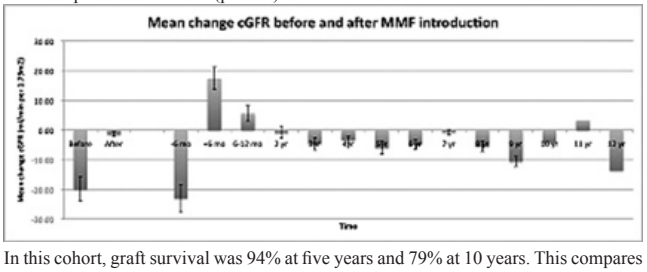
Abstract# 59

LONG TERM GRAFT FUNCTION IN PEDIATRIC RENAL TRANSPLANT PATIENTS WITH CHRONIC ALLOGRAFT NEPHROPATHY RECEIVING MYCOPHENOLATE MOFETIL. Nicholas J. Prince,[1] Mignon I. McCulloch,[1] Larissa Kerecuk,[2] Grainne Walsh,[1] Judy Taylor.[1] *[1]Paediatric Nephrology, Evelina Children's Hospital, London, United Kingdom; [2]Paediatric Nephrology, Birmingham Children's Hospital, United Kingdom.*

PURPOSE: Further follow-up of 35 transplant recipients with CAN receiving MMF in conjunction with calcineurin inhibitor (CNI) minimisation or withdrawal.

METHOD: Retrospective casenote review between the date of transplant and latest follow-up or loss of graft in a previously reported cohort. cGFR was determined by "best fit" linear regression.

RESULTS: 35 patients (26 male) received 18 living related and 17 cadaveric organs between 1992-2004. Mean age at transplant was 7.9 years. MMF was introduced at mean of 3.5 years after transplantation. 13 grafts were lost during the study period after a mean of 10.6 years (4.7–17.6yrs) post transplant. Mean time from transplant to final follow-up or loss of graft was 9.7yrs (4.7–17.6yrs). Mean follow-up period whilst receiving MMF was 5.6 yrs (1–11.4yrs). The mean rate of cGFR (ml/min/1.73m^2/yr) change was -20.0±4.1 (mean±SEM) prior to introduction of MMF and -1.4±0.8 after (p<0.01). The greatest improvement was during the first 12 months with MMF: cGFR increased at a rate of 17.4±2.6 in the 1st 6 months and 5.6±1.9 in the 2nd 6 months. This compares to -23.0±5.6 (p<0.01) in the 6 months before MMF.



In this cohort, graft survival was 94% at five years and 79% at 10 years. This compares favourably with our overall 5 yr graft survival of 95% and NAPRTCS five year data of 84% (living donor) and 78% (deceased donor).

CONCLUSION: Conversion to MMF enabled CNI minimisation/withdrawal and led to significant initial cGFR improvement and subsequent stabilisation. We present cGFR and graft survival data for a further 7 years in this group of patients with deteriorating graft function due to CAN. The long term outcome is better than would have been predicted, and compares favourably with overall transplant results.

Abstract# 60

LEVEL OF VIRUS-SPECIFIC T CELLS AS AN INDICATOR OF OVERIMMUNOSUPPRESSION AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Thurid Ahlenstiel, Jochen H.H. Ehrich, Lars Pape. *Pediatric Nephrology, Medical School of Hannover, Hannover, Germany.*

PURPOSE: After transplantation (Tx) immunosuppression leads to impaired cellular immune defense resulting in increased risk of viral complications. Post-Tx follow-up of virus-specific (sp) T cells may serve as an indicator of viral diseases and overimmunosuppression.

METHOD: Within a prospective longitudinal study we monitored Cytomegalovirus (CMV)- and Adenovirus (ADV)- sp T cells in 37 children (1-17 years) during the first year after kidney Tx. Based on specific cellular activation and induction of intracellular cytokine production, CMV- and ADV-sp CD4- and CD8-T cells were determined by flow cytometry. Viral infections and virus-DNA (PCR) were monitored.

RESULTS: Level of CMV- and ADV-sp CD4-T cells fluctuated depending on the grade of immunosuppression: Under the intensified immunosuppression during the initial post-transplant period we found temporary decrease of virus-sp CD4-T cells. When immunosuppression was reduced, virus-sp CD4-T cells were increasing. In the presence of sufficient numbers of ADV- or CMV-sp CD4-T cells (>2 cells/µl) we did not detect any relevant viral infections or reactivations. Patients with low virus-sp CD4-T cells were susceptible for various viral infections: The absence of CMV- and ADV-sp CD4-T cells (<2 cells/µl) was correlated with a high risk of EBV-infections with persistence of EBV-DNA. In case of high EBV-DNA load (>2500 cop/ml) CMV- and ADV-sp CD4-T cells were significantly lower than without relevant DNA-detection (CMV- T cells: 1.6±1.3/µl versus 18.8±13.3/µl; p<0.0001). In contrast to virus-sp CD4-T cells, virus-sp CD8-T cells rapidly vanished after primary infection.

CONCLUSION: CMV- and ADV-sp CD4 T cells represent not only virus-sp, but also general cellular immune defense: Sufficient levels of virus-sp CD4-T cells (>2 cells/µl) prevent from symptomatic viral infections whereas a decrease is associated with elevated risk of viral complications. Serving as an indicator of overimmunosuppression, monitoring of virus-sp CD4-T cells may improve post-Tx management and optimize individual timing of antiviral therapy and dosing of immunosuppression (effect-related drug-monitoring).

Abstract# 61

MDR1 AND CYP3A5 GENE POLYMORPHISMS AND IT'S RELATIONSHIP TO TACROLIMUS PHARMACOKINETICS IN MEXICAN RENAL TRANSPLANT CHILDREN. Pilar Garcia-Roca,[1] Mayela Perdomo,[1] Gilberto Castañeda-Hernández,[2] Herlinda Reyes-Pérez,[1] Ana Maria Hernández,[1] Yolanda Fuentes,[1] Mara Medeiros.[1] *[1]Laboratorio de Investigación en Nefrologia, Hospital Infantil de México Federico Gómez, México, DF, Mexico; [2]Farmacología, CINVESTAV, IPN, México, DF, Mexico.*

PURPOSE: To determine the frequency of CYP3A5 and MDR1 gene polymorphisms and study their relationship to Tacrolimus (Tac) pharmacokinetics.

METHOD: A cross sectional study was performed in 44 transplant children. A 12h Tac pharmacokinetic profile (pk) was obtained with eight time sample points, DNA was obtained from peripheral blood for CYP3A5 and MDR1 exons 12, 21 and 26 genotyping.

RESULTS: 24 patients (54.5%) were CYP3A5 expressers and 20 (45.5%) non expressers, their relationship to PK is depicted in the table.

Tac PK and CYP3A5 genotype in Mexican children renal transplantation

	CYP3A5*1*3 (EXPRESAN) n = 24	CYP3A5*3*3 (NO EXPRESAN) n = 20	p
D (mg*Kg)	0.12 (0.03 – 0.54)	0.06 (0.02 – 0.16)	0.000
C0 (ng/mL)	5.5 (0 – 9.3)	5.1 (1.7 – 11.3)	0.860
Cmax/D (ng*mL/ mg*Kg*d)	132.5 (8.8 - 435)	243.3 (29.2 – 560)	0.026
ABC0-∞ /D (h*ng*mL/ mg*Kg*d)	1274 (85 - 5842)	3397 (679 – 12184)	0.003

Twenty-four (54.5%) were CYP3A5 expressors and request high tacrolimus doses (0.12 mg/Kg/dia) to appropriate tacrolimus serum levels. Twenty patients (45.5%) were non exppressors, they needed 0.06 mg/Kg/dia. The AUC0-∞/dosis was less in non expressors patients.

Regarding MDR1 exon 26, 18 patients (41%) were TT homozygous and required higher Tac dose, no difference was observed in PK.

Tac PK and MDR1 exon 26 (C3435T) genotype

	CC n = 9	CT n = 17	TT n= 18	p
D (mg*Kg*d)	0.05 (0.02 – 0.24)	0.09 (0.02 – 0.18)	0.14 (0.04 – 0.54)	0.04
C0 (ngmL)	5.2 (2.8 - 9.4)	5.5 (1.7 – 11.3)	5.2 (0 -9.3)	0.879
Cmax (ng/mL)	14.3 (6.2 – 33)	16 (3.3 – 32)	15 (2.3 – 30)	0.997
ABC0→∞/D (h*ng*mL/ mg*Kg*d)	3574 (447 – 12184)	2821 (679 – 7388)	1960 (85 – 5647)	0.393

The patients with TT polimorphism in 26 exon request high tacrolimus doses, but don´t observe diferences in pharmacokinetcs parameters.

Exon 21 and 12 polymorphisms had no influence in Tac dose or PK profile.

CONCLUSION: The CYP3A5*1 allele frequency was 54.5% in mexican renal transplant children. The CYP3A5 gene polymorphism predicts Tac PK.

Abstract# 62

HIGH DOSES OF CALCINEURIN INHIBITORS ARE ASSOCIATED WITH LOW LEVELS OF T REGULATORY CELLS IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS. Karine S. Piard-Ruster, Richard Silva, William Berquist, Betty Pham, Amy Gallo, Sheri M. Krams, Carlos O. Esquivel, Olivia M. Martinez. *Surgery, Multi-Organ Transplant, Stanford University, Stanford, CA, USA.*

PURPOSE: T regulatory (Treg) cells hold promise for promoting long-term allograft survival. Prototypical human Treg cells are $CD4^+CD25^{hi}FOXP3^+$. Previous studies suggest calcineurin signaling is important in Treg generation, however the effects of calcineurin inhibitors on Treg levels in clinical transplant recipients are not determined. Here we analyze the effect of tacrolimus levels on the number of circulating $CD4^+CD25^{hi}FOXP3^+$ Treg cells in pediatric liver transplant recipients.

METHOD: Samples were obtained from 51 pediatric liver transplant patients (26 male and 25 female) with stable graft function and were assigned to one of four groups: 1) pre-transplant (n=11); 2) low tacrolimus (<5ng/ml) (n=23); 3) high tacrolimus (>5ng/ml) (n=10); and off immunosuppression (n=7). Blood $CD4^+CD25^+FOXP3^+$ cells were measured by three-color immunofluorescent staining and flow cytometry.

RESULTS: Patients off immunosuppression had the greatest number of $CD4^+CD25^{hi}FOXP3^+$ cells per 20000 blood lymphocytes (316±42.3) followed by the pre-transplant group (313.6±65.2), patients receiving low doses of tacrolimus (201.9±22.7), and, finally, patients on high doses of tacrolimus (165.9±38.6). The levels of Tregs in patients receiving high doses of tacrolimus were significantly lower than the levels of Tregs in patients off immunosuppression (p= 0.0004). There was a trend towards increased $CD4^+CD25^{hi}FOXP3^+$ cells in patients on low doses of tacrolimus compared to patients on high doses of tacrolimus but this difference did not reach statistical significance. There was no significant difference in the numbers of $CD4^+$ T cells between groups.

CONCLUSION: These data indicate that the level of tacrolimus can affect the number of circulating Tregs and suggest that the calcineurin pathway participates in development, maintenance and/or survival of Treg in children post-transplant.

Abstract# 63

LONG TERM FOLLOW UP OF CHILDREN RECEIVING TACROLIMUS (Tac) OR CYCLOSPORIN A-MICROELMUSION (CyA) POST LIVER TRANSPLANTATION. Carla Lloyd,[1] Ulrich Baumann,[2] Michele Colledan,[3] Deirdre A. Kelly.[1] *[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Ped Gastroenterology and Hepatology, Hannover Medical School, Hannover, Germany; [3]Director, Department of Surgery, Ospedali Riuniti, Bergamo, Italy.*

PURPOSE: To compare 10 year safety and efficacy of Tac and Cya in children post liver transplantation (OLT).

METHOD: 181 children enrolled in a 10 centre, European study. 91 received dual therapy (Tac+steroids, initial dose 0.3mg/kg/day, trough 10-20 ng/mL), 90 received triple therapy (CyA, Azathioprine+steroids, initial dose 10mg/kg/day, trough 100-350 ng/mL). 13 died in the first year and 168 children are under follow up. All results expressed as median (range) on an intent to treat basis.

RESULTS: 68/168 children at 3/10 centres (34 Tac) reviewed to date. 16/68 excluded from analysis: 10 lost to follow up (3.8yrs) (4 Tac); 6 died (1.4yrs) (3 Tac). 52 (26 Tac) reviewed at median follow up 10.9 yr post OLT. Histologically proven rejection: 8 (30%) patients (14 episodes) of acute rejection (AR); 2 (8%) chronic rejection (CR) recorded at 2-5 years post OLT all on CyA: Late rejection: AR in 3 patients: 2 (6%) Tac; 1 (6%) CyA; CR developed in 3; 2 (6%) Tac; 1 (6%) CyA (median 8.1 yrs) 3 PTLD cases reported in first 2 yrs post OLT with none since; no insulin dependent diabetes reported. Median renal function (cGFR ml/min/1.73m^2): 115 (Tac) and 125 (CyA) 10 yrs post OLT (p=ns): 22 had baseline immunosuppression changed due to adverse events: CyA (n=16): AR (10): Renal Dysfunction (4); others (2); Tac (n=6): AR (3); PTLD (1); others (2). There was no significant difference in patient or graft survival at any time post OLT between groups.

CONCLUSION: Of 68 children reviewed in this long term follow up study, 6 died and 10 are lost to follow up. 20/26 (77%) in Tac group and 10/26 (38%) in CyA group remain on original i/s. There is no difference in the incidence of late rejection or in renal function, however there were more episodes of early rejection and adverse effects in those on CyA and hence fewer children remained on this drug. There was no overall difference in survival in those receiving either Tac or CyA up to 10 yrs post OLT.

Abstract# 64

CAMPATH FOR INDUCTION OF IMMUNOSUPRESSION IN PEDIATRIC KIDNEY TRANSPLANTATION. Michael M. Kaabak,[1] Nadezda N. Babenko,[1] Alan K. Zokoyev,[1] Alexey A. Maschan,[2] Aligeydar A. Ragymov.[3] *[1]Kidney Transplantation, Russian Scientific Center of Surgery, Moscow, Russian Federation; [2]Bone Marrow Transplantation, Institution for Pediatric Hematology, Moscow, Russian Federation; [3]Transfusiology, Russian Scientific Center of Surgery, Moscow, Russian Federation.*

PURPOSE: Costimulatory pathway (CD28-B7) is considered to play a key role in rejection and is realized mostly through the mesenhimal cells. We supposed that Campath, being infused several weeks pretransplant can affect mesenhimal cells and promote donor-specific tolerance.

METHOD: 99 children (51 boys), age from 0,7 to 18 years (10,9±5,2), transplanted from September 2006 to December 2009. Patients were followed 841±385 days post transplant. Immunosupression (IS) protocol: First dose of Campath, 30 mg, was infused to live donor kidney recipients 14-27 days prior to transplantation (18.2±2.8). Next dose of Campath was given on Day 0. Maintenance IS was based on CNIs and mycophenolates. Steroids were discontinued after achievement of target CNI level. Protocol biopsies were taken 1 month, 1 and 3 year post transplant.

RESULTS: Graft and patient survival was 95% and 97% for one year and 91% and 94% for two years. Delayed graft function occurred in 12 patients. Biopsy proven acute rejection (BPAR) developed in 18% patients at one year and in 24% at two years, BANFF score: borderline in 59%, 1a in 34%, 1b in 0.5%, 2a in 5% and 2b in 1% of all rejections.

Among 85 patients, survived with functioning grafts, the change of graft function by comparison of CFR and proteinuria at discharge and at the last control was not significant: 82±23 and 82±32 ml per min; 221±241 and 161±139 mg per day. IS at the last control is follows: Tacro+MMF – 29, CsA+MMF – 18, PSI+MMF – 13, Tacro+MMF+Pred – 6, MMF monotherapy – 6, CsA+MMF+Pred – 3, Tacro monotherapy – 3, MMF+Pred – 2, PSI+MMF+Pred – 1, CsA+Pred – 1, CsA+Aza+Pred – 1. Free of steroids remain 84% of patients.

CONCLUSION: Preconditioning of children with Campath 1-H 14-27 days before kidney transplantation allows to reach satisfactory short-term results with little maintenance IS and significant proportion of steroid freedom – important issue in pediatric population.

Liver 1: Rejection and Fibrosis

Abstract# 65

IMPACT OF DONOR AND RECIPIENT RELATED PARAMETERS ON LONG TERM ALLOGRAFT FIBROSIS FOLLOWING PEDIATRIC LIVER TRANSPLANTATION. Carla Venturi, Christine Sempoux, Christophe Bourdeaux, Etienne Sokal, Raymond Reding. *Pediatric Liver Transplant Program, Saint-Luc University Clinics, Université Catholique de Louvain, Brussels, Belgium.*

PURPOSE: The pathophysiology of allograft fibrosis (LAF) in pediatric liver transplantation (LT) is not fully understood. We hypothesized that donor-related (age, graft type, ischemia time) and recipient-related (immunoprophylaxis, acute rejection, CMV/EBV seroconversion, and autoimmunity) parameters might adversely influence hepatic fibrogenesis.

METHOD: We retrospectively analyzed the clinical and biochemical data of 51 primary pediatric LT recipients (median age at LT: 2.65 yrs, r 0.4-14) at the time of protocol liver biopsies (6 mo, 2-5-7-10 yrs post-LT). The histological samples were reviewed by two independent pathologists. LAF grades were categorized according to Scheuer scoring system (F0-F4). (*J Hepatol* 1991;13:372-374).

RESULTS: Median donor age and median ischemia time were: 32 yrs (r 0.4-50) and 145 min (r 66-774), respectively; (cadaveric donors, n=18, living-related donors, n= 33). Median long-term follow-up was 11.1yrs (r 6.3-22). LAF progression along the post-LT follow-up is detailed in the table.

Follow-up	6months n=36	2 years n=38	5 years n=36	7 years n=32	10years n=16
Fibrosis F0/F1/F2/F3/ F4 (%)	31/55/14/0/0	21/37/37/5/0	11/55/31/3/0	13/46/41/4/0	0/60/34/7/0
Mean + SD TAC blood levels (ng/ml)	9.7±1.8(NS)	4.7±1.5(NS)	5.5 ±1.4(NS)	2.8± 1.0(NS)	3.1±1.7(NS)
F1-F4 cases with positive AutoAbody (%)	27.5(NS)	17.4(NS)	7.5(NS)	8.5(NS)	1.2(NS)
Acute rejection	(NS)	P<0.031	(NS)	(NS)	(NS)

There was no significant correlation between LAF grade and ischemia time, donor age, type of graft, and EBV/CMV seroconversion (data not shown). LAF at 2 yrs was significantly related to acute rejection episodes occurring during the first 6 months following LT (P< 0.031).

CONCLUSION: Progressive allograft fibrosis is a common long-term finding in pediatric LT. Early acute rejection seems to adversely impact on long-term LAF,whereas current immunoprophylaxis and autoimmunity had apparently no impact. The particular role of steroids is currently under investigation.

Abstract# 66

ABO-INCOMPATIBLE PEDIATRIC LIVER TRANSPLANTATION IN INFANTS. Thomas A. Gelas, Patrick J. McKiernan, Deirdre A. Kelly, David A. Mayer, Darius F. Mirza, Khalid Sharif. *Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Liver transplantation (LT) for very small recipients is challenging but in experienced centres, good results can be achieved. Despite the risk of antibody-mediated acute rejection, some studies have demonstrated the safety of ABO incompatible liver transplantation (ILT) in children and particularly in infants. The aim of our study was to describe the outcome of liver transplantation in infants <5 kg and the safety of using ILT in this group.

METHOD: All LT performed between 1991 and 2010 in children <5 kg were reviewed. 29 patients were included, five of whom had an ILT. Acute liver failure was encountered in 20 cases. The recipient age and weight at transplantation were respectively 63 days (range: 14-268 days) and 4 kg (range: 2.4-5 kg). The graft-to recipient ratio was 6.1% (range 2.3%- 9%). An aortic conduit and delayed abdominal closure were used respectively in 76% and 81% of the procedures. The ABO compatible liver transplantation (CLT) and ILT groups were similar regarding recipient's demographics, graft types or technical transplantation data.

RESULTS: The 1- and 5-year patient and graft survival were respectively 62%, 62% and 62%, 57.9% with a median follow-up of 95 months. Vascular complications occurred in 6 cases (21.4%) and biliary complications were encountered in 5 patients (17%). Acute and chronic rejection developed respectively in 37% and 26% of the recipients. The 5 patients undergoing ILT are all alive without graft lost after a median follow-up of 34 months (range 7-55 months). When compared with the CLT group, no significant differences were found regarding patient or graft survival, vascular or biliary complications and rejection rates.

CONCLUSION: In our experience, ILT in small infants has short and long term outcomes comparable to ABO-compatible grafts and excellent results can be achieved with a standard immunosuppressive protocol. To avoid mortality on the waiting list for neonatal recipients, ABO-incompatible liver grafts can be used safely.

Abstract# 67

ELEVATED PLASMA LEVELS OF SOLUBLE CD30 AND CD40L ARE ASSOCIATED WITH GRAFT DYSFUNCTION IN PEDIATRIC LIVER RECIPIENTS. Sergey V. Gautier, Olga M. Tsirulnikova, Olga E. Gichkun, Rivada M. Kurabekova, Alexander A. Ammosov, Olga P. Shevchenko. *Federal V. Shumakov Research Center of Transplantology and Artificial Organs, Moscow, Russian Federation.*

PURPOSE: It was found that new biochemical and immunological markers can be effective for prognosis and monitoring in organ transplantation. Elevated plasma level of soluble CD30 (sCD30) is associated with rejection of renal transplant. And soluble CD40L (sCD40L) level is predictor of development of cardiac transplant vasculopathy. The aim of the study was to evaluate prognostic value of plasma levels of sCD30 and sCD40L for prediction of graft dysfunction development in children with end-stage liver disease (ESLD) after living-donor liver transplantation (LDLT).

METHOD: The study included 65 children with ESLD aged 14±6 (4-36) months before and after LDLT and 38 adult living-related liver donors aged 37±19 (18-56) years. Plasma concentrations of sCD30 and sCD40L were measured by ELISA.

RESULTS: In children with ESLD pre-transplant plasma levels of sCD30 (78.3±36.3 ng/ml) and sCD40L (3.2±1.8 ng/ml) were significantly higher than in healthy donors (31.1±11.7 ng/ml, p<0.01 and 0.9±0.6 ng/ml, p<0.01 resp). After LDLT concentrations of sCD30 and sCD40L were significantly decreased (56.4±19.0 ng/ml, p<0.01 and 1.7±0.6 ng/ml, p<0.01 resp).

Pre-transplant plasma level of sCD30 was 83.3±34.1 ng/ml in children, who had graft dysfunction on days 26-32 after LDLT (n=12). It was increased to 106.5±15.9 ng/ml, p<0.05 in 18-21 days after transplantation. Elevation of the concentration of sCD30 was observed 2-5 days before increasing of liver enzyme activity. In these children pre-transplant plasma level of sCD40L was significantly higher (5.7±2.1 ng/ml, p<0.05) than in common group.

CONCLUSION: Our data have shown that elevated plasma levels of sCD40L before LDLT and sCD30 after LDLT can be early predictors of liver graft dysfunction in children with ESLD.

Abstract# 68

LIVER TRANSPLANTATION: BEDSIDE DETECTION OF REJECTION AND ISCHEMIA BY MICRODIALYSIS CATHETERS. Haakon Haugaa,[1,2] Tor Inge Tonnessen.[1,2] *[1]Anesthesia and Intensive Care, Oslo University Hospital, Oslo, Norway; [2]University of Oslo, Oslo, Norway.*

PURPOSE: Rejections and vascular occlusions are besides biliary complications and infections serious and frequent complications following pediatric liver transplantation. With rejection, the increased metabolism caused by activated lymphocytes implies increment of lactate and pyruvate. Ischemia represents an imbalance between lactate and pyruvate towards lactate. Microdialysis catheters implanted in liver grafts are able to sample metabolic substances. The aim of the present study was to investigate the clinical value of bedside monitoring of intrahepatic metabolic substances in pediatric liver transplants.

METHOD: Microdialysis catheters were inserted in the liver grafts at the end of the transplantation. Bedside measurements of lactate, pyruvate, glucose and glycerol were performed. Lactate:pyruvate-ratio (LP-ratio) was calculated.
RESULTS: Sixteen liver grafts were included. The catheters performed satisfactorily without complications median (range) 8.5 (0.5-14) days. Seven patients had biopsy verified episodes of rejections: Median (range) 4.3 (2.2-8.7) days before bilirubin or alanine transaminase increased, lactate rose from median (quartiles) 1.3 (1.2-1.7) to 2.1 (2.1-2.2) mM (p=0.018) and pyruvate from 105 (96-131) to 183 (174-211) µM (p=0.018). LP-ratio was stable (p=0.31). Rejections were detected with 100 % sensitivity and 92 % specificity. Four patients had occluded vessels: Compared to controls (n=11, "pre-rejection" data included), lactate rose from median (quartiles) 1.3 (1.2-1.8) to 6.4 (3.9-9.2) mM (p=0.004). Pyruvate was stable (p=0.28). LP-ratio rose from 11.8 (10.5-13.2) to 23.7 (18.1-61.1) (p=0.013). Ischemia was detected with 100 % sensitivity and specificity.
CONCLUSION: Microdialysis catheters detected episodes of rejection and ischemia in pediatric liver transplants with high levels of sensitivity and specificity. Rejections were detected several days before current standard monitoring. We regard the method feasible and safe and suggest implementation in the routine monitoring after pediatric liver transplantation for early and reliable detection of complications.

Abstract# 69

HISTOLOGICAL FINDINGS IN ONE YEAR PROTOCOL BIOPSIES FOLLOWING PAEDIATRIC LIVER TRANSPLANTATION: LOW INCIDENCE OF ABNORMALITIES WITH COMBINED TACROLIMUS AND STEROID REGIME.

Helen M. Evans,[1] Simon Chin,[1] Stephen Mouat,[1] Kai-Yin Chau,[2] Mee-Ling Yeong.[3] *[1]Paediatric Gastroenterology, Starship Hospital, Auckland, New Zealand; [2]Pathology, Auckland City Hospital, Auckland, New Zealand; [3]Diagnostic Med Lab, Auckland, New Zealand.*

PURPOSE: Histological abnormalities, including chronic hepatitis & fibrosis, are increasingly reported in liver biopsies of children after liver transplantation (LT). These changes can be progressive & may represent a form of rejection. Liver biochemistry is often initially normal. Our LT programme began in 2002 and utilises tacrolimus (levels 5-8 after the first 3 months) and low-dose steroids for the first year. Children undergo protocol liver biopsy at 1 year post LT.
METHOD: From 2002-2009, 51 children underwent LT & 50 survived for 1 year. 40 (16 male; median age at LT 25 months; median time post LT 12.5 months; 31 biliary atresia) underwent protocol biopsy. 2 had transferred to adults; 1 had graft failure; 1 is awaiting biopsy; 3 were deferred due to ongoing treatment for biliary obstruction & 4 declined biopsy. Biopsies were reviewed by 2 pathologists. Steroids were discontinued in those with normal biopsies or findings unrelated to immunosuppression.
RESULTS: 29/40 (73%) of biopsies were normal. 2/40 (5%) had chronic hepatitis & 1/40 (3%) had isolated fibrosis. 3/40 (8%) had moderate-severe steatosis. Other findings were acute rejection (2/40) & biliary obstruction (3/40). Median AST & ALT were 39 (range 13-636) & 29 (range 9-764) respectively. 2 children with normal biopsies, all those with biliary obstruction & none with chronic hepatitis or fibrosis had abnormal biochemistry.
CONCLUSION: Tacrolimus in combination with prolonged use of low-dose steroids may reduce the incidence of chronic hepatitis giving rise to further speculation that the aetiology is related to rejection or under-immunosuppression. However, prolonged steroid use needs to be balanced with potential adverse effects on linear growth (which were not observed in our patient cohort) & the possible increase of steatosis. Evaluation of the later protocol biopsies in these children will be required to determine if these findings are maintained with time.

Abstract# 70

NON INVASIVE BIOMARKERS AND TRANSIENT ELASTOGRAPHY IN MONITORING LONG TERM GRAFT FUNCTION IN PAEDIATRIC LIVER TRANSPLANT RECIPIENTS.

Emer Fitzpatrick,[1] Sunitha Vimalesvaran,[1] Alberto Quaglia,[2] Ragai Mitry,[2] Prashant Bachina,[1] Stephen Mouat,[1] Nigel Heaton,[2] Anil Dhawan.[1] *[1]Paediatric Liver GI and Nutrition Centre, King's College Hospital, London, United Kingdom; [2]Institute of Liver Studies, King's College Hospital, London, United Kingdom.*

PURPOSE: Chronic graft fibrosis and hepatitis has been increasingly reported in long term liver transplant recipients. In a significant number of children post-liver transplantation, fibrosis may develop silently over years leading to graft loss. Liver biopsy is currently the accepted method of assessing fibrosis however this is a static measure and repeat biopsy carries a risk of morbidity and mortality. The aim of this study was to evaluate use of non-invasive markers of liver fibrosis in post-transplant patients.
METHOD: Children underwent protocol liver biopsy at 10 years post-transplant (only children who had biochemically normal liver function were included). Blood was taken on the day of biopsy. ELISA was used to assay plasma for CK18M30 fragments. Serum was analysed for the Enhanced Liver Fibrosis test (ELF) using an immune-1 analyser. A smaller cohort also underwent transient elastography (TE). Biopsies were scored for fibrosis by a hepato-histopathologist from F0 (no fibrosis) to F4 (cirrhosis).
RESULTS: Twenty children (11 male); median age 14 years, were recruited. Initial diagnosis was biliary atresia in 8, Alagille in 3, acute liver failure in 3, and miscellaneous in the remainder. Fibrosis stage: F1 in 10, F2 in 7, F3 in 3, none had F0 or F4. Median ELF scores for F1, F2 and F3 were 9.83, 10.2 and 10.99ng/ml. AUROC for severe fibrosis (≥F3) for ELF was 0.74. CK18M30 and the indirect measure AST to Platelet Ratio Index (APRI) had an AUROC of 0.667 and 0.627 respectively. TE had an AUROC of 0.875 for ≥F3.
CONCLUSION: Liver fibrosis was universal in children even with normal LFTs at 10 years post-transplantation. The use of blood biomarkers in combination with TE proved an effective mode of monitoring fibrosis progression in liver allografts.

Abstract# 71

ACOUSTIC RADIATION FORCE IMPULSE IMAGING IN THE ASSESSMENT OF LIVER FIBROSIS IN PEDIATRIC PATIENTS.

Maria J. Noruegas,[1] Hugo C. Matos,[1] Isabel Gonçalves,[2] Maria A. Cipriano,[3] Maria C. Sanches.[1] *[1]Radiology, Hospital Pediátrico Coimbra, EPE, Coimbra, Portugal; [2]Hepatology, Hospital Pediátrico de Coimbra, EPE, Coimbra, Portugal; [3]Pathology, Hospitais Universidade de Coimbra, EPE, Coimbra, Portugal.*

PURPOSE: To determine if acoustic radiation force impulse imaging (ARFI) tissue quantification is useful in the estimation of liver fibrosis in pediatric age, correlating it with liver fibrosis quantification assessed by histological analysis.
METHOD: ARFI is a new technology integrated into conventional B-mode, that provides complementary information by characterizing tissue stiffness. Characterization is achieved by applying a push pulse, resulting in displacement of tissue elements producing shear waves with different velocities that are then quantified. Pediatric patients with history of chronic liver disease were submitted to ARFI and in the same year to liver biopsy for histological quantification of fibrosis. ARFI imaging was performed using Virtual Touch software with ACUSON S2000 (Siemens) and 4MHz frequency transducer. Results were compared with a control group of pediatric patients with no known history of liver disease.
RESULTS: A total of 52 patients were submitted to ARFI with mean age of 8 years (range 1-16 years). The study group included 32 of the patients (mean age 8 years), 31,2% (10 patients) with chronic liver disease and 68,7% (22 of the patients) submitted to liver transplant. The control group included 20 patients (mean age 7 years) with no history of liver disease. Mean shear wave velocity (SWV) in the study group was 1,70m/s (1,06-3,62m/s) compared to 1,19m/s in the control group (0,91-1,5m/s). Area under the receiver operating characteristic curve for the accuracy of the ARFI imaging, sensitivity and specificity were, respectively: 0.83, 0.79, 0.77 for F1; 0.82, 0.89, 0.75 for F2; 0.98, 1, 0.97 for F4. SWV that were predictive for each fibrosis stage were 1.31 (F1), 1.39 (F2), 2.25 (F4).
CONCLUSION: ARFI allows SWV quantification that correlates with the degree of fibrosis in liver. This procedure can become a valid alternative in the follow-up of children submitted to liver transplant and chronic liver disease, avoiding stated biopsies.

Abstract# 72

LIVER TRANSPLANTATION ACROSS ABO BLOOD GROUPS – SINGLE CENTER EXPERIENCE.

Malgorzata Markiewicz-Kijewska,[1] Piotr Kalicinski,[1] Joanna Teisseyre,[1] Dorota Broniszczak,[1] Przemyslaw Kluge,[2] Piotr Czubkowski.[3] *[1]Pediatric Surgery and Organs Transplantation, Children's Memorial Health Institute, Warsaw, Poland; [2]Pathology, Children's Memorial Health Institute, Warsaw, Poland; [3]Gastroenterology, Hepatology and Immunology, Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Liver transplantation has become a routine treatment for children with liver failure, however due to organ shortage or urgency of transplantation marginal donors are more widely accepted including donors with incompatible blood groups. The aim of our study was to assess results of ABO incompatible (ABOi) liver transplantations performed in our center.
METHOD: We performed retrospective analysis of all ABOi liver transplantation for: indications for transplantation, long term graft function, immunosuppression and acute or chronic rejection incidence, patient and graft survival, graft loss and mortality causes. Between 1997 and 2010 we transplanted 41 children aged 0,2-20,5 years (mean 7 years) and body mass 4,6-77 kg (mean 26,33 kg). They received 42 ABOi grafts. Seven patients (17%) died after transplantation (due to multiorgan failure, neurological problems or severe acute rejection).
RESULTS: The actual follow up of living patients is 0,36-13,42 years (mean 3,88 years). The main immunossupressant was tacrolimus in 38 patients. Additional agents were: MMF in 29 pts and/or steroids in 17 pts. Antilymphocytic globulins or antiIL2 rec antibodies were administered to 35 patients. Early acute rejection was observed in 14 pts, late acute rejection episodes developed in 4 patients. All but one AR resolved after boluses of SoluMedrol, one patient was treated with ATG due to steroid-resistant AR. Vascular complications were found in 4 patients (HA thrombosis in 1, PV thrombosis-3). There was no chronic rejection in this series.

CONCLUSION: Liver transplantation with ABOi grafts can be a live saving procedure in patients with ALF or acute decompensation of chronic liver disease (especially if suitable donor is not available) with comparable long term graft and patient survival to transplantation with ABO compatible grafts.

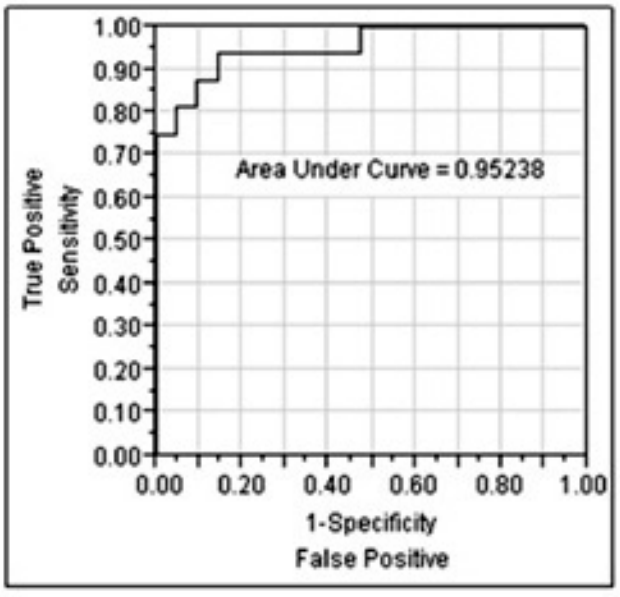
Abstract# 73

A PERIPHERAL BLOOD 13 GENE-SET FOR DIAGNOSIS OF PEDIATRIC LIVER ALLOGRAFT TOLERANCE. L. Li,[1] L. Wozniak,[2] S. Heish,[1] S. Rodder,[1] S. McDiarmid,[1] K. Cox,[1] M. Sarwal.[1] *[1]Pediatric, Stanford, Stanford, CA, USA; [2]Pediatric, UCLA, LA, CA, USA.*

PURPOSE: To identify the monitoring biomarkers of liver tolerance (TOL) specific to pediatric and adult liver transplant TOL.

METHOD: 238 samples were used into 3 projects: 1. Microarray discovery on Agilent Whole Human Genome microarrays (n=58): 20 unique whole blood samples from Stanford including 7 pediatric TOL liver transplant (P-TOL) and 13 non-TOL patients; 38 published adult samples (Llordella *et al*) including 17 adult tolerant (A-TOL) and 21 non-TOL patients. 2. Microarray validation (n=98): including 58 microarray samples and 19 STA from adult published study, 6 healthy controls from Stanford, and 9 P-TOL and 6 Non-TOL from UCLA. 3. Q-PCR validation and prediction (n=79): including 37 microarray samples from Stanford and UCLA and 20 minimal immunosuppression (IS) (MIS), and 22 stable (STA) patients on dual IS from Stanford and UCLA.

RESULTS: 13 genes were identified (FDR<5%) by PAM as a minimum gene set to cross-validate and predict P-TOL with 100% sensitivity (sen) and 92% specificity (spe), 76% sen and 95% spe in the adult dataset, and 100% sen and 83% spe for 15 UCLA samples from microarray. These genes are enriched in liver regeneration and regulated by NFkB1 and SMAD3 and are highly expressed in NK, endothelial and dendritic cells. By regression model from Q-PCR validation on 37 samples, the 13 genes can predict 88% sen, 90% spe with ROC=95%.



In addition, 45% (9/20) MIS and 73% (16/22) STA patients were predicted as TOL. There is no association between gene expression and age either at the sample time or age at the transplant for 13 genes.

CONCLUSION: Specific peripheral transcriptional genes can be identified in TOL for pediatric and adult liver recipients, may provide a means to non-invasively monitor patients in a serial manner for IS minimization.

Organ Donation

Abstract# 74

LAPAROSCOPIC LEFT LIVER SECTIONECTOMY (LLLS) FOR PEDIATRIC LIVING RELATED LIVER TRANSPLANTATION (LRLT). Marco Spada,[1] Ugo Boggi,[2] Duilio Pagano,[1] Gabriel J. Echeverri,[1] Carlo Bartoccelli,[1] Pieralba Catalano,[1] Calogero Ricotta,[1] Davide Cintorino,[1] Sergio Li Petri,[1] Fabrizio di Francesco,[1] Silvia Riva,[1] Salvatore Gruttadauria,[1] Bruno G. Gridelli.[1] *[1]ISMETT, UPMC, Palermo, Italy; [2]Azienda Ospedaliero-Universitaria, Pisa, Italy.*

PURPOSE: LRLT in children is a method to provide organs for transplantation. We report 2 cases of LLLS for pediatric LRLT.

METHOD: Donor position: lithotomy with surgeon in French position. Trocars: three 12 mm, placed 2 cm upper the supra-umbilical mid-line and sub-costal bi-lateral on the nipple lines; one 5 mm in epigastrium. Special instrumentation: harmonic scissor, ligasure®, Hem-O-Lock clips, and Endo Catch-II® bag. Main steps: division of round, falciform, left triangular ligaments and of lesser omentum; inspection of anatomy; hepatic hilum dissection with exposure of the left hepatic artery; dissection of the right side of the falciform ligament with exposure of the left branch of the portal vein; dissection of the Arantius' ligament and exposure of the left hepatic vein; parenchymal dissection with hilar plate and left biliary duct(s) section; Pfannestiel incision; placement of the graft (S2-3) into an Endo Catch-II® bag; vessels transection with endoTA; graft extraction.

RESULTS: Case 1. Donor: 19 year-old woman (w=67 kg, h=165 cm). Operation time was 495 min; total ischemia time (TIT) 38 min, and warm ischemia time (WIT) 7 min. No blood loss. Postop course uneventful: after 3 months donor remains asymptomatic with normal liver function. Recipient:10-month-old girl affected by sclerosing cholangitis, (PELD=23); after 3 months of follow-up the recipient is well with normal liver function. Case 2. Donor: 25 year-old woman (w=53 kg, h=150 cm). Operation time was 405 min, TIT 43 min, and WIT 6 min. No blood loss; Postop course and follow up uneventful. Recipient: 11-month-old girl affected by biliary atresia (PELD=10); after a 1 month of follow-up she's alive and well with normal liver function.

CONCLUSION: No donor's morbidity or mortality was observed. The laparoscopic pediatric LDLT is a safe and feasible procedure that should be considered in experienced centers with advanced laparoscopic expertise.

Abstract# 75

COMPARISON OF PEDIATRIC ALLOCATION POLICY FOR KIDNEYS IN DIFFERENT DEVELOPING COUNTRIES. M.A. Macher, M. Thuong, E. Savoye. *Agence de la Biomédecine, Saint Denis La Plaine, France.*

PURPOSE: Most people agree that pediatric patient awaiting renal transplantation (RT) deserve special consideration according to the deleterious effects of dialysis on growth, and development. Therefore most countries have developed specific criteria for kidney (K) allocation to children. But benefit to shorten time on waiting list has to be balanced with the organ quality and HLA-matching which influence graft survival.

METHOD: The aim or this study is to compare pediatric priority allocation policy (PPAP) for deceased donor K in developing countries and to analyze their impact on waiting times (WT), HLA- and age-matching.

RESULTS: In France, since 1996, candidates under 16 are given priority (P), extended to those under 18 in 2008. There is a national P for K from donors under 18 and regional P for K from donors 18-30 years old. But since 2007, regional P became more limited and took place after other higher grade P and one K is given through local allocation. With this policy, number of RT in recipients under 18 remains stable in the last 5 years, 93 to 122 per year including 6 to 18% of living donor RT, accounting for 3 % of all RT.The number of new children registered (96 to 144) and the number transplanted are balanced. But because of children still on list at the end of each year, there remains an imbalance of 100 to 120 and the number of candidates for one K is 1.8 to 2.1 (versus 3.8 for adults). From 2005 to 2010, the median WT was 7.8 m versus 24.3 in adults ($p<0.001$). Since 2007, WT increased for children under 16: 3.8 m for 1999-2002 versus 7.5 for 2007-2010, but decreased for adolescents aged 16 to 17 from 18.3 m to 11.4. Age-matching was favourable with 75% of donors under 18 and 26% between 18 -29. There were 3 HLA mismatches or less in 41% of cases.

CONCLUSION: PPAP in France for K resulted in reduced WT and allocation of K from young donors with correct HLA-matching. Comparison with other countries has to be performed with results issued from other national registries boards. Questionnaires has been sent concerning PPAC, WT, HLA- and age- matching and indications on organ shortage allowing comparison between different systems :UNOS, EuroT,UK.

Abstract# 76

PREDICTING THE DONOR LIVER LEFT LATERAL SEGMENT WEIGHT FROM ANTHROPOMETRIC VARIABLES. Thomas Gelas,[1,2] Darius F. Mirza,[1] Olivier Boillot,[2] Paolo Muiesan,[1] Mustapha Adham,[2] David A. Mayer,[1] Khalid Sharif.[1] *[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Liver Transplantation Unit, Hospital Edouard Herriot – Hospices Civils de Lyon, Lyon, France.*

PURPOSE: Most of pediatric liver transplantation grafts consists in a left lateral segment (LLS). Liver graft size matching is one of the major factors determining a successful outcome. It is then potentially important that evaluation of the segmental liver weight of deceased donors could be performed preoperatively. The aim of our study is to develop a formula to evaluate the LLS graft weight using anthropometric parameters; helping transplant surgeons to avoid large-for size or small-for size syndromes.

METHOD: 122 donors from 2 European transplantation centres (United Kingdom and France) were retrospectively reviewed. There was 48 female and 74 male. Eighteen were living related donors (LRLT) and 104 deceased donors. The mean donor age was 28.2 years (range 15-63). The body weight and height were respectively 70.1 kg (range 45-111) and 172.7 cm (range 152-197). The body surface area (BSA) was 1.83 m^2 (range 1.41-2.46).

RESULTS: The whole liver weight (WLW, n=66) was 1462 grams (range 921-2340) and the liver to body weight ratio (WLW/BW) was 2% (range 1.45%-2.8%). The LLS graft weight was 313 grams (range: 183-537 g). The ratio between LLS and BW (LLS/BW) was 0.452% (range 0.27-0.74). The LLS represented 22.3% of the WLW

with a large variability ranging from 15.4 to 31.3%. Our predictor variables were only moderately correlated with Pearson correlations between LLS and BSA of 0.458, LLS and BW of 0.446. Conveniently, the following formula can be used to approximate the LLS weight: LLS (grams) = 165 X BSA (m^2) + 10.
CONCLUSION: The present study shows that the LLS/BW ratio is 0.45% in European donors and LLS represent around 22% of the WLW. The weight of the LLS is highly variable and hardly predictable using simple anthropometric variables. Potential donors should not be rejected because of their size without further evaluation of the LLS.

Abstract# 77

THE CAUSES OF ORGAN DONATION REFUSAL IN IRAN. Seyed Mohsen Dehghani, Siavash Gholami, Ali Bahador, Saman Nikeghbalian, Heshmatollah Salahi, Seyed Ali Malek-Hosseini. *Shiraz Transplant Research Center, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran.*
PURPOSE: Family refusal is an important factor that limits the number of organ donors. Many studies from around the world have reported different reasons why families refuse organ donation. Cultural reasons and religious factors as well as perception of brain death are the principal for there refusals.
The aim of this study is to evaluate the reasons for donation refusal by family members in organ procurement organization of Shiraz Transplant Center.
METHOD: The study retrospectively evaluated potential organ donors with brain death who were identified between March 2009 and March 2010 in Shiraz Transplant Center.
RESULTS: The study included 125 potential donors of whom 73 (58.4%) families refuse donation. The main reasons for family denial were: lack of acceptance of brain death in 26 (35.6%), belief in miracle and patient recovery in 22 (30.1%), fear of gossip regarding sale rather than donation of organs in 11(15.1%), fear about deformation of the donors body in 9 (12.3%), and other reasons in 5 (6.8%).
CONCLUSION: Despite an introduction of a death brain, family members play an important role in the final decision for organ donation. The general public should be encouraged to register their donation preferences in the death brain.

Abstract# 78

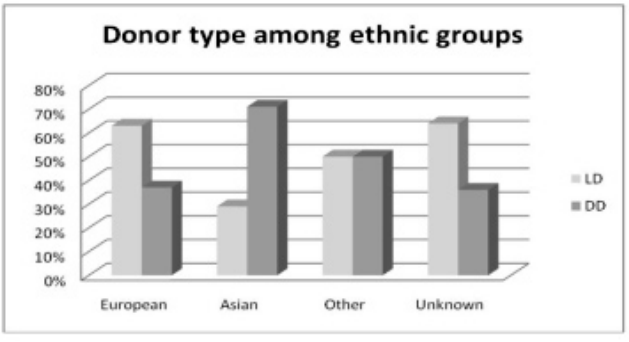
KIDNEY PROCUREMENT FROM PEDIATRIC DONORS IN FRANCE. M.A. Macher, F.X. Lamy, V. Reiter, C. Lamotte. *Agence de la Biomedecine, Saint Denis La Plaine, France.*
PURPOSE: While in France, the overall number of brain dead donors increased over 50% in the last 10 years(y), with a maximum of 1563 donors in 2008, there was a decrease in the number of donors of pediatric age (under 18).
METHOD: This led us to analyze organ procurement in subjects under 18 in France between 2000 and 2009 using data from the base of the Agence de la biomedecine.
RESULTS: The number of potential pediatric donors (PD) identified decreased from 177 to 133 (- 25%) mainly for children from age 4 to 18 (- 32%) and for effective PD from 71 to 52 per year (- 27%).The causes of death are age related. Anoxia is more frequent in infants (32% <2 vs 14% [12-18 y]), injuries not related to road accidents (RA) decrease with age (20% <2 vs 13% [12-18 years]), while RA increase with age (11% < 2 vs 50% [12-18 years]). The overall number of RA decreased by 54% over the study period. The opposition rate for organ removal was 36.7% for PD (31.1% for all donors) ranging from 17 to 45.8% according to the pediatric age group. The rate of organ retrieval in effective donors is comparable to that observed in adults after the age of 2 for the liver (> 75%) and after the age of 4 for kidneys (> 96%). The kidneys from PD <16 were transplanted to pediatric recipients in 67% of cases. Since 2008, pediatric priority was extended from 16 to 18 y and the rate of kidneys from donors aged 16 -18 transplanted to pediatric recipients increased from 19 to 63%. Meanwhile, demand for pediatric transplantation was stable, with stability of the number of candidates, although there is an increase of 15% between 2007 and 2010. One hundred to 120 transplants yearly are mainly performed with pediatric kidneys (67%). The shortage rate (number of candidates per kidney) increases slightly from 1.8 to 2.1 between 2004 and 2009.
CONCLUSION: In conclusion,the progressive diminution of PD is largely explained by the decrease of RA through prevention policies. It should lead to discuss with pediatric intensivists on ways to increase identification of PD and to reduce the high rate of opposition in children. Pediatric nephrologists have to consider the development of living donor transplantation as an alternative to the shortage.

Abstract# 79

THE FROSTBITTEN LIVER: CAN SUBZERO COLD PRESERVATION BE A CAUSE OF PRIMARY NON FUNCTION? Kristina Potanos,[1] Khashayar Vakili,[1] Christopher Weldon,[1] Roger Jenkins,[2] Heung Bae Kim.[1] [1]*Surgery, Childrens Hospital Boston, Boston, MA, USA;* [2]*Surgery, Lahey Clinic, Burlington, MA, USA.*
PURPOSE: Liver transplantation requires appropriate hypothermic packaging techniques to allow for organ transport to the recipient hospital. We present a case of liver transplant in which deviation from standard packaging practice may have caused subzero storage temperatures during transport, resulting in a clinical picture resembling primary non function (PNF).
METHOD: We performed a retrospective chart review, focusing on perioperative events, organ packaging documentation and postoperative course.
RESULTS: An 18 month old male with alpha-1-antitrypsin deficiency underwent whole liver transplant from a size matched deceased donor. Peak donor AST and ALT were 186 and 105. Upon arrival at the recipient hospital, ice crystals were noted in the University of Wisconsin (UW) solution. The liver was noted to have a rubbery feel, but was not obviously frozen. The transplant proceeded uneventfully. Despite short ischemia times, the postoperative course was biochemically similar to PNF. Transaminases were markedly elevated; peak AST was 17,060 unit/L on POD2 and peak ALT was 8,160 unit/L on POD3. INR and total bilirubin were elevated in the early postoperative period, peaking at 6.1 and 12.1 mg/dL. All values returned to near normal limits by discharge on POD19. Follow-up of over 3 years has demonstrated normal liver function. Upon case review, it was discovered that organ packaging at the time of recovery included storage in the first bag with only 400ml of UW solution due to the small graft size. Pure ice was placed inadvertantly in the second bag instead of slush.
CONCLUSION: We hypothesize that the postoperative complication of delayed graft function was related to the subzero storage of the liver graft during transport, resulting in frostbite of the liver. This case is the first reported description of subzero cold injury following inappropriate packaging of an otherwise healthy donor liver. The clinical picture closely resembled that of PNF, perhaps implicating this mechanism of injury in other unexpected cases of PNF.

Abstract# 80

UTILIZATION OF LIVING DONORS VARIES BETWEEN ETHNICITY IN PEDIATRIC RENAL TRANSPLANTATION. Valerie Langlois, Rulan S. Parekh, Jun C. Teh, Gail Picone, Diane Hebert, Lisa A. Robinson, Naifain Al Kalbani. *Paediatrics, The Hospital for Sick Children, Toronto, ON, Canada.*
PURPOSE: Ethnic disparities in transplant outcomes including acute rejection and graft survival have been documented in both pediatric and adult kidney transplant patients even after controlling for confounding factors.
The study objectives were to determine 1) if utilization of living related donor (LRD) transplantation varies by ethnicity; and 2) if outcomes of living donor grafts vary by ethnic status of the recipient compared to deceased donor (DD) grafts. We hypothesized that those of Asian ethnicity utilized more DD transplants and had worse clinical outcomes.
METHOD: A cross-sectional non-concurrent retrospective cohort study was conducted at our institution with 185 renal transplants between 1 January, 1996 and 30 June, 2006. Ethnicity was categorized as Caucasian or European, Asian, African, Aboriginal, Others and Unknown. Because of the small number of Africans and Aboriginals, they were regrouped with Others. Outcomes included the number of biopsy-proven acute rejection and estimated glomerular filtration rates (eGFR) on follow-up.
RESULTS: Of the 185 total number of transplants, the mean age at transplantation was 11.9 ± 4.9 yrs with mean follow-up of 2.8±1.6 years, 45% were Caucasian, 17% were Asian, 11% were Others and 27% were Unknown. The utilization of living donors was 63% in Caucasian compared to 29% in Asian, 50% in Others and 64% in Unknown.



There was no statistical difference in the number of acute rejections in the first 6 months post transplant or in the eGFR.
CONCLUSION: We demonstrated that Asians utilized more DD compared to Caucasians. We did not find an association with outcomes. However, this will need to be assessed in longer follow-up. The barriers preventing LD need to be further evaluated.

Abstract# 81

THE EFFECTS OF MATERNAL DONOR ON THE RENAL ALLOGRAFT OUTCOME. Kaan Gulleroglu,[1] Sare Akyuz,[2] Esra Baskin,[1] Umut Bayrakci,[1] Sema Aktas,[3] Munire Turan,[4] Hamdi Karakayali,[3] Mehmet Haberal.[3] *[1]Pediatric Nephrology, Baskent University, Ankara, Turkey; [2]Pediatric Nephrology, Sami Ulus Children's Hospital, Ankara, Turkey; [3]General Surgery, Baskent University, Ankara, Turkey; [4]Laboratory of Immunology, Baskent University, Ankara, Turkey.*

PURPOSE: During pregnancy and nursing, a baby's developing immune system is intimately exposed to the mother's antigens. To determine whether this exposure is of clinical benefit to patients who later receive an allograft, we studied the outcome of primary renal transplantations from relative donors.

METHOD: Forty-six renal transplanted children younger than 18 years old were divided into 2 groups based on living donor type as maternal donor (group1) and the other relative donors (group2). 38 patients received maternal donor allograft and the remaining 8 were from non-maternal relative donor. The impact of HLA haplotype compatibility between donor and recipient on the various outcomes was studied.

RESULTS: The mean age of recipients at the time of transplantation was similar for two groups (group1:13.02±4.04, group2:13.05±4.09). The mean age of maternal donors was significantly younger than non-maternal donors (37.31±5.83, 42.71±7.01, $p<0.05$). HLA haplotype compatibility between donor and recipient was similar for two groups. There was not any difference for glomerular filtration rate and acute rejection episode between two groups. Graft survival at posttransplant 3rd years was 92% for maternal donor allograft and 88% for non-maternal relative donor ($p>0.05$). Although it doesn't mean a statistical significance, clinically it makes difference on the quality of life of the recipients.

CONCLUSION: Graft survival of kidney from living donors is excellent. It seems that there is not a significant difference for allograft outcome between maternal and non-maternal relative donors.

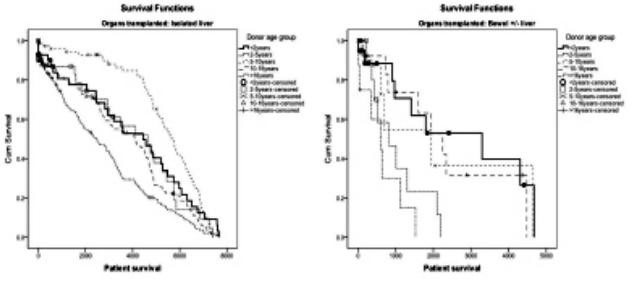
Abstract# 82

INFANT ORGAN DONORS FOR PAEDIATRIC RECIPIENTS: AN UNDERUTILISED RESOURCE? Evelyn Ong,[1] Khalid Sharif,[1] Paolo Muiesan,[1,2] David Mayer,[1,2] Darius Mirza.[1,2] *[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Liver Unit, Queen Elizabeth Hospital, Birmingham, United Kingdom.*

PURPOSE: Paediatric patients on the UK liver & intestinal transplant waiting list increased by 30% last year.In expanding the donor pool, higher proportions of donors are older and clinically obese,factors that may affect outcomes adversely.Infant donors are scarce due to difficulties in declaring brain stem death and obtaining consent.We reviewed our data to examine if outcomes justify their use as potential donors.

METHOD: Single institution outcomes of primary liver (LTx),bowel +/- liver (BLTx) and combined liver/kidney (LKTx) transplants from 1989 to 2009 were reviewed and compared between donor age groups.

RESULTS: Of 626 transplants,62 had infant donors (42(68%)LTx,19(31%) BLTx,1(1%)LKTx).The incidence of hepatic artery (p=0.07),portal vein (p=0.64) and biliary complications (p=0.52) was comparable between infant and older donors for all transplants.There was also no significant difference in incidence of graft failure between infant and older donors in LTx (24%, p=0.19), BLTx (21%, p=0.62) or LKTx (0%, p=0.34).



Cox regression analysis adjusting for recipient age and diagnosis showed there was no significant difference in survival of the graft or the patient between all donor ages for either LTx or LKTx. However BLTx graft survival from infant donors was significantly higher compared with 2-5y (p=0.039) and 5-10y (p=0.02) donors.In our study period 243 recipients weighed less than 10kg and were potential recipients for infant donors.

CONCLUSION: Liver grafts from infant donors produce comparable results to older donors.Weight matched intestinal donors may improve survival and therefore infant donation should be encouraged for this cohort.Four times as many recipients could have benefited from infant donors during our study period.

Abstract# 83

BONE MINERAL DISEASE IN CHILDREN AFTER RENAL TRANSPLANTATION IN STEROID-FREE AND STEROID-TREATED PATIENTS – A PROSPECTIVE STUDY. Jacek Rubik,[1] Elzbieta Karczmarewicz,[2] Ryszard Grenda,[1] Halina Matusik,[2] Pawel Pludowski,[2] Malgorzata Kiliszek,[1] Jaroslaw Piskorski.[3] *[1]Department of Nephrology, Kidney Transplantation and Hypertension, The Children's Memorial Health Institute, Warsaw, Poland; [2]Department of Biochemistry and Experimental Medicine, The Children's Memorial Health Institute, Warsaw, Poland; [3]Institute of Physics, University of Zielona Gora, Zielona Góra, Poland.*

PURPOSE: The aim of the study was to compare the long term effect of three medical interventions: 1) two prophylactic oral doses of 50 mg ibandronate; 2) daily oral dose of 0.25 μg of 1α-OHD3 (both of these regimens in patients receiving steroids), and 3) steroid minimization immunosuppressive protocol in patients with no other specific prophylaxis.

METHOD: Patients: 37 children in total, at mean age of 13.33 ± 3.49 years, dialyzed for 15.93 ± 16.7 months before transplantation, were divided in 3 groups depending on medical intervention. Bone mineral content and density (BMC, BMD, DXA), serum markers of bone resorption and formation (CTX, P1NP), calcium, phosphate, 25OHD3/ 1,25 (OH)2D3 and PTH concentration were evaluated during 2 years of follow-up.

RESULTS: The mean values of BMD in the whole population and among the three subgroups remained within age- and gender-matched normal range during follow-up. Patients from group II (alphacalcidiol) and III (steroid minimization) showed significant decrease of BMD Z-scores over time, and this effect was determined with increasing age by multivariate analysis. Patients receiving two doses of ibandronate maintained unchanged Z-scores for BMD and BMC over time.

CONCLUSION: Two-dose oral bondronate prophylaxis protocol was effective in terms of preventing the decrease of bone mineral density in children after renal transplantation at low risk of bone complications who were receiving steroid-based immunosuppression during a two-year follow-up period. Steroid minimization by itself, with no additional prophylaxis, was not as effective.

Abstract# 84

PREVALENCE AND RISK FACTORS FOR NUTRITIONAL VITAMIN D DEFICIENCY AND ABNORMAL BONE MINERAL DENSITY IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Kristen Sgambat, Shamir Tuchman, Leticia Ryan, Rachel Wood, Asha Moudgil. *Childrens National, Washington, DC, USA.*

PURPOSE: Pediatric renal transplant (Tx) recipients are at increased risk for bone disease due to convergence of effects from underlying kidney disease and vitamin D (VitD) deficiency. We investigated risk factors for VitD deficiency and abnormal bone mineral density (BMD) in a Tx cohort.

METHOD: Records of 68 Tx(2-21 yrs) were retrospectively reviewed. 25OHVitD was measured at baseline then every 2-4 months. VitD status was classified as deficient(<15), insufficient(15-30) or replete(>30ng/ml). Those with low VitD were treated with ergocalciferol(ergo) or cholecalciferol(chole). Pretreatment VitD levels were analyzed for associations with possible risk factors and compared to a control group of 52 healthy children using logistical regression. Baseline DXA scans of 26 Tx were compared to 47 controls. BMD was classified as normal($z > -1$), osteopenia(z -1 to -2.5) or osteoporosis($z < -2.5$).

RESULTS: Of 68 Tx, 41 were African American (AA) and 27 non-AA. 16(23.5%) of all Tx were VitD deficient. Prevalence of deficiency was double among AA(29.3%) vs non-AA(14.8%). Of all Tx, 24(35.3%) were insufficient;18(43.9%) AA were insufficient compared with 6(22.2%) non-AA. Multiple logisitc regression showed AA(OR 9.7,$p<0.01$), winter(OR 6.4,$p<0.05$), older age(OR1.2,$p<0.01$), males(OR3.9,$p<0.05$),and <6 months time since Tx(OR5.0,$p<0.05$) were associated with increased risk of low VitD. Of 40 Tx with low VitD at baseline, 27 have completed >12 weeks of therapy. Of 9 treated with ergo, none achieved repletion. 14 of 18 treated with chole achieved repletion after mean of 9.2 months. Of 26 Tx with DXA, 9(34.6%) had low BMD($z <-1$). Tx had 20-fold higher risk of low BMD than controls($p<0.05$), controlling for age, race and gender.

CONCLUSION: Low VitD and BMD are prevalent after Tx. VitD should be measured routinely and those with low levels treated with VitD. Preliminary data suggests better repletion of VitD with chole vs ergo. Duration of therapy to achieve VitD repletion is perhaps longer than current guidelines recommend. Strategies to optimize BMD in this population should be further investigated.

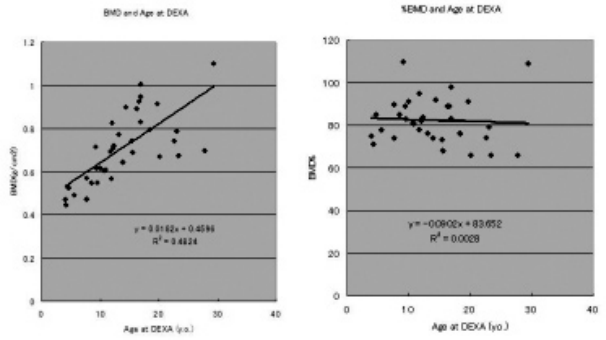
Abstract# 85

BONE MINERAL DENSITY APPEARED TO BE RETAINED BY EARIER RENAL TRANSPLANTATION IN CHILDREN.UNDER 10 YEARS OLD. Takeshi Kawamura,[1] Atsushi Aikawa,[1] Seiichiro Shishido,[2] Ken Sakai,[1] Jiro Takasu,[1] Yoji Hyoudou,[1] Yujiro Aoki,[1] Hiroshi Nihei,[1] Yasuo Niitsu.[1] *[1]Nephrology, Toho University, Faculty of Medicine, Tokyo, Japan; [2]Pediatric Nephrology, Toho University, Faculty of Medicine, Tokyo, Japan.*

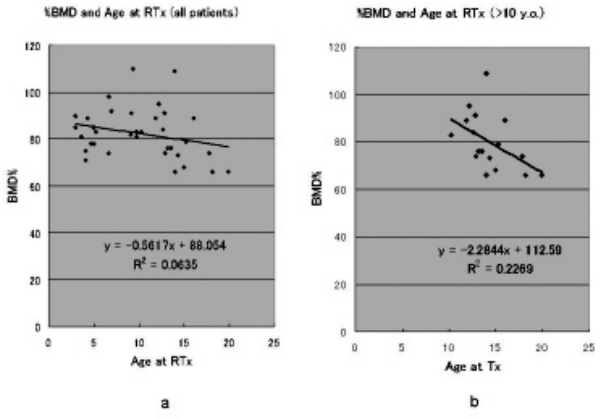
PURPOSE: Reduced bone mass is a common complication for renal transplantation(RTx) in adults. While retaining bone mass is so important in order to get fair growth especially in pediatric RTx, only few data are focused on this area in Japanese cohort. This study is aimed to investigate the bone mineral density (BMD) pre- and post RTx in Japanese pediatric recipients.

METHOD: We investigated BMD, structural status, and graft function of 38 Japanese pediatric RTx patients at the age of 1~20 (9.8±4.6). BMD of lumbar vertebra, determined by dual energy X-ray absorptiometry (DEXA) before (3.1±1.5 months, n=6) and after (69.7±64.4 months, n=32) RTx. %BMD was calculated based on Japanese reference data according to age.

RESULTS: The mean BMD increased with age following RTx. However catch-up increase of %BMD was not observed after RTx.



Moreover, % BMD post RTx were retained with growth in small patients whose age at RTx were less than 10 years, while elderly transplanted recipients (≥10 years) tended to loss %BMD with growth after RTx.



CONCLUSION: Significant decrease of BMD was noted in pediatric patients with end stage renal failure before RTx. Care should be taken, because elderly transplanted recipients may loss more BMD even after RTx.

Abstract# 86

VITAMIN D INSUFFICIENCY AND DEFICIENCY IN PEDIATRIC RENAL TRANSPLANT PATIENTS. Kirsten Ebbert, Josephine Chow, Jennifer Krempien, Mina Matsuda-Abedini, Janis Dionne. *Department of Nephrology, B.C. Children's Hospital, Vancouver, BC, Canada.*

PURPOSE: Vitamin D deficiency is prevalent in the pediatric chronic kidney disease (CKD) population. Recognizing that renal transplant patients have a form of CKD, we assessed the prevalence of Vitamin D insufficiency and deficiency in pediatric renal transplant patients, compared to a population of healthy children. We also compared seasonal differences in mean 25-hydroxyvitamin D (25-OHD) in each group.

METHOD: We prospectively studied 31 pediatric renal transplant patients from the Multi-Organ Transplant Clinic in British Columbia, Canada. 25-OHD levels were measured in summer (April-September) and winter (October-March) of one year, and patients completed a 3 day dietary record. 25-OHD levels were determined in 46 control patients throughout the year. Vitamin D status was defined as per the current Kidney Disease Outcomes Quality Initiative guideline recommendations, with levels below 37.5nmol/L considered deficient, and levels 37.5 to 75nmol/L as insufficient.

RESULTS: The overall prevalence of vitamin D insufficiency and deficiency was 76% (95%CI:61,87%) in the pediatric renal transplant patients and 91% (95%CI:80,98%) in the control population. The mean 25-OHD level was 52.3+/- 17.9nmol/L in the winter and 65.6+/-18.8nmol/L in the summer (95%CI diff.: 3.9,22.7) in the paired renal transplant samples. In the control group, the mean 25-OHD level was 51.5+/-15.2nmol/L in the winter and 59.3+/-15.6nmol/L in the summer. Dietary intake of Vitamin D will also be analyzed in relation to serum 25-OHD levels.

CONCLUSION: Vitamin D insufficiency and deficiency was highly prevalent in our control population. We did not find an increased prevalence in our pediatric renal transplant recipients compared to the control population. This is likely due to factors including increased awareness of nutrition and routine dietary monitoring in these patients. Consistent with the current literature, we also found significant seasonal differences in 25-OHD levels.

Abstract# 87

PREVALENCE OF VITAMIN D DEFICIENCY IN A PEDIATRIC KIDNEY TRANSPLANT POPULATION. Vivian Cornelius,[1,2] Teresa Maiorano,[1,2] Diane Hebert.[1,2] *[1]Transplant Centre, The Hospital for Sick Children, Toronto, Canada; [2]Nephrology, The Hospital for Sick Children, Toronto, Canada.*

PURPOSE: Kidney transplant recipients are at risk for Vitamin D deficiency. There is limited evidence that vitamin D may be protective in metabolic diseases and graft rejection. The primary objective of this cross-sectional study was to determine the prevalence of vitamin D deficiency and insufficiency in our pediatric kidney transplant population. The secondary objective was to determine the effects of dietary and supplemental vitamin D_3 on serum levels.

METHOD: We recruited 39 subjects (44% female and 56% male) in spring months from April to July 2009. Their average age was 13.02 years (SD 4.04 years) and 33% of patients had an eGFR less than 90 ml/min/1.73m^2. Serum 25(OH) vitamin D was collected as routine blood work. A validated calcium and vitamin D food frequency questionnaire was used to determine dietary intake. A 2nd questionnaire collected data on vitamin supplementation, diet restrictions, sun exposure, sun screen use, skin pigmentation, and city of residence. Retrospective demographic, anthropometric, eGFR, initial diagnosis, use of corticosteroids and duration of transplant data were also collected.

RESULTS: All subjects lived above latitude 40° north, where during the winter and early spring UVB radiation is insufficient for vitamin D synthesis. All subjects received prednisone. Fifty-one percent of the patients had normal serum values (≥75nmol/L), 33% were insufficient (40-74nmol/L) and 16% were deficient (0-39nmol/L). Patients with insufficient and deficient vitamin D levels (mean of 49.1 nmol/L) had a mean daily total vitamin D intake (diet +/- supplementation) of 432 IU (SD 595 IU), compared to patients with normal vitamin D levels (mean 95.4 nmol/L) who had a mean daily intake of 658 IU (SD 515 IU) (p=0.14). Subjects with insufficient/deficient levels receiving diet alone had significantly lower serum levels (41.9nmol/L) than those receiving supplementation (58.9nmol/L) (p = 0.014).

CONCLUSION: The prevalence of hypovitaminosis D was 49%. Supplementation with Vitamin D_3 had a significant effect on insufficient and deficient serum levels.

Abstract# 88

PERSISTENT HYPERPARATHYROIDISM AFTER PEDIATRIC RENAL TRANSPLANTATION. Esra Baskin,[1] Kaan Gulleroglu,[1] Umut Bayrakci,[1] Sema Aktas,[2] Hamdi Karakayali,[2] Mehmet Haberal.[2] *[1]Pediatric Nephrology, Baskent University, Ankara, Turkey; [2]General Surgery, Baskent University, Ankara, Turkey.*

PURPOSE: Hyperparathyroidism is a frequent complication of chronic kidney disease and persists after renal transplantation 25-43% of patients. Glomerular filtration rate less than 70ml/min, use of cyclosporine A and low serum 25-OH D vitamin levels after transplantation are the risk factors of persistent hyperparathyroidism.

METHOD: Forty-four pediatric renal transplant recipients with stable graft function were studied. Median follow-up time after transplantation was 17.5 months. None of the patients was treated with vitamin D or calcium supplements or had undergone previous parathyroidectomy. 29 patients received cyclosporine A, 15 patients received tacrolimus as immunosuppressive treatment. Also each patient received mycophenalote mofetil and oral prednisolone. Bone mineral densitometry of the lumbar spine was measured. The aims of our study were to examine the status of parathyroid hormone levels after transplantation and determine the clinical and biochemical risk factors of persistent hyperparathyroidism.

RESULTS: Fifteen patients have parathyroid hormone levels greater than 70 pg/ml. Mean serum bicarbonate level was significantly lower in patients with persistent hyperparathyroidism when compared with the other patients (respectively 18.9±3.01, 21.8±3.49, p< 0.05). A significant negative correlation was noted between parathyroid hormone level and serum bicarbonate level (r=-0.30, p=0.044). Another significant negative correlation was shown between parathyroid hormone level and Z score (r=-

0.31, p=0.038). Mean serum calcium and mean serum phosphate levels were similar for high and normal parathyroid hormone levels. There was not any relationship between posttransplant parathyroid hormone levels and glomerular filtration rate, steroid doses, type of immunosuppressive regiment, fractional excretion of sodium and tubular phosphate reabsorption.
CONCLUSION: In conclusion we assume that low serum bicarbonate level is one of the predictor of persistent hyperparathyroidism after renal transplantation.

Ethical/Psychosocial 1: Neurocognitive and Neuropsychosocial Outcomes

Abstract# 89

COMPARISON OF NEUROCOGNITIVE PROFILES AND RISK FACTORS IN CHILDREN AFTER SOLID ORGAN TRANSPLANTATION. Anu Haavisto,[1] Erik Qvist,[2] Christer Holmberg,[2] Hannu Jalanko,[2] Jari Lipsanen,[1] Marit Korkman.[1] *[1]Institute of Behavioural Sciences, Helsinki, Finland; [2]Pediatric Nephrology and Transplantation, Hospital for Children and Adolescents, Helsinki, Finland.*
PURPOSE: Children share, regardless of type of transplantation (Tx), many common risk factors for an inferior neurodevelopmental outcome. The aim of this study was to determine similarities and differences in cognitive profiles between pediatric heart-, kidney-, and liver Tx patients.
METHOD: 78 Tx patients (19 heart, 45 kidney, 14 liver) aged 6-16 years underwent a standardized test of intelligence (WISC-III) and a neuropsychological assessment using NEPSY-II. Mean age at assessment was 12.0 (SD 3.1) years for heart-, 11.2 (3.2) for kidney-, and 12.1 (3.3) for liver Tx recipients. Time since Tx was, on average, 5.5 (3.6) for heart-, 7.1 (3.6) for kidney-, and 8.3 (4.4) years for liver recipients. Cognitive outcome for children with post-Tx complications or neurological sequelae were analyzed separately.
RESULTS: No differences between the Tx groups emerged in WISC-III or NEPSY-II when age at Tx and follow-up time were controlled for. In WISC-III there was a trend for the liver Tx group (VIQ 96, PIQ 93) to score better than the kidney- (VIQ 85, PIQ 80) and heart Tx (VIQ 90, PIQ 82, n.s.) recipients. Tx patients achieved significantly poorer scores in subtests assessing visuomotor and visuoconstructive functions compared to subtests of attention and memory in the NEPSY-II. Patients with post-Tx complications (e.g. severe infections, rejections) did not differ from those without complications; however, children with neurological sequelae, acquired both pre- and post-Tx, performed poorer in all subtests than children with a normal neurological outcome.
CONCLUSION: Thus, the Tx groups scored significantly poorer in subtests assessing visuomotor and visuoconstructive functions, compared to those measuring attention and memory. These findings indicate that neurological sequelae, rather than type of Tx or post-Tx complications, are associated with a poorer cognitive outcome, and that visuomotor and visuoconstructive domains are particularly sensitive to diffuse and non-acute, acquired insult.

Abstract# 90

BEHAVIOUR AND SOCIAL FUNCTIONING AFTER PAEDIATRIC LIVER TRANSPLANTATION. Tanja Kaller,[1] Nadine Langguth,[1] Rainer Ganschow,[2] Björn Nashan,[3] Karl-Heinz Schulz.[1,3] *[1]Medical Psychology, University Hospital Eppendorf, Hamburg, Germany; [2]Children's Hospital, University Hospital Eppendorf, Hamburg, Germany; [3]Transplantation Center, University Hospital Eppendorf, Hamburg, Germany.*
PURPOSE: Liver transplanted children have an increased risk to develop serious developmental problems. Based on previous research, we hypothesized that liver transplanted children show more behavioural problems and poorer social functioning compared to the norm.
METHOD: The sample consists of 117 children (53% girls, aged 10.3±3.7 years) that completed a behavioural questionnaire late postoperatively (i.e., 8.8±4.3 years after transplantation). The mean age at Ltx was 41.0±46.1 months. Assessment included: behaviour (SDQ, self- and proxy-report) and intelligence (WISC, K-ABC).
RESULTS: Regarding behaviour 77% to 91% of the assessed children scored within the normal range. In the subscales (proxy-report) hyperactivity (t=5.0, p<.001), problems with peers (t=8.7, p<.001), and total sum score (t=3.0, p=.004) results were significantly below the population mean. In the self-report only problems with peers (t=10.4, p<.001) was significantly below population mean. Here 22.7% of the children scored within the borderline or abnormal range compared to 13.3% in the norm population. Moreover, problems with peers was highly correlated with all subscales of the K-ABC (r=-.37, p=.04 to r=-.54, p=.002) and total IQ-score of the WISC (r=-24, p=.04). In semi-structured interviews, parents with children that experience more problems with peers reported more social problems at school (r=.49, p<.001), more problems with teachers (r=.38, p=.004) and more problems with subject materials (r=.38, p=.001).
CONCLUSION: The results corroborate our hypotheses in parts. Regarding social adjustment, our results provide evidence suggesting that liver transplanted children might be at risk of interpersonal difficulties, i.e. peer problems. Further research is needed to understand the origin of these problems. Interrelations between behaviour and intelligence support the previous findings that comprehensive psychological diagnostics and psychosocial support are necessary to ensure children's social integration.

Abstract# 91

NEUROPSYCHOLOGICAL FUNCTION OF CHILDREN BEFORE LUNG, LIVER, OR KIDNEY TRANSPLANTATION. Jackson Wong,[1] Susan Gilmour,[1] Verna Yiu,[1] Cathy Schellenberg,[1] Janet Edgerton,[2] Thomas Snyder.[2] *[1]Department of Pediatrics, University of Alberta, Edmonton, AB, Canada; [2]Department of Psychiatry, University of Alberta, Edmonton, AB, Canada.*
PURPOSE: Children with chronic, end-stage organ failure are at risk of psychosocial and cognitive impairment. Hypoxia in lung failure (LF) and diabetes in cystic fibrosis are associated with subtle deficits of motor speed and memory, deficits also seen in patients with end-stage hepatic failure (HF) and renal failure (RF). This study was undertaken to evaluate the differential effects of these conditions.
METHOD: As part of standard protocols for transplant assessment, the psychosocial and cognitive functions of 6 children with end-stage lung disease were compared to those of age-matched patients with HF or RF. Assessment included standard tests of intelligence, attention, memory, fine-motor coordination, and executive function. Psychosocial function was assessed by parent-rated behavior (Child Behavior Checklist).
RESULTS: As a group, patients showed average abilities, including intellectual functioning (35th percentile), immediate attention, memory, executive skills, and reading (52nd percentile). Relative weaknesses were evident for manual speed/coordination and mathematics (22nd percentile). Kruskal-Wallis analyses showed no significant differences between groups except for greater problems with attention (p .007) and externalizing behavior (p .036) for RF vs. LF and HF. Post-hoc Mann-Whitney analyses indicated that rule-breaking behaviors (p.004) accounted for the greater externalizing behaviors of RF regardless of congenital or dialysis status.
CONCLUSION: Children assessed for lung, liver, or kidney transplant generally showed average cognitive abilities and psychosocial functioning but subtle deficits of perceptual-motor processing speed and fine-motor coordination. Memory was intact. Math skills were weak and may merit special attention. Patients with RF had unique problems with attention and rule-breaking behavior. Post-transplantation follow-up is required to determine if all groups of patients maintain their cognitive and psychosocial functioning status.

Abstract# 92

THE BEANSTALK PROGRAM: DEVELOPMENTALLY FOCUSED CARE FOR THE YOUNG TRANSPLANT CHILD DURING PROLONGED HOSPITALIZATION. Stephanie So, Alaine Rogers, Catherine Patterson, Wendy Drew, Julia Maxwell, Jane Darch, Carolyn Hoyle, Sarah Patterson, Stacey Pollock-BarZiv. *Hospital for Sick Children, Toronto, Canada.*
PURPOSE: Solid organ transplantation (SOT) is standard therapy for end stage disease. Young children undergoing SOT are at increased risk for developmental delay, particularly those with prolonged hospitalizations. The Beanstalk Program (BP) provides an optimal environment, ongoing education and facilitates positive experiences to enhance development for children <3 years old who require hospitalization >3 weeks. This study investigates parental experiences and perceptions of developmentally focused care during their child's hospitalization.
METHOD: Parents whose children were in the BP between 2003-2008 were recruited to participate in a mixed method study. Participants completed the Measure of Processes of Care (MPOC-20), with additional questions regarding the BP, and were invited to participate in a qualitative semi-structured interview. MPOC-20 scores are reported descriptively. Interviews were analysed until saturation of themes was achieved.
RESULTS: Twenty parents (of children hospitalized between 3 weeks to 15 months) completed the MPOC-20. Scores rate the extent of healthcare provider's behaviour as perceived by the family ranging from 1 (worst) to 7 (best). Highest scores included Respectful and Supportive Care (6.33) and Beanstalk Programming (6.34); lowest scores were for Providing General Information (5.65). Interview data generated several key themes: a) Parents describe striving for "normalcy" with the importance of routines, creating safe spaces for their child and accommodating the family/child's needs; b) Shifting the focus to their child's development in the midst of complex medical issues helped parents reframe their perspective and prepare for the journey home; c) Receiving appropriate developmental information and skills helped with empowerment and confidence as a parent.
CONCLUSION: Parental perceptions of experiences during prolonged hospitalizations attest to the importance of developmentally focused care for young SOT patients. The BP has positively impacted the culture of care for this population.

Abstract# 93

COGNITIVE OUTCOMES IN PAEDIATRIC LIVER TRANSPLANT SURVIVORS. Tulpesh Patel,[1] Joel B. Talcott,[1] Sue V. Beath,[2] Jacqueline Blyth,[2] Jaswant Sira,[2] Jemma Mears,[2] Gareth Griffiths,[3] Indra van Mourik,[2] Deirdre Kelly.[2] *[1]School of Life and Health Sciences, Aston University, Birmingham, United Kingdom; [2]Birmingham Children's Hospital, Birmingham, United Kingdom; [3]Chemical Engineering and Applied Chemistry, Aston University, Birmingham, United Kingdom.*

PURPOSE: To investigate the impact of liver disease on cognitive ability in children with liver disease in the context of covariates such as the age of onset and transplant (Tx) intervention.

METHOD: This cross-sectional study used standard Wechsler psychometric assessment batteries to evaluate neuropsychological function (Full-scale IQ and Information Processing Speed (IPS)). We studied 23 children with liver disease, of whom 13 had undergone liver Tx, and compared their performance to 9 healthy age-matched controls. 17 patients had cholestatic liver disease from birth (early onset liver disease (EOLD); pre-Tx n=10, post-Tx n=7), 6 were well until they developed fulminant liver failure after 3 years of age (late onset liver disease (LOLD); post-Tx n=6.

RESULTS: Chronic liver disease had significant negative effect on cognitive development, with age at the onset of disease an important moderator of this effect. Significant differences in IPS were observed between the EOLD, post-Tx group (IPS =81.6) and controls (mean IPS=104.7) p= .017; (d)=1.36), with 31% of the variance in IPS accounted for by EOLD coupled with transplantation. Differences in IPS between the EOLD post-Tx patients and EOLD pre-Tx patients (mean IPS=91.7) approached statistical significance (p=.06; effect size (d)=1.26). LOLD (fulminant liver failure) post-Tx patients (mean IPS=102.5) performed no differently to controls on any psychometric measures.

CONCLUSION: EOLD has a significant impact on cognitive outcomes, possibly through the disruption of early neurodevelopment processes. Survivors of fulminant liver failure however, have performances similar to that of the healthy controls suggesting that the transplant procedure itself did not affect cognitive outcome. Enrolling patients in a large-scale, longitudinal study would help illuminate the extent and persistence of the cognitive deficits observed in paediatric liver disease.

Abstract# 94

POLYUNSATURATED FATTY ACIDS AND COGNITIVE OUTCOMES IN PAEDIATRIC LIVER DISEASE. Tulpesh Patel,[1] Gareth Griffiths,[2] Joel B. Talcott,[1] Jacqueline Blyth,[3] Jaswant Sira,[3] Jemma Mears,[3] Indra van Mourik,[3] Patrick McKiernan,[3] Sue V. Beath,[3] Deirdre Kelly.[3] *[1]School of Life and Health Sciences, Aston University, Birmingham, United Kingdom; [2]Chemical Engineering and Applied Chemistry, Aston University, Birmingham, United Kingdom; [3]Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Polyunsaturated Fatty Acids (PUFAs) serve important structural and functional roles in the central nervous system, which may modulate cognitive function. This study used a liver disease and transplant (Tx) model to evaluate whether sub-optimal concentrations of PUFAs, as a result of fat malabsorption or dependence on inadequate dietary sources, is associated with PUFA deficiency and deficits in cognitive ability.

METHOD: In 28 paediatric patients (14 pre-Tx, mean age 12.1; 14 post-Tx, mean age 15.0) and 11 healthy controls (mean age 12.2), erythrocyte biomarkers of fatty acid status, including the major omega-6 (linoleic and arachidonic), omega-3 (docosohexaenoic and eicosapentaenoic) fatty acids and deficiency markers (osbond and mead acid), were quantified using standard gas chromatography-mass spectrometry. Full-scale IQ (FSIQ) and Information Processing Speed (IPS) were assessed using standard Wechsler psychometric assessment batteries.

RESULTS: Compared to controls, no signs of PUFA deficiency were observed in the pre- or post-Tx groups, suggesting that: (1) neither sets of patients were deficient in their dietary intake of PUFA precursors, linoleic and alpha-linolenic acid, and (2) these patients are able to sufficiently synthesise PUFAs from these precursors to levels comparable to controls. Strong negative correlations were observed between omega-6 fatty acids and FSIQ and IPS scores (r=-.620 and -.39; p<.001), independent of disease diagnosis and Tx (n= 39).

CONCLUSION: These findings suggest no significant deficiency of important omega-3 fatty acids in liver disease patients. The relationship between pro-inflammatory omega-6 fatty acids and FSIQ requires further investigation. Longitudinal studies of Tx patients assessing dietary intake and PUFA and IQ will help clarify the role of PUFAs in cognitive development in paediatric liver disease.

Liver 2: Surgical Aspects

Abstract# 95

SURGICAL COMPLICATIONS IN SPLIT LIVER TRANSPLANTATION; A 12 YEARS EXPERIENCE. Thomas Gelas, Ahmed Taha, Carla Lloyd, Patrick McKiernan, Girish Gupte, Indra van Mourik, Deirdre Kelly, Paolo Muiesan, David Mayer, Darius F. Mirza, Khalid Sharif. *Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Split liver transplantation (SpLT) was developed in order to overcome the organ donor shortage for pediatric liver recipients. It remains a technically demanding procedure and is considered to be associated with a higher incidence of complications. The aim of this study was to analyze a single-center experience of pediatric SpLT performed between 1998 and 2010.

METHOD: 136 children receiving SpLT were retrospectively reviewed. The recipient age and weight at transplantation were respectively 20.5 months (14 days-15.2 years) and 10 kg (2.6-66.6 kg). Main indications for transplantation were extrahepatic biliary atresia (n=56, 41%), metabolic diseases (n=27, 20%) and acute liver failure (n=12, 9%). Donor age was 25 years (10-59 years) and donor to recipient weight ratio was 6 (0.75 to 24.6). A left lateral segment was used in 114 (84%), a left lobe in 13 (10%) and an extended right lobe in 3 (2%). The graft was reduced to a monosegment in 6 SpLT (4%). An aortic conduit was used in 31 patients (23%) and insertion of an abdominal prosthesis or staged abdominal closure in 19% of the recipients. The duration of surgery was 6.5 hours (3.75-13.8 hours) and the cold ischemic time was 10.1 hours (6.2-17.5).

RESULTS: The ITU and hospital stay was respectively 2 days and 23 days. 71 reoperations were necessary in 43 recipients (31.6%). Vascular complications occurred in 25 cases (18.4%), related to hepatic artery in 6 cases (4.4%), portal vein in 13 (9.6%) and venous outflow in 6 (4.4%). Biliary complications were encountered in 26 patients (19%) with 16 biliary leaks and 12 anastomotic strictures. Acute and chronic rejection developed respectively in 49% and 6% of recipients. The 1-, 5- and 10- year patient and graft survival were respectively 97%, 92%, 89% and 93%, 86%, 82% with a median follow-up of 60 months.

CONCLUSION: Pediatric SpLT is a safe procedure in experienced centres with excellent long term results. Biliary complications remain a difficult issue in SpLT.

Abstract# 96

BILIARY STRICTURES AFTER LIVER TRANSPLANTATION IN CHILDREN. Piotr Czubkowski,[1] Malgorzata Markiewicz,[2] Jan Pertkiewicz,[3] Zolna Zbigniew,[3] Mikolaj Teisseyre,[1] Piotr Kalicinski,[2] Joanna Pawlowska,[1] Irena Jankowska,[1] Diana Kaminska.[1] *[1]Department of Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland; [2]Department of Paediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [3]NZOZ Endotherapy, Warsaw, Poland.*

PURPOSE: The aim of the study was to evaluate efficiency of non-surgical methods in the management of biliary complications after paediatric liver transplantation.

METHOD: Between 1990-2010 466 LTx were performed in our institution. We performed the retrospective chart review of patients (23 M/17 F) after liver transplantation (25 CAD/15 LR) with biliary complications. The patients were referred to endoscopic retrograde cholangiopancreatography (ERCP), percutaneous transhepatic cholangiography-PTC with bile duct balloon dilatation and biliary stent/catheter placement or surgical revision.

RESULTS: In 40 children after LTx presenting with anastomotic biliary stricture we performed 56 PTC and 41 ERCP. At the moment of first intervention 23 patients had Roux-en-Y loop and 17 had duct-to-duct anastomosis. The mean age at the first intervention was 9,75 years (SD±4,1) and time from LTx was 1,92 years (SD±2,4). After LTx the total mean follow up without re-transplantation/death was 2,6 (SD±2,2) and after biliary intervention 1,74(SD±1,4) years. Early biliary complications <30 days after LTx occured in 16 patients (40%): bile leakage in 8, fistulas in 5, stenosis in 5 cases. 11 children (27,5%) underwent surgical reconstruction of biliary anastomosis after unsuccesful endoscopy/PTC), 7 underwent ReLTx and 2 were deceased due to post-transplant infections. The overall good outcome of non-surgical interventions was achieved in 29 patients (72,5%).

CONCLUSION: Non-surgical approach is effective and safe in biliary complications after liver transplantation. The majority of patients require repeatedly performed intervensions. Surgical approach should be considered in selected cases with poor response to primary treatment.

Abstract# 97

SURVIVAL RATES IN PEDIATRIC RECIPIENTS OF SPLIT AND REDUCED LIVER TRANSPLANTS IN THE U.S. Wida Cherikh,[1] Heung Bae Kim,[2] Chad Waller,[1] Simon Horslen.[3] *[1]United Network for Organ Sharing, Richmond, VA, USA; [2]Children's Hospital Boston, Boston, MA, USA; [3]Seattle Children's Hospital, Seattle, WA, USA.*

PURPOSE: This analysis was conducted to compare survival within 5 yrs of transplant (tx) in pediatric (ped) recipients of deceased donor (DD) split and reduced with whole liver (LI) txs in the U.S.

METHOD: We included ped recipients of splits where the second segment went to an adult recipient (N=393), ped recipients of reduced LI (N=388) and ped recipients of whole LI txs (N=2,062) during 3/1/02-12/31/08, from the OPTN database. The unadjusted graft and patient survival within 5 yrs of tx were computed using the Kaplan-Meier method. Multivariable Cox regression models were used to compare survival within 5 yrs of tx among the procedure types in the presence of other risk factors. Results of the Cox models are presented as adjusted hazard ratio (AHR) of graft loss or death and p-value.

RESULTS: Recipients of split and reduced LI txs tended to be younger than 6 yrs and in Status 1 at tx. Reduced LI txs tended to have cold ischemia time of ≥8 hrs. There was a statistically significant difference in the unadjusted graft and patient survival among the three procedure types (p-value of 0.03 and 0.01, respectively). For example, 5-yr graft survival was 73% for split, 74% for reduced and 78% for whole txs; and 5-yr patient survival was 84% each for split and reduced and 88% for whole txs. Compared to DD whole txs, there was no significant difference in the adjusted risk of graft loss for split LI txs (AHR=1.20; p=0.32) or for reduced LI txs (AHR=1.16; p=0.31). There was also no significant difference in the adjusted risk of death for split LI txs (AHR=1.17; p=0.51) or for reduced LI txs (AHR=1.35; p=0.12). The adjusted risk of graft loss or death within 5 years of tx was comparable between split and reduced liver txs.

CONCLUSION: In this retrospective analysis, ped recipients of DD split and reduced liver grafts have a comparable 5-yr graft and patient survival to ped recipients of whole liver grafts. This national registry data supports current efforts to split suitable organ donors to better serve the ped LI waiting list.

Abstract# 98

DOES EARLY DETECTION OF HEPATIC ARTERY COMPLICATIONS AFTER PAEDIATRIC LIVER TRANSPLANTATION RESULT IN GRAFT SALVAGE? Caroline M. Smith, Terry Humphries, Helen Woodley, Sanjay Rajwal, Venkatesh Karthik, Suzanne Davison, Magdy Attia, Raj Prasad. *Leeds Liver Unit, Leeds Teaching Hospitals Trust, Leeds, West Yorkshire, United Kingdom.*

PURPOSE: Hepatic artery (HA) complications following paediatric orthotopic liver transplant (POLT) fall into 2 groups: hepatic artery thrombosis (HAT) and hepatic artery stenosis (HAS). Both are associated with graft loss. Early ultrasound detection of hepatic artery thrombosis has been suggested but not proven to improve graft loss rates. We aim to analyse the impact of a strict Doppler ultrasound (DUS) protocol on graft salvage following HA complications detected in the first week post operatively.

METHOD: Doppler Ultrasound results from 130 transplants in 123 children from 2001 to April 2010 with a minimum follow up of 3 months were analysed for diagnosis of HAT or suggestion of HAS. Children underwent a Doppler Ultrasound on Days 1,2,3,5, and 7. Outcomes were collated from a prospective database and case reviews. Median follow up 1618 days.

RESULTS: Incidence of both HAT and HAS following POLT was 6.0%.

Of 8 cases of HAT, 2 were diagnosed intraoperatively and despite attempts at revascularisation immediately relisted. 4 were detected within and 2 outside the protocol period. Cases were confirmed with angiography and 4 underwent attempted open revascularisation. 7 grafts were lost, 5 within 1 week, one at 3 months and one at 2 years. Delayed graft loss was associated with biliary stricture. Only one of the eight grafts was salvaged.

8 cases of HAS were confirmed with angiography (DUS PPV 61.5%). 7 presented within the protocol period and one at day 23. All grafts were salvaged, 3 with angioplasty and stent insertion and 5 through laparotomy and redo arterial anastomosis.

CONCLUSION: Early detection of hepatic artery stenosis is associated with excellent graft salvage. In our population early detection of hepatic artery thrombosis through a Doppler ultrasound protocol was not associated with graft salvage.

Abstract# 99

IMMEDIATE POSTOPERATIVE INTENSIVE CARE TREATMENT FOR PEDIATRIC COMBINED LIVER-KIDNEY TRANSPLANTATION: OUTCOME AND PROGNOSTIC FACTORS. Florian Brinkert,[1] Egmont Harps,[4] Susanne Schmidtke,[4] Lutz Fischer,[5] Björn Nashan,[5] Rainer Ganschow,[3] Markus J. Kemper.[2] *[1]Pediatric Gastroenterology and Hepatology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [2]Pediatric Nephrology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [3]Pediatric Hepatology and Liver Transplantation, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [4]Pediatric Intensive Care Unit, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [5]Hepatobiliary Surgery and Transplant Surgery, University Medical Center Hamburg-Eppendorf, Hamburg, Germany.*

PURPOSE: Studies reporting the immediate pediatric intensive care (PICU) treatment after combined liver kidney transplantation (CLKT) are scarce, although this period is pivotal for survival and long-term outcome.

METHOD: We retrospectively analyzed all pediatric CLKT performed in our centre between 1998 and 2010.

RESULTS: 16 patients underwent 17 CLKT at a median age of 5.3 (range 1.3 - 15.9) years. Median body weight at CLKT was 17.7 (range 9.2 – 55) kg. Underlying diagnosis was primary hyperoxaluria type 1 (PH1) in 9 and autosomal recessive polycystic kidney disease (ARPKD) in 7. Median time on PICU was 8.5 (range 3 – 68) days, however patients with PH1 had a significantly longer stay (p=0.031). Median duration of ventilation was 1 day, however 5 patients required ventilation for 25 - 52 days. Continuous veno-venous hemofiltration was used in 9 patients due to delayed kidney graft function, volume overload or high plasma oxalate. Overall, survival after CLKT was 100% and long-term outcome very good at a mean follow-up of 3.6 (range 0.5-12.2) years. Waiting time, donor age and donor-to-recipient weight ratio were significant risk factors for an extended PICU stay (p=0.02, 0.0031, and 0.014, respectively).

CONCLUSION: Immediate postoperative course after CLKT may be challenging and complex. However, excellent results can be achieved, even in small children.

Abstract# 100

THE IMPACT OF INTRAOPERATIVE TRANSFUSION OF BLOOD PRODUCT ON SURVIVAL AFTER PAEDIATRIC LIVER TRANSPLANTATION. Mirco Nacoti, Federico Lorusso, Sabrina Buoro, Sergio Vedovati, Pietro Brambillasca, Luigi Naldi, Vittorio Corno, Michele Colledan, Alberto Benigni, Bruno Carrara, Carlo Pirola, Valter Sonzogni. *Riuniti Hospital, Bergamo, Italy.*

PURPOSE: Intraoperative transfusion of red blood cells (RBC) is associated with adverse outcome after orthotopic liver transplantation (OLT) in adult patients. In the last years notable advance has been observed in the study of red-cell transfusion in children, but the influence of RBC transfusion on outcome after paediatric OLT has not been studied in detail. In this study, we evaluate the impact of various blood products on outcome after OLT.

METHOD: Thirty-one variables, including blood product transfusions, were studied in relation to outcome in 243 pediatric patients undergoing a first OLT between 2002 and 2009. Data were analyzed using uni- and multivariate stepwise Cox's proportional hazards analyses, as well as propensity score-adjusted analyses to control for selection bias in the use of blood products.

RESULTS: Median age at transplant was 1.36 years. In uni- and multivariate analyses, recipient's age, total ischemia time, transfusion of fresh frozen plasma (FFP) and (RBC) were highly dominant in predicting 1-yr patient survival.

Multivariate analysis of 1-yr patient survival

	Hazard ratio (95% CI)	P-value
Recipient's age (m)		
≤16	-	
>16	3,528 (1,402-8,878)	0,007
Total ischemia time (min)		
≤420	-	
>420	3,486 (1,467-8,282)	0,005
RBC during surgery (units)		
≤1	-	0,062
2	1,575 (0,547-4,535)	0,400
≥3	3,428 (1,181-9,953)	0,023
FFP during surgery (units)		
≤1	-	0,046
2	1,136 (0,341-3,780)	0,835
≥3	3,191 (1,126-9,048)	0,029

These risk factors were independent from well-accepted indices of disease, such as the Pediatric for End-Stage Liver Disease, comorbidity and previous abdominal surgery. The negative impact of RBC and FFP transfusion on survival was dose-related and was confirmed by propensity-adjusted analysis.

CONCLUSION: This retrospective study indicates that RBC and FFP transfusions are an independent risk factor for survival after paediatric OLT. These findings have important implications for transfusion practice in paediatric liver transplant recipients.

Infectious Disease 1: BK Virus

Abstract# 101

BK VIRUS IN URINE OF KIDNEY TRANSPLANTED CHILDREN, A COMPARISON WITH NORMAL POPULATION. Alaleh Gheissari,[1] Sharareh Moghim,[1] Safoora Navaee.[1] *[1]Pediatric Nephrology, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran; [2]Virology Department, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran; [3]Pediatrics, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran.*

PURPOSE: In transplanted patients, consumption of high doses of steroid, mycophenolate mofetile and tacrolimus have been considered as risk factors for BK virus nephropathy.

Aim: To determine the presence of BK virus in urine of kidney transplanted children and children with focal segmental glomerulosclerosis (FSGS) in compare with normal population.

METHOD: This cross sectional study was carried on 79 immunocompromised children under 18 years (39 kidney transplanted and 40 with FSGS) and 52 normal population at St. Alzahra hospital, Isfahan from June 2009-.July 2010. The informed consent was obtained from children over 6 years or their parents.

Inclusion criteria:

Children with idiopathic FSGS who have been consumed mycophenolate mofetil with or without cyclosporine or steroid for at least 3-6 months.

· Children who under went kidney transplantation for at least 3-6 months before study and have been received mycophenolate mofetil with cyclosporine/tacrolimus and steroid.

· Normal glomerular filtration rate (GFR ≥ 90 ml/min) for case and control groups.

· No past history of recent urinary tract infection.

Urine BK virus was detedted by PCR method. DNA was extracted from the first morning urine by chloroform method. VP1 gene specific primer was prepared based on a 176bp length segment.

RESULTS: Two patients in kidney transplanted group, 3 patients in FSGS group and 6 people in control group had positive PCR for urinary BK virus. There was not significant difference between the mean of positive urinary BKV PCR in immunocompromised and immunocompetent groups, p>0.05. Mean of GFR in positive and negative urinary BK virus groups were 125± 30.8 and 132.2 ± 42.5 ml/min, respectively>0.05.

CONCLUSION: Although immunocompromised patients are susceptible to BK virus infection, there might be a large urinary shedding of BK virus in some of normal population who prone them to this infection when they become immunocompromised.

Abstract# 102

POLYOMA BK-VIRUS-SPECIFIC T CELLS AS A SURROGATE MARKER FOR POLYOMAVIRUS-ASSOCIATED NEPHROPATHY AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Thurid Ahlenstiel, Jochen H.H. Ehrich, Lars Pape. *Pediatric Nephrology, Medical School of Hannover, Hannover, Germany.*

PURPOSE: After kidney transplantation (KTx) immunosuppression causes impaired cellular immune defense resulting in increased risk of polyomavirus-associated nephropathy (PVAN). Prognostic markers for the outcome of Polyoma BK-virus (BKV)-infections are missing. BKV-specific (BKV-sp) T cells may serve as a surrogate marker for BKV-associated complications.

METHOD: After KTx BKV-sp T cells were examined in 11 children (age median 10 years, range 3-17, 82% male) with current or previous detection of BKV-DNA in blood at different times (a total of 45 tests with a maximum of 11 tests per person). Leucocytes were stimulated with BKV-antigens (VP1 and large T). Based on specific cellular activation and induction of intracellular cytokines, BKV-sp CD4+ and CD8+ T cells were identified by flow cytometry. BKV-DNA in blood was determined by PCR.

RESULTS: The majority of our study group (9/11) showed -at least temporarily- BKV-sp CD4+ T cells (up to 4.2 cells/µl), whereas only 4 patients had BKV-sp CD8+ T cells (up to 2.0 cells/µl). Children with biopsy proven florid PVAN (n=3) were characterized by persistent detection of BKV-DNA (>3 months) combined with lack or very low levels of BKV-sp CD4+ T cells (<0.75 cells/µl). In contrast, in case of high levels of BKV-sp CD4+ T cells (>0.75 cells/µl) five out of six patients did not show persistent BKV-DNA in blood, suggesting that sufficient levels of BKV-sp CD4+ T cells (>0.75 cells/µl) enable to overcome BKV-infections. After disappearance of BKV-DNA, BKV-sp CD4+ T cells were not permanently detectable in some patients.

CONCLUSION: In case of BKV-DNA-detection in blood, low levels of BKV-sp CD4+ T cells are associated with increased risk of florid PVAN, whereas patients with sufficient BKV-sp CD4+ T cells do not develop BKV-associated complications. Serving as prognostic marker for individual BKV-sp immune defence, levels of BKV-sp CD4+ T cells may represent the risk of florid PVAN and optimize individual timing of therapeutic interventions.

Abstract# 103

BK VIRUS IN PEDIATRIC KIDNEY TRANSPLANTED PATIENTS: INCIDENCE, DIAGNOSIS, THERAPY AND OUTCOME. Luis E. Lara, Ramon Vilalta, A. Madrid, C. Herrero, Marina Muñoz, S. Chocron, Jose L. Nieto. *Pediatric Nephrology and Transplant, Hospital Vall d'Hebron, Barcelona, Spain.*

PURPOSE: In our center 58 pediatrics patients received a kidney graft from 2006. 5 patients (8.6%) had presented BK viremia positive in three of them were found to have BK virus allograft nephropathy (BKVAN) in their follow-up.

METHOD: All patients transplanted had received induction with thymoglobulin/ Steroids and standard immunosuppression (Tacrolimus/mycophenolate and tapered steroid to be withdrawn at the 6th month) were tested systematically of viremia every month for BK Polyomavirus by PCR the first six months after the transplant and every 3 months from the 6th month. Two viremia positive without BKVAN (number copies between 1200-7969000 and appearance 3er to 12th month). Another 3 patients presented BKVAN (positive viremia appearing between 11th and 122 month and 334000-91500000 copies. These with to severe immunity suppression: Patient 1 Lupus Nephritis steroids/ ciclophosphamide resistant and the 3 patients with rituximab for Antibody Mediated Rejection (AMR) in transplant previous. The BKVAN appeared for polyuria, proteinuria and decrease of glomerular filtration. Renal biopsy showed BKVAN grade B patients 2 and 3, C in the patient 1.

RESULTS: The both patients without nephropathy was reduction in immunosuppression: withdrawn MMF and reduced tacrolimus 50% dose. Both patients had a good evolution with disappearance of BK in blood in 6 months. The patients BK nephropathy underwent and also plan have been treated with cidofovir, withdram of mycophenolate, FK reduction 50%, two of them and the third change low-dose everolimus. The evolution of patients with nephropathy degree C evolved with the loss of the graft, both patients with grade B have evolved correctly with the negative viremia and normalization of renal function.

CONCLUSION: The type B nephropathy may be reversible, while type C is irreversible. -BKVAN is an emerging entity since immunosuppressive regimens are more intense induction (with mono/policlonal antibodies) -Epidemiologic studies links BKVAN to high dose of tacrolimus. -Low-dose tacrolimus monotherapy or mTor low-dose regimen could be useful for avoid BKV or BKVAN.

Abstract# 104

TREATMENT OF BK VIREMIA WITH CIPROFLOXACIN AND LEFLUNOMIDE IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Rumina A. Zaman, Robert B. Ettenger, Mohammed H. Malekzadeh, Hay Cheam, Eileen W. Tsai. *Pediatric Nephrology, Mattel Children's Hospital, UCLA, Los Angeles, CA, USA.*

PURPOSE: There is no standardized treatment protocol for BK viremia (BKV) in pediatric (ped) transplant (tx) patients (pts). We sought to develop such a protocol building on and adding to the UCLA experience of BKV treatment with ciprofloxacin (cipro) and those switched to leflunomide (lef) in ped renal tx pts.

METHOD: We identified all cases of BKV in ped renal tx pts at UCLA between 1/2003 to 10/2010. Pts were induced with daclizumab or ATG and maintained on steroid-based or free immunosuppression with tacrolimus and mycophenolate mofetil. Cipro dosing was 10-15 mg/kg/dose up to 500 mg twice per day. BK quantitative PCR, renal biopsies (bxs), and cipro side effects were serially followed. Bxs were classified by Banff 2007 and SV40 staining.

RESULTS: Of 230 pts, 19 (8%) developed BKV with no difference between steroid-based or free regimen. 15/19 pts had concomitant small reduction in immunosuppression. 5/19 pts had acute rejection concurrent with BKV and 3 pts had BK nephropathy. All pts survived. 14/19 pts responded to cipro treatment and had a significant decrease in BKV (p<0.001). 5/19 pts were switched to leflunomide. Cipro responders had median BK peak of 11,757 while those switched to leflunomide had a significantly higher (p<0.04) median BK peak of 183,953.

Characteristics of pts with BKV

Pt#	*+Peak BK viral load (copies/mL)	*Post BK viral load (copies/mL)	Concurrent rejection	BK nephropathy	+Changed to Leflunomide
1	1107660	0	no	no	no
2	2610	0	no	no	no
3	3009	0	no	no	no
4	9483	4663	no	no	no
5	304068	0	no	no	no
6	662500	763	ACR1A/AMR	yes	no
7	2375	0	no	no	no
8	60375	625	ACR1A	no	no
9	77375	0	no	no	no
10	8733	0	no	no	no
11	3551	625	no	no	no
12	6225	0	ACR1B+ACR1A	no	no
13	19496	625	no	no	no
14	14030	625	no	no	no
15	673600	184617	no	yes	yes
16	24119	625	ACR1B	yes	yes
17	183953	4991	no	no	yes
18	8376776	1525569	ACR1A	no	yes
19	114597	27408	no	no	yes

*p<0.001, +p<0.04

CONCLUSION: Cipro is an effective treatment for BKV in ped renal tx pts when the peak viral loads are less than 10,000 copies/mL, and when combined with a small lowering of immunosuppressive agents.

Abstract# 105

PRE-TRANSPLANT SEROLOGIC TESTING TO IDENTIFY RISK OF BKV INFECTION IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Tom D. Blydt-Hansen, Abdalla M. Ali. *University of Manitoba, Winnipeg, Canada.*

PURPOSE: Polyoma BK virus infection and associated nephropathy is an important cause of kidney allograft injury and loss in pediatric renal transplant recipients. We investigated the age-related prevalence of low BKV IgG antibody titer and its association with BKV infection.

METHOD: This was a single center retrospective cohort of 94 pediatric kidney transplant recipients between 1986 and 2007, where pre-transplant stored serum was available for BKV IgG testing. Titers were classified as low, intermediate or high (LAT, IAT, HAT) based on reference sample testing. Incidence of BKV infection (viruria or viremia) and BKV associate nephropathy (BKVAN) in a screened sub-cohort (n=36) were correlated to BKV IgG titers and donor BKV IgG status.

RESULTS: Thirty four percent of kidney transplant recipients had LAT. Recipients aged 0-6 years had the highest prevalence (83%) of LAT ($p < 0.002$). There was no association between recipient gender, era of transplantation with LAT. The prevalence of donor BKV IgG titers indicating prior exposure was 73%. 10 patients (10.6%) developed BKV infection. Of the 36 patients prospectively screened for BKV infection since 2002, 5 (14%) developed early BKV infection with viremia and 3 (8%) had BKVAN. LAT was a significant risk factor for BKV infection ($p=0.02$). Induction therapy with anti-thymocyte globulin was more common in BKV infection but not statistically significant ($p = 0.13$). Only 1/26 patients with IAT or HAT had BKV infection, whereas 4/10 with LAT had BKV infection. No BKV infection was seen in the donor LAT/recipient LAT combination (n=3).

CONCLUSION: LAT is highly prevalent in young pediatric kidney transplant recipients pre-transplant, and LAT is associated with a significantly increased risk of BKV infection post-transplant. Pre-transplant BKV IgG screening may be an effective strategy to stratify BKV risk in the pediatric end-stage kidney disease population.

Abstract# 106

MANAGEMENT OF BK VIREMIA AND NEPHROPATHY IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS WITH INTRAVENOUS IMMUNOGLOBULIN (IVIg). Elizabeth I. Anyaegbu, Paul S. Hmiel. *Pediatric Nephrology, Washington University in St Louis, Saint Louis, MO, USA.*

PURPOSE: We performed a retrospective review to assess the incidence, response to therapy and patient and graft survival after BK viremia and nephropathy. We report our successful treatment of BK viremia and nephropathy with immunosuppression (IS) reduction and administration of IVIg.

METHOD: In the last 10 years, 85 pediatric patients received a renal transplant. Screening for BK virus was done for increased serum creatinine (SCr).

RESULTS: 4.7% and 2.3% developed BK viruria and viremia respectively. IS was reduced in these patients. One patient developed BK viremia following treatment for acute rejection. His serum creatinine at diagnosis was 1.8mg/dl, from a baseline of 0.6-0.9mg/dl. He had persistent BK viremia following reduction of IS and received 5 doses of IVIg at 0.5g/kg with viral clearance.SCr peaked at 2.2mg/dl and was 1mg/dl at viral clearance. Another patient was found to have BK nephropathy on biopsy. His serum creatinine was 1.5mg/dl at viral detection from his baseline of 07- 0.9 mg/dl. IS was reduced and he received 6 doses of 0.5g/kg IVIg monthly with clearance of BK viremia and improved allograft function. He still had persistent viruria at last follow-up.

CONCLUSION: Viral clearance with improvement of allograft dysfunction was seen in all our patients. The therapeutic benefit of IVIg after an inadequate response to reduction in IS was seen. Our report shows that reduction in IS with development of BK viremia and administration of IVIg for treatment of rising viremia and BK nephropathy is efficacious. There are no protocols for the management of BK viremia and nephropathy following IS reduction especially in the face of allograft dysfunction. We speculate that reduction in IS and administration of IVIg with significant BK viremia and nephropathy is a therapeutic option to the rising threat of BK nephropathy. The incidence of BK viruria and viremia at our institution was low compared to other reports. This might be due to the lack of a prospective screening protocol. Our graft survival rate is comparable to other institutions and we have not had a case of graft loss to BK nephropathy.

Abstract# 107

EXERCISE CAPACITY IN YOUNG ADULTS RENAL TRANSPLANTED IN CHILDHOOD. Trine Tangeraas,[1] Karsten Midtvedt,[2] Asle Hirth,[3] Sigve M. Tonstad,[4] Anna Bjerre.[1] *[1]Division of Women and Children, Oslo University Hospital, Rikshospitalet, Oslo, Norway; [2]Division of Internal Medicine, Oslo University Hospital, Rikshospitalet, Oslo, Norway; [3]Department of Pediatrics, Haukeland University Hospital Bergen, Bergen, Norway; [4]Division of Specialised Medicine and Surgery, Oslo University Hospital, Rikshospitalet, Oslo, Norway.*

PURPOSE: To assess cardiorespiratory fitness (CRFitness,VO2peak) in former renal transplanted children reaching adulthood (Ped-Tx), to patients transplanted as adults (Adult-Tx) and to data from healthy controls (HC).

METHOD: V02peak was assessed by treadmill exercise test.

RESULTS: Eighty-four patients were tested (31 Ped-Tx, 17 Adult-Tx, 36 HC), table 1. The groups were equal in age, gender distribution and BMI. Fourteen (45%) of the Ped-Tx were retransplanted. Eighty-seven percent of Ped-Tx had received a kidney (Tx1) from a living donor (LD). There was no difference in eGFR, time in total dialysis prior to Tx or s-Hemoglobin between Ped-Tx and Adult-Tx recipients.

	Ped-Tx(n=31)	Adult-Tx(n=17)	Healthy Controls (n=36)
Age (years)	26.9 (19-41)	28.6 (23.5-34)	33.5 (20-42)
Years since Tx1	18.1 (7-29)	3.7(1.2-12.6)	-
Maximal heart rate	185 (140-222)	186 (172-211)	189(163-203)
V02peak (l/min]	2.5 (1.5-3.9)	2.7 (2.0-4.4)	3.0 (1.9-5.4)
V02peak (ml/kg/min)	37.9 (12.5-56.3)*	40.8 (29.9-57.5)	44.4 (29.5-65.6)

p=0.01 vs HC. Values are median and range

CRFitness (V02peak ml $kg^{-1}min^{-1}$) was not significantly impaired in Ped-Tx compared to Adult-Tx even though Ped-Tx had been exposed to RTx and IS for more than a decade longer. CRFitness was significantly reduced in Ped-Tx, but not in Adult-Tx, compared to HC ($p<0.05$). Use of predominantly LD grafts (i.e. short time in dialysis/pre-emptive transplantation) in our pediatric RTx program, may be predictive for a more favourable CV status in adulthood.

CONCLUSION: Former RTx children reaching adulthood achieved 85% of the V02 peak of healthy controls. V02 peak can be a useful supplemental tool when evaluating physical functioning. The impact of exercise in reducing the cardiovascular risk remains to be determined.

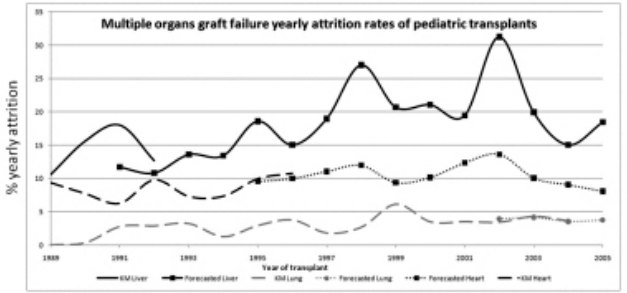
Abstract# 108

LONG-TERM ALLOGRAFT SURVIVAL IN PEDIATRIC HEART, LUNG AND LIVER TRANSPLANTATION IN THE USA. Vikas Dharnidharka, Kenneth Lamb, Sundus Lodhi, Herwig-Ulf Meier-Kriesche. *University of Florida College of Medicine, Gainesville, FL, USA.*

PURPOSE: Improvements in early acute rejection rates have led to better 1-year outcomes of transplanted organs. In this study, we assessed whether any long-term survival benefit accrued in pediatric heart (HR), lung (LU) and liver (LI) transplant (TX) survival.

METHOD: We analyzed data between 1989-2008 from 5421 HR, 771 LU and 8857 LI TXs (< 18 years age, first or repeat), from the national SRTR database. Kaplan-Meier (K-M) or ordinary least square (OLS) estimates were used to calculate median and projected survival half-lives. Attrition rates were stratified by year of TX.

RESULTS: A progressive improvement in LI TX half-life is seen during the last two decades, from 11 years in 1989 to 18 years in 2005. In contrast, for other organs the median half-life has either not changed (9 years for HR TX in both 1989 and 2005) or remained very low (0 years in 1989 to 4 years in 2005 for LU TX). In LI TX recipients, 1st year attrition rates have dropped dramatically from 39% in 1989 to 13% in 2008, but the yearly attrition rate between 5-10 years post-TX remained stable around 3% between 1989 and 1999. In HR TX recipients, 1st year attrition rates have dropped dramatically from 27% in 1989 to 12% in 2008, but the yearly attrition rate between 5-10 years post-TX remained stable around 5% between 1989 and 1999. In LU TX recipients, 1st year attrition rates have dropped dramatically from 65% in 1989 to 20% in 2008, but the yearly attrition rate between 5-10 years post-TX remained stable around 10% between 1989 and 1999.



CONCLUSION: LI TX showed dramatic improvements in both short term and long term allograft survival, but only short term progress was made in HR and LU TX in children. Further progress in long-term survival may need targeting endpoints beyond 1st-year rejection and survival rates.

Abstract# 109

WORSE LONG-TERM OUTCOMES IN ADOLESCENT RECIPIENTS OF KIDNEY, HEART AND LIVER TRANSPLANTS.

Vikas Dharnidharka, Kenneth Lamb, Sundus Lodhi, Herwig-Ulf Meier-Kriesche. *University of Florida College of Medicine, Gainesville, FL, USA.*

PURPOSE: Single center reports demonstrate worse long-term allograft survival in adolescents across different organs. Long-term data are limited in pediatric-only databases since data follow up stops at graduation to adult care.

METHOD: Using data from the national Scientific Registry for Transplant Recipients in the USA for pediatric transplant recipients from 1989 to 2009, we calculated median half lives and constructed graft survival curves. Recipient age at transplant (< 12 or adolescent 12-17 years) was fitted with other covariates into proportional hazards models.

RESULTS: In kidney (KI) transplant recipients (< 12 = 2891, 12-17 = 4465), unadjusted graft survival curves demonstrated worse graft survival for adolescents after 1-year post-transplant. In heart (HR) and liver (LI) recipients, children < 12 years age at transplant (n= 4107 and 7336, respectively) had worse graft survival initially. However, the survival lines crossed at 4 and 5 years post-transplant respectively, such that adolescent HR (n=1611) and LI (n=1884) had worse survival thereafter. Yearly graft loss rates are below 5% in recipients under 12 years, whereas adolescent KI and HR recipients experience yearly graft loss attrition of 5-10%. Median half lives in adolescents receiving a KI transplant improved slightly from 4.2 years if transplanted in 1989, to 5.7 years if transplanted in 2004, remaining inferior to recipients < 12 years in all eras. HR and LI adolescent recipients have similar worse median half lives compared to recipients < 12 years age if transplant received after 1995. Multivariate models showed a higher adjusted hazard ratio of 1.284 (p value < 0.001) for KI allograft loss if recipient age was 12-17. Similar higher risk was demonstrated if recipient age 12-17 in HR transplants lasting > 4 years (AHR 1.424, p value 0.0027) and LI transplants lasting > 5 years (AHR 1.868, p value < 0.0001).

CONCLUSION: In this analysis of a national large transplant database with long-term follow up into adulthood, adolescents have worse long-term allograft outcomes than younger children with KI, HR or LI transplants.

Abstract# 110

FEBRILE URINARY TRACT INFECTIONS (fUTI) AFTER PEDIATRIC KIDNEY TRANSPLANTATION (KTx): INTERIM REPORT OF A PROSPECTIVE REGISTRY OF THE GERMAN SOCIETY OF PEDIATRC NEPHROLOGY (GPN)*.

Markus J. Kemper,[1] Friederike Weigel,[2] Anja Lehnhardt,[1] Ulrike John.[2] *[1]Pediatric Nephrology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [2]Pediatric Nephrology, University Children's Hospital, Jena, Germany.*

PURPOSE: fUTI have been shown to be a frequent complication in children after KTx in retrospective single center studies. In order to address the prevalence, risk factors of fUTI after KTx and their impact on renal function we established a prospective, multicenter registry within the German Society of Pediatric Nephrology (GPN).

METHOD: 175 children from 14 centers collected at the time of registration for NTx. Of these 135 children have bee transplanted (60 girls 75 boys) with a planned follow-up of 2 years; currently this was completed in 75 patients (43%).

RESULTS: Underlying diagnosis were congenital anomalies of kidney and urinary tract including renal dysplasia were present in 40%. 31 of 75 (41%) children had a FUTI and 15 of these patients (16%) had at least one relapse. The risk for fUTI was highest in the first 2-6 months after KTx (35%, p<0.03). The most frequently isolated bacteria were E.coli (23%), Enterococci species (18%) and Klebsiella (11%). Patients with urinary tract abnormalities had fUTI more frequently before KTx (66% vs 34%, p<0.001), however this risk factor disappeared after KTx (30% vs. 70%, p= 0.074). In the preliminary analysis eGFR (absolute GFR declined in the cohort with fUTI compared to no fUTI (77 ± 26 vs 103 ± 22 ml/min/1,73m², p=0.045).

CONCLUSION: This first multicenter prospective study in its interim report confirms an increased risk for fUTI after KTx. Urinary tract abnormalities do not seem to have an increased risk for fUTI after KTx. fUTI seem to contribute to an accelerated chronic graft dysfunction.

*Contributing Centers: Hannover: Lars Pape, Heidelberg: Burkhard Tönshoff, Erlangen: Jörg Dötsch, Cologne: Bernd Hoppe, Freiburg: Martin Pohl, Rostock: D. Haffner, Leipzig: S. Wygoda, Zurich: G. Laube, Memmingen: H. Fehrenbach, Münster: E. Kuwertz-Bröking, Prague:T. Seemann, Innsbruck: L.B. Zimmerhackl.(†)

Abstract# 111

SURVEY OF SKIN PROBLEMS IN CHILDREN WITH SOLID ORGAN TRANSPLANTS.

Alex Zvulunov,[1,5] Daniela Cohen,[1] Rivka Shapira,[3,4] Dan Ben-Amitai,[1,4] Miriam Davidovits.[2,4] *[1]Dermatology Unit, Schneider Children's Medical Center of Israel, Petah Tiqva, Israel; [2]Institute of Nephrology, Schneider Children's Medical Center of Israel, Petah Tiqva, Israel; [3]Institute of Gastroenterology, Schneider Children's Medical Center of Israel, Petah Tiqva, Israel; [4]Sackler Faculty of Medicine,Tel Aviv University, Tel Aviv, Israel; [5]Ben Gurion University of Negev, Beer Sheba, Israel.*

PURPOSE: We aimed to survey the spectrum of skin problems in children and adolescents with kidney or liver transplants and to explore the effects of immunosuppressive drugs on the number, density and distribution of acquired melanocytic nevi (AMN) in this population.

METHOD: Children and adolescents with kidney and liver transplants followed in the Schneider Children's Medical Center were recruited. Pertinent medical history and sun-exposure behavior were recorded. All patients underwent complete skin examination. All melanocytic nevi were registered according to their distribution in 32 topographic regions of the body. Skin melanin and erythema scores in sun-exposed and unexposed skin areas were measured. Statistical analyses were performed using SPSS software.

RESULTS: 56 children were enrolled, 75% males. Transplanted organs were: kidney -49, liver -3 and kidney and liver -4. Current mean age was 15+/-5.7 years, follow-up after transplantation was 5.3+/-4.2 years.Skin infections were observed in 8 (14%) children only: Verrucae vulgaris – 4,Molluscum Contagiosum1, Tinea Versicolor–2, onychomycosis-2. Mean density of acquired melanocytic nevi was 15/m² (range 0-88). Significant correlation was found between AMN density and lighter skin color (p=0.018 for melanin index and p=0.012 for erythema index), but not for the age, time since transplantation or cumulative doses of tacrolimus or MMF. Linear regression analysis confirmed that lighter skin color is the only significant factor determining the AMN density in this population (p=0.022)

CONCLUSION: Unlike in previous studies in adults, the occurrence of cutaneous complication of prolonged immuno-suppression was rare and independent of duration or total doses of immuno-suppressants in our population of children with transplanted solid organs.

Poster Session I

Abstract# 112

POST-TRANSPLANT CYCLOPHOSPHAMIDE IN AUTOLOGOUS STEM CELL TRANSPLANT FOR AUTOIMMUNE DISEASE.

Timothy D. Prestidge,[1] Collin C. Barker,[1] Megan Himmel,[2] Jessica Huang,[2] Megan K. Levings.[2] *[1]BC Children's Hosp, Vancouver, Canada; [2]Child & Family Research Inst, Vancouver, Canada.*

PURPOSE: Select patients with autoimmune disease respond to autologous stem cell transplantation (ASCT). Regulatory T cells (Tregs) play a role in disease biology and post-transplant cyclophosphamide (PTC) produces favourable immune modulation in the allogeneic transplant setting. By avoiding ex-vivo T-cell depletion, using an intermediate intensity regimen and including PTC we sought to safely and effectively treat a patient with refractory Crohn disease while documenting lymphocyte subset recovery.

METHOD: An 18year old with uncontrolled Crohn disease for five years had failed medical therapy and multiple biologic agents. In the six months prior to transplant she had 33days in hospital and required on average 0.5mg/kg/day of prednisone. Stem cells were mobilized with cyclophosphamide and granulocyte colony stimulating factor. Conditioning was: rabbit anti-thymocyte globulin 5mg/kg days -11, -10, -9 and -8; cyclophosphamide 50mg/kg days -7 and -6; fludarabine 30mg/kg days -5, -4, -3, -2 and -1; PTC 50mg/kg days +3 and +4. Lymphocyte analysis days -11, +30, 45, 60 and 90.

RESULTS: Conditioning was well tolerated. Streptococcal sinusitis was treated effectively with antibiotics. Opiate analgesia was required for a wisdom tooth which was removed acutely. There were no other grade III or IV toxicities. Neutrophils were detected from day +17. She remained platelet independent. Lymphocyte subset and Treg recovery was documented and monitoring is ongoing. She has remained out of hospital and asymptomatic off all treatment. One year follow up has not yet been achieved.

CONCLUSION: Currently described ASCT regimens for autoimmune disease avoid excessive toxicity, but may not provide sufficient lymphoablation or immunomodulation for all patients. PTC has not previously been described in pediatrics or in any ASCT setting. Pre-clinical and clinical evidence suggests our regimen would provide a favourable immune environment. While our follow-up is currently short, the novel approach is well tolerated and associated with preserved immune reconstitution and complete clinical response to date.

Abstract# 113

DEVELOPING AN ETHICAL DECISION MAKING MODEL ON A PEDIATRIC TRANSPLANT UNIT. Karen Cote, Sharon McAuliffe, Jennifer Ormsby. *Children's Hospital, Boston, USA.*

PURPOSE: The field of pediatrics and family centered care presents a host of ethical issues. This problem is compounded when transplantation is necessary. The ethical issues are complicated by extended hospital stays and disruption of the family unit. Clinicians often do not receive sufficient education in ethical decision making.

METHOD: A literature search on the topic of ethics and transplantation yielded a wide range of topics. However, there was a scarcity of articles relating to pediatrics and solid organ transplantation. Although our institution has a hospital wide ethics committee, the transplant unit felt the need to develop a mechanism for discussing ethical issues. A model was developed to address specific ethical concerns. utilizing an ethic resource nurses and a nurse ethicist.

RESULTS: Case studies are presented monthly. The ethics resource nurses develop a monthly agenda, with feedback from the staff on ethical concerns. The case study, developed around ethical principles, facilitates open communication and education through a multidisciplinary team approach.

CONCLUSION: Ethics is the framework for clinical decision making. To provide excellence in care, clinicians need to be aware of the complicated ethical needs of the transplant patients and families.

Abstract# 114

EDUCATION AND SUPPORT OF MEDICAL PROFESSIONALS CARING FOR A DYING TRANSPLANT PATIENT. Dawn A. Freiberger. *Pulmonary, Childrens Hospital Boston, Boston, MA, USA.*

PURPOSE: Because so much emphasis is placed on giving patients hope for the future, it is difficult for nurses and other health professionals to emotionally care for an end of life transplant patient. It is particularly difficult when a child dies slowly over time instead of an acute event. When the choice is made by the family for the child to die in the hospital, medical staff need to have the tools needed to both physically and emotionally care for the child and family. There is very little in the literature that addresses this issue.

METHOD: A program was developed at Children's Hospital Boston to help nursing staff on a solid organ transplant floor to provide high quality care for a dying post transplant child. We started by having twice a month early morning meetings to accommadate both day time and night time staff. A variety of topics were discussed ranging from physically caring for a dying child to emotional support of the care giver. We had some guest speakers come to talk about specific topics. The parents of a child who had died a couple of years earlier, came to talk about what was helpful to them through the process.

A specific room on the solid organ transplant unit was designated for a child who was end of life. This room was able to be closed off from the rest of the unit to a degree. It allowed family members privacy and a place to gather with out disrupting the rest of the unit. A queen sized bed was placed in the room with non hospital bedding to give the room a feeling of home and also space for parents to get into the bed with the child if desired.

RESULTS: Prior to this program, all solid organ transplant end of life patients died in the intensive care unit. Since this program started, several children and families have requested to allow thier children to die on the unit with the staff that they are most close to.

It is now an option to have these children stay on the transplant unit. These deaths were viewed as having gone well with all the needed support for the child, family and staff.

CONCLUSION: Medical professionals need tools to care for a dying child. Education and planning is the key to a more meaningful death for children and their family.

Abstract# 115

UTILIZING VARIOUS MODALITIES PRE AND POST TRANSPLANT TO TEACH AND BE TAUGHT BY CHILDREN AND ADOLESCENTS. Kirsten N. Getchell. *Child Life Services, Transplant, Children's Hospital Boston, Boston, MA, USA.*

PURPOSE: Children and families cope differently with health care experiences, including transplant. Providing different modalities to facilitate expression and understanding is vital in the transplant process. Child Life Specialists play a key role in the multidisciplinary team, offering opportunities for medical play, expressive art, and medical art. These modalities incorporate what is safe and familiar (play and art) with what is unfamiliar (health care experiences), providing windows in which health care staff can identify what the patients understand and are having a difficulty coping with.

METHOD: Child Life Specialists utilize their expertise in child development to meet children and adolescents at their level when educating patients and learning from patients. Medical play, expressive art, and medical art are different modalities used to educate and clarify misconceptions of healthcare information. Whether inpatient or outpatient, pre or post transplant these different modalities can be used in various ways to provide opportunities to foster development growth along the continuum. Play and art familiarize patients with various medical equipment and experiences, allowing for choice, independence and control. By offering opportunities for expression and feelings, children and adolescents develop innovative ways of coping with medical experiences.

RESULTS: When opportunities for medical play, expressive art, and medical art are provided, children and adolescents feel more involved in their care and can express their feelings and concerns more freely. As a result, children and adolescents are often better prepared for upcoming procedures and health care experiences. These opportunities help children cope better with medical procedures, equipment, hospitalization and changing health.

CONCLUSION: Identifying and utilizing different modalities such as medical play, expressive art, and medical art, health care professionals provide children and adolescents with holistic care which addresses the physical, cognitive, social, emotional, and spiritual development of children.

Abstract# 116

"WE CAN'T STAY HERE FOREVER" – PARENTS' PERCEPTIONS OF TRANSITION. Emily Ghent, Maria De Angelis, Krista VanRoestel, Heather Miller, Samantha J. Anthony. *Hospital for Sick Children, Toronto, Canada.*

PURPOSE: Transfer of care to adult centres is a pivotal stage in the ongoing medical management of pediatric transplant recipients. To assist parents in supporting their children through transition, the needs and perceptions of parents must be understood. This qualitative study sought to enhance evidence based practice by exploring the experiences of parents during the transition process.

METHOD: Parents of adolescent liver transplant recipients (aged 12 - 18 years) at a single transplant centre were invited to participate in a semi-structured interview exploring their experiences related to the future transfer of their child's healthcare to an adult facility. Phenomenological methodology guided the data collection, analysis and theoretical development.

RESULTS: A convenience sample of 14 parents of 13 adolescent liver transplant recipients (4 male, 31%) with a median age of 13.9 years (range 12.3-18 years) at a median time post-transplant of 10.1 years (range 8 months – 15.5 years) participated. The complexity of parent views was captured and the following themes identified: 1) perceived differences in transplant programs and hospital environments; 2) perception of uniqueness of child and varying levels of developmental readiness; 3) identification of shifting parental role and impact on self; 5) sense of inevitability surrounding transfer of care resulting in a sense of optimism in their own and their child's ability to cope; and 6) ideas about potential intervention strategies for transition.

CONCLUSION: Both parent and adolescent readiness and support throughout the transition process are vital. Insight gained from those experiencing the phenomenon is key to the development of relevant clinical interventions. This study provides a foundation for further exploration and an evidence base for more family-centered interventions aimed at meeting the transitional needs of both parents and adolescents.

Abstract# 117

DESCRIBE THE IMPACT OF RENAL PLAY SPECIALIST INTERVENTIONS DURING FIRST POST-TRANSPLANT YEAR. Cathy Gill, Grainne Walsh, Mignon I. McCulloch, Judy Taylor. *Paediatric Nephrology, Evelina Children's Hospital, London, United Kingdom.*

PURPOSE: Describe the impact of Renal Play Specialist interventions during first post-transplant year.

METHOD: 6 year old boy with antenatally diagnosed renal failure, on haemodialysis received a deceased donor transplant after being on call for more than 3 years. Following transfer to our unit for transplantation, concerns included severe needle phobia, extreme anxiety and behaviour difficulties. Identified psycho-social issues also included maternal stress, inability to cope, uncertainty and unclear expectations and in particular not being able to say 'No!' During the initial months, he also underwent complex urological surgery necessitating self catheterisation via a Mitrofanoff.

RESULTS: Regular individual therapeutic sessions included exploring his feelings, fears and anxieties; participating in play therapy, learning relaxation and breathing techniques for use during invasive procedures. Extensive information sessions with patient and family focussed on behaviour modification, boundary setting and formation of contracts. These interactive developmentally appropriate sessions gave him a better understanding which helped with his struggle with some of his treatment regimen, in particular increased fluid intake. This facilitated treatment in a way which was acceptable to the child.

CONCLUSION: Intensive therapeutic interventions have had a positive outcome. One year on, this young man is barely recognisable with positive coping, attending school and actively taking part in his self care. His behaviour has normalised which is allowing his mother to cope with the many changes in their lives and anticipate the future positively. This allows their parent/child relationship to become less traumatic and not be centred on his health needs. One of the complicating factors with children with renal disease is that their condition is lifelong; their understanding and need for information, changes as they grow and develop. Play Specialist intervention will continue to be invaluable as this young man grows and develops.

Abstract# 118

LONG-TERM EFFECTS OF PEDIATRIC LIVER TRANSPLANTATION ON QUALITY OF LIFE AND SEXUAL HEALTH. Silja Kosola,[1,2] Hanna Lampela,[1] Jouni Lauronen,[2] Heikki Mäkisalo,[3] Erik Qvist,[1] Mikko Pakarinen.[1] *[1]Hospital for Children and Adolescents, Helsinki University Central Hospital, Helsinki, Finland; [2]National Graduate School of Clinical Investigation, Helsinki, Finland; [3]Department of Surgery, Helsinki University Central Hospital, Helsinki, Finland.*

PURPOSE: Liver transplantation (LTx) is a life-saving procedure which often results in immediate improvement of health-related quality of life (QoL). We assessed the long-term effects of pediatric LTx on QoL and sexual health in adulthood.

METHOD: We conducted a national cross-sectional study of pediatric patients who underwent LTx between 1987 and 2007. Of 66 survivors 57 participated (86%) a mean of 10.7 years after LTx (range 1.5-23.2) at mean age of 17.4 years (range 3.5-35.0). Controls (n=141) matched for age and sex were randomly picked by the Finnish Population Register Centre. We used the PedsQL4.0 for children and parents of appropriate age groups. Adults filled the SF-36, AUDIT, and DISF-SR questionnaires. Data on demographics, contraception use, and pregnancies were also collected.

RESULTS: LTx patients and controls younger than 7 had similar QoL. Both LTx recipients aged 8-17 and their parents reported significantly lower scores for school functioning (P<0,01). Of 16 school-age patients, 31% were a year behind in school compared to 5% of controls (P<0,01).

General health was excellent/very good in 43% of adult patients and fair/poor in 18% in comparison to 66% and 10% of adult controls. No difference was found in working status, smoking or drinking habits, or BMI. LTx recipients lived alone more often than controls (20% and 6%, respectively).Sexual health was similar between groups. LTx recipients and their partners used condom-based contraception more often than controls (58% and 12%, P<0,01), and 61% of patients reported having received insufficient information on effects of LTx and immunosuppression on fertility. Four of 24 (17%) adult LTx recipients had hoped for pregnancy compared to 26% of controls, and three patients have become parents.

CONCLUSION: Comparable QoL is achievable after pediatric LTx. More attention should be given to social, school-functioning, and fertility issues.

Abstract# 119

"FINDING ME IN ALL THIS" – A INNOVATIVE PSYCHOSOCIAL APPROACH TO ASSIST CHILDREN AND ADOLESCENTS IN THE COMPLEX LIFE JOURNEY POST LUNG TRANSPLANTATION. Jenny-Maree A. Marshall. *Paediatric Lung Transplant Service, The Alfred Hospital, Melbourne, VIC, Australia.*

PURPOSE: The complex challenges of adjusting to the "gift of life" and the desire to return to meaningful/normative childhood and adolescent life roles after long awaited lung transplantation is the focus of this paper. This paper aims to present a method for preserving elements of the integrity of the child/adolescent's world, enabling them to fulfil their life roles such as son/daughter, sibling, friend, player, within the complex and "adult like" world of lung transplantation. In the setting of immediate recovery from lung transplantation, the paediatric lung transplant team is focused primarily on surgical healing, adjustment to anti-rejection medication, and education related to medication management and adherence. This paper showcases the application of the therapeutic relationship and therapeutic space in creating a greater balance for the child/adolescent during the recovery and rehabilitation phases.

METHOD: In-depth case study analysis across multiple presentations will be used to describe the occupational therapy psychosocial approach utilised to guide the child/adolescent through the rehabilitation process. The therapist's use of self, along with use of therapeutic tools such as art, journaling, letter writing, and role playing to explore thoughts and feelings will be presented.

RESULTS: The playful and soulful child/adolescent is presented within the context of the recovery journey in the acute hospital setting and documentation of positive effects the child and adolescent experiences in relation to themes of adjustment, coping, and transition are evident.

CONCLUSION: In the acute hospital setting where the ongoing demands of medical management pose a direct threat to the child/adolescent's ability to maintain their normative expected and desired life roles, it is crucial that there is therapeutic attention to facilitating essential elements of identity, empowerment and the ongoing sense of connectedness for a child/ adolescent to their own world where "everybody is so excited this happened to me, but I just feel like it is all too hard- all I want to do is go play my friends".

Abstract# 120

SO WHO SEES THE PSYCHOLOGIST? Amy McNaughton, Hollie Burnett, Julie G. Flett, Terry Hewitt, Richard Kirk. *Paediatric Cardiothoracic Transplant, Freeman Hospital, Newcastle upon Tyne, United Kingdom.*

PURPOSE: To investigate the number of referrals made to a transplant clinical psychology service following its introduction into an established transplant program. This information could assist others in estimating workloads when initiating a service.

To look at the number of referrals across each month of the year.

To look at the number of re-referrals.

To look at the number of referrals as a percentage of the number of transplants performed each year.

To look at the ratio of males to females referred over the five years.

METHOD: The number of referrals were obtained from the Health Psychology database (Telecare) and retrospectively analysed.

RESULTS: Referrals made increased each year: in 2006 there were 15 referrals, 2007, 38 referrals, 2008, 34 referrals, 2009, 69 referrals and 2010 45 referrals. These referrals were for: assessment for transplant, clinical difficulties pre and post transplant and family members needing input.

There were more referrals in January, April and October each year.

Re-referrals have increased each year, however, the average rate of re-referrals has reduced.

There has been an increase in the percentage of transplant recipients seen at the time of transplant

More females than males have been referred, despite relatively even numbers of male and female transplant recipients.

CONCLUSION: The increasing referral rate is to be expected when a service begins. The referral rate was under-estimated at the start of the service; hence the need to increase the number of psychology sessions 2007 then again in 2009. Sessions were increased from 3 to 5, and then 8 (1 session=half day).

The referral rate increased over school holiday periods. More females than males have been referred, despite relatively even numbers of male and female transplant recipients.

Re-referrals have increased each year, however, the average rate of re-referrals has slowed down. This could be due to more patients being seen at time of transplant and an increase in psychological skills being transferred to other staff, and therefore, not captured by this dataset.

Abstract# 121

YOUTH WITH CHRONIC HEALTH CONDITIONS: HOW CAN WE BEST TEACH YOU SELF MANAGEMENT SKILLS? Rita Pool,[1] Margot Mitchell,[2] Corrine McCurdy,[2] Norma D'Agostino,[3] Elizabeth Dettmer,[1] Geraldine Cullen-Dean,[1] Sharon Lorber,[1] Jeffrey Schiff,[2] Miriam Kaufman.[1] *[1]Transplant Centre, Renal Program, The Hospital for Sick Children, Toronto, ON, Canada; [2]Division of Nephrology, University Health Network/TGH, Toronto, ON, Canada; [3]Psychology, University Health Network/PMH, Toronto, ON, Canada.*

PURPOSE: Poor preparation for transition to an adult oriented care facility results in health outcomes that are less than optimal. Skills-building opportunities exist before transition and require reinforcement after transition. This study will inform the creation of a unique, skills-building program for youth.

METHOD: One program for this age range, rather than adolescents or young adults separately allows for individual differences in development, reinforcement of skills, and potential for the older participants to assist the younger participants. Poor self-management of chronic conditions in youth (age 15-25) may have long-term health consequences. Youth were consulted regarding what formats of a self-management skills-building program would maximize recruitment and retention.

RESULTS: Youth favoured interactive Saturday half day sessions with mixed diagnoses, with both a professional and a peer leader, and limited parental involvement.

Over 70% wanted to cover managing symptoms; career planning; supports; intimacy; negotiating health system; transition; difficult decisions; and substance use.

Youth valued primarily face- to- face discussion over internet delivery, a varied interactive format and starting at an early age. They valued the experience of peers and an opportunity to become a mentor.

Recruitment should involve caregivers' recommendation during a clinic appointment, not via mail.

CONCLUSION: Youth's endorsement on this age range and a wide range of topics suggests great interest and opportunities in a youth-oriented program.

Abstract# 122

DEVELOPMENT AND USABILITY OF TEEN POCKET PATH® A MOBILE HEALTH APPLICATION TO PROMOTE SELF-CARE AMONG ADOLESCENT ORGAN TRANSPLANT RECIPIENTS.

Diana A. Shellmer,[1] Annette DeVito Dabbs,[2] Mary Amanda Dew,[2] George Mazariegos.[1] *[1]Surgery, University of Pittsburgh Medical School and the Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA, USA; [2]University of Pittsburgh, Pittsburgh, PA, USA.*

PURPOSE: Nearly 2,000 children receive a solid organ transplant every year. Over the past 13 years, the number of pediatric organ recipients grew by 20% with the largest increase (35%) among adolescents. Unfortunately, graft loss accelerates in adolescence and limited skills in self-care alongside high rates of nonadherence to the medical regimen are considered the major culprits. Since rates of electronic media usage (e.g., texting, cell phone, and internet) are highest among adolescents, we expanded Pocket PATH® (Personal Assistant for Tracking Health), an effective mobile health application to promote self-care in adult recipients to include custom programs for use with adolescent transplant recipients and their parents.

METHOD: In this study we describe the process of "user centered design" to develop and test the usability of the application with adolescents and their caregivers. User centered design utilizes the feedback of the end user (in this case the adolescents and their parents) to help develop and customize features to assure that users will find the product useful, user friendly, and satisfactory.

RESULTS: We describe the iterative process utilized in user centered design, the benefits of involving the user in development, and preliminary design of our mobile health application. Initial findings suggest satisfaction with our prototype and acceptance of its use and application by pediatric transplant recipients and their parents.

CONCLUSION: Mobile health technologies such as Teen Pocket PATH® offer a potential novel strategy to improve self-care. By developing these technologies in a collaborative and "user centered" fashion we can help create technology that has a greater likelihood of success in promoting self-care activities and reducing nonadherence among adolescent transplant patients.

Abstract# 123

USING A DEVELOPMENTAL CHECKLIST TO FACILITATE TEACHING AND PREPARATION FOR TRANSITION TO ADULT CARE.

Robin Stone, Roberta Hoffman, Lynne Helfand, Emily Holman, Analia Rao. *Children's Hospital Boston, Boston, MA, USA.*

PURPOSE: Research reports a high rate of morbidity as patients transition from pediatric to adult care. Our Pediatric Transplant Center established a transition committee to address the issues and to ensure preparation for successful transition. A Developmental Checklist was designed to assess the knowledge of 12-22 year olds around their transplant, self care and relationships with health care providers. The checklist is divided by age groups and adds developmentally appropriate questions as patients get older. This tool is being used to aid in designing educational materials.

METHOD: Transplant social workers developed a questionnaire to assess the patients' knowledge about their transplant, medical management and participation in self care. Without a parent present, a transplant social worker administers the questionnaire to the patient annually in the outpatient clinic. The purpose is discussed with a parent and each is offered a blank copy. Topics addressed with the 12-14 year olds include the medications, dosing, side effects, healthy lifestyle choices and restrictions. Added topics for the 15-17 year olds include communication with medical providers, understanding risks associated with non adherence and substance abuse. 18-22 years are screened for their level of independence in self care management.

RESULTS: A year of checklist screening is complete. Patients, parents and staff were pleased with the implementation to help in developing competence and confidence in the transition process. The tool identified areas of knowledge gaps and is also guiding the development of educational material.

CONCLUSION: A development checklist can aid in assessing knowledge with transplant self care and as a basis for teaching transition skills. Findings suggested gaps in our initial checklist which we have added to starting our second year of assessment. Findings suggest that establishment of a transition to adult program, along with the acknowledgement by the transplant team about the developmental process of transition, can help to prepare patients for successful transition to an adult center.

Abstract# 124

POST TRANSPLANT MEDICINE EDUCATION – A COLLABORATIVE APPROACH.

William Thornhill, Patricia Hayes, Grainne Walsh, Mignon McCulloch, Judy Taylor, Geoff Koffman. *Paediatric Nephrology, Evelina Children's Hospital, London, United Kingdom.*

PURPOSE: We have developed a collaborative post transplant teaching program to enable our children and young people to gain confidence and independence in managing their chronic medication.

METHOD: Description of our program development.

RESULTS: It is widely accepted that adherence with life long transplant medicines is a difficult issue particularly for young adults and for those transplanted as toddlers who grow up lacking in education about their condition. Our medicine education programme was developed following regular discussion within our team about service developments and ways to improve clinical care.

The programme is led by the paediatric renal pharmacist assisted by a pharmacy technician, clinical nurse specialist and senior medical staff. Following pre-transplant education sessions, introduction medicine education starts prior to discharge from the inpatient unit. These education sessions continue weekly until the patient, family and senior pharmacist are happy with progress and confidence level. The average number of sessions is 6 per patient, with follow up sessions at 3 and 6 months and annually thereafter. Additional sessions are scheduled if issues arise during the child's clinical course.

Medicines are organised in a dosette box, initially filled jointly by pharmacy and the child, with the child quickly being given responsibility for filling the box initially under supervision moving to independence on an individually planned schedule.

A wide range of issues are discussed during these sessions including medicine interactions, over the counter medicines, herbal products, vaccinations and contraception.

An individual medicine sheet is available electronically which can be updated with ongoing changes whilst a progress sheet allows all members of the transplant team to be kept updated.

CONCLUSION: The success of our kidney transplant program is multi-factorial but we feel that empowering our young patients to be proactive in their long term care is a key to this success. This positively impacts on their individual quality of life as they have fewer co-morbidities and less inpatient episodes.

Abstract# 125

LONG TERM FOLLOW UP OF YOUNG ADULT TRANSPLANT RECIPIENTS FOLLOWING TRANSFER FROM A SINGLE PAEDIATRIC RENAL UNIT.

Grainne Walsh, Elisabeth George, Judy Taylor, Mignon McCulloch, Geoff Koffman, Rowena Remorino, Cathy Gill. *Evelina Children's Hospital, London, United Kingdom.*

PURPOSE: Young adult transplant recipients are a vulnerable group as they transfer from paediatric to adult services. High levels of graft loss have been reported in the literature resulting in much discussion; resources now need to be directed to service developments.

METHOD: A group of young adults transferred during 2000-2001 were reviewed in December 2009.The original audit compared rejection rates, adherence with follow up and number of inpatient days in their final year in paediatrics vs their first year in adults. This follow up audit looked at long term outcomes, graft function, general health and functionality in society.

RESULTS: 16 young adults were reviewed > 9 years post transfer.

At time of transfer 62% (10/16) patients still had their 1st graft, 19% (3/16) 2nd graft, 13% (2/16) 3rd graft and 6% (1/16) 4th graft.

Mean age at 1st transplant = 11.8 years (range 1-18 years)

Deceased donor: Living Donor 87.5% (14/16) :12.5% (2/16)

At time of review (December 2009)

Patient survival 94% (1 patient died - PTLD)

66% (10/15) remain transplanted with the same graft

7% (1/15) have been re-transplanted

27% (4/15) are currently receiving dialysis therapy

Quality of life (QOL)

25% (4/16) attended university with 2 continuing study for a post graduate degree

88% (14/16) are in paid employment

QOL questionnaires in first audit revealed many patients felt unsupported and would have liked more formal attention to psychosocial needs. Medical & nursing staff were often not able to predict patients who were at higher risk for complications and non-adherence.

CONCLUSION: Long term follow-up of young adults demonstrated a 94% patient survival and a 66% graft survival. No patient was lost to follow up. 88% of patients were in employment, making a contribution to society. Our results demonstrate a positive picture of the long term follow up of young adults who have originated from a single paediatric unit.

Resources are now being directed to developing a robust service with emphasis on seamless transfer from paediatrics to adult services with ongoing peer support.

Abstract# 126

ONCE-DAILY IMMUNOSUPPRESSION FOLLOWING PEDIATRIC LIVER TRANSPLANTATION: IMPROVING QUALITY OF LIFE?

Karen Bindeballe, Eva D. Pfister, Ulrich Baumann. *Paediatric Gastroenterology and Hepatology, Hannover Medical School, Hannover, Germany.*

PURPOSE: Nonadherence to immunosuppressive therapy following transplantation may lead to graft loss. The aim of this study was to compare safety, adherence and quality of life in a once-daily versus a twice-daily immunosuppression protocol.

METHOD: Inclusion criteria for the study were: Tacrolimus based immunosuppression, minimum age of 10 years, at least 12 months post transplantation with normal transaminases and normal renal function. Patients who met these criteria were offered conversion from twice-daily tacrolimus (Prograf®) (respectively 3 patients from cyclosporin/azathioprine) 1:1 to tacrolimus prolonged-release (Advagraf®) once-daily. 10 patients with twice-daily immunosuppression served as controls. We provided the

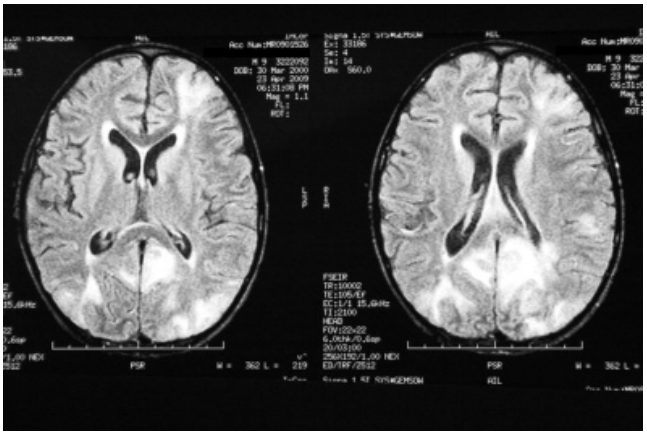
memory device *Medication Event Monitoring Systems* (MEMS®), measuring date and time of drug intake to each patient. Patients also answered the KIDSCREEN questionnaire for assessment of quality of life. The investigation was backed by phamacokinetic profiles before (d 0) and after conversion (day 14). We also monitored liver and renal function, histological evidence of graft rejection in case of abnormal liver function tests and CMV status (pp65).
RESULTS: Of 16 potential candidates 9 patients (56%) declined because they did not want to jeopardize their stable medical situation. Preliminary data shows that adherence does not differ significantly between both groups. The overall quality of life was rated similar, however patients with a once-daily tacrolimus application noted a strong preference to the new regimen. In this latter group, the area under the curve of tacrolimus concentration before (d 0) and 14 days after the switching (d 14) showed equivalent drug exposure. After conversion to a once-daily immunosuppressive regimen, liver and renal function remained stable, no CMV infection/reactivation was observed.
CONCLUSION: Conversion of a tacrolimus based immunosuppression to once-daily application appears safe and is not associated with graft rejection, change of liver function tests or renal function. Preliminary data suggests an improvement of quality of life.

Abstract# 127

TACROLIMUS LEVELS...NOT ALWAYS A PATIENT'S FAULT.
Camilla M. Cook, Jennifer Gilarde, Marilyn Moonan, Michael J.G. Somers. *Children's Hospital Boston, Boston, MA, USA.*
PURPOSE: Tacrolimus, the primary immunosuppressant for children with kidney, liver, multivisceral and intestine transplants, has variable oral absorption. It has a narrow therapeutic range; trough levels are followed to adjust dosage. For children, tacrolimus is often extemporaneously compounded into an oral liquid by community pharmacies. We highlight the risks inherent in compounding tacrolimus liquid formulations and the value of recognizing potential compounding error.
METHOD: We present cases of two recently transplanted children discharged on liquid tacrolimus. Both children suffered post-transplant morbidity temporally related to compounding errors by local pharmacies.
RESULTS: A 3 yo boy with ESRD from obstructive uropathy is admitted 4 weeks after deceased donor kidney transplant. He takes tacrolimus/MMF immunosuppression, has had steady trough tacrolimus levels of 10 ng/ml, and good renal function (creatinine 0.5 mg/dl) but now has trough levels < 3 despite sequential dose increase and rise in Cr to 1.2 mg/dl. Renal biopsy shows acute rejection; he receives a steroid pulse. Tacrolimus levels in hospital on his recently augmented dose but hospital-compounded tacrolimus liquid are > 20 ng/ml and dosing is re-adjusted downward. A sample of his home tacrolimus liquid, compounded locally, is analyzed and found to be 0.1 mg/ml vs the labeled 1 mg/ml.
A 10 yo boy with severe combined immunodeficiency disease, status post two bone marrow transplants, develops pulmonary fibrosis and undergoes bilateral lung transplant. He takes tacrolimus/MMF/steroids with stable trough tacrolimus levels in hospital. Within a week of discharge, tacrolimus levels are negligible on tacrolimus liquid compounded locally. He is switched to tacrolimus pills, levels improve, but is admitted for shortness of breath/decreased pulmonary function tests. Analysis of locally compounded tacrolimus liquid reveals a more dilute preparation than intended or labeled.
CONCLUSION: We conclude that with sub-therapeutic tacrolimus levels, clinicians may need to consider compounding errors. The importance of reliable local resources and pharmacists knowledgeable in compounding practice is underscored.

Abstract# 128

STATUS EPILEPTICUS DUE TO REVERSIBLE POSTERIOR LEUKOENCEPHALOPATHY AFTER PEDIATRIC HEART TRANSPLANTATION.
Vanessa Guimaraes,[1] Nayara Mariano,[1] Marcia Sundin,[1] Mirian Chigutti,[1] Arlindo Riso,[2] Estela Azeka,[2] Marcelo Jatene,[2] Ludhmila A. Hajjar,[1] Filomena R.B.G. Galas.[1] *[1]Division of Anesthesiology, Heart Institute, University of São Paulo Medical School, Sao Paulo, SP, Brazil; [2]Department of Paediatric Cardiology and Adult Congenital Heart Disease, Heart Institute, University of São Paulo Medical School, Sao Paulo, SP, Brazil.*
PURPOSE: Reporting 2 cases of reversible posterior leukoencephalopathy syndrome in children secondary to the use of cyclosporine and tacrolimus after heart transplantation, determining status epilepticus with neurological recovery after the cessation of medication.
RESULTS: A 9 years old boy underwent heart transplantation. Cyclosporine was started. He presented a focal convulsive episode and tacrolimus and phenytoin was started. Patient presented new focal seizure. The electroencephalogram revealed a status epilepticus and magnetic resonance showed a reversible posterior leukoencephalopathy with extensive involvement of both hemispheres.



The patient developed coma secondary to alpha brain injury primary and tacrolimus was stopped. After 24h there was improvement with reversal of coma. A 8 years old girl underwent heart transplantation. Cyclosporine was started. She presented a focal convulsive episode and Tacrolimus was prescribed. She developed status epilepticus. The magnetic resonance showed posterior leukoencephalopathy and the electroencephalogram revealed disorganized electrical activity. Tacrolimus with suspended and after 72 h, the patient presented recovery of neurologic status.
CONCLUSION: Cyclosporine and tacrolimus are drugs with potential to cause neurological damage, as reversible posterior leukoencephalopathy. The early diagnosis may result in appropriate therapy. New studies in the pediatric population should be able to determine alternative immunosupressive drugs.

Abstract# 129

TWENTY-FOUR HOURS TACROLIMUS AND MODIFIED RELEASE TACROLIMUS PHARMACOKINETIC STUDY IN PEDIATRIC KIDNEY TRANSPLANT RECIPIENTS.
Yoji Hyodo,[1] Seiichiro Shishido,[2] Yasuo Niitsu,[1] Hiroshi Nihei,[1] Yujiro Aoki,[1] Jiro Takasu,[1] Takeshi Kawamura,[1] Atsushi Aikawa.[1] *[1]Nephrology, Toho University School of Medicine, Tokyo, Japan; [2]Pediatric Nephrology, Toho University School of Medicine, Tokyo, Japan.*
PURPOSE: The purpose of this study was to evaluate pharmacokinetic (Pk) profile of newly developed modified release tacrolimus (MR-TAC) in pediatric kidney transplant recipients.
METHOD: According to our current immunosuppressive protocol, tacrolimus (TAC) was converted to MR-TAC in 10 pediatric patients who received kidney transplantation between April 2010 and December 2010. The switch dose ratio was 1:1, and the 24hours full Pks of both TAC and MR-TAC was assessed.
RESULTS: The mean total daily dose at baseline upon enrollment was 5.5 ± 3.2 mg (range 2.5 ~ 14). The mean trough concentration (C0) of MR-TAC was 20% lower, while the mean maximum concentration (Cmax) of MR-TAC was 20% higher than those of TAC after application, although the area under the time-concentration curve (AUC0-24) of both reagents were equivalent.

Bioequivalence statics for C0, Cmax and AUC0-24 for MR-TAC and TAC

Parameter	TAC	MR-TAC	MR-TAC/TAC ratio	p value
C0	7.5 ± 2.9	5.7 ± 1.7	80.5 ± 21.8	0.216
Cmax	16.8 ± 7.4	19.0 ± 5.8	119.4 ± 28.7	0.123
AUC0-24	235.6 ± 66.3	218.4 ± 61.8	93.7 ± 15.2	0.231

1
A better correlation was observ.ed between area under the time-concentration curve (AUC0-24) and Co ($r > 0.95$, $p < 0.01$ for MR-TAC; $r > 0.65$, $p = 0.38$ for TAC). Renal function remained stable, and no episodes of acute rejection were encountered after the conversion.
CONCLUSION: MR-TAC is an effective immunosuppressive agent in pediatric kidney transplantation. Moreover, MR-TAC may have an advantage over TAC in terms of therapeutic drug monitoring because of a better correlation of C0 and AUC0-24.

Abstract# 130

COMPARISON OF HPLC- VERSUS EMIT-ASSAYS FOR ESTIMATION OF MYCOPHENOLIC ACID EXPOSITION IN PEDIATRIC RENAL TRANSPLANT PATIENTS WITH TACROLIMUS BASED IMMUNOSUPPRESSION.
Therese C. Jungraithmayr,[1] Christoph Seger,[2] Werner Steimer,[3] Gerard Cortina,[1] Monika Edelbauer,[1] Andrea Griesmacher,[2] Lothar B. Zimmerhackl.[1] *[1]Pediatrics, Medical University, Innsbruck, Austria; [2]Medical and Chemical Laboratory Diagnostics, Innsbruck, Austria; [3]Klinische Chemie und Pathobiochemie, Klinikum Rechts der Isar, Munich, Germany.*
PURPOSE: Therapeutic drug monitoring is especially important for pediatric patients to minimize adverse events. Due to the lacking correlation between mycophenolic acid

(MPA) trough levels and drug exposure, exposure profiles are needed. For calcineurin-inhibitor-based therapy abbreviated pharmacokinetic profiles (area under the curve, AUC) have been established [Weber 2002, Filler 2004]. However, although two different methods (EMIT or HPLC) are available, only one algorithm based on EMIT measurements was established for tacrolimus comedication.
METHOD: To evaluate the assumed methodical bias between immunoassay (EMIT) and chromatographic assay (HPLC-UV), 50 abbreviated AUC plasma-sample-series of 14 patients were measured using both methods. Maintenance immunosuppression consisted of mycophenolate mofetil, tacrolimus and prednisone. Calculation of the AUC was based on the three-point algorithm [Filler 2004].
RESULTS: The mean AUC using the EMIT was 68.4 mgh/L ± 4.9 mgh/L (mean ± SEM) versus 57.1mgh/L ± 4.1 (mean ± SEM) using HPLC. The mean relative method bias between HPLC and EMIT AUCs was found to be -17.2 % ± 1.6 % (mean ± SEM). Hence the HPLC-AUC measurement significantly underestimated the AUC compared to the EMIT results. A linear relationship between the AUCs with a slope equation HPLC-AUC (mgh/L) = 0.8 * EMIT-AUC (mgh/l) + 2.5 mgh/L and a correlation coefficient r = 0.97 was found.
CONCLUSION: The methodical bias of -17.2% is not negligible and should be considered when using HPLC derived MPA levels. Due to the tight linear relationship between HPLC and EMIT AUCs, a mathematical conversion seems possible. AUC estimations measured by HPLC have to be divided through 0.8 (or multiplied by 1.25) to make them compatible with the EMIT derived AUCs. This is of especial importance, if MPA AUC target ranges based on EMIT data have to be met.

Abstract# 131

SEVERE PROTEIN-LOSING ENTEROPATHY IN A 8-YEAR OLD BOY POST LIVER TRANSPLANTATION CAUSED BY CALCINEURIN INHIBITOR TREATMENT. Marijke Sornsakrin, Allan Brolund, Rainer Ganschow. *Pediatrics, Division of Pediatric Hepatology and Immunology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany.*
RESULTS: An eight year old boy received a liver transplant at the age of two years for enterovirus induced fulminant hepatic failure. Furthermore, the child has been diagnosed with hypogammaglobulinemia which was continuously treated with substitution of intravenous immunoglobulins. At the age of six years, the patient developed a severe protein-losing enteropathy with an enteral loss of albumin and immunoglobulins, alpha-1-antitrypsin was significantly elevated in the feces. Immunosuppression consisted of tacrolimus and azathioprine.
Profound diagnostics ruled out an enteral infection or inflammatory processes as well as malignancy as cause for the protein-losing enteropathy. Liver function tests were nearly normal at any time. The child has been switched to a cyclosporine based immunosuppression which resulted in a partial improvement for a couple of weeks, before the severity of protein-loss worsened again. We decided to put the child on a calcineurin inhibitor (CNI) free immunosuppression and introduced everolimus in combination with steroids. Six months later the protein-losing enteropathy was completely resolved with an everolimus mono therapy, no further loss of albumin or immunoglobulins have been detected.
CONCLUSION: In summary, we here describe a child post liver transplantation with severe protein-losing enteropathy based on suspected adverse effects of CNI therapy. To our knowledge, this phenomenon has not been described previously in the literature in transplant recipients. The underlying pathophysiology remains unclear.

Abstract# 132

ERRATIC PHARMACOKINETICS OF ORAL TACROLIMUS IN A PEDIATRIC CYSTIC FIBROSIS LUNG TRANSPLANT PATIENT. Jackson Wong,[1] Gerda Tawfik,[2] Cathy C. Schellenberg,[1] Don LeGatt.[3] *[1]Department of Pediatrics, University of Alberta, Edmonton, AB, Canada; [2]Department of Pharmacy, Stollery Children's Hospital, Edmonton, AB, Canada; [3]Department of Laboratory Medicine and Pathology, University of Alberta Hospital, Edmonton, AB, Canada.*
PURPOSE: This study reports on the erratic pharmacokinetics (PK) of tacrolimus (Tacro) in a CF patient post lung transplantation (LTx) with dissimilar PK profiles within a given and between different oral preparations.
METHOD: This is a retrospective report of an 8 year old Pakistani boy 4-7 months post double LTx. He has CF (homozygote δ508) and pancreatic insufficiency. He had a fundoplication pre-LTx and continues to have overnight g-tube feeds post-LTx. His immunosuppression include oral Tacro, Cellcept and prednisone. Despite consistently good lung function (FEV_1>75%), his Tacro was consistently low by 4 months post LTx. Four PK profile of Tacro levels were preformed while the patient was on various preparations of Tacro. The patient was on voriconazole prophylaxis, domperidone and pancreatic enzyme co-administered with Tacro throughout the study. Patient's liver function and INR were normal. Pharmacokinetic parameters (AUC: area under the curve; half-life: t½) were calculated using a on-line baseyian pharmacokinetic program (https://pharmaco.chu-limoges.fr).
RESULTS:
Tacrolimus doses and PK profile

Days post LTx	Dose (mg)/ frequency	Preparations/ route	Trough pair levels	Tmax (h)	peak/ trough ratio	AUC (µgh/L)	T½ (h)
102	3.5/b.i.d	capsules/PO	10.3/10.9	4	3.0	237	6.9
194	3.5/b.i.d	capsules/PO	2.9/5.1	3	3.6	86	11.6
205	3/b.i.d	granules†/s.l.	7.5/9.4	6.5	2.1	150	4.8
215	6/b.i.d	suspension/PO	22.1∗/11.5	2.5	1.3	239	8.7

∗Likely an error. †Opened capsule contents
Table 1 shows trough to trough Tacro level consistence at T_0 and T_{12} within a given profile. Time to peak level (Tmax), t½ and AUCs were highly variable. The correlation (r2) for T_0 to AUC was 0.94.
CONCLUSION: Taco PK and trough levels in this CF LTx patient were erratic. T_0 Tacro levels correlate well with AUC. Sublingual (s.l.) administration did not suggest significant buccal absorption of Tacro. Oral suspension appears to achieve the quickest Tmax post dose.

Abstract# 133

LIVING DONOR TRANSPLANTATION AFTER EXCISION OF INCIDENTALLY DISCOVERED RENAL CANCER. Angel Alonso,[1] Marta Melgosa,[1] Carmen G. Meseguer,[1] Laura Espinosa,[1] Enrique Jaureguizar,[2] Mercedes Navarro.[1] *[1]Pediatric Nephrology Unit, Children Hospital La Paz, Madrid, Spain; [2]Pediatric Urology Unit, Children Hospital La Paz, Madrid, Spain.*
PURPOSE: Published data on kidneys transplanted after discovering and resecting small renal cancers during the transplantation surgery are very rare and, to the best of our knowledge, no paediatric cases have been reported in the literature. Our purpose is to describe the good evolution of a 4 years old boy transplanted after excising an incidentally discovered renal cancer.
METHOD: Retrospective review of patient medical record.
RESULTS: Our patient is a boy who was diagnosed with a bilateral Wilms tumour when he was 15 months old. Subtotal bilateral nephrectomy and chemotherapy were not able to control the disease and a total nephrectomy was required 7 months later, when hemodialysis therapy was begun. Two years later, an HLA- identical living donor transplant from his father was performed.A 2,5 x 2 centimeter mass was discovered in the left kidney and diagnosed as angiomyolipoma during the pre-transplant donor evaluation.During the surgical act, the mass was excised and the kidney implanted, with immediate diuresis and normalization of creatinine in 48 hours. One week later the pathological study revealed the mass was a clear cell renal carcinoma with a histological Furhman grade II /VI. After joint discussion, the urological and nephrological team and the family decided to maintain the transplant, managing the patient with monotherapy based on rapamycin and close ultrasound control. At the present time, 6 years after transplantation, no signs of malignancy have been detected. The boy is clinically excellent, with a normal renal function (estimated glomerular filtration rate (GFR) by Schwartz formula: 130.7 ml/min/1.73 m^2; cystatin C based GFR: 112.95 ml/min/1.73m^2) and has not suffered from any rejection episode.
CONCLUSION: This is the first reported paediatric case of a living-donor graft with a small renal carcinoma excised during surgery. No malignancy has been observed in 6 years of follow-up and renal function is normal as it has been published in adult population.

Abstract# 134

AUTOIMMUNE HEMOLYTIC ANEMIA AFTER PEDIATRIC LIVER TRANSPLANTATION. Cigdem Arikan,[1] Deniz Yilmaz Karapinar,[1] Murat Cakir,[1] Sema Aydogdu,[1] Murat Zeytun,[1] Murat Kilic.[1] *[1]Pediatric GI , Hepatology & Nutrition, Ege University School of Medicine, Izmir, Turkey; [2]Pediatric Hematology, Ege University School of Medicine, Izmir, Turkey.*
PURPOSE: To analyze the demographic, clinical and laboratory findings, treatment strategies and outcome of the children with autoimmune hemolytic anemia (AIHA) after liver transplantation (LT).
METHOD: Medical records of 158 pediatric patients, who underwent orthotopic LT between March 1997 and December 2010, were reviewed for the AIHA. Incidence, clinical and laboratory findings, risk factors, impact on graft and patient survival and outcome was analyzed.
RESULTS: AIHA was diagnosed in five patients (3.16%) during follow-up. All of them were transplanted from live donors and were less than 2 years old at the time of LT, and were on combination of tacrolimus and prednisolone therapy. Viral serological work up showed EBV DNA positivity in one patient. Four patients had cold agglutinin and anticardiolipin (aCL) antibody. Two of them developed lymphoproliferative disorder; PTLD and Kaposi sarcoma following AIHA. All patients were treated with intravenous immunoglobulin and methyl prednisolone combination. Tacrolimus was switched to sirolimus in 2 patients and mycophenalate mophetil in two patients. Although AIHA improved with the standard treatment and immunosuppression modification one of the patient with PTLD was died due to bowel perforation and sepsis.
CONCLUSION: AIHA after LT may be associated with cold agglutinin and aCL antibody positivity. Patients should be closely followed up for the development of lymphoproliferative disorder especially when aCL antibodies are positive.

Abstract# 135

BK VIRUS NEPHROPATHY IN THE NATIVE KIDNEYS OF A PEDIATRIC HEART TRANSPLANT RECIPIENT. Marcus R. Benz,[1] Marceline Huppmann,[1] Barbara Klein,[2] Steffen Hartrampf,[2] Julia Birnbaum,[3] Alexandra Fuchs,[3] Baerbel Lange-Sperandio,[1] Sabine Ponsel,[1] Kerstin Amann,[4] Lutz T. Weber.[1] *[1]Pediatric Nephrology, University Children's Hospital, Munich, Germany; [2]Pediatric Oncology, University Children's Hospital, Munich, Germany; [3]Pediatric Cardiology, University Children's Hospital, Munich, Germany; [4]Nephropathology, University Erlangen, Erlangen, Germany.*

PURPOSE: Reactivation of Polyomavirus BK (BKV) is recognized as an important cause of allograft dysfunction and graft loss in renal transplant recipients. The presentation of BKV associated nephropathy (BKVAN) is initially inconspicuous. Viruria and viremia are precursors, but for the definitive diagnosis of BKVAN immunohistochemical staining for BKV proteins (SV40) is gold standard. BKVAN in native kidneys is rare. There are only few published case reports of BKVAN in patients with non-kidney solid organ transplantation. Thus, screening on BKV is not generally recommended in this population.

METHOD: The currently 5-years-old girl received a cardiac transplant at the age of 3 months due to hypoplastic left heart syndrome (immunosuppression: steroids, cyclosporine, azothioprine; after 2 years switch to Tacrolimus). At the age of 4 years an EBV associated B-cell-lymphoma in terms of a PTLD (stage IV) was diagnosed. Immunosuppression was converted to low-dose tacrolimus and everolimus, and PET-PTLD 2005 protocol was given. 3 months after the end of this treatment, the 5-years-old-girl developed a progressive decrease of glomerular and tubular kidney function.

RESULTS: High BKV levels in urine (>10^8 Geq/mL) and blood (>10^6 Geq/mL) indicated a renal biopsy, revealing BKVAN type B3. Thus, the girl received low-dose everolimus, prednisone, immunoglobulin i.v. und ciprofloxacin stabilizing the kidney function for 3 months. Re-biopsy due to a further decreasing GFR showed progression to BKVAN type C. Viremia was decreasing, but end stage renal failure with peritoneal dialysis was unavoidable.

CONCLUSION: BKVAN in native kidneys is rare, but should be kept in mind when treating children with immunosuppressants and decreasing kidney function occurs, especially in recipients of non-kidney solid organ transplantation.

Abstract# 136

THE RISK OF ATHEROSCLEROSIS DECREASES WITH TIME AFTER LIVER TRANSPLANTATION IN CHILDREN. Piotr Czubkowski, Joanna Pawlowska, Aldona Wierzbicka, Piotr Socha, Irena Jankowska, Mikolaj Teisseyre. *The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Liver transplant recipients are potentially at higher risk of oxidative stress, lipid disturbances and cardiovascular complications. Especially oxydized LDL cholesterol and asymmetrical dimethyl arginine are regarded as most reliable markers of atherosclerosis. The aim of the study was to evaluate the risk of cardiovascular complications by oxidative and lipid status in children after liver transplantation.

METHOD: In 71 children 3 to 5 years after LTx with stable graft function we measured selected markers of atherosclerosis, oxidative stress and lipid metabolism: asymmetrical dimethyl arginine (ADMA), oxidized low-density lipoprotein (oxyLDL), glutathione (GSH), glutathione peroxidase (GPx), total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), very low-density lipoprotein cholesterol (VLDL), lecithin-cholesterol acyltransferase (LCAT), apolipoprotein A-I (ApoAI), apolipoprotein B (ApoB), apolipoprotein E (ApoE), lipoprotein (a) (Lp(a)). After 3 year follow-up we repeated above analysis and compared parameters with the baseline results.

RESULTS: After 3 year follow-up we found significant decrease in: ADMA 0,89 mol/l (0.1-1.7) vs.0,69 (0.1-1.1) p<0.05, oxyLDL 210,4 mU/ml(98.6-931.2) vs. 173 (69.8- 674.2) p<0.05), GSH 715 mol/ml (339.2-814.3) vs. 781 (571.3-888.4) p<0.05, GPx 30,7 U/gHb (20.8-36.7) vs. 31.8 (31.3-31.8) p<0.05), ApoB 0,86 g/l (0,32-1,7) vs 0,73 (0,32-1,8) p<0,05, Lp(a) 14,0 mg/dl (6,0-27,0) vs 11,5 (2,0-26,0) p<0,05. The other parameters did not change significantly: TC 151mg/dl (102-297) vs 156 (106-233) p=0,32, TG 63 mg/dl (33-144) vs 65 (36-110) p=0,06, HDL 50 mg/dl (30-71) vs 49 (38-67) p=0,27, LDL 93 mg/dl (31-233) vs 94 (57-154) p=0,36, VLDL 11 mg/dl (7-42) vs 13 (7-21) p=0,16, ApoAI 1,50 g/l (0,84-1,80) vs 1,48 (0,96-1,80) p=0,69, ApoE 12 g/l (4-19) vs 12 (6-20), LCAT 130 nmol/ml/h (51-295) vs 128 (63-335) p=0,20.

CONCLUSION: Children after LTx present with high risk of oxidative stress and atherosclerosis which decreases with time after transplantation.

Abstract# 137

CHRONIC HEPATITIS E IN A PEDIATRIC PATIENT WITH ACUTE LYMPHOBLASTIC LEUKEMIA. Ugur Halac,[1] Kathie Beland,[1] Pascal Lapierre,[1] Natacha Patey,[2] Pierre Ward,[3] Julie Brassard,[3] Alain Houde,[3] Fernando Alvarez.[1] *[1]Division of Gastroenterology, Hepatology and Nutrition, Department of Pediatrics, CHU Sainte-Justine, Université de Montréal, Montreal, QB, Canada; [2]Division of Pathology and Cellular Biology, CHU Sainte-Justine, Université de Montréal, Montreal, QB, Canada; [3]Agriculture and Agri-Food Canada, Food Research and Development Centre, Sainte-Hyacinthe, QB, Canada.*

PURPOSE: Chronic Hepatitis E virus (HEV) infection has been described in transplanted adult patients. We aimed to study the presence of HEV infection in immmunocompromised children presenting increased serum aminotransferases of unknown aetiology, and histological features of chronic hepatitis.

METHOD: Three children with bone marrow transplantation (BMT) were tested for HEV RNA by reverse transcription-polymerase chain reaction (RT-PCR). HEV amplicons were sequenced and compared with published sequences. Antibody titers (IgG and IgM) to 12 HEV immunodominant regions were measured by enzyme-linked immunosorbent assays.

RESULTS: In one patient with persistently low CD4(+) count, HEV RNA was found in 3 different samples from 7 months to 29 months post-BMT, concomitantly with increased serum aminotransferases and advanced fibrosis that developed rapidly (figure 1). Phylogenetic analysis revealed an HEV strain which was highly similar to swine genotype 3, suggesting a possible case of zoonotic infection.

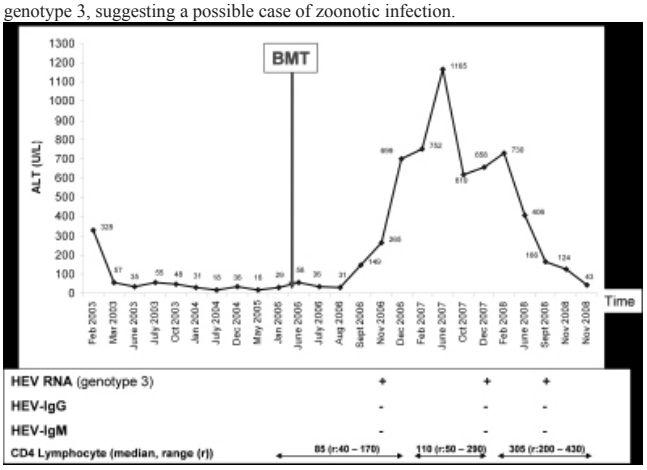


Figure 1: Liver disease activity and hepatitis E virus (HEV) infection

CONCLUSION: In immunosuppressed children developing chronic hepatitis, HEV infection could explain persistently increased serum aminotransferases and chronic liver inflammation potentially leading to severe fibrosis. Infection by HEV, most probably from zoonotic transmission, can result in progressive liver disease in immunocompromised pediatric patients.

Abstract# 138

TRANSMISSION OF SEVERE ADENOVIRUS INFECTION TO RENAL AND LIVER GRAFT RECIPIENTS WITH ORGANS FROM SINGLE DONOR. Wioletta Jarmuzek,[1] Ryszard Grenda,[1] Joanna Teisserye,[2] Piotr Kalicinski.[2] *[1]Dept. of Nephrology & Kidney Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [2]Dept. of Surgery & Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Transmission with graft tissue is one of the major routes of adenovirus infection. The purpose is to report difficulties in diagnosing the localized viral infection.

METHOD: Three related cases report.

RESULTS: Case 1. 11-years old male renal graft recipient, under TAC+MMF+Pred immunosuppression. Presented with fever, proteinuria, hematuria and renal dysfunction at 5 weeks post-transplant. No effect of anti-virals and antibiotics. Viral screening negative. Renal CT-scan: marked necrosis, renal biopsy: suggestion of acute leukemia, despite normal bone-marrow biopsy. Cured with graftectomy at day 45.

Case 2. 14 years –old male renal graft recipient, under IL2R ab + TAC + MMF + Pred immunosuppression. Presented with fever, proteinuria, hematuria and renal dysfunction at 4 weeks post-transplant. No effect of anti-virals and antibiotics. Viral screening negative. Renal CT-scan: marked diffuse necrosis, renal biopsy: - normal (sample taken accidentally from not involved part of the kidney). Cured with graftectomy at day 46 (decision "under pressure" of the case #1).

Late diagnosis: local presence of adenovirus in renal tissue of both removed renal grafts.

Case 3. 9-years-old liver graft recipient, under TAC+ MMF immunosuppression. Hospitalized electively 7 weeks post-transplant due to clinical course of two renal patients, with no symptoms. Liver CT scan: marked necrosis, liver biopsy: suggestion of acute leukemia. Decision on graftectomy – denied.
After establishing the diagnosis of adenovirus infection in renal patients, this patient was treated successfully with cidofovir.
CONCLUSION: Summary: - adnovirus infection was transmitted with two kidneys and liver procured from one donor; - infection was localized in the tissue of 3 grafts; - clinical course was severe in renal, but not in liver graft recipient; - suggestion of life-threating transmission of acute leukemia caused wrong therapeutic decision.

Abstract# 139

INVASIVE ASPERGILLOSIS IN THREE SOLID ORGAN TRANSPLANT RECIPIENTS: PEDIATRIC CASE STUDIES. Lynne M. Lewis, Marilyn M. Moonan. *Pediatric Transplant Center, Children's Hospital Boston, Boston, MA, USA.*
PURPOSE: Describe clinical presentation, treatment and outcomes of solid organ transplant recipients who developed invasive aspergillosis.
Present current recommendations for solid organ transplant recipients regarding risk factors, transmission, diagnostic testing and medical/surgical treatment of invasive aspergillosis.
METHOD: Three pediatric case studies of patients with post transplant invasive aspergillosis treated at the Pediatric Transplant Center.
RESULTS: 3 y.o. female s/p isolated intestine transplant with presumed pulmonary aspergillosis and invasive aspergillosis (Aspergillus fumigatus) of right eye requiring enucleation (2007/2008).
18 y.o. female s/p bilateral lung transplant with invasive pulmonary aspergillosis (Aspergillus fumigatus) resulting in pulmonary hemorrhage and death (2005).
22 y.o. female s/p bilateral lung transplant with central nervous system aspergillosis. Death occurred secondary to overwhelming Pseudomonas sepsis (2004).
Current recommendations: Fungal prophylaxis, diagnostic testing (galactomannan, culture), imaging, medical therapy, surgery, reversal of immune suppression.
CONCLUSION: Invasive aspergillosis in the pediatric SOT recipient is a serious fungal infection resulting in significant morbidity and mortality. A high index of suspicion and appropriate diagnostic testing combined with medical/surgical therapy can improve patient outcome.

Abstract# 140

EFFICACY OF ORAL VALGANCICLOVIR TREATMENT IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS WITH CMV OR EBV INFECTIONS. Elena P. Pestana,[1] Damelys Marin,[1] Carlos Lozada,[1] Tomoaki Kato,[2] Pedro Rivas,[1] Dafne Del Valle,[1] Luzmila Aguero,[1] Ruben Castillo,[1] Abigail Salas,[1] Violeta Silva,[1] Zaira Ron.[1] *[1]Programa Metropolitano Trasplante Higado, Caracas, Venezuela; [2]NewYork-Presbyterian/Columbia Hospital, New York, USA.*
PURPOSE: Cytomegalovirus (CMV) and Epstein-Barr (EBV) virus infections are significant pathogen later in the postoperative course; however effective methods for prophylaxis and treatment are now available. We report the utilization of oral valganciclovir in our pediatric liver recipients with CMV or EBV infections.
METHOD: A retrospective evaluation that included liver transplant recipients that presented with PCR positive for CMV or EBV infections was done. 7 patients that had received live donor liver transplant presented with with either infection, all patients received immunosuppression based on Prograf and steroids, none received any type of induction. All of them had CMV IgG positive previous to transplant and only 5 were positive for EBV IgG pretransplant. All the donors were CMV and EBV IgG positive.
RESULTS: All patients presented with fever, 5 had gastrointestinal disease, mainly diarrhea, 2 had upper respiratory infections. 5 patients reported having leucocystosis with lymphocyte predominant counts. All patients had variable levels of LFT´s elevations with normal bilirrubin. 5 patients were positive for EBV infections with quantitative PCR that varied between 560 to 64964 counts of viral loads, and 2 patients were positive for CMV 2139 to 73925 viral loads counts. Out the patients that presented with either CMV or EBV infections all had higher levels of immunosuppression.
Valganganciclovir treatment (oral route) at dose of 30mg/kg/day and lowering base immunosuppression was indicated in all patients for t least 6 weeks, and negative viral counts was observed over a period f 3 to 12 months, all patients survived and LFT´s normalized.
CONCLUSION: Antiviral therapy with valganciclovir and lowering immunosuppression is central in the treatment of CMV or EBV infections, prompt diagnosis utilizing PCR evaluation allows for a rapid and efficient treatment of this complication in our liver transplant recipients.

Abstract# 141

HEART TRANSPLANTATION: LONG-TERM SINGLE CENTER EXPERIENCE. Estela Azeka,[1] Marcelo Jatene,[1] Arlindo Riso,[1] Filomena Galas,[1] Ludhmilla Hajjar,[1] Carla Tanamati,[1] Jose Otavio Auler,[1] Edmar Atik.[1] *[1]Cardiology, Heart Institute (InCor) University of Sao Paulo Medical School, Sao Paulo, Brazil; [2]Cardiac Surgery, Heart Institute (InCor) University of Sao Paulo Medical School, Sao Paulo, Brazil; [3]Anesthesiology, Heart Institute (InCor) University of Sao Paulo Medical School, Sao Paulo, Brazil.*
PURPOSE: To report the long-term experience of heart transplantation in a single center.
METHOD: From October 1992 to January 2011, there were 92 transplantations. 89 children were submitted to heart transplantation and there were three re-transplantations. The mean age was 6.0 years+/- 4.9 years. The immunosuppression protocol was calcineurin inhibitor and cytostatic agent. Complications such as infection, rejection, tumor, renal transplantation, gallstones and Kaplan-meier survival analysis were analysed.
RESULTS: The Kaplan meier survival analysis showed the overall survival of congenital and acquired cardiomyopathies of 89%,81%,73%,61% at 30 days, 1 year, 5 years,10 years, respectively. The survival of patients with cardiomiopathies was 94%, 92%, 83%, 73% at 30 days, 1 year, 5 years and 10 years. The average of rejection and infection was 3 and 3.5 respectively. 8.9% developed posttransplant lymphoproliferative disease, 2.2% had renal transplantation, 4.4% were submitted to cholecystectomy.
CONCLUSION: Heart transplantation allowed promising results in children and patients with complex congenital heart disease. Rejection surveillance and complications are still the main limitations for long-term survival.

Abstract# 142

RECURRENCE OF PATHOLOGY POST-DOUBLE LUNG TRANSPLANT: A CASE REPORT. Glenda N. Bendiak,[1,3] Connie Yang,[1,3] David Chiasson,[2] Hartmut Grasemann,[1,3] Melinda Solomon.[1,3] *[1]Transplant Centre, Dept of Pediatrics, Hospital for Sick Children, Toronto, Canada; [2]Division of Pathology, Dept of Pediatric Laboratory Medicine, Hospital for Sick Children, Toronto, Canada; [3]University of Toronto, Toronto, Canada.*
RESULTS: A four year old girl presented with a three month history of cough, tachypnea, and failure to thrive. Chest CT showed bilateral interstitial disease and ground-glass changes. Workup for immunodeficiency, infection, cystic fibrosis, and autoantibodies was negative.
Lung biopsy revealed interstitial inflammation, with cellular infiltrates. Alveolar spaces contained foamy macrophages and proteinaceous material. Electron microscopy showed abnormal lamellar bodies in alveolar type II cells. Usual interstitial pneumonia-like pattern was diagnosed, although the underlying aetiology was unclear.
The patient deteriorated, despite treatment with steroids and immunosuppression, and was listed for transplant. After a protracted course requiring extra-corporeal membrane oxygenation support, she received double-lung transplantation. She was discharged from hospital six weeks later.
She then developed episodic cough, tachypnea and wheeze. Gastroesophageal reflux was diagnosed. Despite treatment, her symptoms worsened. Imaging showed bilateral interstitial changes and ground-glass opacities. Bronchoalveolar lavage and transbronchial biopsies showed no evidence of infection or rejection.
She became hypoxemic, requiring ventilation. Open lung biopsy showed interstitial thickening and increased cellularity. Airspaces were expanded, with organizing pneumonia-like alveolar plugs. No evidence of acute cellular rejection or infection. The aetiology could not be determined. Despite all interventions, she developed progressive respiratory failure, leading to death.
In retrospect, the similar clinical course, imaging, and histology in the native and transplanted lungs suggest possible recurrence of an underlying disorder. Given the abnormal lamellar bodies in the native lungs, leading possibilities include a previously undescribed surfactant disorder, or accelerated chronic rejection in the context of an underlying fibroinflammatory process.

Abstract# 143

EFFECTS OF POST TRANSPLANT FOLLOW UP FACILITY TYPE ON SURVIVAL IN PEDIATRIC HEART TRANSPLANT PATIENTS. Richard Chinnock, Sarah Hess. *Loma Linda University, Loma Linda, CA, USA.*
PURPOSE: Post transplant survival in pediatric heart transplant patients varies in the population. The purpose of this study is to assess the effect of facility type providing follow up care to heart transplant patients on graft loss (re-transplantation).
METHOD: We compared the type of facility providing post transplant follow up and the risk of graft loss (n=316). We used a Cox proportional hazards model for determining the risk-adjusted affect on graft loss. Type of follow up facility was analyzed by non-transplant center versus transplant center.
RESULTS: The crude hazards ratio showed follow up at transplant centers was significantly different from non-transplant centers (HR 1.38 CI 1.02, 1.86). There was not a significant difference in graft loss between patients seen at transplant centers compared

to non-transplant centers (HR 1.24 CI 0.92, 1.67) when controlling for gender, diagnosis, donor age, treatment age, and ischemic time. Other outcomes such as death, use of inotropes, post-transplant lymphoproliferative disorder (PTLD), and cardiac allograft vasculopathy (CAV), were also analyzed. Crude analysis showed increased hazard of death for transplant centers compared to non-transplant center (HR 1.38 CI 1.02, 1.86) although this finding was not significant when controlled for gender, diagnosis, donor age, treatment age, and ischemic time. Death, use of inotropes, post-transplant lymphoproliferative disorder (PTLD), and cardiac allograft vasculopathy (CAV) were not significantly different between transplant centers and non-transplant centers in the crude or adjusted models.
CONCLUSION: The risk adjusted survival for cardiac transplant patients does not significantly differ by the type of facility patient's are receiving their follow up care. Further study is warranted to better predict graft loss, death, and other outcomes in pediatric heart transplant patients.

Abstract# 144

INFANT WAITLIST MORTALITY IS UNCHANGED IN THE NORWOOD ERA. Deborah Gilbert,[1] Scott R. Auerbach,[1] David N. Campbell,[2] Max B. Mitchell,[2] James Jaggers,[2] Biagio A. Pietra,[1] Shelley D. Miyamoto.[1] *[1]Pediatrics, University of Colorado, Aurora, CO, USA; [2]Surgery, University of Colorado, Aurora, CO, USA.*
PURPOSE: Infant heart transplantation has proven to be very successful with good long-term outcomes to date but is limited by donor supply. Prior to the availability of the Norwood procedure at our institution, most infants with hypoplastic left heart syndrome were listed for transplant. We hypothesized that infant waitlist mortality is lower following local Norwood availability.
METHOD: We performed a retrospective review of our transplant database and identified all neonates (<30 days of age) listed for cardiac transplantation from 1990-2010. Patients were divided into pre-Norwood era (1990-2002, Era 1) and post-Norwood era (2003-2010, Era 2).
RESULTS: There were 113 neonates listed in Era 1 (8.7/year) and 43 (5.4/year) in Era 2 (not significant, ns). In both Eras, 92% of infants had single ventricle anatomy. There was no difference in gender (33% vs 43% female), age (12±6.3 vs 10.9±8.1 days), blood type (47% vs 50% O) or status (93% vs 91% status 1A) at time of listing between Era 1 and 2. Patients in Era 2 had a lower weight at time of listing (4.25±0.65 vs 2.61±0.61 kg, $p<0.0001$). At time of transplant, 67% in Era 1 compared to 69% in Era 2 were hospitalized, 11% vs 9% were on a ventilator, 0% vs 3% were on mechanical support and 6% vs 13% were on intravenous inotropes (all ns). Of patients in Era 1, 76% survived to transplant with a waitlist time of 81±60 days compared to 74% and 71±45 days for Era 2 (ns). There was no difference in one year survival, 84% in Era 1 and 86% in Era 2. Of those that died prior to transplant, there was no difference between Era 1 and 2 for listing weight (3.0±0.6 vs 2.8±0.7 kg), wait list time (59±64, range 4-298 vs 73±113, range 2-375 days) or prior surgery (19% vs 18%).
CONCLUSION: Despite a trend towards fewer neonates listed for transplant following the availability of the Norwood, there was no improvement in waitlist time or mortality. Infants listed in Era 2 were smaller at time of listing, perhaps precluding any potential for improvement in waitlist mortality.

Abstract# 145

COMBINED HEART + LIVER TRANSPLANTS (CH+LTx) IN CHILDREN: TECHNICAL AND IMMUNOSUPPRESSIVE STRATEGY TO ENSURE A GOOD OUTCOME. Christine S. Hwang, Amy Gallo, Irene Kim, Clifford Chin, Clark A. Bonham, Waldo Concepcion, Carlos O. Esquivel. *Transplantation, Stanford University, Stanford, CA, USA.*
PURPOSE: Although infrequent operations, the combination of a heart and liver transplant in apediatric patient may result in a challenging undertaking. The purpose of this study was to describe the technique, logistical issues and immunosuppressive strategy of children who underwent cH+LTx for end-stage cardiac and liver disease.
METHOD: The medical records of three children who underwent cH+LTx were reviewed. The operations were performed under extracorporeal circulation and both organs were transplanted *en bloc*. The thoracic and liver transplant teams worked simultaneously. All vascular anastomoses were completed before the patient was taken off pump.
RESULTS: All patients are alive and well with a median follow up of 909 days ranging from 178 to 1610 days. The demographic and outcomes data are shown in the table:

Demographics and Clinical Features

Age (yr)	Gender	Weight (Kg)	Tx date	OR-min	Ind IS	Maint IS	F/U days
17.8	F	54.6	8/2006	590	Daclizumab	Tac + Sirolimus	1610
14.1	F	41	6/2006	629	Daclizumab	Tac + MMF	940
7.9	M	29.8	8/2010	720	ATG	Tac + MMF	178

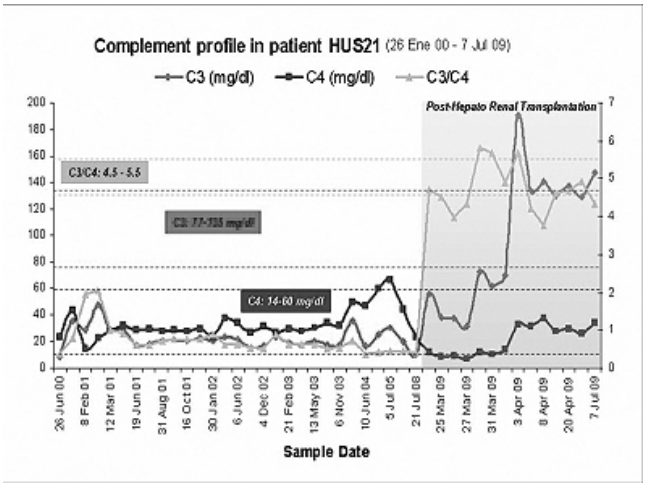
Ind IS = Induction immunosuppression. Maint IS = Maintenance immunosuppression. F/U = follow up. ATG = antithymocyte globulin. Tac = tacrolimus. MMF = Mycophenolic acid.
Case #1 and #2 received maintenance steroids for the first month post-transplantation and then, they were discontinued. Case # 3 did not receive steroids. Case # 3 developed histologically proven humoral rejection that resolved with the administration of ivIg infusions.
CONCLUSION: cH+LTx can be safely carried out by performing transplantation of the two organs *en bloc* along with the judicious use of immunosuppression.

Abstract# 146

OUTCOME OF PROTOCOL RENAL BIOPSY IN POST RENAL TRANSPLANT IN CHILDREN. Ibrahim Al Hassoun,[1] Essam Al Sabban,[1] Abbas Al Abbad,[1] Hamad Al Mojalli,[1] Ibrahim Al Ahmadi,[2] Ahmed Chaballout,[2] Syed Raza,[2] Hadeel Al Manea.[3] *[1]Pediatrics, KFSH&RC, Riyadh, Saudi Arabia; [2]Surgery, KFSH&RC, Riyadh, Saudi Arabia; [3]Pathology and Laboratory Medicine, KFSH&RC, Riyadh, Saudi Arabia.*
PURPOSE: We are doing renal transplantation for patient weighing 8 kg and above, up to 14 years of age. With the increase of number of interstitial fibrosis and serum creatinine more than expected in our patients. We thought that protocol biopsy may help in predicting early rejection and help in the management and improve outcome of these patients.
METHOD: The protocol biopsy was done for patients received renal transplant at 0, 3, 6, 9 and 12 months, post renal transplanted and if clinically indicated. The biopsies are submitted to pathological and immunological examinations and other studies including searching for the viral infection, polyeoma virus (PK) and cytomegalovirus.
RESULTS: Protocol biopsies were done for all new renal transplant recipient for a two-year-period with a total number of patients 37 and total number of biopsy is 106. The LR was 26 cases (66%) and Cadaveric 13 (34 %). The biopsy results showed that the normal biopsy is 64 (61.1 %), acute rejection 7 (6.3%), interstitial fibrosis 21 (19.8 %), border line rejection is 7 (63%), drug toxic change 2 (1.8%) and 5 (4.7%), Acute Tubular Necrosis (ATN). The total number of acute rejection cases is 7, i.e. 6.3% cases biopsies. Four of them have significant increase of serum creatinine and 3 patients who had no increase in serum creatinine. ATN has 5 cases all of them have clear primary cause of delayed graft function and dehydration. There were 4 cases of infections: 2 polyeoma virus and 2 pyelonephritis.
CONCLUSION: The outcome of protocol biopsy post renal transplantation was not highly predictive of significant morbidity effect on patient or graft. The borderline changes did not lead to significant effect even without treatment. Interstitial Fibrosis finding was not significant in the short or long term outcome when found in protocol biopsy. The Protocol biopsy should consider at any time with protocol change where acute rejection is high.

Abstract# 147

SUCCESSFUL COMBINED LIVER AND KIDNEY TRANSPLANTATION IN A CHILD WITH HYPOCOMPLEMENTEMIC ATYPICAL HAEMOLYTIC UREMIC SYNDROME (aHUS) DUE TO A FACTOR B MUTATION. Angel Alonso Melgar,[1] Margarita López Trascasa,[1] Mercedes Navarro Torres,[1] Ángela Vega Bueno,[1] Pilar Sánchez Corral.[1] *[1]Paediatric Nephrology, Hospital La Paz, Madrid, Spain; [2]Hospital La Paz, Madrid, Spain; [3]Hospital La Paz, Madrid, Sudan.*
PURPOSE: Case description: A four-month old boy was diagnosed of hypocomplementemic aHUS on May 2000, and during the following three years he suffered eight clinical recurrences. He developed a severe hypertension requiring more than 5 anti-hypertensive drugs, and presented acrocyanosis, urticarial-like phenomena and several confusional episodes secondary to microvascular disease. Neither plasma infusion nor exchange immunosuppressive drugs improve the clinical evolution developping ESRD at 3 years. Hypertension and vascular symptoms persisted while he was on peritoneal dialysis or hemodialysis, as well after bilateral nephrectomy. Complement C3 levels remained very low, while C4 levels were normal. No mutations were found in the complement components factor H, factor I or MCP, but the patient presented a heterozygous gain-of-function mutation in factor B (Lys323Glu; Goicoechea *et al.* 2007; *PNAS* 104: 240-245).
METHOD: A combined liver/kidney transplant after an isolated plasma exchange was performed on March 2009. Immunosuppressive regime was: basiliximab, steroids, tacrolimus and mycophenolate mofetil.
RESULTS: Kidney and liver functions normalized in the first two weeks. C3 and C4 levels were low the first week, but the C3/C4 ratio was completely normal immediately after transplantation, indicating that the anomalous C3 activation has been corrected.



The patient has remained stable for 18 months without new HUS relapses.
CONCLUSION: The good clinical outcome of the patient since liver-renal transplantation suggest that this could be a good therapeutic option for patients presenting atypical HUS associated to mutations in factor B.

Abstract# 148

SUCCESSFUL KIDNEY TRANSPLANTATION IN TWO INFANTS WITH BODY WEIGHT BELOW 5 KG. Oliver Amon,[1] Marcus Weitz,[1] Alfred Koenigsrainer,[2] Silvio Nadalin.[2] *[1]Pediatrics, University Hospital of Tuebingen, Tuebingen, Germany; [2]General, Visceral and Transplant Surgery, University Hospital of Tuebingen, Tuebingen, Germany.*
PURPOSE: In June 2007 and July 2009 a successful kidney transplantation in two infants with body weight of 3.9 kg and 4.7 kg was performed.
METHOD: Case reports
RESULTS: Patient 1, born at 33 weeks of gestation with body weight of 2700 gs, had renal insufficiency with posterior urethral valves. Peritoneal dialysis was started, but had to be switched to intermittent hemodialysis because of multiple complications. After two episodes of cardiopulmonary resuscitation an early renal transplantation was indicated. 6 weeks after bladder augmentation cystoplasty a kidney transplantation could be performed at age 5 months/body weight 3.9 kg. Immediate kidney function was achieved and at the age of 3 1/2 years his serum creatinine is 0.4 mg/dl with tacrolimus and azathioprine as immunosuppression. Because of a central movement disorder he has to be treated with levodopa.
Patient 2 had also renal insufficiency from birth with posterior urethral valves. He was small for gestational age with birth weight 2180 gs at 37 weeks of gestation.Peritoneal dialysis was started. Because of pulmonary hypoplasia mechanical ventilation was necessary initially. Because of multiple complications he had to be treated with peritoneal dialysis as well as intermittent hemodialysis. After 2 episodes of circulatory shock during dialysis we prepared him for kidney transplantation, which could be performed at age 6 months with body weight 4.7 kg. Kidney function was normal from the beginning. He has had a normal psychomotor development and catch-up growth thereafter. His serum creatinine is 0.4 mg/dl under tacrolimus and mycophenolate mofetil immunosuppression.
CONCLUSION: Our experience demonstrates that if life-threatening complications occur, early kidney transplantation is feasible and it is not necessary to keep a child on dialysis treatment in order to reach a certain body weight (e.g. 7 - 10 kg).

Abstract# 149

CD46-ASSOCIATED ATYPICAL HUS WITH UNCOMMON COURSE CAUSED BY MUTATIONS IN THE cblC MMACHC GENE. Antonia Bouts,[1] Gajja Salomons,[2] Jaap Groothoff,[1] Jean-Claude Davin.[1] *[1]Pediatric Nephrology, Emma Children's Hospital/Academic Medical Center, Amsterdam, Netherlands; [2]Clinical Chemistry, Metabolic Unit, VU Medical Center, Amsterdam, Netherlands.*
PURPOSE: CD46-associated aHUS has a less severe course than other mutations of complement system factors. We reported recently a child with CD46-associated aHUS who developed a slowly progressive on-going HUS leading to ESRF within 12 months. Mutation screening of CFH, CFI, C3 and CFB showed no abnormalities. Serum factor H and factor I concentrations were normal. Mutation screening of membrane cofactor protein (CD46) showed a missense mutation in exon 11 (c.1058C>T, p.Ala353Val;alternative syntax Ala304Val).
METHOD: 17 months after starting HD, at age 11, he received a cadaver kidney transplant. Immunosuppression: prednisolone, cyclosporine, MMF and basiliximab. Prophylactic plasma therapy during one week. No HUS relapse occurred after transplantation. Plasma creatinine level 12 months post-transplant was 0.9 mg/dL (80 µmol/L). 24 months after transplantation he developed a progressive fatigue, polypnea and hypoxia without any clinical or laboratory signs of HUS recurrence. Ultrasound of the heart led to a diagnosis of pulmonary hypertension. He died because of cardiorespiratory failure.
RESULTS: Etiological investigation of a suspected pulmonary embolism led to the finding of hyperhomocysteinemia (plasma concentration 185 µg/L). Necropsy analysis of the lungs showed a massive endothelial proliferation in post-capillary venules pleading for a diagnosis of pulmonary veno-occlusive disease (PVOD). Subsequent DNA analysis revealed two heterozygous mutations of the methylmalonic aciduria cblC with homocystinuria type C gene (MMACHC) (c.276G>T; p.(Glu92Asp)/erroneous splicing and c.442_444delinsA; p.(Val148MetfsX33).
CONCLUSION: Progressive on-going HUS leading to ESRF as well as fatal PVOD observed in this patient probably resulted from the combination of different pathogenic mechanisms of endothelial dysfunction associated with *CD46* and cblC MMACHC gene mutations. It indicates that, aside mutations for complement genes, investigations to Cbl disorders should be added to the work-up of every aHUS patient.

Abstract# 150

HUMORAL REJECTION IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS RECEIVING STEROID MINIMIZATION IMMUNOSUPPRESSION. Lavjay Butani,[1] Brian Gallay.[2] *[1]Pediatric Nephrology, University of California Davis Medical Center, Sacramento, CA, USA; [2]Transplant Nephrology, University of California Davis Medical Center, Sacramento, CA, USA.*
PURPOSE: Steroid minimization (SM) is being more commonly used in pediatric renal transplant recipients due to a favorable metabolic profile with comparable cellular rejection rates. After encountering SM patients who developed humoral rejection (HR), we performed a case-control study to identify predictive factors associated with HR in the setting of SM.
METHOD: Demographic and laboratory data on pediatric renal transplant recipients on a SM regimen were abstracted. Data on patients with (n=4) and without (n=19) biopsy proven HR (c4d staining & donor specific antibodies) were compared using the student's t-tests.
RESULTS: The median age at transplant was 13.8 years; median time to HR was 17 months. Compared to controls, the HR cohort was older (15.9 vs. 12.1 years, p 0.01). There were no other demographic differences between the groups. Children with HR had a lower mean tacrolimus trough level and were more likely to have a sub-therapeutic trough level at 6 months (3.5 versus 5.5 ng/ml, p 0.05); mean mycophenolate mofetil doses were lower at all times points expect 3 months in the HR group, but this was not statistically significant. This occurred in spite of higher mycophenolic acid trough levels at each study time point in the HR group (significant at 3 [p 0.19] and 6 [p 0.03] months).

Drug Exposure Between Groups

	3 month	6 months	9 months	12 months
Tacrolimus trough (ng/ml)	8.4 (8)	5.5 (3.5) *	5.3 (3.7)	4.5 (3.3)
Mycophenolate mofetil dose (mg/m2/day)	673 (715)	710 (523)	658 (538)	680 (529)
Mycophenolic acid trough (µg/ml)	1.9 (4.2) *	1.5 (3.1) *	1.6 (2.7)	1.6 (3.2)

Data are expressed as means; data outside parentheses are for control group, data in parentheses pertain to HR cohort (* $p < 0.05$)
CONCLUSION: Children receiving a SM regimen have a lower safety net and may benefit from more intensive monitoring of tacrolimus exposure. Mycophenolate mofetil dose modifications based purely on mycophenolic acid trough determinations should be resisted in the setting of SM to avoid an increased risk of HR.

Abstract# 151

PROPHYLACTIC PLASMA EXCHANGE (PPE) ALLOWS LONG-TERM PRESERVATION OF RENAL FUNCTION OF NATIVE KIDNEY AND KIDNEY TRANSPLANT IN *CFH* MUTATION-ASSOCIATED HUS. Jean-Claude Davin,[1,2] Jaap W. Groothoff,[1] Antonia H. Bouts.[1] *[1]Pediatric Nephrology Department, Emma Children's Hospital/Academic Medical Centre, Amsterdam, Netherlands; [2]Pediatric Nephrology Department, Queen Fabiola Academic Children's Hospital/ ULB, Brussels, Belgium.*
PURPOSE: Atypical HUS (aHUS) related with *CFH* mutation is known to lead to ESRF in more than 60% of patients. Relapses after transplantation (Tx) occur in > 70% of patients with graft lost in 93%. We describe the results of long-term PPE on renal function of transplant (pt 1) and native kidney (pt 2) in homozygote 15 y old twin sisters presenting with severe familial aHUS related with *CFH* mutation (c.3572C>T, Ser1191Leu).
METHOD: PPE strategy
Pt 1 (first Tx): 40 ml/kg before Tx followed by daily sessions until D7 after Tx and progressive tapering until one session/week pursued indefinitely.
Pt 2 (initial HUS): 40 ml/kg daily until pl. creat. normalisation (D21) pursued by one session/2 weeks indefinitely.In case of relapse, daily PEs until recovery of base line pl.creat.
RESULTS: Pt1: pl.creat.: 124 mcmol/L, 100 months post-Tx despite 2 relapses due to CMV infection. Pt 2: pl.creat.: 54 mcmol/L, 120 months after the first episode despite 2 relapses.

Complications in both patients: hypertrophic arteriovenous shunt vascular access; allergic reactions to plasma controlled by using Octaplas.
CONCLUSION: PPE combined with PE intensification in case of relapses allows long-term preservation of renal function of native kidney and renal transplant in severe aHUS related to *CFH* mutation.

Abstract# 152

BONE MINERAL DISORDERS IN PEDIATRIC RENAL TRANSPLANTION. Ali Derakhshan,[1] Afshin Ghaleh Golab,[2] Mohammad-Hossein Fallahzadeh,[1] Mitra Basiratnia,[1] Mehrzad Lotfi,[1] Ghamar Hossini Al-Hashemi.[1] *[1]Shiraz Nephro Urology Research Center, Shiraz University of Medical Sciences, Shiraz, Fars, Islamic Republic of Iran; [2]Pediatric Nephrology, Tabriz University of Medical Sciences, Tabriz, Islamic Republic of Iran.*
PURPOSE: Incomplete resolution of CRF-associated abnormalities of bone mineral metabolism results in the relatively high prevalence of renal osteodystrophy (ROD) in pediatric kidney recipients.This issue was studied cross sectionally in a our center.
METHOD: In 57 children demographic data, height, weight, serum calcium (Ca), phosphorus (P), alkaline phosphatase (Alk-P), parathyroid hormone (PTH), 25(OH)-Vitamin D_3, BUN and creatinine were obtained.Left hand-wrist radiography and bone mineral densitometry by DXA technique were carried out. Appropriate softwares were used for interpretation of Z-score of bone mineral density (BMD)and statistical analyses.
RESULTS: Fifty seven children all with well-functioning allograft,with a mean age of 18.7± 4.25, age at transplantation 13.1±3.46 (4.5-20) years with a mean follow up of 67.1±33.8 months were studied. The patients' height-age and bone-age of 11.9±1.8 and15.6±3.3 years respectively, revealed a mean height-age and bone-age retardation of 5.7±2.3 and 1.22±1.47 years; respectively.
Hyperparathyroidism, hyperphosphatemia, hypercalcemia and hypophosphatemia was found in 27(47.3%),9 (15.8%), 9 (15.8%) and 5 (8.8%) of the patients respectively.
The mean BMD Z-score was -1.77±1.13 (-4.2 -1.1) for lumbar spine and -1.64±0.89 (-3.9-1.9) for femoral neck. The BMD Z-scores showed meaningful correlations with the serum Alk-P level independent of serum Ca, P and PTH (p=0.002).Inverse correlation was found between serum level of PTH and GFR (p = 0.011).
CONCLUSION: Relatively high prevalence of bone-mineral disorder in pediatric renal recipients warants a periodic paraclinical evaluation including a bone densitometry.

Abstract# 153

UROLOGICAL COMPLICATIONS FOLLOWING PAEDIATRIC RENAL TRANSPLANT. Priya Gajjar,[1] Angus Alexander,[2] Peter Nourse,[1] Alp Nomanoglu,[2] Alan Pontin,[3] Delwahir Khan,[3] John Lazarus,[3] Allistair Millar.[2] *[1]Red Cross War Memorial Children's Hospital (RCWMCH), University of Cape Town (UCT), Cape Town, South Africa; [2]RCWMCH, UCT, Cape Town, South Africa; [3]Groote Schuur Hospital, UCT, Cape Town, South Africa.*
PURPOSE: To review the urological complications post renal transplant.
METHOD: Retrospective folder review of all transplants performed since 1968. Urological complications were classified as, vesico-ureteric reflux, leaks, stenoses, or unexplained hydronephrosis.
RESULTS: A total of 192 children were transplanted since 1968. The renal transplants were performed by an extra-peritoneal approach, and the ureteric anastomosis was done using the Lich-Gregoir approach with a 2-3 cm. tunnel; no stents were used. Twenty three urological complications were noted in 21 patients, giving an incidence of 10, 9%. Of the 21 patients, there were 15 boys and 6 girls with ages ranging from 2.4 to 18.4 yrs (mean 8.3). The commonest complication was vesico-ureteric reflux (VUR), accounting for 81% of the urological complications. Of these, 40% had abnormal bladders with voiding dysfunction. Three developed leaks, two had ureteric stenoses, and two developed strictures. Two patients had unexplained hydronephrosis. All those who had VUR presented with recurrent pyelonephritis, and half of those with normal bladders were re-implanted, with resolution of urinary infection. The patients with leaks presented early either with a perinephric collection, or pyelonephritis. The patients with stenoses presented with primary graft failure with dilated pelvises. The patients with leaks and stenoses were managed by a combination of percutaneous nephrostomies, double J stents, and balloon dilatation. Twenty of the 21 patients are alive and well. Four however lost their grafts directly or indirectly as a result of ureteric complications.
CONCLUSION: The reported complication rate is within accepted published limits. VUR was the most frequently observed. Management includes prevention by appropriate surgical technique, early diagnosis, the use of both diagnostic and interventional radiology and timely intervention of skilled urologists and surgeons.

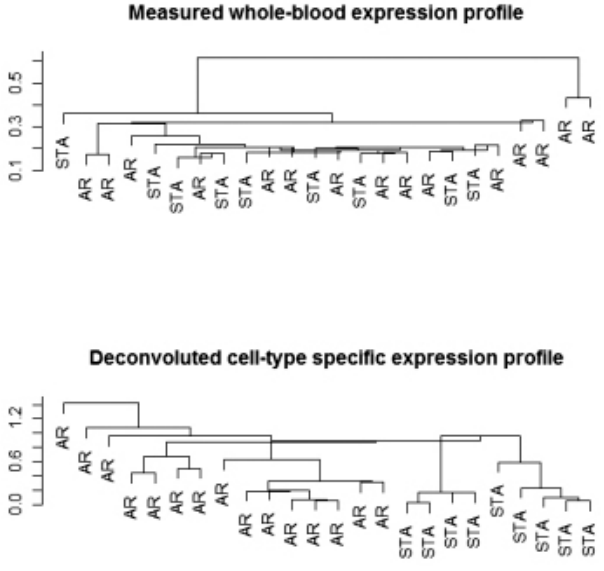
Abstract# 154

EXTRAPERITONEAL RENAL TRANSPLANTATION IN SMALL CHILDREN RESULTS IN EARLY IMPROVEMENT IN GRAFT FUNCTION. Sarah Heap,[1] Nicholas Webb,[2] Matthew Kirkman,[1] Denise Roberts,[2] Hany Riad.[1] *[1]The Transplant Unit, Manchester Royal Infirmary, Manchester, United Kingdom; [2]Department of Paediatric Nephrology, Royal Manchester Children's Hospital, Manchester, United Kingdom.*
PURPOSE: Renal transplantation is considered more technically challenging in small children compared to adults, especially using live donor adult kidneys. Traditionally, kidneys were placed intraperitoneally but over the last decade extraperitoneal positioning has been attempted. The aim of this study was to establish whether there is a difference in kidney function and outcome dependent on the position of the kidney.
METHOD: The medical notes of all children under the age of 6 who received a renal transplant at our unit between January 1998 and October 2009 were reviewed. Demographic data, operation details, mismatch, immunosuppression regime, complications and function of the graft were analysed.
RESULTS: A total of 30 transplants were performed in children under six years of age. The one-year patient and graft survival were 97% and 93%, respectively. Eighteen were undertaken via an intraperitoneal approach, with the remaining being placed extraperitoneally. There were no significant differences in the number of complications observed between the two groups and median length of stay was comparable (19.5 days versus 20.5 days for the intraperitoneal group).
The plasma creatinine values for the two groups were compared using multivariate linear regression analysis and adjusted for age, weight, gender and baseline plasma creatinine. Between day 2 and 14 post-operatively, patients who underwent extraperitoneal renal transplantation had an adjusted change in plasma creatinine which was significantly lower throughout this period.
CONCLUSION: Extraperitoneal approach of kidney transplantation in small children is safe and technically feasible. From our series, there appears to be early improved function, although there is no long-term difference in function between approaches.

Abstract# 155

NOVEL CELL-TYPE SPECIFIC DECONVOLUTION OF WHOLE-BLOOD GENE EXPRESSION PROFILES IN RENAL ACUTE REJECTION. Purvesh Khatri, Shai Shen-Orr, Robert Tibshirani, Atul Butte, Minnie Sarwal. *Stanford University, Stanford, CA, USA.*
PURPOSE: The expression profile of different blood cell-types in rejection is unknown posing significant challenge to identify non-invasive biomarkers for rejection.
METHOD: We developed a novel statistical deconvolution method for identifying cell-type specific gene expression profiles using whole blood microarray expression data and relative frequencies of individual cell types in each sample. Whole blood gene expression data from 24 renal transplant patients (AR=15, STA=9) with simultaneous relative frequencies of monocytes, lymphocytes, eosinophils, basophils, and neutrophils, were analyzed on Affymetrix whole genome expression arrays.
RESULTS: We estimated expression profiles for each cell type in each sample using deconvolution. Although whole blood expression analysis using SAM did not identify any significant genes between AR and STA, using the estimated expression profiles identified 213 genes significantly upregultaed in AR in one of the cell types (FDR < 5%). Furthermore, hierarchical clustering using whole blood expression data does not classify the samples correctly, the deconvoluted gene expression profile in specific cell subsets could distinctly cluster the samples in two groups (Fig. 1). We downloaded 132 microarrays of a specific blood cell type from NCBI GEO. The estimated cell-specific expression profile in STA group is highly correlated with measured expression profiles in that cell type, whereas the estimated cell-specific expression profile in AR group does not correlate with the measured cell-specific expression profile, which clearly show that during rejection gene expression profiles of a specific cell-type are clearly disrupted (Fig. 1).

CONCLUSION: Deconvolution is able to identify the specific subset of blood cells that correlates with acute rejection in renal allografts.



Abstract# 156

RENAL TRANSPLANTATION FOR FIBROMUSCULAR DYSPLASIA. Noel Knops,[1] Marlies Cornelissen,[2] Leo Monnens.[3]
[1]Department of Pediatric Nephrology and Solid Organ Transplantation, University Hospitals Leuven, Leuven, Belgium; [2]Department of Pediatric Nephrology, Radboud University Medical Center, Nijmegen, Netherlands; [3]Department of Physiology, Radboud University Medical Center, Nijmegen, Netherlands.

PURPOSE: Fibromuscular dysplasia is a vasculopathy associated with stenosis, and aneurysm formation. Angiographic signs are encountered in 3-4% of asymptomatic potential living kidney donors. In pediatrics, FMD is the most important cause of renovascular hypertension. The treatment options include: antihypertensives, transluminal/surgical revascularization, and partial or total nephrectomy. This report goes one step further.

METHOD: We describe the history of a one-year-old girl who suffered from renovascular hypertension due to FMD. Imaging revealed bilateral stenoses of the renal artery extending into the distal branches. The hypertension proved unamenable for pharmacologic treatment and the intrarenal located stenoses rendered conventional angioplasty not feasible. At the age of 5 years, the most affected kidney was removed. But hypertension persisted together with a progressive cardiomyopathy and retinopathy. At the age of 6 years the remaining kidney was removed, followed by a living related renal transplantation with a kidney donated by her mother. Now 8 years later, both she and her mother are well.

RESULTS: We are the first to present renal transplantation for severe renovascular hypertension due to FMD. The strategy immediately relieved the patient's hypertension, and prevented time on dialysis. The increased risk of FMD in relatives poses a dilemma for living related donation, since it can (re)occur in recipient and donor after transplantation. We recommend that donors with an increased risk for FMD, should be screened for renovascular lesions. FMD in the donor renal artery is not regarded as an absolute contraindication for kidney transplantation, illustrated by several published cases. We found no reports on graft lost due to FMD and the donor-morbidity during follow-up appears not to be increased.

CONCLUSION: Renal allograft transplantation after bilateral nephrectomy can be considered for therapy-resistant renovascular hypertension due to FMD.

Abstract# 157

CREATIVELY USING SIMULATION TO EFFECTIVELY TRAIN NEW NURSE GRADUATES TO CARE FOR PEDIATRIC RENAL TRANSPLANT PATIENT. Marilyn Moonan, Amanda Berube.
Children's Hospital, Boston, USA.

PURPOSE: Nursing care of the pediatric renal transplant patient depends upon a number of interventions to occur in a timely manner. In many hospitals, post transplant pediatric patients are managed in an intensive care environment. Within our institution, the majority of our patients are managed on the inpatient transplant floor postoperatively, as a protocol patient. Teaching graduate nurses to care for these high acuity patients created a challenge. Utilizing simulation, we developed an innovative scenario that enabled the learner to practice fluid management, central venous pressure monitoring, medication administration, wound care, and the psychological aspect of taking care of these delicate pediatric patients.

METHOD: Small individual groups of graduate nurses participated in a four hour course that consisted of didactic education, a simulated scenario, open-forum debriefing and a post-evaluation. A Certified Clinical Transplant Nurse and a Staff Development simulation coordinator facilitated the transplantation course. After a didactic session, the participants were given an introduction to the written patient scenario where they were expected to utilize the information in caring for their simulated renal transplant patient. This scenario consisted of three sections, between each section a time out was held, the manikin was paused, and discussion about the nursing intervention leading up to that particular point occurred.

RESULTS: The participants discussed their apprehension in caring for the post operatively renal transplant patient, especially managing their fluid balance. The participants anecdotally had stated that their comfort level had increased after having this opportunity to practice caring for this patient population in a simulated controlled environment.

CONCLUSION: Simulation can be very useful in educating graduate nurses about care of the pediatric transplant patient. Anecdotal reports from participants demonstrated an improvement in comfort levels. These findings suggest the need for further research in this area, using an evaluation measure pre and post the course.

Abstract# 158

THE PERIOPERATIVE AND OPERATIVE MANAGEMENT OF PRIMARY HYPEROXALURIA TYPE 1: SINGLE CENTER EXPERIENCE. Kristina Potanos,[1] Heung Bae Kim,[1] William Harmon,[2] Khashayar Vakili.[1] *[1]Surgery, Childrens Hospital Boston, Boston, MA, USA; [2]Nephrology, Childrens Hospital Boston, Boston, MA, USA.*

PURPOSE: Primary hyperoxaluria type 1 (PH1) is a rare metabolic disorder that results in accumulation of oxalate in body tissues, including the kidneys. This leads to renal injury with progression to end stage renal disease. The definitive treatment for PH1 is liver or combined liver-kidney transplantation. There is no standardized protocol amongst centers for perioperative management. We present three patients who underwent liver-kidney transplant for PH1, and review the management for patients with PH1 undergoing transplantation at our center.

METHOD: We completed a retrospective chart review from January of 2007 to December of 2009 of all patients undergoing transplantation for PH1 at our center.

RESULTS: Three patients were identified in the chart review, ranging in age from 22 months to 13 years at the time of transplant. All received preoperative hemodialysis (HD) 4-7 days per week, with the goal of reducing oxalate levels to minimize deposition in the renal graft after transplant. The duration of preoperative HD was 8-15 months. All patients received deceased donor organs; two patients received split liver grafts. Bilateral native nephrectomies were performed in each patient to reduce the total body burden of oxalate. One patient was re-explored on POD11 for bile leak; there were no other complications. All patients had aggressive postoperative HD until oxalate levels were consistently measured at less than 20 mg/day/1.73m². HD was completed on average by POD 23 (6,19,44). Follow up has been complete, ranging from 5 months to over 3 years. Renal function has been excellent in all patients, with no signs of oxalate deposition in the transplanted kidney.

CONCLUSION: We advocate aggressive pretransplant and posttransplant HD in addition to bilateral native nephrectomies to reduce the risk of injury to the newly transplanted kidney in patients with PH1 undergoing combined liver-kidney transplantation.

Abstract# 159

EARLY ULTRASOUND SCAN AFTER PAEDIATRIC LIVING DONOR RENAL TRANSPLANTATION ALLOWS IMMEDIATE CORRECTION OF PERFUSION PROBLEMS AND MAINTAINED PRIMARY GRAFT FUNCTION. Ben Pullar, Colin Forman, Mignon McCulloch, Geoff Koffman, Jonathon Olsburgh. *Department of Renal Transplant Surgery, Guys Hospital, London, United Kingdom.*

PURPOSE: 70 paediatric live donor kidney transplants have been performed at our institution since 2005. It can be difficult to diagnose early arterial occlusion in children with a native urine output. One approach is to perform duplex ultrasound in the immediate post operative period to identify perfusion problems. Our protocol was that transplant recipients should receive ultrasound (US) assessment of renal perfusion before leaving recovery or on arrival in Paediatric Intensive Care (PICU). This study aims to determine whether these scans have directly affected management in the immediate post operative period by allowing early surgical correction of the underlying perfusion problem.

METHOD: We performed a retrospective review of the case notes and investigations results of the 70 paediatric renal transplants performed. We recorded the indication for transplant, mode of Renal Replacement Therapy (RRT), and pre-operative native urine output.

We then looked at the post operative scan reports and recorded subsequent interventions in cases with abnormal perfusion on ultrasound.

RESULTS: 63/70 (90%) had US in recovery / PICU. 4 did not have US in recovery and 3 cases results were not available.

2/63 (3%) of cases had abnormal graft perfusion on ultrasound; both had native urine output; and both were immediately returned to theatre.

Case one was reported as no arterial flow on US. At operation a large renal artery thrombus was identified requiring thrombectomy and re-implantation.
Case two, US showed minimal intra-renal blood flow. This improved following exploration and repositioning of the graft.
Both cases subsequently had global perfusion on repeat US and primary graft function.
CONCLUSION: Early postoperative ultrasound identified perfusion problems in 3% of paediatric live donor renal transplants allowing immediate graft saving intervention. All cases had native urine output and may not have been identified by urine output measurement alone. We recommend US in recovery / on arrival in PICU in all paediatric renal transplants.

Abstract# 160

IMPROVEMENT OF GLUCOSE METABOLISM IN PEDIATRIC RECIPIENTS AT 1 YEAR AFTER KIDNEY TRANSPLANTATION: DIFFERENCE BETWEEN TACROLIMUS AND CYCLOSPOLINE BASED IMMUNOSUPPRESSION. Hiroyuki Satoh,[1] Zenichi Matsui,[1] Masaki Muramatsu,[1] Sachiko Sakai,[1] Seiichirou Shishido.[2] *[1]Pediatric Urology and Kidney Transplantation, Tokyo Metropolitan Children's Medical Center, Tokyo, Japan; [2]Pediatric Kidney Transplantation, Toho University, Tokyo, Japan.*
PURPOSE: In this study, we investigate the difference of glucose metabolism in pediatric recipients of kidney transplantation(KT) between pretransplant and at 1 year posttransplant Oral Glucose Tolerance Test(OGTT) receiving tacrolims(Tac) or cyclosporine(CsA).
METHOD: Between 1999 and 2009, eighty-six recipients had OGTT before KT and at 1year after KT. The subjects were classified into three groups by WHO criteria. These patients received either a CsA or a Tac based immunosuppression. The recipients who showed pretranplant abnormal GT had the CsA based regimen.We assessed Insulinogenic index(I-index), HOMA-beta and HOMA-R, HbA1c and metabolic status.
RESULTS: The mean age of 86 patients was 10.6±6.9 years with 49 males and 37 females. The mean follow-up was 5.2±2.6 years. Body Mass Index was 16.7±3.4. 29 of 86 patients (33.7%) revealed abnormal GT in the pre-transplant OGTT: 16(18.6%) with impaired GT(IGT) and 13 (15.1%) with DM. Pretransplant abnormal GT was recovered at 1 year after KT: 24 of 29(82.7%) pre-transplant abnormal GT recipients change into normal and 4 recipients unchanged. I-index and HOMA-beta that indicates insulin secretion improved after KT under Tac and CsA based immunosuppression. I-index using CsA and HOMA-beta using Tac showed significant improvement (I-index: CsA 0.64 to 1.46, p=0.03; Tac 0.73 to 1.14) (HOMA-beta: Tac 114.3 to 190.9, p=0.04; CsA 145.4 to 106.3) HOMA-R that indicates insulin resistance unchanged in both group(Tac 1.39 to 1.75; CsA 1.66 to 1.54). All patients showed normal HbA1c, no significant metabolic change and no PTDM after KT.
CONCLUSION: Our results demonstrated that pre-KT glucose metabolism improved at 1year after KT recieving Tac and CsA. CsA based immunosuppression showed no PTDM in pretransplant abnormal GT recipients and may reduce a risk of development of PTDM. However, we should assess the diatobetogenic action of Tac-based immunosuppression.

Abstract# 161

INTERVENTION TO INCREASE FLUID INTAKE FOLLOWING PEDIATRIC RENAL TRANSPLANT. Penny Scholl,[1] Kristin Kullgren,[2] Paul Hmiel.[3] *[1]Solid Organ Transplant, St. Louis Children's Hospital, St. Louis, MO, USA; [2]Psychology, St. Louis Children's Hospital, St. Louis, MO, USA; [3]Nephrology, Washington University School of Medicine, St. Louis, MO, USA.*
PURPOSE: Hydration post-renal transplant is crucial for renal perfusion and related to better graft function in adults. In adults, 1/3 of recipients are adherent to fluid requirements. There are no studies of fluid adherence following pediatric renal transplant and further research is needed. The HydraCoach® interactive water bottle tracks real-time fluid consumption. Our goal was to determine if its use would improve fluid adherence and kidney functioning following pediatric kidney transplant.
METHOD: Participants ages 7 to 19 years and >1 month post-transplant were randomized to the intervention (HydraCoach®; n = 14) or control group (standard education; n = 16) and given a daily fluid intake target based on body size. Labs were reviewed for Na, BUN, and creatinine. Participants kept a written record of daily fluid intake for 28 days. One month later labs were reviewed, fluid diaries collected, and the intervention group completed a satisfaction survey.
RESULTS: 63% provided valid intake data. 36% of the control and 86% of the intervention group were ≥ their target. Na decreased and neared significance. BUN was stable. Creatinine increased significantly for the overall and intervention group.
Most found the bottle easy to use and felt comfortable using it around friends. Half reported the bottle helped increase intake and they would continue its use.
CONCLUSION: An interactive water bottle may help pediatric kidney transplant patients meet fluid goals. Tracking may be an intervention itself adding accountability and structure. The intervention group's better intake didn't appear to positively impact kidney function. Tracking may not have been accurate for either group impacting results. The intervention group largely reported satisfaction with the bottle and were likely to continue its use.
Results should be interpreted with caution given the small sample. Data collection during hot summer months may have impacted outcomes. Future research should track outcomes over a longer time period.

Abstract# 162

IS CYSTEAMINE THERAPY STILL NECESSARY AFTER RENAL TRANSPLANTATION IN CYSTINOSIS? Marieke C.M. Scholten, Huib de Jong, Elisabeth A.M. Cornelissen. *Pediatric Nephrology, Radboud University Medical Centre, Nijmegen, Netherlands.*
PURPOSE: Cystinosis is caused by intralysosomal accumulation of cystine and characterized by renal failure as well as deterioration of other organs. Cysteamine therapy depletes the cystine by using alternative pathways. Thyroid failure is one of the known complications. We analyzed risk factors for hypothyroidism.
METHOD: Medical histories of 36 cystinosis patients were analyzed. Data were collected on last known measurement in euthyroidism group (n=13) and on time of diagnosis of hypothyroidism in hypothyroidism group (n=23). Mann-Whitney U test, Chi-square test and Fisher's exact test were used to analyze the data. Multivariate logistic regression was performed for age and each significant factor separately.
RESULTS: Mean age was not significantly different (median 21.4 yrs (range 4.2-28.7) vs 13.9 (3.3-41.7), p=0.62). TSH was higher in hypothyroidism group (5.5 mU/L (2.8-36.7) vs 1.7 (0.4-4.2), p<0.01), while fT4 was similar (12.0 pmol/L (9.0-19.3) vs 12.6 (7.8-20.9), p=0.74). GFR was definitely lower in patients with hypothyroidism (43.0 ml/min/1.73m^2(21.5-95.1) vs 91.8 (3.5-131.8), p<0.01). Thereby more hypothyroid patients received a renal transplant (10/13 vs 9/23, p<0.05), of whom 8 developed hypothyroidism only after transplantation. Age at starting Cysteamine was higher in hypothyroidism (2.8 yrs (0.6-25.3) vs 1.3 (0.3-16.3), p<0.05). Also dose of Cysteamine was lower in hypothyroidism group (14.0 mg/kg/day (0-118.5) vs 51.5 (15.2-73.0), p<0.05). There was no significant difference in urinary protein/creat ratio (1.2 g/10mmol (0-10.7) vs 1.08 (0-7.8), p=0.86) and mean blood cystine-levels of last 5 years (6/12 (50%) vs 18/23 (78%), p=0.13). Correlation between hypothyroidism and GFR, dose of Cysteamine and renal transplants were all significant independent of age.
CONCLUSION: Renal failure seems to be an indicating factor for thyroid failure. Renal transplant with corresponding immunosuppressives doesn't protect. Early starting with adequate dose of Cysteamine delays or maybe even prevents hypothyroidism. So, Cysteamine has to be continued after renal transplantation to prevent or delay deterioration of other organs.

Abstract# 163

DETECTION OF RENAL SCARS BY TRANSPLANT RENAL ULTRASOUNDS AND DMSA SCANS AFTER URINARY TRACT INFECTIONS IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Cheentan Singh,[1] Vikas Shah,[2] Sachit Shah,[2] Rashika Fernando,[2] Peter J. Anderson,[2] Lorenzo Biassoni,[2] Stephen D. Marks.[1] *[1]Pediatric Nephrology, Great Ormond Street Hospital, London, United Kingdom; [2]Radiology, Great Ormond Street Hospital, London, United Kingdom.*
PURPOSE: To study the clinical features and compare the accuracy of transplant renal ultrasound (TRUS) and dimercaptosuccinic acid (DMSA) scans in the detection of scars following urinary tract infection (UTI) in paediatric renal transplant recipients (RTR).
METHOD: Clinical notes of RTR who underwent TRUS and DMSA following UTI were reviewed for presence of bladder dysfunction, clinical presentation and episodes of culture positive UTI. The presence or absence of cortical thinning on TRUS and the severity of scarring (focal or multiple) detected on DMSA was noted.
RESULTS: 38 RTR, aged 1.5 to 16.3 (median 5.9) years were recruited with 22 (58%) patients having bladder abnormalities. Antibiotic prophylaxis was administered to 20 (53%) RTR for PCP prophylaxis, hostile bladders or previous history of UTI. Ten (26%) patients required hospital admission for intravenous antibiotics with 29 (76%) culture positive UTI. Only 10 (26%) patients had afebrile UTI and 60% of these had hostile bladders who had statistically higher incidence of renal scarring (16 (72%) vs 9 (56%) normal bladders; p = 0.04). TRUS were performed in all children during or after UTI episode with 3 (8%) with renal scarring. Abnormal DMSA scans were noted in 25 (66%) patients, of whom 16 (64%) had multiple and 9 (36%) had focal defects. TRUS could delineate only 3 (12%) of the 25 patients who had a defect on DMSA. DMSA is considered the gold standard in detecting renal scarring and the calculated sensitivity of TRUS in this study was only 12%.
CONCLUSION: UTI commonly occur in paediatric RTR with hostile bladders. The clinical features are diverse and a high index of suspicion should be maintained in order to ensure prompt treatment of UTI in RTR to prevent transplant renal scarring and preserve renal allograft function. TRUS is easily available but has a low sensitivity when compared to DMSA scans in detecting areas of scarring in transplant kidneys in paediatric RTR following UTI.

Abstract# 164

SUCCESSFUL TREATMENT OF RECURRENT ATYPICAL HEMOLYTIC-UREMIC SYNDROME WITH ECULIZUMAB AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Michael J.G. Somers, Nancy M. Rodig. *Div of Nephrology, Children's Hospital Boston and Harvard Medical School, Boston, MA, USA.*

PURPOSE: Mutations in complement cascade regulatory proteins predispose to atypical hemolytic-uremic syndrome (aHUS), frequently leading to ESRD and transplantation (tx). aHUS recurs commonly post-tx and is difficult to treat. Eculizumab, a monoclonal antibody against complement protein C5, may be efficacious therapy for recurrent aHUS linked to complement mutations.

METHOD: We present the case of a 7 yo African-American girl who developed plasmapheresis(PP)-resistant aHUS, quickly progressing to ESRD. ADAMTS13 activity and levels of Factor I (FI) and Membrane Cofactor Protein (MCP) were normal. Factor H (FH) level was low. Mutational analysis of FH, FI, and MCP discerned an FH allele deletion and homozygosity for many single nucoleotide FH polymorphisms, including one found in >30% of Sub-Saharan Africans and reported in an aHUS mutation database. Deceased donor renal tx occurred in March 2009 with maintenance tacrolimus/MMF immunosuppression.

RESULTS: 2 months (mos) post-tx, the child had transient thrombocytopenia, but no change in her hemoglobin or LDH, maintained renal fct, and no microangiopathy on tx biopsy. Four mos post-tx, recurrent aHUS and acute graft dysfunction occurred, responding quickly to limited PP. 6 mos post-tx, aHUS and increased Cr recurred, again responding to PP maintained for 2 mos. PP was then stopped and every 2 wk eculizumab infusion commenced and maintained to present (>1 yr), with no recurrent aHUS, improved graft fct, and no apparent adverse sequelae.

Post-Transplant Course

Date	Platelets	Hb/Hct	LDH	Cr	eGFR	Treatment
4/09	351,000	9.6/27.5	257	0.6	70	Not applicable
5/09	70,000	9.6/27.5	287	0.7	60	None
7/09	113,000	7.5/20.3	1115	1.7	25	Limited pheresis
8/09	232,000	9.5/26.5	455	0.9	50	None
9/09	133,000	7.1/19.9	1301	1.8	25	Chronic pheresis
11/09	349,000	8.9/26.8	249	1	45	Eculizumab begun; pheresis stopped
1/11	332,000	10.2/30	217	0.9	50	Ongoing eculizumab q 2 wks

CONCLUSION: We conclude that eculizumab can be used long-term as a strategy to treat and prevent recurrent aHUS related to some FH mutations. Its availability allows such children to avoid chronic PP or rapid return to dialysis.

Abstract# 165

STATIN USE IN PEDIATRIC KIDNEY TRANSPLANTATION. Deborah R. Stein, Michael J.G. Somers. *Div of Nephrology, Children's Hospital Boston and Harvard Medical School, Boston, MA, USA.*

PURPOSE: Hyperlipidemia frequently complicates ESRD and kidney transplant (ktx) pts are at risk of renal and cardiovascular complications associated with it. Use of lipid-lowering agents (statins) in pediatric ktx recipients is limited. This study analyzes clinical characteristics and sequelae of statin therapy (rx) in these children.

METHOD: We retrospectively reviewed consecutive ktx recipients aged 1-18 yo over an 8 yr period. By protocol, cholesterol > 200 mg/dl prompted statin rx. We identified all children requiring statins, characterized demographic and lab data, and assessed response to rx or drug complications.

RESULTS: In 125 consecutive ktx children (51% boys; median age at ktx 12yo; median time since ktx 3.6y), 38 (30%) received statin (47% boys; median age at ktx 11yo; median time since ktx 6y). Pts on statins were similar to others in gender and age at tx. Pts >14 yo were more likely to receive statins (39% vs 18%, p=0.01). Median rx duration was 29 mo (range 4-104 mo). Statin rx was associated with mTOR use (30/40 pts, p<0.01) but not calcineurin inhibitors (14/88 pts) or steroids (22/65 pts). Median cholesterol fell on statins (233mg/dl to 165) with no change in median AST/ALT. Median CK increased on statins, though remained nl (68 u/L to 84, p<0.05). 14/38 statin pts (37%) had drug withdrawn for one or more reasons. Of these 14, 36% had elevated CK (median 453 u/L), 36% had nl cholesterol upon mTOR withdrawal, 21% had elevated AST/ALT, 14% had spontaneous improvement. Statin withdrawal pts were similar in age, gender, immunosupression, and median pre-statin cholesterol, CK, and transaminases compared to statin-maintained pts. In pts withdrawn due to lab anomalies, median CK, AST, and ALT normalized whereas median cholesterol increased (176 mg/dl to 197, p<0.001).

CONCLUSION: We conclude that in pediatric ktx recipients: 1) Hyperlipidemia is common and often linked to mTOR rx and older age; 2) Statin rx is efficacious with little effect on AST, ALT, or CK; 3) Statin complications are rare; children with eventual complications have no predictive clinical characteristics or screening labs pre-rx; 4) Statin complications tend to resolve with drug withdrawal.

Abstract# 166

SUCCESSFUL RENAL TRANSPLANTATION IN A CHILD CASE UTILIZING THE RENAL VEIN AND SPLENIC VEIN IN CHILDREN WITH INFERIOR VENA CAVA THROMBOSIS: A CASE REPORT. Jiro Takasu,[1] Seiichiro Shishido,[2] Takeshi Kawamura,[1] Atsushi Aikawa,[1] Kei Hasegawa.[3] *[1]Nephrology, Toho University School of Medicine, Tokyo, Japan; [2]Pediatric Nephrology, Toho University School of Medicine, Tokyo, Japan; [3]Pediatrics, Toho University School of Medicine, Tokyo, Japan.*

PURPOSE: Present a renal transplantation in a child case utilizing renal vein and splenic vein persistence inferior vena cava thrombosis.

METHOD: Case presentation.

RESULTS: A 12 year-old, 30kg boy with Intellectual Disability and autism was referred for kidney transplantation with chronic renal failure due to bilateral renal hypo/dysplastic kidney. HELLP syndrome for maternal gestational birth at 31weeks, 1248 g. Onset of hepatoblastoma at age 1 also extended right Enlarge hepatic lobectomy after chemotherapy. There has been no recurrence. As Pretransplantation examination, ultrasound (US) and magnetic resonance venography (MRV) shows inferior vena cava (IVC) thrombosis and collateral venous flow is developed. Peritoneal dialysis was introduced to Investigation of vascular anastomosis performed a kidney transplantation on July 15, 2010. Donor renal artery anastomosis was performed side to end anastomosis to Aorta. The donor renal vein and inferior pole in the middle of the main branches were thick from the ovarian veins branch out after a lower pole branch. Anastomosed to the renal vein near the confluence of the testicular vein and left renal vein. In addition, donor ovarian vein was separated and used as vein graft main brunch to splenic vein to disperse venous perfusion pressure for portal system. Ureteroureterostomy was performed the transplant ureter to the recipient's own ureter. The operation time was13hours and 52minuits, Worm ischemic time was 4 minutes, Total ischemic times were 141minutes, the initial urine was 76 minutes. The postoperative course was uneventful. Renal vein thrombosis was not observed and both drainage flows in CT at Postoperative 3 months were good. And serum creatinine is about 0.8 mg/dl

CONCLUSION: We've got to avoid serious complications of renal transplantation by examining the vessels in renal transplantation.

Abstract# 167

OUTCOME OF NEPHROPATHIC CYSTINOSIS IN PEDIATRIC RENAL TRANSPLANTATION: A SINGLE CENTRE EXPERIENCE. Rezan Topaloglu,[1] Yelda Bilginer,[1] Fatih Özaltin,[1] Ali Düzova,[1] Tuncay Aki,[2] Seza Ozen,[1] Aysin Bakkaloglu,[1] Nesrin Besbas.[1] *[1]Pediatric Nephrology, Hacettepe University Faculty of Medicine, Ankara, Turkey; [2]Urology, Hacettepe University Faculty of Medicine, Ankara, Turkey.*

PURPOSE: Nephtopathic cystinosis is an inborn error of metabolism due to lysosomal accumulation of cystine in a variety of tissues.End stage renal disease is one of the major causes of morbidity and mortality in these patients. Renal transplantation and cysteamine therapy have improved the life quality and life expectancy of these children.
We report our single centre experience to assess the survival of renal function in children with cystinosis after renal transplantation.

METHOD: Medical reports of 5 children with cystinosis were evaluated. Three of them were from living related and two from cadaveric donors. Two of them were on CAPD, one of them was on hemodialysis before transplantation and two were performed preemptively. All patients were treated with calcineurin- based triple immunosuppressive therapy.

RESULTS: The mean age was 14.2 ± 2.07 years. The median transplantation duration was 23 months. One of the patients had lost renal function due to acute rejection and the other one due to incompliance. The remaining ones have all functioning grafts and their median creatinine level was 0.48 mg/dl (ranging 0.42-0.98 mg/dl).

CONCLUSION: Renal transplantation with cysteamin therapy changed the cystinosis patients faith from mortal condition towards a treatable chronic illness.

Abstract# 168

LESS PRE-EMPTIVE RENAL TRANSPLANTATIONS AND MORE REJECTIONS IN IMMIGRANT CHILDREN THAN IN NATIVE DUTCH AND BELGIAN CHILDREN. Wilma F. Tromp,[1] Johanna H. Lee,[1] Antonia H.M. Bouts,[1] Laure Collard,[2] Karlien Cransberg,[3] Rita Van Damme-Lombaerts,[4] Koen J. van Hoeck,[5] Nathalie Godefroid,[6] Linda Koster-Kamphuis,[7] Marc R. Lilien,[8] Ann Raes,[9] Nadejda Ranguelov,[10] Jaap W. Groothoff.[1] *[1]Pediatric Nephrology, Emma Children's Hospital AMC, Amsterdam, Netherlands; [2]Pediatric Nephrology, CHU, Liege, Belgium; [3]Pediatric Nephrology, Sophia Children's Hospital Erasmus MC, Rotterdam, Netherlands; [4]Pediatric Nephrology, UH, Leuven, Belgium; [5]Pediatric Nephrology, UH, Antwerpen, Belgium; [6]Pediatric Nephrology, UC Louvain, Bruxelles, Belgium; [7]Pediatric Nephrology, UMC St Radboud, Nijmegen, Netherlands; [8]Pediatric Nephrology, Wilhelmina Children's Hospital UMC, Utrecht, Netherlands; [9]Pediatric Nephrology, UH, Ghent, Belgium; [10]Pediatric Nephrology, HUDERF, Bruxelles, Belgium.*

PURPOSE: RICH-Q (Renal Insufficiency therapy in CHildren-Quality assessment and improvement) aims to improve the quality of care for children with End Stage Renal Disease. We investigated whether policies differ and whether transplantation is less successful in immigrant children than in native children.

METHOD: All Dutch and Belgian children transplanted since September 2007 are included. Therapy characteristics and outcomes are registered on a 3 monthly base in a GCP database. Immigrants were defined as children of whom 1 or both parents were born in non-Western countries.

RESULTS: The median [range] follow-up time of 92 children transplanted between September 2007 and June 2010 was 14 [0-25] months. 34% (31/92) were immigrants. Ages ranged from 1 to 19 in native children and from 1 to 17 in immigrant children. 31 % (19/61) of transplantations in native children were performed pre-emptively versus 10% (3/31) in immigrant children. Living related donor transplantation was performed as first transplantation in 56% (34/61) of the native children versus 19% (6/31) of the immigrant children. Survival analysis showed a significantly larger rejection risk in immigrants (p = 0.027).

CONCLUSION: In immigrant children pre-emptive and Living related donor transplantation is performed less often than in native children. After transplantation, these children are more prone to rejections.

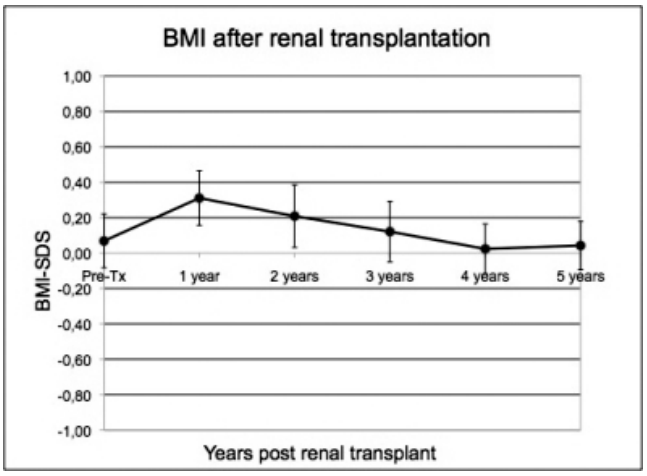
Abstract# 169

STEROID-FREE IMMUNOSUPRESSION: EFFECT ON BMI AND GROWTH. Per Wittenhagen,[1] Helle C. Thiesson,[2] Mette Neland.[1] *[1]Department of Paediatrics, Odense University Hospital, Odense, Denmark; [2]Department of Nephrology, Odense University Hospital, Odense, Denmark.*

PURPOSE: Obesity and growth retardation are well known complications to steroid based immunosuppression in transplantation. We evaluated the effects of steroid free immunosuppression on body mass index (BMI) and linear growth in children following renal transplantation.

METHOD: Retrospective review of 47 children transplanted from 1994-2009 immunosuppressed with calcineurin inhibitor and mycophenolate mofetil. BMI-standard deviation score (SDS) and height-SDS were compared before (pre-Tx) and after (post-Tx) transplantation. Anthoprometric data were calculated using reference data from Nysom (BMI) and Albertsson-Wikland (height). Data from patients treated with steroids due to rejection were excluded.

RESULTS: Pre-Tx 6 % (3 out of 47) of the patients were obese defined by BMI > 95th percentile (similar to normal Danish children). BMI-SDS remained stable after transplantation, pre-Tx (0.07±0.15) and 5 years post-Tx (0.04±0.22) (P>0,2), see figure below.



All groups had a significant catch-up growth, however most pronounced in the youngest age-groups. Average height-SDS in our population are depicted in table 1. No patient developed diabetes.

Height SDS ± sem

	Pre-Tx (n=47)	1-yr (n=46)	2-yr (n=23)	3-yr (n=30)
0-6 year	-2.00 ± 0.67	-0,83 ± 0.29, p<0.05	-0,59 ± 0.24	-0,85 ± 0.42
6-12 year	-1.83 ± 0.26	-1,21 ± 0.21, p<0.05	-1,09 ± 0.24	-0,98 ± 0.31
≥12 years	-1.34 ± 0.36	-1,16 ± 0.35, p<0.05	-1,13 ± 0.44	-1,28 ± 0.45
All	-1.79 ± 0.17	-1,30 ± 0.17, p<0.05	-1,18 ± 0.19	-1,25 ± 0.21

Table 1

CONCLUSION: With 5 years follow-up we find that steroid-free immunosuppression after renal Tx protects against glucocorticoid induced obesity and to our knowledge this is the first study showing the absence of weight gain. Furthermore we demonstrate catch-up growth especially in the youngest children.

Abstract# 170

PLASMA SUCCINYLACETONE IS RAISED AFTER LIVER TRANSPLANTATION FOR TYROSINAEMIA TYPE 1 AND ASSOCIATED WITH REDUCED PORPHOBILINOGEN SYNTHASE ACTIVITY SUGGESTING IT IS FUNCTIONAL. David C. Bartlett,[1,2] Philip N. Newsome,[1,2] Mary Anne Preece,[3] Elisabeth Holme,[4] Carla LLoyd,[5] Patrick J. McKiernan.[5] *[1]Centre for Liver Research, University of Birmingham, Birmingham, United Kingdom; [2]Liver Unit, Queen Elizabeth Hospital, Birmingham, United Kingdom; [3]IMD Laboratory, Birmingham Children's Hospital, Birmingham, United Kingdom; [4]Department of Clinical Chemistry, Sahlgrenska University Hospital, Gothenburg, Sweden; [5]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Tyrosinaemia type 1 (TT1) is a rare disorder of tyrosine metabolism leading to accumulation of toxic metabolites such as succinylacetone (SA) and a high risk of hepatocellular carcinoma. Children with TT1 traditionally required liver transplantation (OLT) and while the need for this has been reduced by the introduction of nitisinone some still go on to require OLT. Circulating SA inhibits the enzyme porphobilinogen (PBG) synthase and its activity can be used as a marker of functional circulating SA. Elevated urinary SA post OLT thought to be due to local production has been reported. This study describes a novel finding of elevated plasma SA following OLT for TT1.

METHOD: A retrospective analysis was performed of patients treated for TT1 at our institution from 1989-2010.

RESULTS: 13 patients underwent OLT for TT1. In patients who received nitisinone prior to OLT, mean urinary and plasma SA were elevated prior to treatment but both normalised by the time of OLT (p<0.05). Mean PBG synthase activity increased from abnormally low to levels well within the normal range at the time of OLT (p<0.01). Mean urinary SA in patients not treated with nitisinone was elevated prior to OLT; plasma levels and PBG synthase activity were not available prior to OLT for this group. Following OLT, mean urinary and plasma SA were elevated in all for the duration of follow up and in those treated with nitisinone PBG synthase activity fell from pre-OLT levels as plasma SA recurred.

CONCLUSION: Urinary and plasma SA levels are elevated following OLT for TT1. Low-normal PBG synthase activity suggests the circulating SA may be functional. The clinical significance of this is unclear.

Abstract# 171

RESULTS OF COMBINED LIVER-KIDNEY TRANSPLANTATION (CLKTx) AND LONGITUDINAL GROWTH IN CHILDREN WITH AUTOSOMAL RECESSIVE INHERITED POLYCYSTIC KIDNEY DISEASE (ARPKD). Florian Brinkert,[1] Michael van Husen,[2] Lutz Fischer,[3] Björn Nashan,[3] Rainer Ganschow,[4] Markus J. Kemper.[2] *[1]Pediatric Gastroenterology and Hepatology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [2]Pediatric Nephrology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [3]Hepatobiliary and Transplant Surgery, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [4]Pediatric Hepatology and Liver Transplantation, University Medical Center Hamburg-Eppendorf, Hamburg, Germany.*

PURPOSE: ARPKD often results in end-stage-renal disease and the necessity of renal replacement therapy in early childhood. Congenital progressive liver fibrosis is a feature of ARPKD and may result in hepatosplenomegaly and portal hypertension. Thus, CLKTx may be necessary.

METHOD: We conducted a retrospective chart analysis of seven patients who underwent a combined CLKTx between the years 2003 and 2009 at the University Medical Center Hamburg-Eppendorf. In all patients clinical and laboratory data were collected. Concerning the longitudinal growth development Standard Deviation Score (SDS) were recorded.

RESULTS: Seven children were transplanted at a median age of 10 years (range 1.7-16 years) and with a median weight of 18.2 kg (range 10.5–55 kg). After a median follow-up of 3.6 years (range 1.6-7.2 years) all patients are alive. The first transplanted patient had to be retransplanted due to kidney artery thrombosis. A single kidney transplantation was necessary due to non adherence in the later follow-up. One Patient underwent a solitary liver re-transplantation. Today the liver and kidney function of all patients are stable. The median creatinine of 0.75 mg/dl (range 0.33-1.77mg/dl) results in a calculated GFR of median 101 ml/min/1.73m² (range 72-154 ml/min/1.73m²). The longitudinal growth data show good growth after CLKTx.

CONCLUSION: The results of CLKTx for patients with ARPKD are encouraging. Both the lack of mortality and the good growth show that CLKTx is an important therapy for patients with ARPKD affecting liver and kidney.

Abstract# 172

AUTOIMMUNE LIVER DISORDER AFTER OLT: FREQUENCY AND CONSEQUENCES. Thomas H. Casswall, Maria Magnusson, Antal Németh, Björn Fischler. *Ped Gastroenterol, Hepatol & Nutr, CLINTEC, Karolinska Institutet, Stockholm, Sweden.*

PURPOSE: Histological and immunological findings indicating de novo autoimmunity have earlier been described after orthoptic liver transplantation (OLT). We aimed to evaluate our patients for autoimmune features after OLT.

METHOD: A retrospective analyses of children < 18 yrs., liver transplanted 2000-2009. Patients were investigated 1, 3 and 5 (+/- 1 yr) years post OLT with autoantibodies (ANA, SMA and LKM), ESR and IgG and the results were compared to findings from protocol biopsies.

RESULTS: 26 patients, 15 boys, were included. Median age at OLT (10 living donors) was 1.25 (0.4-16.6) years. The pre-OLT diagnoses were: biliary atresia (BA): 16, autoimmune liver disease (AILD): 3; alpha 1-antitrypsin deficiency 2, Alagille syndrome: 1, PSC: 1, progressive familiar intrahepatic cholestasis:1, cystic fibrosis: 1, and mitochondrial disease: 1. 11 of 26 pts had positive autoantibodies at least once. In all, at one, three and 5 years post-OLT, 26% (5/19), 40% (8/20), and 26% (5/19) had detectable autoantibodies, respectively. Autoantibodies were detected on at least one occasion in all 3 patients with AILD as pre-OLT-diagnosis, in 8 (4 living donors) of 16 (50%) patients with BA, and in none of the patients with other diagnoses. One patient with AILD had repeatedly positive antibodies whereas in the other 10 patients these occurred transiently. Only one AILD patient was LKM positive, the other two had ANA and/or SMA antibodies. Liver biopsies showed grade 1 interface hepatitis in one ANA-antibody positive AILD patient 3 years after transplantation, suggesting recurrence of AILD. De novo autoimmune hepatitis was not seen in any of the other patients. Rejection activity index (RAI) score was < 4 in all patients except in the patient with recurrence of AILD (RAI 4). No patient had elevated IgG.

CONCLUSION: There is a clear risk of post-OLT recurrence of AILD. Autoantibodies occur in high frequency in BA patients after OLT, whereas de-novo hepatitis was not seen in our patients. The explanation and clinical implications of these "de novo" autoantibodies in transplanted BA children are unclear.

Ref: Kerkar N et al. Lancet. 1998:7;351:409-13.

Abstract# 173

IS THROMBOPHILIA AN INCREASED RISK FOR THROMBOSIS AFTER PAEDIATRIC LIVER TRANSPLANTATION? C. Cunha,[1] C. Piedade,[1] P. Martinho,[2] I. Gonçalves,[3] E. Furtado.[4] *[1]Paediatric Surgery, HPC, Coimbra, Portugal; [2]Haematology, CHC, Coimbra, Portugal; [3]Hepatology, HPC, Coimbra, Portugal; [4]Liver Surgery and Transplantation, HUC, Coimbra, Portugal.*

PURPOSE: Thrombosis is one of the most fearful words in transplantation and a major cause of early graft failure.

Prothrombotic abnormalities can be acquired during liver transplantation, increasing the risk of postoperative thrombotic events.

METHOD: The authors reviewed the thrombophilic profile (Factor V Leiden, G20210A prothrombin, and MTHFR gene mutations) from donors and/or recipients and the occurrence of thrombotic events in 79 paediatric liver transplants with a follow up of at least 6 months. Retransplants were excluded.

RESULTS: Patients (40 boys and 39 girls) included had a median age at transplant of 4,86 years.There were 19 transplants with thrombotic events.

The thrombophilic profile from 54 donors and 56 recipients and in 31 transplants from donors and recipients was studied.

One donor and 3 recipients were found heterozygous (HTZ) carriers for the Factor V Leiden (FVL). There were no homozygous (HMZ) carriers. HTZ G20210A prothrombin gene mutation was found in 2 donors and 2 recipients. HTZ MTHFR gene mutation was detected in 52% of donors and 41% of recipients. HMZ MTHFR gene mutation was detected in 5 donors and 6 recipients. One patient and 1 donor were doubling heterozygous.

For the G20210A prothrombin gene mutation and MTHFR gene mutation there were no significant statistic results. For the FVL there was a significant result for its presence both in donors (p= 0.046) and recipients (p= 0,005) when there was a thrombotic event, with a likelihood ratio of 3,25 for donors and 7,95 for recipients.

CONCLUSION: In Europe 4-6% of the population is a HTZ carrier for the FVL gene mutation.

Despite this high prevalence rate, heterozygosis for the mutation confers only a low thrombotic risk and many HTZ carriers never experience thrombosis.

However, with other cofactors acting as synergistic events, individuals with the mutation are more prone to thrombotic events.

In this study being a HTZ carrier for the FVL gene mutation was a risk factor for thrombosis after liver transplantation.

Abstract# 174

THE DISCRIMINANT ANALYSIS OF RISK FACTORS IN CILDREN WITH ACUTE LIVER FAILURE DUE TO AMANITA PHALLOIDES POISONING. Maciej Dadalski, Diana Kaminska-Gocal, Irena Jankowska, Joanna Pawlowska, Józef Ryzko. *Department of Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: The aim of the study was to construct the best model of clinical and laboratory factors up to 4 day after poisoning to predict clinical outcome in children after Amanita phalloides poisoning.

METHOD: We retrospectively estimated data obtained from 78 children with acute liver failure (INR>2,0 or INR >1,5 and encephalopathy) due to Amanita phalloides poisononing hospitalized in our center from 1983 to 1990 (before LTx and extracorporeal liver support therapy in children were available in Poland). 35 (aged 8,2±3,5) died, 43 (aged 8,9±3,6) remained alive. The following factors were taken into considerations: age, time between poisoning and diarrhea, maximal grade of encephalopathy up to 4 day and ALT, INR, total serum bilirubin, creatinine, urea taken from 3 and 4 day after poisoning. The forward stepwise discriminant analysis was used to establish the best discrimination model.

RESULTS: The following factors were assessed as the best to the model: INR Day 4, bilirubin Day 4, creatinine Day 4, urea Day 4, grade of encephalopathy, time between poisoning and diarrhea. Using the grouping classification functions the sensivity and the specifity of the model was 0,65 (95%CI 0,47 do 0,80) and 0,95 (95%CI 0,84 do 0,99) respectively. When a priori probability of bad outcome was increased to maximize sensivity the results were 0,97 (95%CI 0,85 do 0,99) and 0,37 (95%CI 0,23 do 0,53) respectively.

CONCLUSION: The obtained model with early clinical and laboratory factors may be in considered in qualification or disqualification to LTx in children after Amanita phalloides poisoning.

Abstract# 175

SIROLIMUS IN PEDIATRIC LIVER TRANSPLANTATION. Sandra M. Ferreira, Hugo Clemente, Aline R. Antunes, Isabel M. Gonçalves, Susana Almeida. *Unidade de Hepatologia, Hospital Pediátrico Coimbra, Coimbra, Portugal.*

PURPOSE: Sirolimus (SRL) has been used as an "off-label" drug for immunossupression (ISS) in liver transplanted (LT) children. Small series were published in contrast with the larger experience in renal transplantation. Some concerns still exist about adverse effects including ongoing nephrotoxicity and SRL related hepatitis.

To review our experience with SRL in pediatric liver transplantation over the last 3 years.
METHOD: A retrospective study comprising 19 of 156 LT recipients in a single center since 1994. SRL indications were ongoing/chronic rejection, graft dysfunction and ISS in context of tumors - tacrolimus (TAC) sparing regimens. Patients under SRL for less than 4 months were excluded. Variables analyzed were: age, rejection episodes, liver histology and laboratory data (serum alanine aminotransferase (ALT), urea, creatinine) prior to and after SRL treatment. Drug-related adverse effects were also recorded.
RESULTS: Nineteen children were included, the median age at LT being 5 years (4 months-14 years). SRL was started 3 years (median) post-LT (3 months-15 years). Indications were: ongoing/recurrent allograft rejection (7), TAC sparing regimens (8), nephrotoxicity (6), tumors (5), others (5). SRL was used in combination with TAC in 7 children and replacing TAC in 12. Mean trough SRL level was 6 ng/ml. Median serum ALT level before and after SRL was respectively 76U/L (12-347U/L) and 43U/L (9-120U/L). Liver histology improved in 6/15 patients and worsened in 2. In patients converted due to nephrotoxicity, urea and creatinine decreased respectively 21 and 24%. At present median follow-up of 14 months (2 months-8 years) 3 patients discontinued SRL although well tolerated (ongoing nephrotoxicity/retransplantion). Drug was withdrawn due to adverse events in 3 children (pneumonitis, toxic hepatitis, severe proteinuria).
CONCLUSION: Our study is limited by the small number of patients and short follow-up. SRL was a safe drug in LT children. Efficacy as a rescue agent for graft dysfunction could not be demonstrated. Selected patients and prospective studies are needed to clarify the usefulness of m-TOR inhibitors in current LT ISS protocols.

Abstract# 176

PNEUMOCYSTIS CARINII PNEUMONIA IN TRANSPLANT PATIENTS: RISK FACTORS AND OUTCOME. Sara Gozzini,[1] Fabrizio Gennari,[2] Deirdre A. Kelly,[1] Patrick J. McKiernan,[1] Girish Gupte,[1] Carla Lloyd,[1] Indra van Mourik,[1] Jane Hartley,[1] Khalid Sharif.[1]
[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Dipartimento di Chirurgia e Centro Trapianti, Ospedale Pediatrico Bambin Gesu', Rome, Italy.
PURPOSE: Pneumocystis carinii pneumonia (PCP), a common cause of pneumonia after solid organ transplantation, has been effectively eliminated with the use of Trimethoprim-sulfamethoxazole (TMP-SMX) prophylaxis during the initial transplant period. Following this period, patients with multiple episodes of graft rejection or undergoing increased immunosopression may be at high risk of developing PCP. In the liver and multivisceral transplant population, no evidence based guidelines exist for re-introducing prophylaxis.The aim of this study was to identify risk factors, and outcome of children with PCP post transplant.
METHOD: Demographics, presentation, diagnosis, risk factors, management and outcome of patients who developed PCP were retrospectively reviewed.
RESULTS: 606 primary transplants including liver, liver/kidney, isolated bowel and multivisceral were performed between 1989 and 2010, and received 6 months PCP prophylaxis. 4 patients were diagnosed with PCP, median time post transplant 57 months. The diagnosis was suspected by clinical signs, radiological findings and confirmed by BAL in 3 and by BAL PCR in 1. All 4 patients had an episode of rejection on an average of 7.5 months prior to developing PCP. 1 developed PCP while still on prophylaxis. 2 episodes of acute rejection were treated with increased Tacrolimus and pulse steroids, while 1 had Sirolimus, steroids and Basiliximab. 1 chronic rejection was treated with Sirolimus, Tacrolimus and steroids. 2 patients had inverse CD4:CD8 lymphocyte subsets with very low CD4 T cell count, while 3 of 4 patients had CD4 T cell below the normal range. All were treated with TMP-SMX. 3 of 4 children died, and in 2 the cause was PCP.
CONCLUSION: Despite the small number of patients of this study we believe intensifying immunosupression without PCP prophylaxis was probably the cause of PCP infection. CD4 T cell count and lymphocyte subset might be helpful to predict need for TMP-SMX prophylaxis.

Abstract# 177

EVALUATION OF DUCT-TO-DUCT BILIARY RECONSTRUCTION IN PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION. Shintaro Hayashida, Masaki Honda, Hiroko Suda, Yuki Ohya, Kwang-Jong Lee, Hidekazu Yamamoto, Takayuki Takeichi, Katsuhiro Asonuma, Yukihiro Inomata. *Pediatric Surgery and Transplantation, Kumamoto University, Kumamoto City, Kumamoto, Japan.*
PURPOSE: Duct-to-duct choledochocholedochostomy (DD) is now generally accepted procedures for biliary reconstruction in adult-to-adult living donor liver transplantation (LDLT). However, the feasibility of DD in pediatric patients has not been widely accepted. In our institution, DD has been the first choice in the biliary reconstruction for pediatric patients, including the infantile generation, when their bile ducts are available.
METHOD: Ninety-nine pediatric patients underwent LDLT from 2000 to 2010. Forty patients performed with DD were studied retrospectively. Median follow-up period was 54.2 months (range: 111-1 months). Incidence of biliary complications, strategy and the outcome of the treatment for them were studied.
RESULTS: Bile leakage occurred in 2 patients (5.0%), and both were successfully treated by drainage. Biliary strictures occurred in 5 (13%), and in patients under 10-year-old (n=29), only one developed (3.4%). Endoscopic retrograde biliary drainage or percutaneous transhepatic cholangiodrainage was performed as the initial treatment for biliary strictures. Three patients required re-anastomosis by Roux-en-Y hepaticojejunostomy or magnet compression anastomosis.
CONCLUSION: Duct-to-duct biliary reconstruction was considered to be acceptable in pediatric patients, especially in young children.

Abstract# 178

SUCCESSFUL LIVING DONOR LIVER TRANSPLANTATION FOR EXTRAHEPATIC BILIARY ATRESIA (POST KASAI PROCEDURE) ACCOMPANIED BY COMPLEX CONGENITAL HEART ANOMALIES WITH SEVERE SHUNT. Ken Hoshino, Naoki Shimojima, Yasushi Fuchimoto, Minoru Tanabe, Yuko Kitagawa, Yasuhide Morikawa. *Surgery, KEIO University, School of Medicine, Tokyo, Japan.*
PURPOSE: We report a successful living donor liver transplantation on a seven-month old boy with complication of extrahepatic biliary atresia (failed Kasai) accompanied by highly complex cardiac anomalies. The severest case on record.
METHOD: The patient was seven months old, weighing 4.0kg with complication of extrahepatic biliary atresia. Liver transplantation was recommended and the patient was referred to our institution. It was an ABO incompatible case accompanied by combined malformation including situs inversus, polysplenia, intestinal malrotation and complex congenital heart anomalies: intermediate AVSD (post PA banding), coarctation of Ao (post balloon dilation), TAPVR, PLSVC, TR (grade III) and IVC interruption.
RESULTS: A cross-functional medical team was assembled and studied possible occurrences of the following problems during the operation associated with reflow of the graft; right ventricular failure caused by volume overload, non-functioning graft caused by relative outflow block, desaturation caused by severe shunt and air embolization. Through the cross-functional examination, it was concluded that each problem was solvable.
We frequently met face-to-face with the patient's family and explained that the surgery would be the first case in the world and would have a high risk during and after the operation. The family had a strong desire for transplantation for their son and did not change their mind.
Having gained the approval of the ethical committee of Keio University Hospital, we conducted a living donor liver transplantation on this patient using hyper-reduced left lateral graft. During the operation, CHDF was efficiently applied; stabilizing the blood pressure and no drastic right ventricular failure took place. The transplantation was completed successfully.
CONCLUSION: After 23 months, the postoperative course has been going generally well. To date, there has been no sign of cardiac failure and the hepatic graft has been functioning well.

Abstract# 179

EXTRACORPOREAL MEMBRANE OXYGENATION FOR SEVERE HEPATOPULMONARY SYNDROME AFTER PAEDIATRIC LIVER TRANSPLANTATION. Sandrine Jean, Christophe Chardot, Florence Lacaille, Olivier Bustarret, Philippe Pouard, Nadège Salvi, Karen Lambot, Sabine Irtan, Laurent Dupic. *Hôpital Necker – Enfants Malades, Université René Descartes, Paris, France.*
PURPOSE: We report on the use of ECMO for refractory hypoxemia after paediatric liver transplantation for severe hepatopulmonary syndrome (HPS).
METHOD: Case report: A boy presented with biliary atresia, polysplenia, and partial atrioventricular canal. He underwent Kasai operation (day 70), and complete repair of the heart defect (7 and 15 months). His heart was thereafter assessed as functionally normal. Secondary failure of the Kasai operation occurred with biliary cirrhosis, jaundice, portal hypertension, and cyanosis secondary to massive intrapulmonary shunts (proven by heart catheterism), requiring pre-operative continuous oxygenotherapy. He underwent urgent LT (age 17 months, weight 10 kg) with a split graft. Intra-operative course was uneventful. In the immediate post-operative course, he developed severe hypoxemia, unresponsive to conventional therapy, including nitric oxide and high frequency oscillator ventilation, and leading to multiple organ failure. Liver graft function and neurological assessment were satisfactory. An arterio-venous ECMO was placed in the ICU bed between the right jugular vein and right carotid artery, with minimal heparinotherapy.
RESULTS: Blood oxygenation, and hemodynamic parameters immediately improved, multiple organ failure recovered. He remained on ECMO for 9 days and he was extubated 9 days after decanulation. On day 21, he had an episode of pulmonary oedema, due to mitral regurgitation secondary to post-ischemic valve dysfunction. Nine months after LT, the child is alive and well, with normal blood oxygenation on air, as well as normal liver function tests, renal function, neurological examination and cognitive development. He still has a moderate mitral regurgitation requiring medical therapy.
CONCLUSION: ECMO can be used after LT in children with life-threatening hypoxemia secondary to HPS, as a bridge to reversal of the shunts. It might better be considered before the occurrence of irreversible complications of severe hypoxemia.

Abstract# 180

CHARACTERISTIC OF CHILDREN WITH ACUTE LIVER FAILURE DUE TO AMANITA PHALLOIDES INTOXICATION.

Diana Kaminska-Gocal, Maciej Dadalski, Irena Jankowska, Joanna Pawlowska, Józef Ryzko. *Department of Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Aim of the study was to characterise natural history (before performing liver transplantation and extracorporeal liver support therapy were available in Poland) of acute liver failure due to Amanita phalloides poisoning in polish paediatric population.

METHOD: Datas of 78 patients admitted to our hospital with acute liver (INR>2,0 or INR >1,5 and encephalopathy) or multiorgan failure because of Amanita phalloides consuming from 1983 to 1990 were analyzed retrospectively.

RESULTS: 43 patients (aged 8,9±3,6) remained alive (group 1), 35 children (45%, aged 8,2±3,5) died (group 2). Time of death certification in our patients was from 4 days after death cap eating to 25 days (median 7 days). Diarhoea +/-vomits and abdominal pain were observed during one hour to 36 hours after poisoning (median 10,5 hours, in group median 12 hours 1, 8,5 hours in group 2). In blood test the highest INR (5,37±3,953, median: 4,06, group 1 vs. group 2 median 2,9 vs. 6,26), ALT (4302±4929 U/l, group 1 vs. 2 median: 2950 vs. 3450 U/l) and total serum bilirubin level (3,72±2,47 mg/dl, group 1 vs. 2 median: 2,25 vs. 4,15 mg/dl) were noticed at day 4. There was no significant difference between group 1 and 2 in neurological status of patients at day 4: in both group median and all patients grade of enceophalopathy was 3. 14 patients (18%) had acute liver and kidney failure, all these patients died.

CONCLUSION: Risk of fatal outcome in child poisoned with Amanita phalloides is high. In children, who died due to Amanita phalloides intoxication, earlier onset of gastrointestinal symptoms, higher INR, ALT and serum bilirubin values at day 4 were observed.

Abstract# 181

LONG TERM OUTCOMES IN LIVER TRANSPLANTATION FOR PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS.

Hamdi Karakayali,[1] Sema Aktas,[1] Figen Ozcay,[2] Gokhan Moray,[1] Adnan Torgay,[3] Mehmet Haberal.[1] *[1]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [3]Anesthesiology, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: PFIC patients usually develop fibrosis and end-stage liver disease before adulthood. Most PFIC patients are ultimately candidates for liver transplantation (LT). We studied outcomes of patients with PFIC after LT.

METHOD: Sixteen of the 298 LT performed at our center since September 2001 were transplanted with the diagnosis of PFIC. There were 10 male, 6 female, with the mean age of 3.7±4.1 years. Three patients were younger than 1 year. Of these 16 patients, 2 had PFIC1, 11 had PFIC2, and 3 had PFIC3. All grafts were obtained from a living-related donor except one.

RESULTS: Surgical complications included hepatic artery thrombosis in 1, biliary leak in 2, biliary stenosis in 3, and hepatic vein stenosis in 2 patients. While 1 biliary stenosis was treated surgically, all remaining complications were treated with interventional radiological techniques. Hepatocellular carcinoma was observed in 3 patients. Of these, 2 were PFIC2, 1 was PFIC3. Eight patients experienced at least 1 episode of acute cellular rejection which was treated with steroids. During the mean follow-up 52.1±24.8 months. Five patients (2 PFIC1, 3 PFIC2) experienced steatosis and/or fibrosis. The remaining 11 patients showed no evidence of liver disease. One child who had concomitant fibrosis and steatosis developed intermittent diarrhea a few weeks post-LT and died 25 months after LT due to liver failure, 1 child who had fibrosis died 29 months after LT due to variceal bleeding, and 1 child died due to sepsis 3 months after LT. At the time of this writing, remaining 13 patients are alive with normal liver function.

CONCLUSION: Although the clinical courses and outcomes of PFIC1 patients after LT are still not sufficient owing to steatosis/fibrosis, LT for PFIC is a good treatment modality with good outcomes and little morbidity.

Abstract# 182

ANESTHETIC MANAGEMENT OF HEPATOPULMONARY SYNDROME, LONG QTc INTERVAL & PANHYPOPITUITARISM DURING LIVER TRANSPLANT.

P. Kovatsis, R. Dumont, J. Ibla, H.B. Kim. *Children's Hospital, Boston, USA.*

PURPOSE: We present a unique case of liver transplantation (LT) in a patient with hepatopulmonary syndrome (HPS), long QTc & panhypopituitarism.

METHOD: A 16yo, 81kg male presented with cryptogenic cirrhosis, HPS, long QTc & panhypopituitarism. Saturations ranged from 60% on room air to 94% on 3L O_2. He underwent LT 7 months later. Management included taking his standard desmopressin & thyroxine, adding stress steroids & avoiding drugs with a high risk of prolonging the QTc. Saturations ranged from 91-100% & $ETCO_2$ from 31-66mmHg. The A-a gradient ranged from 160-467. Infusions of dopamine, epinephrine, glucose & insulin were started to optimize cardiopulmonary, electrolyte & metabolic status. Estimated blood loss was 2500ml & replacement included 6u PRBC, 720ml cell saver blood, 7u FFP, 500ml 5% albumin, & 8L crystalloid. Because of the competing issues of massive fluid shifts & blood loss versus hyponatremia from vasopressin, vasopressin was avoided until sodium levels rose to a high of 155mmol/l approximately 2 hours post-reperfusion. With vasopressin at 40u/hr, the sodium level decreased to 150 at the termination of the anesthetic 1½ hours later. Urine output for the 8½-hour anesthetic case was 2100ml (1940ml pre-vasopressin). Immediate postoperative course was uncomplicated with resolution of the long QTc & hypoxemia over several weeks.

RESULTS: This case combines the rare findings of HPS, panhypopituitarism & long QTc all of which compound the potential for perioperative instability. HPS and long QTc lead to decreased survival. Despite this patient's complex, multiple medical issues, the decision was to proceed with LT given the patient's poor prognosis otherwise.

CONCLUSION: HPS remains a significant clinical challenge posing many medical & ethical issues. There are no clear criteria for which patients with HPS should proceed to LT nor is there a good understanding on what factors increase perioperative risk. Until more defined criteria or viable medical alternatives become available, LT with HPS is an acceptable option even with moderate to severe HPS & confounding medical issues such as long QTc interval & panhypopituitarism.

Abstract# 183

INTENSIVE CARE MANAGEMENT AFTER PAEDIATRIC LIVER TRANSPLANTATION USING THREE DIFFERENT IMMUNOSUPPRESSIVE REGIMENS: A SINGLE CENTER EXPERIENCE.

D. Krebs-Schmitt,[1] E. Grabhorn,[1] A. Briem-Richter,[1] D. Singer,[2] S. Schmidtke,[2] L. Fischer,[3] R. Ganschow.[1] *[1]Pediatric Hepatology and Gastroenterology, University Hospital Eppendorf, Hamburg, Germany; [2]Neonatology and Intensive Care Medicine, University Hospital Eppendorf, Hamburg, Germany; [3]Hepatobiliary and Transplant Surgery, University Hospital Eppendorf, Hamburg, Germany.*

PURPOSE: To evaluate the intensive care management and rate of complications after paediatric liver transplantation, we conducted a retrospective study from 2004 to 2009.

METHOD: The patients were divided into 3 subgroups treated with different immunosuppressive regimens in addition to CsA 1-2 mg/kg/day i.v. (group 1: 60mg/m2 prednisolone without basiliximab, group 2: 60mg/m2 prednisolone plus basiliximab, and group 3: 15 mg/m2 prednisolone plus basiliximab).

In 2004 most of the pediatric liver transplant recipients in our center still received the higher dose of prednisolone +/- basiliximab. Since reduction of steroids in combination with basiliximab does not increase the rate of acute cellular rejection our standard regimen was changed since 2005. The current study included 130 liver transplantations in 106 children.

RESULTS: The underlying diagnoses were biliary atresia (n=54), metabolic disease (n=16), cholestatic liver disease (n=13), chronic hepatitis (n=5), acute hepatic failure of unknown origin (n=10), and miscellaneous (n=32).

The rate of early infections was 40% in group 1, 52% in group 2, and 52% in group 3. The rate of surgical complications was 28%, 52%, and 29%, respectively. The rate of acute cellular rejection was in group 1: 14% vs. group 2: 32% vs. group 3: 18%. The need for treatment with catecholamines was 2 days in group 1, 3 days in group 2 and 1 day in group 3. The time on mechanical ventilation differed with the longest time in group 2 with 11 days and 3 days in group 1 and 3.

CONCLUSION: Our study shows that an immunosuppressive regimen including 15 mg/m2 prednisolone has the lowest rate of acute cellular rejections, surgical complications and time on mechanical ventilation with an equal rate of infections. This indicates that a higher dose of steroids has no beneficial effects.

Abstract# 184

PERSISTENT SPLENOMEGALY AFTER PEDIATRIC LIVER TRANSPLANTATION (LTx).

Maria Magnusson, Thomas Casswall, Björn Fischler, Antal Németh. *CLINTEC, Karolinska Institutet, Stockholm, Sweden.*

PURPOSE: Our aim of this study was to evaluate time to normalization of spleenic enlargement in children after ltx.

METHOD: The charts of 34 children transplanted 2001-2009 at age <18 were retrospectively reviewed. Patients with enlarged spleen on ultrasound prior to the tx, were included and data concerning platelet level, palpable spleen, spleen size and blood flow on ultrasound, liver biopsies, immunosuppression, virology and post transplant lymphoproliferative disease (PTLD) were analyzed before tx, and at follow up 1, 3, and 5-6 years post-ltx. Platelet count <150 x 10^9/L was considered as hypersplenism.

RESULTS: 27 of 34 children (81%) had splenomegaly on ultrasound and were included in the study. At the first follow up enlarged spleen was noted on ultrasound in 18/25(72%). At 3 and 5-6 years respectively splenomegaly was seen in 15/21(71%) and 7/15(47%). A palpable spleen was noted on clinical exam in 36 %, 28% and 13 % at follow up 1, 3, and 5-6 years respectively. Low platelet count was seen in 4/25, 7/21 and 3/15 at follow up. Two patients developed cirrhosis in the graft and portal hypertension with varices, one of them was retransplanted after 4 years. Apart from these two patients the persistent splenomegaly could not be explained by the degree of fibrosis during follow-up. All three patients who were treated for PTLD had splenomegaly at 1 and 3 years post-tx, while one of them had a normalized spleen size at 5 years post-tx.

None of the patients with PTLD had low platelet count at follow up. In the rest of the patients other possible causes of splenomegaly including portal thrombosis have been ruled out. In four of the patients with low platelet count at 1 and/or 3 year follow up this could be due to medications (mycophenolate mofetil in 2 patients and rifampicin in one) or infection (parvovirus B19 in one).
CONCLUSION: Almost half of the patients had splenomegaly on ultrasound at 5-6 years post-ltx. Factors other than portal flow also might influence the rate of splenic involution. Ultrasound identifies splenomegaly more often than clinical examination and it does not always imply hypersplenism. Post-ltx thrombocytopenia can be multifactorial.

Abstract# 185

LIVER TRANSPLANTATION IN NEONATAL LIVER FAILURE DUE TO HERPES SIMPLEX VIRUS. Patricia McClean,[1] Suzanne Davison,[1] John Roche,[1] Raj Prasad,[1] Khalid Sharif,[2] Jane Hartley,[2] Patrick McKiernan.[2] *[1]Children's Liver & GI Unit, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom; [2]The Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom.*
PURPOSE: Disseminated neonatal herpes simplex virus (HSV) infection is rare in the UK and frequently fatal. World wide there are only a few published cases of successful liver transplantation in this condition and this study describes the outcome of four infants transplanted in the UK in 2010.
METHOD: The case notes of the infants were reviewed retrospectively. We also reviewed 3 published cases in which there was enough clinical detail.
RESULTS: Four infants (2 male) presented with features of acute liver failure at 5-10 days of age. Gestational ages were 35-40 weeks and birth weights 2.94-3.4 kgs. Two infants had HSV1 isolated and 2 had HSV2. All were treated with intravenous acyclovir and initially ventilated in the intensive care unit. Three required renal support and inotropes. They each underwent a liver transplant at 11-64 days of age. One infant died within 2 days of transplantation and 2 survived for 23 and 70 days respectively but had multiple complications including persistent renal failure and bowel perforation. The final infant, who had required no renal or inotropic support pretransplant, is currently very well 35 days after his transplant.
Of the 3 published cases of successful liver transplantation on days 12, 60 and 78 of life, none required renal support before transplantation.
CONCLUSION: From the results of our series and review of the published cases, infants with liver failure alone due to HSV infection can benefit from liver transplantation. However those with multiorgan failure have a very poor prognosis.

Abstract# 186

5 YEAR OUTCOMES AFTER SERIAL TRANSVERSE ENTEROPLASTY IN CHILDREN WITH SHORT BOWEL SYNDROME. Carol Oliveira,[1,2] Nicole De Silva,[1,2] Paul W. Wales.[1,2] *[1]Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada; [2]The Group for Improvement of Intestinal Function and Treatment (GIFT), The Hospital for Sick Children, Toronto, ON, Canada.*
PURPOSE: The STEP is a novel intestinal lengthening procedure introduced in 2003. Our aim was to report 5 year outcomes in patients who have received the STEP at our institution using clinical and objective assessments of intestinal function.
METHOD: Twenty seven STEP procedures have been performed between May 2003 and Jan. 2010. The 12 patients who had a STEP prior to Jan. 2005 (follow-up of >5 years) were analyzed. Clinical (weight gain, enteral tolerance, stool frequency, bacterial overgrowth), and biochemical outcomes (citrulline levels, D-Xylose absorption, Alpha-1 antitrypsin clearance and fecal fat content) were performed pre-STEP and post-STEP on an annual basis. Data is presented as means with standard deviation. Paired t-tests were used to compare post-STEP outcomes to pre-STEP values ($p<0.05$ was significant). IRB approval was obtained.
RESULTS: There were 12 patients (3 females, median age 5.5 months (range 1 day - 14 years)). STEP resulted in mean increase in length of dilated bowel segment of 89%±26% and increase in total small bowel length of 46%±40% with mean application of 16 cartridges. Two patients received liver-intestinal transplants post STEP (at 4mos and 5mos), and 2 patients subsequently died from sepsis and liver failure at 3mos and 8mos. The remaining 8/12 patients have mean follow-up of 69±5mos and all show stable intestinal absorptive capacity [*data not shown*]. Seven of 8 patients weaned off parenteral nutrition by 3 years. No patient has required repeat STEP or bowel tapering. Three patients remain on treatment for bacterial overgrowth. One patient developed staple line leak and one patient developed GI bleed from staple line ulcers.
CONCLUSION: This report represents the largest series of STEP patients followed beyond 5 years. After the early loss of patients to transplant or death, 66% of patients exhibit robust intestinal function with minimal complications.

Abstract# 187

MULTIVISCERAL TRANSPLANTATION IN A CHILD WITH CYSTIC FIBROSIS AND SHORT BOWEL SYNDROME. Kristina Potanos,[1] Khashayar Vakili,[1] Roger Jenkins,[2] Daniel Kamin,[3] Heung Bae Kim.[1] *[1]Surgery, Childrens Hospital Boston, Boston, MA, USA; [2]Surgery, Lahey Clinic, Burlington, MA, USA; [3]Gastroenterology/Nutrition, Childrens Hospital Boston, Boston, MA, USA.*
PURPOSE: Cystic fibrosis (CF) is an inherited disease with multisystem manifestations. Liver disease and pancreatic exocrine dysfunction are the most common extrapulmonary manifestations of CF; management of end stage disease with liver or combined liver-pancreas transplantation is established. A subset of pediatric patients present with complicated meconium ileus and resultant short bowel syndrome (SBS). Liver disease in these patients results from biliary complications of CF or parenteral nutrition associated liver disease (PNALD). We describe multivisceral transplant (MVT) in an infant with CF and SBS.
METHOD: We completed a retrospective chart review, focusing on the indications for transplant, the postoperative course and current follow-up.
RESULTS: A male infant was referred for multivisceral transplant. His history included CF and SBS from meconium peritonitis and multiple small bowel atresias necessitating resection. The patient also had decompensated cirrhosis and severe PNALD. At eight months of age, he underwent MVT from a size matched donor. The postoperative course was complicated by a central venous line infection and mild acute intestinal rejection. The patient was discharged home POD 55 on full enteral feeds. Despite the young age of the patient, the explanted pancreas had classic features of duct inspissation and acinar fibrosis. Follow-up of greater than four years has been excellent with no pulmonary complications. Weight and height are most recently measured at the 14th and 43rd percentiles, and pancreatic enzyme replacement has not been required since transplant.
CONCLUSION: This is the first report of successful multivisceral transplant in a child with CF and demonstrates the potential for excellent intermediate term outcomes in children with CF. MVT can be performed with minimal pulmonary morbidity in children with CF, with the additional benefit of normal pancreatic function. Cystic Fibrosis should not be considered a contraindication to MVT.

Abstract# 188

OUTCOME OF DUCT-TO-DUCT VERSUS ROUX-EN-Y HEPATICOJEJUNOSTOMY IN BELOW 15 KG PEDIATRIC LIVER TRANSPLANT RECIPIENTS. Mohammed F. Shaheen, Khalid O. Abdullah, Mohammad M. Hamshow, Wael A. O'Hali. *Hepatobiliary Sciences & Transplantation, King Abdulaziz Medical City, Riyadh, Saudi Arabia.*
PURPOSE: To compare biliary complications following duct-to-duct (d-d) versus Roux-en Y hepaticojejunostomy (h-j) biliary anastomoses in pediatric liver transplants weighing <15 kilograms.
METHOD: A retrospective review of pediatric liver transplants from 11/2003 till 11/2010 was performed. All recipients weighing <15kg were included, excluding a case of primary non-function. Demographics, PELD score, graft ischemia time, patient and graft survival, biliary and vascular complications were studied. Patients were grouped based on the type of biliary anastomosis performed. Group 1(d-d) and Group 2(h-j) anastomoses. Both groups were subdivided according to number of ducts and anastomoses, 1 duct-1 anastomosis (1d-1a), 2 ducts-2 anastomoses (2d-2a), 2 ducts-1 anastomosis (2d-1a). Student t-test, Fisher's exact test and logistic regression were used in the statistical analysis.
RESULTS: 21 patients were identified (12 males, 9 females) with a mean age of 2.05 ± 1.25 years and a mean weight of 9.53 ± 2.72 kg (range = 5.3 – 13.9 kg). Six were deceased donor liver transplants using whole grafts, and fifteen were living related liver transplants using left lateral segments. Mean PELD score was 16.19 ± 8.85. Group 1 consisted of 13 patients; 9 with 1d-1a, 3 with 2d-2a and 1 with 2d-1a. Group 2 consisted of 8 patients; 6 with 1d-1a, 1 with 1d-1a and 1 with 2d-1a. Group 1 had 4 complications in 2 patients; one had anastomotic stricture (1d-1a), the other had anastomotic stricture, hepatic artery stenosis and thrombosis (2d-1a). In group 2, there were 2 complications in 2 patients; one had anastomotic leak (2d-1a) and the other had anastomotic stricture (1d-1a). All were treated with no impact on graft survival. No statistical difference was found in the post operative biliary ($p=0.62$) or vascular ($p=0.99$) complications between the 2 groups.
CONCLUSION: Our data showed no difference in outcome of duct-to-duct versus Roux-en Y hepaticojejunostomy biliary anastomosis. Duct-to-duct biliary anastomosis can be performed safely in pediatric liver transplantation recipients weighing <15kg.

Abstract# 189

ASESSMENT OF PROTOCOL ULTRASOUND FOLLOWING PAEDIATRIC ORTHOTOPIC LIVER TRANSPLANT; WITH RECOMMENDATIONS FOR ONCE DAILY SCANNING DAYS 1, 3, 5 AND 7. Caroline M. Smith, Saeed S. Raza, Terry Humphries, Helen Woodley, Magdy Attia, Patricia MClean, Raj Prasad. *Leeds Liver Unit, Leeds Teaching Hospitals Trust, Leeds, West Yorkshire, United Kingdom.*

PURPOSE: Recommendations for Ultrasound (US) regimens following paediatric orthotopic liver transplant (POLT) are varied. Doppler assessment allows assessment of hepatic artery and portal vein flow. We aim to clarify diagnostic weight for each day of scan and make recommendations as to streamlining the protocol.

METHOD: Outcomes following POLT were analysed by day and finding of US scan. The outcomes were collated from a prospective database and case note review for 130 transplants in 123 children from November 2000 to April 2010, median follow up 1618 days. US scans are performed on days 1,2,3,5,7. Altered LFT's or intra-abdominal sepsis prompted US assessment after day 7.

RESULTS: Incidence of surgical complications occurring within the first month post operatively were: HAT 6.0%, HAS 6.0%, PVT 0.8%, PVS 0.4%, bile leak 6.9%, biliary stricture 3.1%.

Abnormal day 1 and 5 scans were associated with graft loss. An abnormal US scan does not predict patient mortality.

US on days 1, 5 and 7 showed the highest positive predictive value (0.39,0.5 and 1.0 respectively). There were no false negative scans, and therefore sensitivity for all days was 100%.

Median day of US result suggestive of surgical pathology is as follows: HAT day 3, HAS day 5, PVT day 1 and PVS day 3, biliary stricture day 11.5 and bile leak day 12. 33.3% of surgical complications requiring intervention within one month post OLT were found after day 7 with majority of them being biliary leak or stricture.

CONCLUSION: We would recommend protocol US scanning of children post OLT on days 1,3,5,7, reflecting days with greatest diagnostic weight and those identifying HAT. Protocol driven US after day 7 is not indicated as suspicion of biliary complication is prompted by biochemical abnormalities or sepsis.

Abstract# 190

COAGULATION FACTOR XII DEFICIENCY ACQUIRED BY ORTHOTOPIC LIVER TRANSPLANTATION IN 12 YEAR OLD BOY – CASE REPORT. Joanna Teisseyre,[1] Anna Klukowska,[2] Piotr Kalicinski,[1] Mikolaj Teisseyre,[3] Dorota Broniszczak.[1] *[1]Pediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [2]Pediatric, Hematology and Oncology, Medical University of Warsaw, Warsaw, Poland; [3]Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Liver transplantation may be associated with transmission of deficiencies of proteins synthesized by the liver including coagulation factors. The aim of the study is to report the case of transmission of congenital deficiency of coagulation factor XII to 12 year old patient undergoing orthotopic liver transplantation.

METHOD: Case report: 12 year old boy with end-stage liver disease secondary to cystic fibrosis underwent liver transplantation from deceased donor.The liver donor was 33 year old female with traumatic intracranial hemorrhage and no previous episodes of abnormal bleeding. Her aPTT was normal, but FFP was administered before laboratory evaluation.

RESULTS: Coagulation evaluation before LTx showed slight abnormalities secondary to recipient liver disease – INR 1.29. Activated partial thromboplastin time (aPTT) before transplantation was normal: 31.8-43.1 sec. Posttransplant cogulation evaluation revealed a persistently prolonged aPTT >180sec and severe deficiency of Hageman factor with activity 0% was diagnosed. One-year posttransplant period the patient underwent without any bleeding complications and thrombophylic tendency.

CONCLUSION: Although the factor XII was not measured in the recipient but the normal aPTT exluded the severe deficiency before LTx. Hageman's factor deficiency is rare and benign disorder causing prolonged aPTT, probably without any clinical significance. This report shows the ever-present risk of donor-to-recipient disease transmission during transplantation.

Abstract# 191

IMPACT OF LIVER TRANSPLANTATION(LTx) ON LONG TERM RESPIRATORY FUNCTION AND NUTRITIONAL STATUS IN PATIENTS WITH CYSTIC FIBROSIS ASSOCIATED LIVER DISEASE(CFLD). Indra van Mourik,[1] Joanne Dowman,[2,3] Danni Watson,[4] Bridget Gunson,[2,3] Carla Lloyd,[1] Jane Clarke,[5] Ed Nash,[4] David Honeybourne,[4] Joanne Whitehouse,[4] Deirdre Kelly,[1] Philip Newsome.[2,3] *[1]Liver Unit, Birmingham Children's Hospital NHS Trust, Birmingham, West Midlands, United Kingdom; [2]Liver Unit, University Hospital Birmingham/Queen Elizabeth Hospital, Birmingham, West Midlands, United Kingdom; [3]Centre for Liver Research, Institute of Biomedical Research, University of Birmingham, Birmingham, West Midlands, United Kingdom; [4]Department of Respiratory Medicine/Regional Cystic Fibrosis Unit, Birmingham Heartlands Hospital, Birmingham, West Midlands, United Kingdom; [5]Regional Paediatric Cystic Fibrosis Unit, Birmingham Children's Hospital NHS Trust, Birmingham, West Midlands, United Kingdom.*

PURPOSE: To review long term outcome of LTx in children(C) and adults(A) with CFLD.

METHOD: Retrospective review of children(19,11M/8F) and adults(21,16M/5F) with CFLD who underwent LTx in Birmingham between 1987-2009.Data included demogr aphics,indications,nutritional data (BMI(A),height/weight z-scores(C)), lung function (%FEV1/FVC(A), FEV1/FVC z-scores(C), renal function(calculated GFR) and post LTx complications.

RESULTS: 1/5yr actuarial survival rates were 90/85% for (C) and 85/64% for (A) respectively,comparable to survival rates for other indications.

Table 1

Lung Function (LF)	at LTx	6 mths	12 mths	24 mths	48 mths	60 mths
median FEV1 z-score(C)	-1.37	-1.07	-0.88	-1.43		-2.26
median FVC z-score(C)	-0.84	-0.87	-0.53	-0.57		-1.34
median %FEV1(A)	49.2	49.5	48.8	41.3	45	37.6
Nutrition						
median Wt z-score (C)	-0.85	-1.18	-1.28	-1.07		-1.92
median Ht z-score (C)	-1.36	-1.62	-1.7	-1.97		-1.44
median BMI (A)	19.7	19.3	19.2	19		19.6

LF improved up to 1 year,stabilised up to 2 years post LTx, then deteriorated as per non-LTx CF patients.Reduced admissions for iv antibiotics for pulmonary exacerbations (A).Late deaths in each group were from respiratory complications. LTx did not improve nutritional status and pre-LTx nutritonal status did not alter 1-or 5 year survival.

CONCLUSION: Ltx in children and adults is effective treatment for CFLD,initially stabilises respiratory disease but offers no short or long term nutritonal benefits.

Abstract# 192

BILIARY COMPLICATIONS AFTER PEDIATRIC LIVER TRANSPLANTATION: EXPERIENCE OVER A 20 YEAR PERIOD. Barbara E. Wildhaber, Samuel Luethold, Dominique C. Belli, Valerie A. McLin. *Pediatrics, Hôpitaux Universitaires de Genève, Geneva, Switzerland.*

PURPOSE: Analysis of biliary complications (BC) following pediatric liver transplantation (LT) over a 20 year period at the Swiss national reference center for pediatric LT in Geneva.

METHOD: Retrospective study of all pediatric LT-patients of a single institution, from May 1990 to December 2010, median follow up of 100 months (range 1d-235m).

RESULTS: One-hundred-and-four patients received 111 LT, i.e. 11 living (LD) and 100 deceased donors (DD). BC occurred in 24 patients (21.6%): in 4 LD (36% of LD-LT) and 20 DD (20% of DD-LT).

Amongst 11 choledocho-choledochal anastomoses (CCA) were 5 (45%) BC: 1 twist, 2 leaks, 2 primary strictures (at 6 and 11m). Amongst 100 entero-biliary anastomoses (EBA) were 19 (19%) BC: 2 accidental ligations of secondary bile ducts (both LD), 2 obstructions, 7 leaks (median 4d, range 1-57d), 8 primary strictures (median 5m, range 9d-46m).

Accidental ligations, twist and obstructions were all treated with surgical redo of the anastomoses, 1/5 developed a secondary stricture. Of 9 leaks, 4 healed with drainage alone without sequelae, 5/9 had a primary redo (2/5 developed a secondary stricture, 1/5 a re-leak (death 3m after LT due to MODS). Of 13 strictures (10 primary, 3 second after redo) 2 had no treatment and cleared spontaneously, 3/13 had a primary redo without sequelae, 8/13 had 1-6 rounds (median 1, range 1-6) of percutaneous balloon dilatation (PBD) with finally 3 redos (after 1 or 2 sessions); overall 6/13 (46%) strictures had a redo. Only 1/8 sessions of PBD was performed before 2000. In total 15/24 BC-patients had 16 anastomosis redos (63% of BC-patients, 67% of all BC).

CONCLUSION: Compared with the literature we report a satisfying incidence of BC after pediatric LT. LD grafts and CCA are associated with more BC than DD grafts and EBA, respectively. Biliary strictures are the most frequent, bile leaks the most frequent early BC. Management for strictures has changed since 2000: PBD is now the treatment of choice. Yet, many redos are seen in this series. This high rate may be due to aggressive, early surgery rather than more expectant management preferred by other centers.

Kidney 3: Outcomes and Survival

Abstract# 193

SURVIVAL RATES OF PEDIATRIC KIDNEY TRANSPLANTS IN THE U.S. AFTER SHARE 35. Wida Cherikh,[1] Sharon Bartosh,[2] Chad Waller,[1] Eileen Brewer.[3] *[1]United Network for Organ Sharing, Richmond, VA, USA; [2]Univ of Wisconsin Hosp & Clinics, Madison, WI, USA; [3]Baylor Coll Med & Texas Children's Hosp, Houston, TX, USA.*

PURPOSE: On 9/28/05, a national kidney allocation change known as Share 35 was implemented in the U.S. so that children listed before age 18 receive local priority for kidneys from donors <35 yrs. After Share 35, overall number of transplants (txs) in pediatric (ped) continues to increase but there are more HLA mismatched (MM) txs in children. The current analysis was conducted to compare graft and patient (pt) survival of pediatric txs before and after Share 35.

METHOD: Non-zero MM ped DD kidney txs during 9/28/02-9/27/08, from the OPTN database were included. Unadjusted survival within 3 yrs of tx were compared between 2 periods (9/28/02-9/27/05 vs 9/28/05-9/27/08) using log-rank test of the Kaplan-Meier (KM) method. Multivariable Cox regression models were used to compare survival within 3 yrs of tx between 2 periods in the presence of other risk factors. Results of the Cox models are presented as adjusted hazard ratio (AHR) of graft loss or death and p-value.

RESULTS: The study cohort had 1,011 DD ped txs before and 1,476 txs after Share 35. After Share 35, a significantly lower % of ped txs had 0-DR MM (6% vs 9%) or 1-DR MM (46% vs 52%) and a higher % had 2-DR MM (48% vs 39%). The differences in the unadjusted KM graft and patient survival between the 2 tx periods were marginally significant (p-value of 0.09 and 0.05, respectively). The 3-yr unadjusted KM graft survival before and after Share 35 was 81% and 83%, respectively; whereas the 3-year pt survival was 97% and 98%, respectively. The adjusted risks of graft loss within 3 yrs were not significantly different between the 2 periods (AHR=1.05, p=0.84). The adjusted risks of death within 3 yrs were also not significantly different between the 2 periods (AHR=1.22, p=0.79).

CONCLUSION: Despite significantly higher % of ped txs with more HLA MM after Share 35, the adjusted graft and pt survival within 3 yrs of tx were similar to those before Share 35. Longer follow-up (5 to 10 yrs) is needed to assess potential late effects of more HLA DR MM on graft and pt survival.

Abstract# 195

RENAL TRANSPLANTATION IN ATYPICAL HEMOLYTIC UREMIC SYNDROME (AHUS) UPDATE OF THE INTERNATIONAL HUS REGISTRY (HUSNET). Magdalena Riedl,[1] Johannes Hofer,[1] Alejandra Rosales,[1] Reinhard Würzner,[2] Thomas Giner,[1] Lothar B. Zimmerhackl,[1] Therese C. Jungraithmayr.[1] *[1]Pediatrics I, Medical University Innsbruck, Innsbruck, Austria; [2]Section for Hygiene and Medical Microbiology, Medical University Innsbruck, Innsbruck, Austria.*

PURPOSE: Due to the frequent progression to endstage renal disease renal transplantation is needed, but might be complicated by disease recurrence in patients with aHUS.

METHOD: Since 2001 the HUS study group (www.hus-online.at) is collecting data and performs complement analysis in patients with atypical HUS. In 26 out of 141 patients of the database 49 renal transplantations were performed. This includes patients with mutations like heterozygous factor H (n=1), homozygous MCP (n=1), heterozygous factor I (n=2), a patient with mutations in fH and fI and 2 patients with fH antibodies and associated CFHR1 deletion.

RESULTS: Graft loss was reported in 71% (35/49) of transplanted kidneys, in 74% (26/35) it was due to disease recurrence. Rejection occurred in 5/3 graft losses (14%) lost grafts. Already 26% (9/35) of the grafts were even lost during the first month after renal transplantation, 57% (20/35) in the first year after transplantation. All patients of the registry with HUS recurrence lost their graft within 5 years. The median follow-up time for the patients with preserved kidney function (14 grafts) is 15 months (4.3 months – 8 years).

CONCLUSION: Renal transplantation in aHUS patients is associated with a high risk of graft loss due to HUS recurrence. However, according to the underlying cause effective treatment options have been recently established.

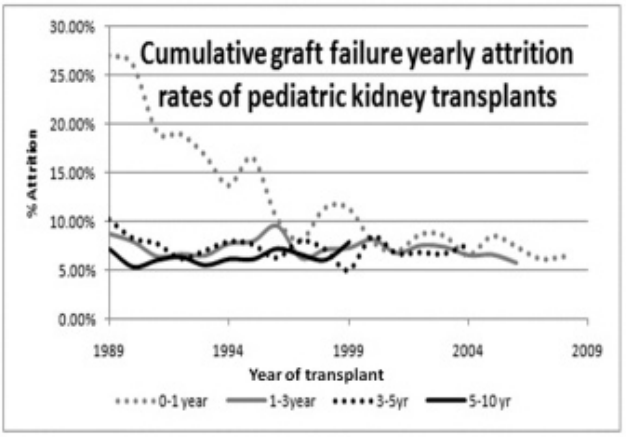
Abstract# 194

LONG-TERM ALLOGRAFT ATTRITION RATES HAVE NOT IMPROVED IN PEDIATRIC KIDNEY TRANSPLANTATION IN THE UNITED STATES: A NATIONAL REGISTRY ANALYSIS. Vikas R. Dharnidharka, Kenneth E. Lamb, Sundus Lodhi, Herwig-Ulf Meier-Kriesche. *University of Florida College of Medicine, Gainesville, FL, USA.*

PURPOSE: One-year survival of transplanted kidney allografts has dramatically improved over the past two decades, but whether this improvement has been mirrored by long-term allograft survival remains to be answered. This study quantifies the evolution of long-term pediatric renal allograft survival.

METHOD: We analyzed data between 1989-2008 from the national UNOS/SRTR database on 6920 solitary deceased donor standard criteria kidney transplants to pediatric recipients (< 18 years age). Kaplan-Meier (K-M) or ordinary least squares (OLS) estimates were used to calculate median and projected survival half-lives. Attrition rates were stratified by year of transplant.

RESULTS: A slight and progressive improvement in transplanted organ half-life is seen during the last two decades, from 5 years in 1989 to 7 years in 2005. First year attrition rates have dropped steadily and dramatically from 22% in 1989 to 6% in 2008. In contrast, long-term attrition rates have not shown the same consistent improvement. The yearly attrition rate between 1-3 and 3-5 years post transplant has remained between 5-10% between 1989 and 2003. The yearly attrition rate between 5-10 years post-transplant remained stable around 7% between 1989 and 1999.



CONCLUSION: With first-year survival rates almost approaching 100% and the rapid decline in first-year attrition rates, further progress in long-term survival will come from focusing target endpoints beyond first-year rejection and survival rates.

Abstract# 196

DEVELOPMENT AND VALIDATION OF A NEW STATISTIC MODEL FOR LONG TERM GRAFT FUNCTION AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Christin D. Werner,[1] Antonia Zapf,[2] Thurid Ahlenstiel,[1] Lars Pape.[1] *[1]Pediatric Nephrology, Medical School of Hannover, Hannover, Germany; [2]Biometry, Medical School of Hannover, Hannover, Germany.*

PURPOSE: There is no adequate statistic model established to estimate future glomerular filtration rate (GFR) in children after kidney transplantation. Simple formulas based on linear regression analysis as used in adults are not established in children.

METHOD: For 63 children after pediatric kidney transplantation (KTX) an optimal prognosis model for GFR 3-7 years after KTX was calculated using mean ΔGFR/month between months 3 and 24 after KTX and baseline GFR 3 month after KTX. This model was validated by leave-one-out-cross-validation for years 3-7 after KTX. Quality of prognosis was given as mean squared error (MSE) and mean absolute error (MAE). Results were compared with the simple linear regression model used in adults.

RESULTS: The following statistical model was used for every prognosis year (i=3, ..., 7).

$$\mathbf{Y}_i = \boldsymbol{\beta}_{i0} + \boldsymbol{\beta}_{i1} \cdot \mathbf{X}_{i1} + \boldsymbol{\beta}_{i2} \cdot \mathbf{X}_{i2} + \boldsymbol{\varepsilon}_i$$

$$log(\mathrm{GFR}_i) = \beta_{i0} + \beta_{i1} \cdot \Delta\mathrm{GFR/month} + \beta_{i2} \cdot \mathrm{GFR\ (Baseline)}$$

For example, GFR 7 years after Tx can be calculated as follows: 3.49 + 14.8 * ΔGFR/month + 0.0072 * GFR (Baseline)

Comparison of the new statistic model and the simple linear model for adults lead to relevantly lower MSEs and MAEs for the new model:

	N	MSE new model	MAE new model	MSE model for adults	MAE model for adults
year 3	63	0.05	0.17	3802	43
year 4	47	0.07	0.20	2464	37
year 5	39	0.05	0.17	1915	28
year 6	27	0.08	0.22	1364	23
year 7	24	0.10	0.26	1068	18

MSE and MAE calculated by the ne model and by the model for adults

CONCLUSION: Our new statistic model is the first to predict long-term graft function in children with a very high precision. It should be validated in larger, independent cohorts.

Abstract# 197

THE EFFECT OF NEPHRON MASS/RECIPIENT BSA RATIO ON OUTCOMES IN KIDNEY TRANSPLANTATION. Luciana S. Feltran,[1] Paulo C. Koch Nogueira,[2] Alvaro Pacheco-Silva.[1] *[1]Nephrology, UNIFESP – Escola Paulista de Medicina, Sao Paulo, Brazil; [2]Pediatrics, UNIFESP – Escola Paulista de Medicina, Sao Paulo, Brazil; [3]Nephrology, UNIFESP – Escola Paulista de Medicina, Sao Paulo, Brazil.*

PURPOSE: To compare outcomes of pediatric kidney transplantation according to nephron mass/recipient BSA ratio.

METHOD: We prospectively compared 3 groups of transplanted children categorized according to doses of nephron mass: a) group I - 13 children received < 100 g/m^2; b) group II - 27 received 100 to 200 g/m^2; c) group III - 10 received > 200 g/m^2. Patients were followed for 2 years with ultrasound measurements and kidney function tests. Measurements were performed at 1 week, 1, 6, 12 and 24 months.

RESULTS: At baseline the groups were different with regard to recipient age (15.0±2.8; 11.0±3.0 and 5.6±3.3 years), recipient weight (45.1±10.0; 27.9±10.7 and 15.1±4.0 Kg), donor age (14.1±17.7; 25.5±15.4 and 37.1±15.3 years), donor type (deceased donors =2/13; 15/27 and 8/10) and graft weight (85.2±30.2; 138.6±40.0 and 169.0±31.6 grams). Results are depicted in the table.

Parameter		1 week	1 month	6 months	12 months	24 months
Graft volume (cm3)	Gr I	50.8±19.2 a	50.1±15.5 a	53.7±11.9	65.3±14.8	64.4±18.5
	Gr II	62.1±15.3	57.0±15.0	55.2±22.7	60.4±18.0	64.3±22.3
	Gr III	75.8±30.3	74.4±18.9	64.7±13.0	59.9±10.3	64.2±18.6
Resistive index	Gr I	0.67±0.07	0.65±0.05	0.64±0.08 a	0.66±0.06	0.65±0.06
	Gr II	0.69±0.12	0.65±0.08	0.63±0.08 a	0.66±0.06	0.65±0.06
	Gr III	0.67±0.09	0.69±0.09	0.72±0.04	0.67±0.06	0.66±0.08
eGFR (ml/min/1,73 m2)	Gr I	48.0±30.8 b	73.1±20.9 b	79.5±14.5	92.3±23.5	95.9±25.7
	Gr II	77.0±34.5	90.0±18.3	92.0±31.5	103.9±32.0	102.5±28.0
	Gr III	100.2±42.8	102.9±22.0	108.8±26.3	104.0±24.2	99.8±20.0
Urine protein/ creatinine	Gr I	NA	2.0±5.0	0.8±2.0	0.4±0.5	0.2±0.2
	Gr II	NA	0.2±0.5	0.4±1.3	0.3±1.0	0.2±0.7
	Gr III	NA	0.2±0.3	0.1±0.2	0.3±0.9	0.2±0.6

a p<0.05 compared to Group III; b p<0.05 compared to Groups II and III

CONCLUSION: All parameters were comparable at the end of the follow-up suggesting adaptation of the grafts to recipients. Children who received a greater nephron mass showed a RI increase at 6 months and a 15% graft volume reduction at 2 years suggesting that big kidneys transplanted to small children might result in low perfusion of the graft and possible wastage of nephron mass.

Abstract# 198

EFFECT OF DONOR/RECIPIENT BODY WEIGHT RATIO, DONOR WEIGHT, RECIPIENT WEIGHT AND DONOR AGE ON KIDNEY GRAFT FUNCTION IN CHILDREN. Jaroslav Spatenka,[1] Tomás Seeman,[2] Eva Foltynová,[1] Jiri Dusek,[2] Karel Vondrák,[2] Jan Janda,[2] Jan Burkert,[1] Anna Habrmanová,[1] Jana Krejcová,[1] Karel Matousovic.[1,3] *[1]Transplantat Center, University Hospital Motol, Prague, Czech Republic; [2]Department of Pediatrics; [3]Department of Medicine, Charles University Prague, 2nd Faculty of Medicine and University Hospital Motol, Prague, Czech Republic.*

PURPOSE: The nephron dosing, the body surface area (BSA) of the recipient, and the age of a donor may influence the early and late kidney graft function and survival. We hypothesized that supplementing a higher mass of renal parenchyma from adult donors would improve graft function in pediatric recipients.

METHOD: We calculated estimated GFR (eGFR; Schwartz formula) and absolute GFR (absGFR) in 57 renal grafted children (1995-2007) aged 3.1 – 17.9 yr (12.3 ± 4.1 yr, mean ± SD), weighing 12.9 to 85.0 kg (37.1 ± 15.4), upon discharge from the hospital after transplantation (TPL), 1 yr after TPL, and at the last follow-up (1,5-11,7 yr after TPL; 5.4 ± 2.4 yr). We correlated their eGFR with the individual ratio between the donor and the recipient body weight at time of TPL (donor/recipient body weight ratio; D/R BWR), and we evaluated the effect of the donor and the recipient weight on the eGFR and on absGFR.

RESULTS: The D/R BWR varied between 0.65 and 5.23. We found a significant positive correlation between D/R BWR and eGFR at the three evaluated time periods (r = 0.6064, $P < 0.001$ at discharge; r = 0.5599, $P < 0.001$ 1 yr post-TPL; r = 0.3048, $P < 0.05$ at the last follow up). Using the multiple linear regression analysis, we found that both eGFR and absGFR values were much more determined by the recipient than by the donor weight (27 % vs 6 % and 43 % vs 4 %, at discharge from the hospital, respectively). A tendency for lower eGFR with increasing age of donors was apparent at discharge and 1 yr after TPL, but it reached statistical significance only at the last follow-up (r = 0.4254, $P < 0.01$).

CONCLUSION: In pediatric renal transplant recipients, the value of D/R BWR directly correlated with eGFR in the early and late post-transplant period. However, this correlation was mainly influenced by the recipient weight while the donor weight played only a minor or negligible role. Therefore, the long-term prognosis of pediatric kidney transplantation is mainly affected by other factors than the donor weight.

Abstract# 199

UROLOGICAL AND VASCULAR COMPLICATIONS AFTER KIDNEY TRANSPLANTATION IN CHILDREN: SPANISH MULTICENTER STUDY. L. Espinosa,[1] C. Fdez Camblor,[1] L.E. Lara,[2] M.J. Sanahuja,[3] M.G. Ariceta,[4] F. De la Cerda,[5] A. Vila,[6] M.N. Plana,[7] A.E. Gonzalez,[7] M.J. Mtnez Urrutia,[1] J.A. Martín,[2] A. Serrano.[3] *[1]H. La Paz, Madrid, Spain; [2]H.Vall de Hebrón, Barcelona, Spain; [3]H. La Fe, Valencia, Spain; [4]H de Cruces, Bilbao, Spain; [5]H.Virgen del Rocío, Sevilla, Spain; [6]H.Sant Joan de Deu, Barcelona, Spain; [7]Clinical Biostatistics Unit, H.Ramón y Cajal, Madrid, Spain.*

PURPOSE: To estimate the incidence of urological and vascular complications after kidney transplantation (KT) in children during the first year post intervention and to explore associated risk factors.

METHOD: Medical records of all pediatric kidney transplants performed between 2004 and 2007 in six Spanish hospitals were reviewed. Donors and recipients demographics and clinical data were collected as well as data of the grafting surgical procedure.

RESULTS: 220 patients younger than 18 years of age received a kidney transplant: 87.6% from a deceased donor, 20.1% of the patients have had a previous kidney graft and 95% were isolated KT. 57.8% of the recipients were males with a median age of 11years (IQR 5.3-14.6). Most of the recipients were on dialysis (71.4%), for an average of 7.8 months (SD 12.2). The cumulative incidence of urological complications was 10.5% being the most frequent complication urinary stenosis/obstruction. Vascular graft complications were observed in 23 patients (10.5%), and thrombosis was the most frequent. Graft lost occurred in 23 patients (10.5%) and one patient died. Vascular graft thrombosis was present in 75% of these 24 patients. Among several factors analyzed, recipient´s age was consistently associated with the risk of complication (p=0,005). Older recipients were more likely to have urologic complications, while the younger recipients were more likely to suffer vascular complications. Consequently weight and height were also associated with the risk of complications. However, obesity (Body Mass Index > 97% percentile) was not associated with poor outcome.

CONCLUSION: Urological and vascular complications in children are frequent after KT and adequate preventive measures are needed, particularly to avoid graft loss from vascular problems.

Abstract# 200

THE VALUE OF EARLY DOPPLER USG AND DTPA IN PREDICTING LATE SURVIVAL OF TRANSPLANTED KIDNEYS. Esra Baskin,[1] Umut Bayrakci,[1] Engin Melek,[1] Kaan Gulleroglu,[1] Nihal Uslu,[2] Ayse Aktas,[3] Sema Aktas,[4] Hamdi Karakayali,[4] Mehmet Haberal.[4] *[1]Pediatric Nephrology, Baskent University, Ankara, Turkey; [2]Radiology, Baskent University, Ankara, Turkey; [3]Nuclear Medicine, Baskent University, Ankara, Turkey; [4]General Surgery, Baskent University, Ankara, Turkey.*

PURPOSE: Doppler ultrasonography (DUSG) and Tc-99m-DTPA renal scintigraphy are useful tools for the management and follow-up of the transplanted kidney. However, the role of DTPA in predicting long term graft function has never been studied yet. The current study was aimed to assess the value of early DUSG and DTPA to predict long term graft functions.

METHOD: 70 children with renal transplantation were enrolled in the study by retrospectively analyzing their records. The mean age of patients was 13.61±3.99 years. The mean Ptx follow-up time was 41.66±30.37 months. All patients were underwent DUSG and DTPA at 3rd and 7th Ptx days. Resistive index (RI) obtained by DUSG and renal uptake and GFR levels by DTPA. The value of early Ptx DUSG and DTPA in predicting long term graft function was studied by means of renal function tests during follow-up.

RESULTS: We have found that 96% of patients with low (<0.7) mean renal artery RI at Ptx 7th day have functioning graft at Ptx 5th year. However, only 81% of patients with RI>0.7 have functioning graft at Ptx 5th year (p<0.05).

We have found that 33% of patients with normal DTPA at Ptx 7th day and 66% of patients with abnormal DTPA have poor functioning graft at the end of Ptx 5th year (p=0.03). 29.5% of patients with DTPA revealing GFR<60 ml/min have lost their graft while only 7.5% of patients with GFR≥60 ml/min have lost their graft (p=0.03).

50% of patients with DTPA uptake at Ptx 7th day <3.5 were found to have graft loss while only 11% of patients with uptake ≥3.5 (p=0.04).

We did not find any significant relation between Ptx 3rdday DUSG, DTPA and long term graft survival.

CONCLUSION: Parameters obtained by DTPA at Ptx 7th day have a significant predictive value about long term graft survival. We suggest checking renal functions by DTPA at Ptx 7th day to get predictive information about long term graft survival as well as short term complications.

Abstract# 201

THE SHARE-35 KIDNEY ALLOGRAFTS RESULT IN HIGHER CUMULATIVE GRAFT FAILURE IN CHILDREN THAN IN ADULTS. Vikas Dharnidharka,[1] Asha Moudgil,[2] Kenneth Lamb,[1] Jon A. Gregg,[1] Herwig-Ulf Meier-Kriesche.[1] *[1]University of Florida College of Medicine, Gainesville, FL, USA; [2]Children's National Medical Center, Washington, DC, USA.*

PURPOSE: In October 2005, the Organ Procurement and Transplant Network (OPTN) in the USA changed the allocation policy for kidneys from deceased donor (DD) younger than 35 years, giving preference to pediatric recipients < 18 years age. This change led to an increase in proportion of DD kidney transplants (KTX) for children from 50% to 80%.

METHOD: We analyzed effect of this change, using OPTN database from Oct 2005 - Nov 2010 involving 46,071 living donor (LD) or DD < 35 year (S-35) KTX. Cumulative graft failure (CGF) was calculated using Kaplan-Meier (K-M) estimates. Cox proportional hazard models were fitted to determine adjusted hazard ratios (AHR) for outcomes from LD versus S-35 KTX in pediatric and adult recipients.

RESULTS: After October 2005, 13.7% of the S-35 DD KTX were allocated to children (613 out of 4618), an increase from 5% of all DD KTX in prior years. K-M univariate estimates showed that S-35 KTX in children had higher CGF compared to S35 KTX in adults and LD KTX in both adults and children ($P < 0.01$ for all comparisons). In multivariate adjusted Cox models, CGF for S35 KTX in children remained significantly worse (AHR 2.058, $p = 0.0154$). After adjusting for interactions for donor source (living or S-35) and recipient age (adult or child), S-35 KTX in children still showed significantly worse CGF (AHR 1.934, $P < 0.001$). Adolescents (12-17 years) received disproportionately higher number (62%) of all S-35 KTX and this is the group which was driving the worse graft survival in children. In fact S-35 TX in children < 12 yrs had equivalent CGF to adults.

CONCLUSION: S-35 KTX fare worse compared to LD in both adults and children. In addition S-35 KTX in children do worse than the same kidneys in adults. The worse S-35 KTX results in children are driven by worse outcomes in adolescents and are not observed in children < 12. From a utilitarian point of view this data makes a possible case for revisiting the S-35 policy and considering to limiting the S-35 policy to children < 12.

Ethical/Psychosocial 2: Transition

Abstract# 202

GRAFT FAILURE AND ADAPTATION PERIOD TO ADULT HEALTH CARE CENTERS IN PEDIATRIC RENAL TRANSPLANT PATIENTS. Susan M. Samuel,[1] Alberto Nettel-Aguirre,[1] Brenda R. Hemmelgarn,[2] Marcello A. Tonelli,[3] Andrea Soo,[1] Camillia Clark,[1] R. Todd Alexander,[4] Bethany J. Foster.[5] *[1]Pediatrics, University of Calgary, Calgary, AB, Canada; [2]Medicine, University of Calgary, Calgary, AB, Canada; [3]Medicine, University of Alberta, Edmonton, AB, Canada; [4]Pediatrics, University of Alberta, Edmonton, AB, Canada; [5]Pediatrics, McGill University, Montreal, QB, Canada.*

PURPOSE: Transfer from pediatric to adult care, which occurs during adolescence for most pediatric renal transplant recipients, may require a period of adaptation to the new healthcare environment. We sought to determine if this adaptation period was associated with an increased risk of graft failure.

METHOD: Children (0-18 years) recorded in the Canadian Organ Replacement Register who received a first kidney transplant in a pediatric health center between 1992 and 2007, and who had ≥3 months of graft function, were followed until death, loss to follow-up, or December 31, 2007. Cox proportional hazards models were used to estimate the excess risk associated with a period of adaptation to adult-oriented care, defined as the interval 0.5 years before to 2.5 years after the first recorded adult care visit. Models were adjusted for age, gender, donor source, and ethnicity.

RESULTS: Of the 413 patients evaluated, 149 were transferred to adult care during study period. In total, 78 (18.9%) experienced graft failure -- 23 during the adaptation period. Compared with the period before adaptation, the adjusted hazard ratio for graft loss within the adaptation period was 2.24 [95% confidence interval (CI) 1.19-4.20]. The adjusted graft failure rate was 2.26 [1.04-4.93] times higher after 18 years of age than between 0 and 13 years. Aboriginal ethnicity, and deceased donor source were also associated with a significantly higher risk of graft failure.

CONCLUSION: The period of adaptation to adult-oriented care is associated with a high risk of graft failure in pediatric renal transplant patients.

Abstract# 203

TRANSITION CLINIC: THE CHU STE-JUSTINE AND CHUM EXPERIENCE. Veronique Phan,[1] Marie-Jose Clermont,[1] Catherine Girardin.[2] *[1]Pediatric, CHU Ste-Justine, Montreal, Canada; [2]Medicine, CHUM, Montreal, Canada.*

PURPOSE: Transition to adult care is a critical period in the follow-up of transplanted children. Many studies have reported poor graft outcome following transition. Previous data from our transplant unit showed an eleven percent unexpected graft loss within 3 years of transfer to adult clinic. A transition clinic was set up in order to improve care and follow up of transplanted patients during the transition period in collaboration with one adult renal team. Herein a report of our experience and short-term outcomes.

METHOD: Created in 2006, the transition clinic was created at our main referral adult transplant program, the Centre Hospitalier Universitaire de l'Universite de Montreal (CHUM). A transplant nurse dedicated to the transition clinic coordinates the clinic. The same CHUM transplant physician is present at each clinic and accompanied by one of the pediatric transplant physicians. The clinic is scheduled once a month and 5 or 6 patients are seen at each clinic. Data from patients transferred for a minimum of 6 months were analyzed.

RESULTS: Fourteen young adults (7 women) have been transferred for at least 6 months since the clinic creation. They were on average 21.1 ± 0.9 years old at the time of transition and have been transplanted for a mean of 8.12 ± 4.2 years. Mean follow up since transition is 2.11± 3 years, ranging from 6 months to 4.2 years. Following transfer, there was neither graft loss nor any acute rejection episode. Patient's renal function remains stable except for one patient well known for non-adherence pre transition. Young adults that did not attend regular clinics prior to transition are still non-adherent but the dedicated clinic permits the adult transplant team to keep tract of them and thus avoid losses to follow-up.

CONCLUSION: A transition clinic requires an infrastructure, coordination with the pediatric transplant program and most importantly a dedicated adult transplant program. In our experience, it permits a closer follow-up following transition. Hopefully, it will help prevent early unexpected graft loss following transition and better prepare our young patients to the reality of adult medicine.

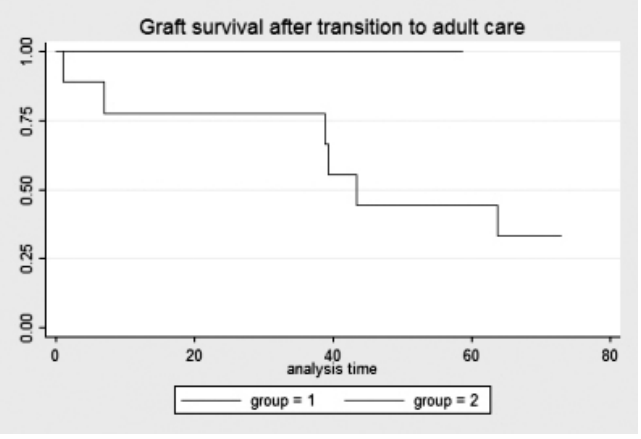
Abstract# 204

INTEGRATED PEDIATRIC TO ADULT TRANSITION COMBINED WITH A YOUNG ADULT TRANSPLANT CLINIC SERVICE REDUCES KIDNEY TRANSPLANT FAILURE RATES. Paul N. Harden,[1] Daniel Lonsdale,[1] Nikki Bandler,[1] Suzanne Bradley,[2] Stephen Marks,[2] Judy Taylor,[3] Grainne Walsh.[3] *[1]Oxford Transplant Centre, Churchill Hospital, Oxford, United Kingdom; [2]Department of Paediatric Nephrology, Great Ormond Street Hospital, London, United Kingdom; [3]Dept of Paediatric Nephrology, Evelina Childrens Hospital, London, United Kingdom.*

PURPOSE: Transfer from paediatric to adult care has been associated with a 35% graft failure rate in the UK within 12 months. We assessed the impact on graft survival of introducing an integrated paediatric to adult transition service coupled with creation of a young adult clinic.

METHOD: In 2006 we introduced a joint transition clinic with clinicians from both 2 paediatric and 1 adult centres. Paediatric patients were seen jointly in a transition clinic for 1-2 years before transfer to adult care into a young adult clinic. Patients who transferred directly between 2002-2006 (Group 1) were compared to a second cohort from 2006-2010 (Group 2) who transitioned from paediatric care to the young adult clinic service.

RESULTS: 9 (3m;6f) teenagers transferred in group 1 at a median age (range) of 18(16-18); whilst 12 (7m;5f) teenagers in Group 2 transitioned aged 17.5(16-18) to the young adult clinic service. In Group 1, 6 of 9 (67%) developed transplant failure at a median of 40(1-62) m post-transfer. In Group 2 there have been no transplant failures at a median follow-up of 18(7-46) m post-transfer.



At 12 m post-transfer there were 2/9 (22%) graft failures in Group 1 and no graft failures in group 2 (p=0.08). Late acute rejection occurred in 33% of Group 1 and 0% of Group 2 (p=0.04).

CONCLUSION: The introduction of an integrated transition service for teenage transplant recipients transferring to adult care has led to a reduction in the rate of transplant failure and risk of late acute rejection.

Abstract# 205

PROSPECTIVE ASSESSMENT OF TRANSITION READINESS SKILLS AND ADHERENCE FOLLOWING THE TRANSFER FROM PEDIATRIC TO ADULT LIVER TRANSPLANT CARE.

Emily M. Fredericks, Dawn Dore-Stites, John C. Magee, Victoria Shieck, Andrew Well, Sally J. Eder, Gary L. Freed, M. James Lopez. *University of Michigan Health System, Ann Arbor, USA.*

PURPOSE: The purpose of this study was to prospectively evaluate the association between transition readiness skills, medication adherence and clinic attendance following the transfer from pediatric to adult liver transplant care.

METHOD: As part of our program's ongoing transition program, pediatric liver transplant recipients (LTR) ≥12 years of age routinely complete a transition readiness skills survey (TRS), which assesses self-management skills, regimen knowledge and psychosocial adjustment. Medication adherence (standard deviations of trough tacrolimus blood levels [tacro SD]) and rate of clinic attendance were prospectively collected. Multiple linear regression analyses examined the contribution of TRS to post-transfer medication adherence and clinic attendance.

RESULTS: 24 LTR have completed the TRS and subsequently transferred to adult care. 15 LTR had complete medication and clinic attendance data for 6-months post-transfer and were included in analyses. Tacrolimus was the primary immunosuppressant for all. Mean age at transfer was 20.3 years (range 19-22). Mean time since transfer was 12.7 months (range 6-20). Average rate of post-transfer clinic attendance was 81±22% and average tacro SD was 2.23±2.3. Higher post-transfer tacro SD were associated with lower psychosocial adjustment (r= -0.69, p=0.005), younger age at transfer (r= -0.54, p=0.036), and older current age (r= -0.6, p=0.018). Higher rate of clinic attendance was associated with better psychosocial adjustment (r= 0.633, p=0.01). Regression analyses revealed that psychosocial adjustment accounted for 47% of the variance in post-transfer tacro SD (F=11.68, p=0.005) and 40% of the variance in clinic attendance (F=8.7, p=0.01).

CONCLUSION: Higher psychosocial adjustment and older age at transfer were associated with better medication adherence and clinic attendance following the transfer to adult transplant care. The assessment of transition readiness may help identify a high risk population for intervention both pre- and post-transfer.

Abstract# 206

A COLLABORATIVE APPROACH TO THE TRANSITION OF ADOLESCENT RENAL TRANSPLANT RECIPIENTS TO ADULT CARE PROVIDERS.

Jo Ann Palmer,[1] Caryle Glah,[1] Nataliya Zelikovsky,[1,2] Sonya Lopez,[1] H. Jorge Baluarte.[1,3] *[1]Pediatric Nephrology, The Children's Hospital of Philadelphia, Philadelphia, PA, USA; [2]Department of Psychology, LaSalle University, Philadelphia, PA, USA; [3]Department of Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, PA, USA.*

PURPOSE: Studies suggest that preparing adolescent renal transplant recipients for personal responsibility of their health care may impact successful transition to adult care. As a multidisciplinary team, we are committed to preparing these patients to successfully manage their own health care.

METHOD: In 2007 we implemented a formal transition program. The program identifies candidates who are seniors in high school and/or 17 years of age. A Transition Readiness Evaluation is conducted by the social worker and/or clinical psychologist. This assesses medication adherence, decision-making ability, psychosocial adjustment and support, and ability to navigate the health care system. Information about their rights as adults and the concept of advance directives is discussed when they turn 18 years of age. Consent is obtained to discuss medical information with a parent, in compliance with HIPAA. The goal is to successfully transition them to adult care after the first year post high school, acknowledging this year of academic and/or social changes is a stressful time.

RESULTS: Since 2007, 56 adolescents were identified, and 40 participated in evaluation. Seven patients and/or families declined participation, 3 patients transferred care to adult programs prior to assessment and 6 are yet to be scheduled. Most were seniors in high school, 8 patients in college and 2 working prior to protocol but not yet transitioned. Of the assessed group, 13 have been transitioned, 6 waiting appointments at adult centers, 18 are in the transition year, and 3 remain for medical and/or psychosocial reasons.

CONCLUSION: The assessment has made individualized recommendations to reduce barriers and assist in the transition process. As a QI project, a survey was developed to assess the effectiveness of the program. A follow up analysis of transitioned patient and allograft outcomes will determine the success of our approach.

Abstract# 207

PATIENT, PARENT AND PROVIDER REPORT OF NEEDS, BELIEFS AND BARRIERS TO TRANSITION TO ADULT HEALTH CARE IN PEDIATRIC ORGAN TRANSPLANT.

Debra S. Lefkowitz,[1] Cindy Buchanan,[2] Samuel Goldfarb.[1,3] *[1]Children's Hospital of Philadelphia, Philadelphia, PA, USA; [2]University of Colorado, Colorado Springs, CO, USA; [3]University of Pennsylvania, Philadelphia, PA, USA.*

PURPOSE: The transition to adult health care in pediatric thoracic organ transplant is associated with nonadherence and significant medical morbidity, including graft loss. Given the potential consequences of an unsuccessful transition, it is important to develop health care transition intervention tailored to the transplant population. However, specific population needs are rarely carefully assessed prior to program initiation, resulting in interventions with less chance for success. The purpose of this study is to assess beliefs about, needs around, and barriers to successful transition in pediatric thoracic transplant, with the aim of developing tailored intervention strategies and guidelines.

METHOD: 54 thoracic transplant professionals, parents, and adolescent patients completed respective versions of the Health Care Transition Questionnaire, a designed to assess specific beliefs, needs, and barriers around transition in thoracic organ transplant.

RESULTS: The majority of parents, patients, and providers expressed strong concern about patients' ability to successfully transition (44%-84%). They endorsed multiple beliefs about the lack of patient skills/readiness (46% - 69%), poor patient preparedness (44-79%), and lack of adult team ability to meet former pediatric patient needs (35-86%). Patients, parents and providers were concordant in their beliefs about the age at which transition should occur (18-21) and the years of preparation needed (x=3.38yrs). Likewise, participants across groups identified at similar rates the specific skills needed for transition and necessary resources.

CONCLUSION: Results underscore the importance of developing transplant-specific transition guidelines, the initiation of transition preparation several years prior to actual transfer of care, utilization of educational and skills-based strategies, and the correction of negative beliefs associated with transition to adult care.

Abstract# 208

TRANSITION AFTER LIVER TRANSPLANTATION: RESULTS OF AN INITIAL SURVEY.

Norman Junge, Sabine Hornbostel, Malte Becker, Migal Katarina, Eva Doreen Pfister, Ulrich Baumann. *Paediatric Gastroenterology and Hepatology, Hannover Medical School, Hannover, Germany.*

PURPOSE: Increased rates of rejection and graft loss in adolescents have led to the development of transition programmes for adolescents in a number of paediatric transplant centres. Before initiating a programme in our centre we evaluated the requirements of our patients (PAT) and their parents (PAR).

METHOD: A 9 item questionnaire asking for individual needs of young people to support the development of self management skills was developed. We also asked for views as to how well these needs were met by the layout of an established transition programme elsewhere. One copy of the questionnaire was sent to each PAT post orthotopic liver transplantation aged 12 years (y) and above at our centre and another copy to their PAR. Results were analyzed with SAS.

RESULTS: 56 PAT aged 12-18 y (33 male (m.), mean age (m.a.) 14,8 y; 23 female (f.), m.a. 13,9 y) and their PAR were identified. Overall 51 of them replied (45,5%; 17 m. PAT, m.a. 15,2 y; 10 f. PAT, m.a. 13,4 y, 24 PAR). The majority of adolescent PAT (63%) and an even higher percentage of PAR (92%) were in favour of more intense support during the transition period. Only few replies (PAT: 26%, PAR 29%) supported the setup of a specialised day for adolescents outpatient review. PAT saw a greater need for education programmes for their children than the children themselves (PAT 55%, PAR 79%). Whereas 59% of PAT did not want to see the doctor on their own, only 42% of PAR would object to this. In contrast to published data which suggests 12 as the appropriate age for beginning a transition programme, our PAT and PAR prefer to start with 14,5 y and 14,6 y.

CONCLUSION: Our findings suggest significant differences in the perception of needs for transitional care between parents and young people with parents suggesting closer support of young people by medical professionals. Our survey also suggests that transition programmes cannot simply be exchanged between centres with different cultural background. A new transition programme will need to be developed with active participation by young people, their parents and health professionals.

Abstract# 209

TRANSFER VS TRANSITION IN PAEDIATRIC RENAL ALLOGRAFT RECIPIENTS; EXPERIENCE OVER TWO DECADES.

Abbas Ghazanfar,[1] Denise Roberts,[2] Anne Palmer,[1] Mohan Shenoy,[2] Hany N. Riad.[1] *[1]Transplant Surgery, Central Manchester University Hospitals NHS Foundation Trust, Manchester, United Kingdom; [2]Paediatric Nephrology, Central Manchester University Hospitals NHS Foundation Trust, Manchester, United Kingdom.*

PURPOSE: Arranging an efficient and caring transition service has been highlighted as one of the great challenges facing health service provision for the next century. For young people with functioning transplants, transition to adult services is a significant life event which needs careful planning and consideration. Each year in UK, about 40 renal transplant recipients are transferred from paediatric to adult care. Adolescents following transfer are particularly vulnerable and are at high risk of adopting non-concordant behaviour with a risk of losing their allograft.

In response to the growing concerns from policy makers and professional bodies we adopted a transition pathway in 2001. This present study highlights our experience from this pathway.

METHOD: This study comprises of two mile stone retrospective audits performed in our unit over the last two decades.

RESULTS: The results have shown a statistically significant improvement in patient and graft survivals after adoption of transition pathway.

Outcome of pre and post transition audits

	Pre Transition	Post Transition
Period	1980-1997	2001-2009
No of patients	58	78
DNA* at 1 year	10%	6%
DNA at 3 year	24%	25%
DNA at 5 year	15%	9%
Unexpected graft loss at 1 year	1.72% (n=1)	0
Unexpected graft loss at 3 year	5.17% (n=4)	1.28% (n=1)*
Unexpected graft loss at 5 year	10.34% (n=6)	3.84% (n=3)**
Graft survival at 1 year	93.11% (n=54)	98.72% (n=77)
Graft survival at 3 year	89.66% (n=52)	94.88% (n=74)*
Graft survival at 5 year	86.20% (n=50)	94.88% (n=74)**
Patient survival at 1 year	94.83% (n=55)	100% (n=78)
Patient survival at 3 year	91.4% (n=53)	100% (n=78)*
Patient survival at 5 year	88% (n=51)	96.15% (n=75)**

*did not attend **mean results

CONCLUSION: A transition pathway with clear objectives, easy access and flexibility according to young people needs, not only improves patient and graft survival but also have a positive psychological and socioeconomic impact on their life.

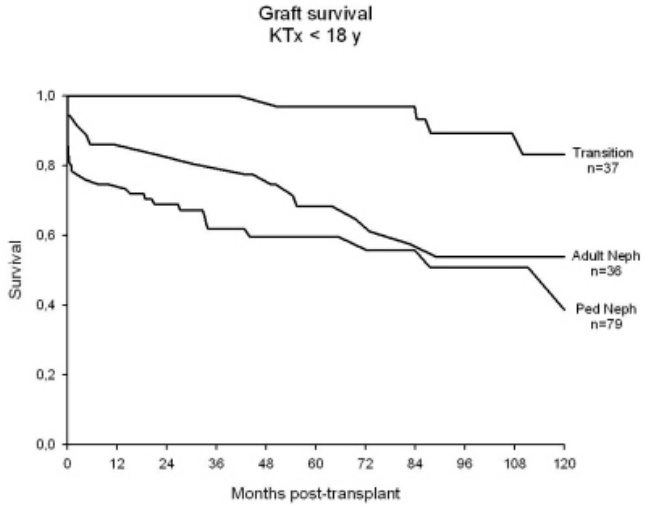
Abstract# 210

TRANSITION OF CARE IN KIDNEY TRANSPLANTATION: BEST OF BOTH WORLDS. Lilian M. Pereira,[1] Liliane C. Prates,[2] Vera M. Belangero,[2] Marilda Mazzali.[1] *[1]Discipline of Nephrology, State University of Campinas, Campinas, Sao Paulo, Brazil; [2]Discipline of Pediatric Nephrology, State University of Campinas, Campinas, Sao Paulo, Brazil.*

PURPOSE: Transition from pediatric to adult care is a complex process. Previous reports showed that it carries increased risk of non-adherence and graft loss. The purpose of the study was to analyze the outcomes of our pediatric transplant program, including the transition group.

METHOD: In the institution, most of the patients < 18 yo, especially small children, are transplanted in Pediatric setting (Ped group) and are transferred to Adult care when become 18 (Transition group), where a welcome protocol of admission is performed. All of the transferred pts are followed by a trained staff, with emphasis in adherence. Due to this approach, some adolescents are transplanted directly in Adult Care (Adult group). In this retrospective study, demographic data and graft survival among groups were compared.

RESULTS: From Jan, 1984 to Jun, 2010, 1748 KTx were performed overall, 152 in pts <18 yo. In Ped group (n=79), mean age at KTx 10.8±2.8y, 68% cadaver donors (CD), 4 re-tx; in Adult group (n=36), mean age 16.1±1.6y, 42% CD, no re-tx; in Transition group (n=37), mean age 14.6±2.4y, 56% CD, 4 re-tx and mean follow-up after transition 52.8±32.7 months. Graft survival at 1, 3, 5 and 10 y was superior in the Transition group than the other 2 groups (Figure, Log Rank p<0.001). In Ped, there were 33 graft loss – vascular thrombosis (n=10), CAN (n=8), death (n=5), acute rejection (n=5), recurrence (n=2), other (n=3). In Adult, 20 graft losses, 14 due to CAN and 6 to other causes. In Transition, 5 graft losses – acute rejection (n=2), death (n=1), CAN (n=1) and recurrence (n=1).



CONCLUSION: A carefully designed Transition of Care protocol can have a great impact in kidney graft survival, probably due to exhaustive adherence measures.

Infectious Disease 2: EBV and PTLD

Abstract# 211

RECIPIENT EPSTEIN-BARR VIRUS (EBV) SERONEGATIVITY IS STILL SIGNIFICANTLY ASSOCIATED WITH RISK FOR POST-TRANSPLANT LYMPHOPROLIFERATIVE DISORDERS (PTLD) AFTER LIVER TRANSPLANTS, THOUGH LESS SO COMPARED TO KIDNEY OR HEART TRANSPLANTS. Vikas R. Dharnidharka, Kenneth E. Lamb, Jon A. Gregg, Herwig-Ulf Meier-Kriesche. *University of Florida College of Medicine, Gainesville, FL, USA.*

PURPOSE: In a prior study of the Collaborative Transplant Study, recipient EBV seronegativity was not associated with increased risk for PTLD in liver transplants, at variance with prior single center reports and with data from renal and cardiac transplants.

METHOD: We analyzed data from the Scientific Registry of Transplant Recipients (SRTR) in the USA, the only other registry with extensive data on renal, heart and liver transplants of all recipient ages and with PTLD data. Recipient EBV serostatus is a required data field since 2002, so we analyzed transplants performed in January 2003 onwards. We determined adjusted hazard ratios (HR) for PTLD in Cox proportional hazards models, with organ transplant type versus EBV status as an interaction variable.

RESULTS: The study set comprised 106,858 kidney transplants (545 PTLDs, 0.51%), 13,194 heart transplants (125 PTLDs; 0.95%) and 39,252 liver transplants (371 PTLDs; 0.95%). Based on recipient EBV serostatus alone, the unadjusted HR for PTLD if recipient EBV seronegative was 5.005 ($p < 0.001$) for kidney, 6.528 ($p < 0.001$) for heart and 2.615 ($P < 0.001$) for liver. In models adjusted for multiple covariates, the adjusted HR dropped slightly to 3.583 ($P < 0.001$) for kidney, 4.037 ($p < 0.001$) for heart, 1.479 ($p = 0.03$) for liver, remaining significant for all organs. Other significant covariates included recipient Caucasian race or pediatric age, deceased donor source kidney, use of T-cell depleting agents or tacrolimus. Interaction models with EBV seropositive kidney transplant as reference group showed significantly higher risk for each organ type if EBV seronegative, but also for liver transplant even with EBV seropositive.

CONCLUSION: Recipient EBV seronegativity is still significantly associated with risk for PTLD in all organs. In liver transplantation the risk for PTLD is higher in EBV negative versus positive patients and also in EBV seropositive subjects compared to other organ types.

Abstract# 212

MULTICENTER, PROSPECTIVE TRIAL ON INCIDENCE AND MORBIDITY OF EBV INFECTION AFTER PEDIATRIC RENAL TRANSPLANTATION (RTx). B. Höcker,[1] S. Böhm,[2] M. Pohl,[3] U. John,[4] M. Kemper,[5] H. Fehrenbach,[6] M. Wigger,[7] B. Tönshoff.[1] *[1]Univ. Hospital, Heidelberg, Germany; [2]Hygiene Institute, Heidelberg, Germany; [3]Univ. Hospital, Freiburg, Germany; [4]Univ. Hospital, Jena, Germany; [5]Univ. Hospital, Hamburg, Germany; [6]Children's Hospital, Memmingen, Germany; [7]Univ. Hospital, Rostock, Germany.*

PURPOSE: The incidence and morbidity of EBV infection in children after RTx have been characterized insufficiently.

METHOD: We therefore conducted a prospective, multicenter study on the incidence and course of EBV primary infection or reactivation in 106 pat. (11.1 ± 5.9 years) during the 1st post-transplant year.

RESULTS: 83% pediatric and 82% adult donors were EBV seropositive. 41% pat. were EBV-naïve at time of RTx. 63% developed EBV primary infection, 46% reactivation. Pat. with primary infection showed a high (18/27 vs. 10/29, p=0.03) and/or persistent (22/27 vs. 5/29, p<0.001) viral load (VL) significantly more often than those with EBV reactivation. In pat. with primary infection, mean VL was 2.72 ± 0.93 vs. 0.33 ± 0.10 x 104 genomes/ml in those with reactivation (p=0.01). 11% had no seroconversion despite primary infection. Whereas 17/27 (63%) pat. with primary infection exhibited clinical symptoms (flu-like, n=12; mononucleosis, n=2; PTLD, n=3), only 3/29 (10%, p<0.001) with EBV reactivation were symptomatic. 8/18 (44%) pat. were asymptomatic despite a high, persistent VL. 3/106 (2.8%) pat. developed a monomorphic (CD20+) B cell PTLD, 7.0 ± 2.0 months after EBV primary infection. The type of calcineurin inhibitor did not influence the incidence of EBV primary infection or reactivation: 30% Tac- vs. 22% CsA-treated pat. underwent primary infection (p=0.45), 25% (Tac) vs. 26% (CsA) reactivation (p=0.91).

CONCLUSION: Pat. undergoing EBV primary infection after RTx show clinical symptoms and a high and persistent VL significantly more often than those undergoing EBV reactivation. The observation that, on the one hand, pat. with a high, persistent VL may remain asymptomatic for months to years, and that, on the other, those with low-level VL may contract EBV-associated PTLD indicates the low predictive value of high EB VL for PTLD development.

Abstract# 213

DEVELOPMENT OF AN ANTI-GP350 CHIMERIC ANTIBODY FOR PREVENTION OF POST-TRANSPLANT LYMPHOPROLIFERATIVE DISEASE. Caroline Alfieri, Valerie Leblond, Jing Hu, Insaf Salem, Jerome Tanner. *Microbiology and Immunology, University of Montreal and CHU Ste-Justine, Montreal, Canada.*

PURPOSE: Epstein-Barr virus (EBV) infection can lead to malignant B-cell proliferation, called post-transplant lymphoproliferative disease (PTLD). The role of the EBV lytic cycle in the development of PTLD has not been well studied. The purpose of this work was first to investigate whether EBV lytic-cycle genes were expressed upon in vitro infection of B cells and, second, to design and characterize a human-mouse chimeric anti-gp350 antibody with the capacity to recognize EBV and to block infection.

METHOD: In order to document viral gene expression during the early and late stages of virus production, transcription of two RNAs representative of the early and late cycle of virus replication were examined temporally during the first 96 hours post-infection. These transcripts were measured using the nucleic acid sequence-based amplification technique. For the second objective, anti-gp350 antibody RNAs, encoding the 72a1 murine monoclonal antibody, were cloned, sequenced and modified using standard techniques. Virus neutralizing capacity by the resulting chimeric antibody was evaluated using the established early-antigen inhibition assay in Raji cells. Computer 3D modeling of EBV gp350-antibody interaction was performed to determine the site of antibody blocking.

RESULTS: In four separate experiments the early and late EBV genes were shown to be transcriptionally active upon EBV infection of peripheral blood B cells. The therapeutic antibody was effective in blocking virus infection by 80%, as indicated by a loss in early-antigen upon infection of Raji cells. Computer modeling of the gp350-antibody interaction site revealed that the chimeric antibody recognized a region on the gp350 molecule which was previously shown to be crucial for binding of EBV to its B cell receptor.

CONCLUSION: This work suggests that EBV-infected B cells can produce virus which may then infect bystander B cells and contribute to the genesis of PTLD. There is justification, therefore, for furthering the development of a therapeutic anti-gp350 antibody with proven neutralization capacity.

Abstract# 214

EBV-SPECIFIC T-CELL (EBVTc) ACTIVITY IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS (TX PTS) WITH AND WITHOUT EBV VIREMIA. Dechu P. Puliyanda, Shili Ge, Artur Karasyov, Anna Petroysan, Stanley C. Jordan, Elaine S. Kamil, Mieko Toyoda. *Pediatric Nephrology and Transplant Immunology Laboratory, Cedars Sinai Medical Center, Los Angeles, CA, USA.*

PURPOSE: Pediatric Tx pts are at risk for EBV infection and PTLD due to sero(-) status pre-Tx. Strategies to monitor for PTLD include measurement of EBV, EBVTc, and global immune suppression (IS). Here we report on results of this monitoring.

METHOD: 32 pts (mean age 15.4 years) transplanted between 1998 and 2010 were monitored for EBV, EBVTc by intracellular cytokine (IFNγ) flow cytometry, and global IS by Cylex immunoknow®. Results were expressed as copies/PCR, %IFNγ+ in CD8+ cells, and ngATP/ml, respectively. EBV>5copies/PCR and EBVTc>0.1% was considered (+).

RESULTS: Of 32 pts, 10 developed EBV viremia; 8/10 (80%) were sero(-) pre-Tx. Of the 10, 2 cleared viremia and 8 maintained persistence for >3 months (PEBV). EBVTc was not consistently detected in 2/8 pts with PEBV, while the remaining 8 with EBV(+) (80%) showed EBVTc(+) at and after EBV infection. In 22 pts with EBV(-), 7 (32%, $p<0.02$ vs. with EBV[+]) and 13 (59%) were sero(-) and (+) pre-Tx, respectively, and serology in 2 were unknown. Of 13 sero(+) pts with EBV(-), only 5(38%, $p<0.05$ vs. with EBV[+]) showed EBVTc(+) at all time points tested, while EBVTc(+) in remaining 8(62%) was not consistent. 5/7 sero(-) pts with EBV(-) consistently showed EBVTc(-), while remaining 2 showed low levels. Mean ATP levels in 2 pts who cleared viremia and those without viremia were 381 and 462ng/ml, respectively, while that in 8 pts with PEBV was 634ng/ml. None of the pts with EBV viremia developed PTLD.

CONCLUSION: 1) Pre-Tx sero(-) pts are at higher risk for EBV infection 2) EBVTc was detected in most pts with EBV viremia, while EBVTc(+) was not consistent in those without, suggesting low or no EBVTc proliferation in pts without EBV infection 3) High ATP levels in PEBV might be in part due to T cell proliferation against EBV. High ATP levels along with the detection of EBVTc may represent lower risk for development of PTLD as none of our pts developed PTLD. Long-term studies may determine utility of ATP and EBVTc in predicting pts at risk for PTLD.

Abstract# 215

PERSISTENT EBV VIREMIA IS ASSOCIATED WITH HIGH ATP LEVELS AS MEASURED BY CYLEX IMMUNOKNOW® IN PEDIATRIC RENAL TRANSPLANT (Tx) RECIPIENTS. Dechu P. Puliyanda, Shili Ge, Odette Galera, Stanley C. Jordan, Elaine S. Kamil, Mieko Toyoda. *Pediatric Nephrology and Transplant Immunology Laboratory, Cedars Sinai Medical Center, Los Angeles, CA, USA.*

PURPOSE: Measurement of ATP in mitogen-activated CD4+ T cells by Cylex Immunoknow® has been used to assess global immunosuppression (IS) post-tx. While it is high during acute rejection (AR), indicating lower IS, it is expected to be low with infections. Low ATP levels at viral infection as cause or result of infection is under debate. We report on ATP levels during viremia and during no viremia in pts with viral infection.

METHOD: A total of 164 samples from 18 tx pts between Jan 2004 and Dec 2010 were tested for global IS (ng ATP/ml) and for CMV, BKV and EBV(copies/PCR). Viremia was defined as >5copies/PCR. Persistent EBV viremia (PEBV) was defined as EBV >5copies/PCR for >3 months. ATP in stable pts without viral infection or AR were also measured.

RESULTS: Of 18 pts, 3, 2 and 8 had CMV, BKV and EBV viremia, respectively. In pts with CMV or BKV, ATP during viremia was lower than at time of no viremia (300±68 vs. 513±206 for CMV, 278±341 vs. 426±188 for BKV) in all 5 pts. Even at 1 month post-therapy, low ATP was observed if viral-PCR was still (+) (316 for CMV, 52 for BKV). CMV and BKV cleared in most pts and ATP levels increased to their baseline. ATP during primary EBV infection was also lower than those at no EBV (345±89 vs. 405±93). However when pts developed PEBV, ATP was significantly higher than at primary EBV infection (634±88 vs. 345±89, $p<0.001$) or those in stable pts (634±88 vs. 436±96, $p<0.003$). No pt with PEBV developed PTLD. Even though pts with PEBV had high ATP, AR was not seen.

CONCLUSION: 1) ATP levels are lower during CMV, BKV and primary EBV viremia compared to those at no infection. Lower ATP levels observed with CMV and BKV infection might be in part result of infections as low levels remained even at 1 month post-therapy if pts still had viremia, 2) Elevated ATP levels in pts with PEBV is not associated with AR. Elevated ATP levels might be in part due to T cell proliferation against EBV and may lower the risk for PTLD as no pt with PEBV developed PTLD.

Abstract# 216

CLINICOPATHOLOGICAL SPECTRUM OF LATE ONSET LYMPHOPROLIFERATIVE DISORDERS AFTER PEDIATRIC HEART TRANSPLANTATION. Silke Wiesmayr, Sarangarajan Ranganathan, Brian Feingold, Susan A. Miller, Marian Michaels, Steven A. Webber. *Pediatrics and Pathology, Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA, USA.*

PURPOSE: Prior studies have largely focused on early onset PTLD. Program maturity (29 years) and improving survival places more children at risk for late PTLD. This study aims to define the prevalence, pathological findings and clinical characteristics of PTLD that develop late after Htx.

METHOD: Retrospective single center review (1982-2010) of PTLD arising > 3 years after Htx. PTLD was classified according to the revised WHO criteria.

RESULTS: Among 274 heart tx recipients, a diagnosis of late PTLD was made in 19; 12 were male and 18 Caucasian. Mean age at tx was 4.5 yrs (0.1-16.4). Late PTLD developed at a mean of 92.8 mths (41-134) post-tx. 4 had experienced prior early polymorphic (P) PTLD 4-13 mths post-tx. Only 2 children were EBV seropositive at tx. The commonest presentation was abdominal pain (9/19;47%); 2 had CNS involvement. Histology revealed 6 P-PTLD, 12 monomorphic (M) PTLD, and 1 Hodgkin Lymphoma (HL). Among the 12 M-PTLD there were 4 diffuse large B cell lymphomas (DLBCL), 5 Burkitt, and 1 case each of: plasma cell tumor, B cell marginal zone lymphoma, peripheral T cell lymphoma. 14 (74%) were EBER positive. During relapse / new late PTLD (n=6), histology changed in 3 including the development of 2 HL after prior DLBCL. Six P-PTLD were treated with reduced immunosuppression (IS) ± rituximab with complete response (CR) in all and 1 late death from sepsis. Among M-PTLD/HL, 2 were managed with reduced IS and remain well and 11 received multi-drug chemotherapy with cessation of IS; 10 of 11 achieved CR with 1 death on treatment from sepsis and 2 late deaths associated with recurrence. 14/19 (74%) are alive with a mean follow-up of 8 yrs (0.4-17).

CONCLUSION: In our center, more cases of late PTLD have been seen than early disease (n=15). Less than a third were P-PTLD, almost all of B cell origin, but 26% were EBV negative. CR is usual and survival is encouraging. However, relapse / new PTLD is common after M-PTLD. Continued vigilance for PTLD is required for all recipients irrespective of length of follow-up.

Abstract# 217

SPECTRUM OF EBV INFECTION IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Deborah R. Stein, Michael J.G. Somers. *Div of Nephrology, Children's Hospital Boston, Harvard Medical School, Boston, MA, USA.*

PURPOSE: EBV infection often complicates pediatric kidney transplants (ktx). Limited data exist as to complications and outcome of symptomatic vs asymptomatic EBV infection. We sought to better characterize the spectrum of EBV infection in children after ktx.

METHOD: We retrospectively reviewed consecutive ktx patients (pts) aged 1-18yo from a single pediatric center over an 8yr period. From surveillance PCR data, post-ktx EBV infections were identified. We ascertained maximum EBV PCR, EBV associated complications such as PTLD or loss of GFR, alterations in immunosuppression and longterm outcomes.

RESULTS: Of 125 ktx children (51% boys, median age at ktx 12yo, 44% living donor, 52% donor EBV+/recipient EBV-), 38% were EBV+ pre-ktx with 91% of donors EBV+. EBV+ PCR (median 211K copies, range 25K to 1300K) developed in 47 (38%) ktx children at median of 6 mos (range 1-40) post-ktx with 51% symptomatic (fever, fatigue, tonsillopharyngitis, adenopathy). 70% were on viral prophylaxis at time of EBV+. Pre-ktx EBV- children were more likely to develop EBV post-ktx than pre-ktx EBV+ children (50 vs 19%, p=0.001). Pts <5yo developed EBV at higher rates than pts 5-10yo or >10yo (53% vs 38% vs 30%). In post-ktx EBV+ pts, 92% developed subsequent EBV- PCR in median 1 mo (range 0-30), with 72% still EBV- at last follow-up (f/u). 55% had reduced immunosuppression with EBV+, and 23% had an acute rejection. In the 47 EBV+ pts, 13% developed concomitant BK virus and 2% developed CMV. Of 11 children with PTLD, 10 were EBV+ post-ktx and EBV+ status was linked to developing PTLD (p<0.0001), especially with peak PCR copies>100K (p<0.05). At last f/u, median GFR in EBV- pts did not differ from EBV+ pts (66 vs 59 ml/min/1.73m2, p=0.7) though in 9/11 surviving PTLD pts, median GFR was lower (47ml/min/1.73m2, p<0.04).

CONCLUSION: We conclude:1.Despite antiviral prophylaxis, post-ktx EBV infection is common in children. 2.Post-ktx EBV infection is more likely in younger and EBV- pts. 3.Although EBV+ was asymptomatic in half of children, PTLD was linked to high EBV PCR. 4.Reduced immunosuppression achieves EBV- PCR in most with little impact on longterm GFR in the absence of PTLD.

Abstract# 218

POST-TRANSPLANTATION LYMPHOPROLIFERATIVE DISORDER IN PEDIATRIC KIDNEY TRANSPLANT RECIPIENTS – A NATIONAL STUDY. Roxana Cleper,[1] Efrat Ben Shalom,[2] Daniel Landau,[3] Irith Weissman,[4] Irit Krause,[1] Osnat Konen,[1] Ruth Rahamimov,[5] Eytan Mor,[5] Nathan Bar Nathan,[5] Yaakov Frishberg,[2] Miriam Davidovits.[1] *[1]Institute of Nephrology, Schneider Children's Medical Center of Israel, Petah Tiqva, Israel; [2]Division of Pediatric Nephrology, Shaare Zedek Medical Center, Jerusalem, Israel; [3]Department of Pediatrics A and Pediatric Nephrology Clinic, Soroka Medical Center, Beer Sheva, Israel; [4]Department of Pediatric Nephrology and Dialysis, Western Galilee Hospital, Nahariya, Israel; [5]Department of Transplantation, Rabin Medical Center, Beilinson Hospital, Petah Tiqva, Israel.*

PURPOSE: Post-transplantation lymphoproliferative disorder (PTLD) is the most common malignancy in pediatric kidney-transplant recipients. The prevalence, clinical profile, and outcome of PTLD in Israel were examined.

METHOD: Data on pediatric (age <19 years) kidney-transplant recipients with PTLD in 1991-2008 were collected from the National Israeli Kidney Transplant Registry and compared with children without PTLD.

RESULTS: PTLD was diagnosed in 12/272 transplant recipients (4.4%), at (median) 3.2 years posttransplantation. PTLD patients were younger at transplantation (4.2 vs 12.5 years), had more AB blood group (30% vs 6.2%) living donors (50%vs 36%)and OKT3 therapy for acute rejection (25% vs 4%). Five were EBV-seropositive at transplantation. PTLD presented with graft dysfunction in 50%, location was abdominal (83%) and B-cell type (67%); T-cell PTLD occurred exclusively in EBV-seropositive patients. Reduced immunosuppression, antiviral agents, anti-CD20 monoclonal antibodies and chemotherapy were used in 12,12,4 and 6 patients, respectively. Survival was 100% in EBV-naïve but 40% in EBV-seropositive patients. Graft loss occurred in 3 of 8 survivors. Mortality risk was higher for older EBV-seropositive patients after prolonged dialysis, with cadaveric donors and T-cell type PTLD.

CONCLUSION: EBV-naïve patients should be monitored for PTLD during first 3-4 years posttransplantation while EBV-seropositive patients are at risk for late-onset lethal PTLD. Pretransplantation EBV seronegative status might confer survival benefit in early detected PTLD with prompt intervention.

Abstract# 219

SUCCESSFUL SEROLOGY-BASED INTERVENTION TO INCREASE PROTECTION AGAINST VACCINE-PREVENTABLE DISEASES IN LIVER TRANSPLANTED CHILDREN: A 19-YR REVIEW OF THE SWISS NATIONAL REFERENCE CENTER. Klara M. Posfay-Barbe, Arnaud G. L'Huillier, Barbara E. Wildhaber, Dominique C. Belli, Maria Rodriguez, Diana Alessandro, Claire-Anne Siegrist. *Pediatrics, Children's Hospital of Geneva, University Hospitals of Geneva, Geneva, Switzerland.*

PURPOSE: Since children referred for orthotopic liver transplantation (OLT) in Switzerland were not vaccinated optimally, new guidelines were set up and recommended to base catch-up immunization on serum antibody titers against vaccine-preventable diseases, before and after OLT.

METHOD: We measure the results of this serology-based intervention by comparing vaccine coverage and antibody titers in the pre- (1990-2002, P1) and post-intervention (2003-2008, P2) cohorts. Antibodies are measured by ELISA.

RESULTS: 44 P1 and 30 P2 children were evaluated. At pre-OLT visit, diphtheria (D), tetanus (T), *S. pneumoniae* (SPn) and measles-mumps-rubella (MMR) serologies were checked more frequently in P2 than P1 (P<0.05). More P2 children were up-to-date for diphtheria-tetanus-pertussis (DTaP) and MMR (P<0.05) or had received ≥1 dose of hepatitis B (HBV), hepatitis A (HAV), SPn and varicella-zoster virus (VZV) vaccines (P<0.05). One year post-OLT, DT, SPn, MMR and VZV serologies were more frequently checked (P<0.05) and antibody titers were higher for DT and HAV (P<0.05) in P2. Gender, age or diagnosis didn't explain these differences. Among P2 patients, pre- and post-OLT titers for D, T, *Haemophilus influenzae* type b (Hib), HBV, SPn14 and SPn19 were correlated (P<0.05 for all).

CONCLUSION: Protection against vaccine-preventable diseases of high-risk children like OLT patients can be significantly improved by serology-based intervention for vaccine-preventable diseases.

Liver 3: Clinical Applications of Liver Transplantation

Abstract# 220

LIVER TRANSPLANTS FOR CHILDREN WITH CYSTIC FIBROSIS RELATED CIRRHOSIS: ANALYSIS OF 22 YEARS OF THE UNOS DATABASE. Chirag S. Desai, Angelika C. Gruessner, Rainer W.G. Gruessner, Tun Jie, Horacio Rilo, Khalid M. Khan. *Department of Surgery, University of Arizona, Tucson, AZ, USA.*

PURPOSE: Liver disease associated with cystic fibrosis (CF) still remains a major cause of death among these patients. Most patients who develop liver disease do so before the age of 10. Outcome analysis of liver transplants with or without lung transplant is restricted to several small series reported from single centers except for an analysis from the European liver transplant registry. An evaluative report of 22 years of OPTN/SRTR database analysis of CF children who had undergone liver or combined liver and lung transplant in the United States will be presented.

METHOD: United Network for Organ Sharing (UNOS) Star files were used for this analysis. All cases from October 1987 through August 2009 were included.

RESULTS: A total of 209 pediatric patients received liver transplants (LT) due to CF related causes. Of those, 201 patients received liver transplants whereas 8 received combined liver and lung (LLT). The survival of LT patients at 1, 3, 5 and 10 years were 88%, 83%, 76% and 60% respectively and for LLT patients were 87%, 75%, 75% and 75% respectively (p=NS). When we evaluated results for the last 10 years, the results were similar. Also, these results were no different than the survival for LT for any other indications.

CONCLUSION: Although impaired pulmonary function is likely to cause an adverse outcome for LT in CF patients, our analysis of UNOS database suggests that outcome is no different than for any other indication of LT in the pediatric population.

Abstract# 221

LONG TERM OUTCOMES AFTER LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCINOMA IN CHILDREN. Sema Aktas,[1] Hamdi Karakayali,[1] Gokhan Moray,[1] Banu Bilezikci,[2] Figen Ozcay,[3] Mehmet Haberal.[1] *[1]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]Pathology, Baskent University, Faculty of Medicine, Ankara, Turkey; [3]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: Primary liver tumors are relatively uncommon in children. Liver transplantation (LT) is an effective operation for pediatric unresectable liver tumors.

METHOD: A retrospective chart review from 2001 to 2010 identified patients who were <18 years old who underwent LT for HCC. Twelve patients (8 males, 4 females), median age of 9.9±4.8, were transplanted and followed for a median of 55 ±21months. In the 9 children, 2 right lobe, 4 left lateral segment, 5 left lobe, and 1 whole liver grafts were used.

RESULTS: According to the TNM staging system; 3 children had stage I, 3 had stage II and 6 had stage IVA HCC. HCC was outside of the Milan criteria in 6 children.

The median AFP level before LT was 7262 ± 17453IU/ML Three patients received preoperative chemotherapy. The pathology findings demonstrated a mean tumor size of 2.3±1.5 cm. The number of tumors was less than 5 in 8 children, and more than 10 in the remaining 4 children. The largest tumor size was 5.2 cm. Three children had microvascular invasion. Postoperative chemotherapy was given only to one child. There were two recurrences of HCC, which occurred in omentom 29 months after LT, and in liver 45 months after LT. While omental recurrence was treated with surgical excision, liver recurrence was treated by radiofrequency ablation and chemotherapy. At the time of this writing, both of them are alive 45 and 11 months after recurrence therapy. One death occurred 17 months after LT due to sepsis, remaining 11 (91%) children are alive with good graft function.
CONCLUSION: There were no prospective or large retrospective studies established to assess the best indications for total hepatectomy and liver replacement in a pediatric population with malignant hepatic tumors. LT has recently become an important therapeutic option for children with HCC. We recommend early consideration of LT for HCC as the main treatment option in children.

Abstract# 222

GALACTOSE ELIMINATION MIRRORS LIVER FUNCTION AND PREDICTS END-STAGE LIVER FAILURE AFTER PORTOENTEROSTOMY IN BILIARY ATRESIA.

Hanna Lampela, Silja Kosola, Mikko Pakarinen. *Section of Pediatric Surgery, Hospital for Children and Adolescents, Helsinki University, Helsinki, Finland.*

PURPOSE: Impaired galactose elimination predicts mortality in adult cirrhotic patients. In order to facilitate timing of liver transplantation (LTx), we assessed whether galactose half-life (Gal½) reflects liver function and end-stage liver failure (ESLF) in biliary atresia (BA).
METHOD: After ethical approval a total of 33 patients who had undergone portoenterostomy for BA with a median age of 3.0 (range; 0.3-19) years were included. Results of intravenous galactose elimination and liver function tests were analyzed. ESLF was defined as listing for LTx within 4 months. To measure Gal½, 350 mg/kg of galactose was given intravenously and blood galactose concentration (µmol/l) was measured with galactose oxidase method from capillary blood samples at 20, 30, 40, and 50 minutes. The values were plotted against time on semi-logarithmic scale, and Gal½ was determined graphically from the line.
RESULTS: Patients with prolonged galactose half-life (Gal½ > 17 min) had markedly increased bilirubin [370 (19-960) vs.13 (3-811) µmol/l, P= 0.001, Mann-Whitney U-test], and decreased prealbumin [89 (49-159) vs. 139 (59-193) mg/l, P=0.005], and prothrombin ratio [43 (26-108) vs. 95 (32-145)%, P<0.001]. Gal positively correlated (Spearman rank correlation) with bilirubin (R=0.589; P<0.001) and negatively with prealbumin (R=-0.630; P<0.001) and prothrombin ratio (R=-0.519; P=0.002). Patients with ESLF had significantly longer Gal½ than the rest [20.5 (11.0-80.0) vs. 11.5 (7.5-30.5) min, P= 0.001]. Gal½ was prolonged over 17 min in 7 of 10 (70%) patients with ESLF, and 3 of 23 (13%) without. Positive predictive value for Gal½ over 17 min was 70%, negative predictive value 87%, and accuracy 82%.
CONCLUSION: Prolonged galactose elimination closely reflects deteriorating liver function after portoenterostomy in BA and indicates development of ESLF facilitating listing for LTx.

Abstract# 223

LIVING DONOR LIVER TRANSPLANTATION FOR ACUTE LIVER FAILURE IN CHILDREN.

Marek Szymczak,[1] Piotr Kalicinski,[1] Dorota Broniszczak,[1] Joanna Teisseyre,[1] Hor Ismail,[1] Joanna Pawlowska,[2] Irena Jankowska,[2] Marek Stefanowicz.[1] *[1]Department of Pediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [2]Department of Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Living Donor Liver Transplantation (LDLT) for patients with Acute Liver Failure (ALF) is controversial but may be an effective alternative for obtaining grafts in a timely fashion particularly in small children. The aim of this study was to analyze the outcome of pediatric patients with acute liver failure who were transplanted with living donor grafts.
METHOD: 43 liver transplantations in children with acute liver failure were performed between 1997 and 2010 in our institution. 14 (32%) children aged from one month to 15 years (mean 5,6 years) were transplanted the graft from living donor. The body mass ranged from 3,1 to 46,7 kg (mean 20,1 kg). The causes of acute liver failure were: mushroom poisoning -2, paracetamol toxicity -1,Wilson's disease -2, HBV hepatitis -1, neonatal hemochromatosis -1, acute AIH -1, toxins -1, iron poisoning -1, unknown -2. The time from qualification to transplantation, postoperative complications, long-term results was analyzed.
RESULTS: The time from listing to transplantation ranged from 11 to 105 hours (mean 39 hours). Two children (14%) died on the third day after transplantation due to multiorgan failure (1 patient) or neurological complications (1 patient). One patient required retransplantation 3 months after first transplantation due to vascular complication. In one child central nervous system complications occurred. Follow-up period range from 7 to 122 months (mean 69 months). 12 (86%) patients are alive with good liver function. No serious complication occurred in any living donor.
CONCLUSION: Living donor liver transplantation is a good option for pediatric patients with acute liver failure. With limited resource of cadaveric graft, transplantation from living donor may be performed within short period of time with satisfactory results in recipients and low risk in donors.

Abstract# 224

RECURRENCE OF AUTOIMMUNE HEPATITIS AND PRIMARY SCLEROSING CHOLANGITIS AFTER LIVER TRANSPLANTATION.

I. Jankowska,[1] J. Teisseyre,[1] J. Pawlowska,[1] M. Teisseyre,[1] J. Cielecka-Kuszyk,[1] J. Ryzko.[1] *[1]Department of Gastroenterology, Hepatology, CMHI, Warsaw, Poland; [2]Department of Surgery and Organ Transplantation, CMHI, Warsaw, Poland; [3]Department of Gastroenterology, Hepatology, CMHI, Warsaw, Poland; [4]Department of Gastroenterology, Hepatology, CMHI, Warsaw, Poland; [5]Department of Pathology, CMHI, Warsaw, Poland; [6]Department of Gastroenterology, Hepatology, CMHI, Warsaw, Poland.*

PURPOSE: Liver transplantation (LTx) is the standard therapeutic approach for the treatment of end-stage liver disease as autoimmune hepatitis (AIH), and primary sclerosing cholangitis (PSC). Results of liver transplantation in these indications are good with a patient survival after LTx at 5 years of 80-90%. However several series have reported a possible recurrence of primary autoimmune liver disease after liver transplantation. Reports on the outcome of LTx for AIH and PSC, in paediatric series remain anecdotal. The aim of this study was to analyse survival outcomes and disease recurrence for LT secondary to AIH and PSC in paediatric patients.
METHOD: A total of 418 patients underwent LTx in our institute between 1990 - 2009 y. During this period 22 patients underwent LTx for AIH, 7 for PSC and 6 AIH/PSC. The standard criteria for diagnosis of recurrent AIH (rAIH) were based on a combination of histological ad biochemical signs of graft hepatitis. The diagnosis of recurrent PSC (rPSC) was based on the Mayo Clinic criteria proposed by Graziadei et al. The mean age at time of LTx was 16,0 (9-20 y), 26 pts (74%) were older then 16 y.
RESULTS: Cumulated 5-year patient and graft survival rates were 91,5% and 80%, respectively. rAIH was diagnosed in 6 (27%), rPSC in 3 pts (43%), and rAIH in one pts from AIH/PSC patients. The mean time to recurrence was 3,1 years.
CONCLUSION: Liver transplantation provides good patient and graft survival rates in cases affected with AIH or PSC. rAIH occurs in approximately 27% of cases, rPSC in 43% but does not significantly affect patient survival.

Abstract# 225

THE IMPACT OF NITISINONE TREATMENT ON THE NEED FOR AND OUTCOME OF ORTHOTOPIC LIVER TRANSPLANTATION IN CHILDREN WITH TYROSINAEMIA TYPE 1.

Patrick J. McKiernan,[1] David Bartlett,[2] Carla Lloyd,[1] Darius Mirza,[1] Philip Newsome.[2] *[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Centre for Liver Research, University of Birmingham, Birmingham, United Kingdom.*

PURPOSE: Tyrosinaemia Type 1 (TT1) is a disorder of tyrosine metabolism which may lead to liver failure and a high risk of hepatocellular carcinoma (HCC). Treatment previously consisted of dietary restriction and orthotopic liver transplantation (OLT) but was transformed by the introduction of Nitisinone in 1992. Here we report how Nitisinone has altered the outcome of and need for OLT in patients with TT1 in our centre.
METHOD: A retrospective analysis was performed to compare the outcome of patients treated for TT1 at our institution in 2 eras; era 1, 1989-2001 and era 2, 2002-10.
RESULTS: 7 patients were treated in era 1 and 31 in era 2 with no significant difference in the annual number seen. 6/7 (85.7%) in era 1 and 7/31 (22.6%) in era 2 underwent OLT. The primary indication for OLT in era 1 was hepatic dysplasia in all with rising Alpha-fetoprotein in 4. Era 2 indications were suspected HCC in 5 patients, proven HCC in 1 and failure to respond to Nitisinone in 1. In patients treated with Nitisinone who subsequently required OLT, treatment was started at a median age of 428 days compared to 52 days in those who have not required OLT (p=0.03). Survival following OLT was 4/6 (66.7%) in era1 and 7/7 (100%) in era 2. 3 patients required a second transplant. Mean calculated glomerular filtration rate decreased post OLT similarly in both groups. Mean tubular reabsorption of phosphate remained normal for both groups up to 5 years post OLT. Mean urinary protein:creatinine ratio normalised post OLT in era 2 subjects and was significantly lower than the era 1 group in which it remained raised up to 5 years post OLT (p=0.005). Quality of life following transplant is good with unrestricted diet in all.
CONCLUSION: OLT remains an effective treatment for TT1. Since the introduction of Nitisinone the need for OLT has been reduced. Early introduction of Nitisinone therapy may prevent the need for OLT. Treatment with Nitisinone prior to OLT results in improved renal tubular function.

Abstract# 226

PROGNOSIS OF BILIARY ATRESIA IN THE ERA OF LIVER TRANSPLANTATION: FRENCH NATIONAL SERIES 1986-2009.

Christophe Chardot, Chantal Buet, Marie-Odile Serinet, Alain Lachaux, Bertrand Roquelaure, Frédéric Gottrand, Pierre Broué, Alain Dabadie, Emmanuel Jacquemin. *French Observatory of Biliary Atresia, Hôpital Necker – Enfants Malades, Université René Descartes, Paris, France.*

PURPOSE: Evaluate the evolution of the prognosis of biliary atresia (BA) since liver transplantation (LT) became widely available.

METHOD: The charts of all patients diagnosed with BA, born between 1986 and 2009, and living in France, were reviewed in 45 centers. Survival were calculated with the Kaplan-Meier method and were compared using the logrank test.

RESULTS: 1107 BA children were identified: 990 born in metropolitan France (incidence 1/18400 life births), 88 overseas, and 29 abroad. 14 children (1.3%) without BA who underwent a Kasai operation were not included. Kasai operation or its variants were performed in 1044 BA patients (94.3%). Survival with native liver after Kasai operation was 40 %, 36 % and 30 % at 5, 10 and 20 years. These results did not progress over years. 587 children underwent LT, 1 to 4 times (692 transplants). Mortality without transplantation was 16 %, 7 % and 4 % in the cohorts 1986-96, 1997-2002 and 2003-2009, respectively. Survival after transplantation was 83%, 82 % and 77% at 5, 10 and 20 years in the whole series. Survival 5 years after transplantation progressed from 75 % in the 1986-96 cohort to 90% in the 1997-2002 and 2003-2009 cohorts. In the whole series, overall BA patient survival was 81%, 80% and 77% at 5, 10 and 20 years. 5 year BA patient survival progressed from 72% in the 1986-96 cohort, to 88 and 89 % in the 1997-2002 and 2003-2009 cohorts.

CONCLUSION: With the sequential treatment of Kasai operation and liver transplantation if needed, 9/10 BA patients can live, and 3/10 reach the age of 20 years without transplantation. The prognosis of BA has improved in recent years, mainly due to a better access to LT, and better results after LT.

Acknowledgements: to pediatricians and surgeons of the 45 centers participating to the French Observatory of Biliary Atresia studies.

Financial support: Programme Hospitalier de Recherche Clinique AOM 02007.

Abstract# 227

EFFECTIVENESS OF LIVER TRANSPLANTATION IN CHILDREN WITH UNRESECTABLE HEPATOBLASTOMA.

Dorota Broniszczak,[1] Hor Ismail,[1] Piotr Kalicinski,[1] Joanna Tesseyre,[1] Bozena Dembowska-Baginska,[2] Danuta Perek,[2] Przemyslaw Kluge,[3] Andrzej Kosciesza.[4] *[1]Pediatric Surgery and Organ Transplantation, Children's Memorial Health Institute, Warsaw, Poland; [2]Oncology, Children's Memorial Health Institute, Warsaw, Poland; [3]Pathomorfology, Children's Memorial Health Institute, Warsaw, Poland; [4]Diagnostic Imaging, Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Hepatoblastoma (HBL) is the most common primary malignant hepatic tumor in childhood. The aim of the study was retrospective analysis of late results in children with unresectable HBL treated with liver transplantation (LTx).

METHOD: Over last 20 years 51 children with HBL were treated in our center. There were 12 (23%) patients with unresectable tumors which were qualified for total hepatectomy and LTx. In 10 patients LTx was performed as primary surgical treatment and in 2 as a rescue surgery due to recurrence after primary resection. There were four patients with large solitary PRETEXT III and PRETEXT IV tumor, four patients with unifocal centrally located tumor involving all main hilar structures and/or all main hepatic veins and 2 patients with multifocal PRETEXT IV tumor. In two patients lung metastases were cleared with preoperative chemotherapy, before the time of LTx.

The analysis of patients' data was performed in regard to PRETEXT, metastases, histopathology and comparison of survival rate to patients treated with conventional resection was done.

RESULTS: Two of ten patients treated with primary LTx died (20%), one due to PTLD and 1 patient due to HBL metastases. Both patients after rescue transplantation died of disseminated disease, without local recurrence.

Comparing patients with PRETEXT III or IV treated with liver transplantation or conventional resection, patients' survival was much better in group treated with transplantation within the same PRETEXT stages.

CONCLUSION: Liver transplantation is becoming standard choice of treatment for advanced liver tumors, however the results are best with liver transplantation as a primary surgery. Results of transplantation as rescue therapy are usually poor, and liver transplantation in these patients is questionable.

Abstract# 228

LIVER TRANSPLANTATION AS A TREATMENT FOR HOMOZYGOUS FAMILIAL HYPERCHOLESTEROLEMIA.

Turan Kanmaz, Yucel Yankol, Cihan Karatas, Nesimi Mecit, Taner Orug, Koray Acarli, Munci Kalayoglu. *Organ Transplantation Center, Memorial Hospital, Istanbul, Turkey.*

PURPOSE: Homozygous familial hypercholesterolemia (HFH) is a disorder resulting from low-density lipoprotein cholesterol (LDLC) receptor gene mutation. Many palliative options have been utilized, including medical therapy, apheresis, ileal bypass, and portocaval shunting. None of these options have proven to be effective curative treatments, because the disease itself results from the malfunction of LDLC receptors. Published data regarding these therapies has been limited to case reports and small series. Here we present the largest series of liver transplantation for HFH and also review the other treatment options reported in the literature.

METHOD: The clinical courses of six pediatric patients who received living donor liver transplants for HFH were retrospectively analyzed.

RESULTS: The mean age of the six patients was 8.9 years, and half of the patients were female. All of the patients developed skin lesions in the early years of their lives. TC levels before transplantation were above 1000 mg/dL in all patients. None of the patients underwent apheresis. Despite dietary restriction, statin administration, and other medical treatment, there was little improvement in TC levels. Therefore, all patients underwent liver transplantation. There were no serious post-operative complications in either the living donors or the recipients. Presently, all patients are alive and well. The mean follow-up after liver transplantation was one year. TC levels three months post-operatively were between 103 and 190 mg/dL, without dietary restriction or statin therapy.

CONCLUSION: Living donor liver transplantation seems to be the only treatment modality to correct the underlying LDLC malfunction in HFH patients without affecting the deceased donor pool. It is also cost effective relative to apheresis and oral drug therapy. Our preliminary results suggest that liver transplantation at an early age in HFH patients is safe and effective.

Kidney 4: Rejection

Abstract# 229

PREDICTION OF ACUTE REJECTION VS VIRAL REPLICATION EVENTS UTILIZING IDO ENZYME ACTIVITY AND CD4 ATP LEVELS.

Vikas Dharnidharka, Eihab Al Khasawneh, Sushil Gupta, Allah Hafiz, Amir Shahlaee, Jonathan Shuster, Douglas Theriaque, Timothy Garrett. *University of Florida, Gainesville, USA.*

PURPOSE: Infections such as cytomegalovirus (CMV), Epstein-Barr virus (EBV) and BK virus (BKV) have become as important as acute rejection for long-term allograft survival. Less invasive biomarkers tested so far predict risk for one event or the other, not both. The indoleamine 2, 3 dioxygenase (IDO) enzyme metabolizes tryptophan (trp) to kynurenines (kyn); in immune cells this pathway is important in allorecognition. CD4-ATP levels predict infection events. We hypothesized that the combination in a panel would be superior in predicting both extremes.

METHOD: We prospectively and longitudinally tested a blood and urine immune monitoring biomarker panel monthly for first 12 months post-transplant, at same time as PCR testing for CMV, EBV and BKV, from 25 consecutive children receiving a kidney transplant. Blood and urine kyn/trp ratios and blood CD4 T-cell ATP levels were correlated with acute rejection, major infection events or stable group in the next 30 days.

RESULTS: The 25 subjects experienced 6 discrete episodes of biopsy proven acute rejection in 5 subjects and 16 discrete events of major infection in 14 subjects (7 BK viruria, 6 cytomegaloviremia, 1 Epstein-Barr and cytomegaloviremia, 2 transplant pyelonephritis). When correlating samples (N = 104) directly to events, serum kyn/trp ratios were significantly elevated in the group that experienced acute rejection within the next 30 days (mean ratio 8.658 + SE 1.93) compared to the other two groups (ratio 5.695 + SE 0.29 in stable group and 6.844 + SE 1.19 in major infection event group, p value = 0.02). When incorporating within-subject variability also, analyses revealed that over time, urine kyn/trp ratios showed an increase of +17 (p = 0.01) and blood CD4-ATP levels showed a 110-point decrease (p = 0.007) within a given subject prior to a major infection event.

CONCLUSION: These pilot results suggest that a panel of biomarkers together can predict both over- or under-immunosuppression, but need validation in an independent study population.

Abstract# 230

BIOMONITORING OF GENOTOXIC DAMAGE IN CHILDREN WITH CHRONIC RENAL DISEASE AND IN THOSE AFTER KIDNEY TRANSPLANTATION.

Kaan Gulleroglu,[1] Banu Aykanat,[2] Gonca Cakmak Demircigil,[2] Kibriya Fidan,[3] Umut Bayrakci,[1] Necla Buyan,[3] Esra Baskin,[1] Aylin Sepici,[4] Bahar Buyukkaragoz,[3] Hamdi Karakayali,[5] Mehmet Haberal,[5] Sema Burgaz.[2] *[1]Pediatric Nephrology, Baskent University, Ankara, Turkey; [2]Toxicology, Gazi University, Ankara, Turkey; [3]Pediatric Nephrology, Gazi University, Ankara, Turkey; [4]Biochemistry, Gazi University, Ankara, Turkey; [5]General Surgery, Baskent University, Ankara, Turkey.*

PURPOSE: Elevated cancer risk related to an elevated level of genomic damage is one of the important consequences of chronic renal disease. There has been no previous study examining genomic damage in children with chronic renal disease. We examined the genomic damage in children with chronic renal disease.

METHOD: The genomic damage evaluated by using Comet, modified Comet, MN, FISH-MN Assay in lymphocytes and MN Assay in buccal epithelium. Lymphocytes and buccal epitelium were taken from 17 predialysis (PreD), 15 hemodialysis (HD), 17 transplant (Tx)patients and 20 healthy children.
RESULTS: The DNA base damage (TINT) determined by Comet Assay increased in Tx (5,79±1,94), HD (4,91±1,35) and PreD (4,92±1,23) groups ($p<0,05$). It was found that purine base damage in PreD (5,18±5,53) and Tx (4,49±3,78) groups was higher than the HD (1,57±1,77) group ($p<0,05$) whereas primidine base damage was the same in all patient groups ($p>0,05$). MN frequencies in lymphocytes were significantly higher in Tx (6,12±5,33), HD (9,07±4,86) and PreD (9,19±2,61) groups when compared with that of control ($p<0,05$). However, the DNA damage as MN frequencies in HD and PreD groups were higher than the Tx group ($p<0,05$). In buccal epithelium, the DNA damage determined by MN Assay was also increased in Tx (9,65±7,31), HD (9,50±7,12) and PreD (8,24±8,66) groups ($p<0,05$). There was an interaction between BUN, creatinine, TAS, uric acid and ferritine and genotoxicity parameters. Regression analysis shows that being in any of the patient groups increases the Comet as DNA base damage, MN, C(+)MN, C(-)MN and buccal MN frequencies.
CONCLUSION: Our results reveal that pediatric PreD, HD and Tx patients have an increased genotoxic damage and thus contributing to the future cancer risk.

Abstract# 231

UNRECOGNISED GRADE II T-CELL MEDIATED REJECTION IN PAEDIATRIC RENAL TRANSPLANT RECIPIENTS. Chrysothemis C. Brown,[1] Neil J. Sebire,[2] Stephen D. Marks.[1] *[1]Department of Paediatric Nephrology, Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom; [2]Department of Paediatric Pathology, Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom.*
PURPOSE: Acute renal allograft rejection is classified according to the Banff classification system and has prognostic and therapeutic implications. Acute T-cell mediated rejection (TCMR) is diagnosed by the presence of either tubulo-interstitial inflammation (grade I) or arteritis (grade II-III). Therefore, the diagnosis of Grade II or III TCMR requires the presence of a large artery on biopsy. In many cases, arteritis will be accompanied by tubulo-interstitial inflammation. However, in cases where arteritis occurs without tubulo-interstitial changes, TCMR could go undiagnosed if a large vessel is absent on biopsy.
We sought to establish the incidence of grade II or III TCMR in our cohort of paediatric renal transplant recipients and estimate the frequency of undiagnosed TCMR due to absence of a large artery on renal biopsy.
METHOD: 103 unselected renal transplant biopsies from 66 patients, performed for investigation of acute or acute on chronic renal allograft dysfunction between Oct 2008 and Dec 2010, were reviewed.
RESULTS: 70 (68%) contained a large vessel (>200µm diameter). Of these, 15 (21%) had evidence of arteritis fulfilling the criteria for grade II-III TCMR. In 60% of biopsies with grade II TCMR, arteritis was observed in the absence of significant tubulo-interstitial inflammation.
CONCLUSION: A significant proportion of biopsies classified as 'normal' or 'borderline change' in the absence of a large vessel may represent undiagnosed grade II TCMR. This may result in a delay in treatment or non-optimal therapy and has important prognostic and therapeutic implications for the management of acute allograft dysfunction.

Abstract# 232

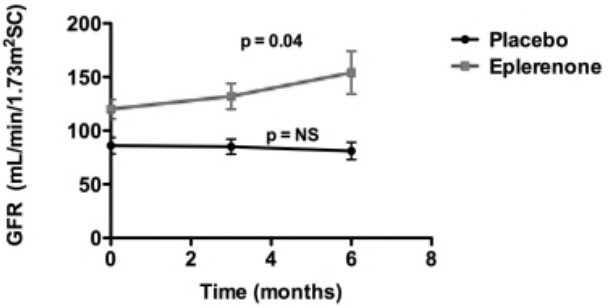
PROTOCOL BIOPSY AND BIOMARKERS OF ACUTE REJECTION IN PEDIATRIC KIDNEY TRANSPLANTATION. Viola Pinto,[1] Paulina Salas,[1] Daniel Hevia,[2] Jaime Hernandez,[3] Susana Elgueta,[3] Luis Contreras,[4] Francisco Cano,[5] Magdalena Gonzalez,[2] Luis Michea,[2] Angela Delucchi.[5] *[1]Exequiel Gonzalez Hospital, Santiago, Chile; [2]Biomedical Science Institute, Molecular Cell Studies, Santiago, Chile; [3]Public Health Institute, Santiago, Chile; [4]Pathology Department, Santiago, Chile.*
PURPOSE: Acute rejection (AR) in pediatric kidney transplantation (Tx) is still a challenge, renal allograft biopsy is the best predictor. Molecular markers as IL-17, Fop3 and GATA3 mRNA,specific donor antibody (SDA) could be used for diagnosis. We propose to study correlation between protocol renal bx, SDA and biomarkers.
METHOD: Fifteen recipients, 2-16 years were randomized to withdrawal (SW:9) or steroid control (SC:6).Protocol bx at month 12 was indicated. mRNAs Foxp3, IL-17, GATA3, CD4 in urine and kidney tissue by qRT-PCR and SDA using Luminex were performed. Informed consent was obtained according to prevailing ethical standards of the country. Mean, student-t, Mann-Whitney, Wilcoxon test; significance $p<0.05$.
RESULTS: Eighteen biopsies were performed, 15 protocol and 3 for clinical suspected of AR or plasma creatinine increased in 20% from baseline. In 3/15 (20%) patients bx Foxp3 levels significantly increased post-Tx. One patient in SW group had humoral C4d (+) rejection, no increase in plasma creatinine and markers were seen. In 2/15 (13.3%) patients with normal renal function, protocol bx showed borderline cellular AR, Foxp3 was negative. There was no significant difference in mRNAFoxp3 levels in SW and SC. In 5 /15 (33%) patients SDA were detected, none of these patients showed histological evidence of humoral rejection. In 11/15 (73.3%) patients calcineurin inhibitor toxicity was observed, 9 in protocol bx, without correlation TAC levels and doses.
CONCLUSION: Urine sample of Foxp3 and mRNAGATA3 could be a promising non-invasive diagnostic test in cellular AR. Post-Tx SDA does not always correlate with humoral AR. Nephrotoxicity was frequent in protocol bx independent of TAC levels. Protocol bx is useful to detected early graft histological finding not perceived clinically. This research was funded by Fondecyt Grant # 1080166.

Abstract# 233

URINE METABOLITE PROFILES DISTINGUISH ACUTE REJECTION FROM ACUTE ALLOGRAFT INJURY AND NORMAL FUNCTIONING ALLOGRAFTS IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Tom D. Blydt-Hansen,[1] Rupasri Mandal,[2] David Wishart.[2] *[1]University of Manitoba, Winnipeg, Canada; [2]University of Alberta, Edmonton, Canada.*
PURPOSE: Renal biopsy is used for surveillance of rejection and to investigate acute allograft dysfunction. We hypothesize that non-invasive urine metabolite profiles determined by mass spectrometry differentiate between clinical phenotypes of acute allograft injury, including acute rejection, in children after renal transplantation.
METHOD: Urine samples from 39 children at the time of renal allograft biopsy for surveillance and clinical indication to identify rejection. 74 samples analyzed according to Banff/clinical criteria: Rejection (REJ=18; ≥i2t2), Normal (NOR=18; <i1,t1), Borderline (BOR=22; ≥i1t1 & <i2t2) and Acute Kidney Injury (AKI=16; Biopsy for indication >15% increase creatinine, <i1t1). 112 metabolites measured by direct injection mass spectrometry (ratio to creatinine). Class separation determined using Partial Least Squares Discriminant Analysis (PLS-DA), metabolites ranked by Variable Importance in Projection (VIP) and permutation testing to determine statistical significance ($p<0.05$).
RESULTS: PLS-DA yielded significant separation of the 4 classes together ($p<0.001$). Thereafter class separation of component subgroups was compared. AKI shows clear separation from NOR ($p<0.001$), REJ ($p=0.01$) and BOR ($p<0.001$). REJ is distinct from NOR ($p=0.03$) but overlaps with BOR ($p=0.49$). BOR trends toward difference from NOR ($p=0.09$). Grouping BOR & REJ together, they separate from NOR ($p<0.001$) and AKI ($p<0.001$). 9/15 highest ranked VIP metabolites are common between BOR and REJ vs. NOR. With BOR & REJ grouped, 8/15 are common to BOR and REJ, and the remainder to one or the other vs. NOR. 11/15 top VIP metabolites for AKI vs. NOR are distinct from REJ vs. NOR.
CONCLUSION: Acute rejection results in a urine metabolite profile that is readily distinguished from NOR and AKI. The profile resulting from BOR closely resembles REJ. This noninvasive approach may provide a robust biomarker to identify rejection and other causes of acute kidney injury post-renal transplant. Validation with a larger independent sample is needed.

Abstract# 234

ALDOSTERONE BLOCKADE IN CHILDREN WITH CHRONIC ALLOGRAFT NEPHROPATHY. Mara Medeiros,[1] Luis Velásquez-Jones,[1] Ana Maria Hernández,[1] Sonia Ramírez,[1] Yolanda Fuentes,[1] Saul Valverdes,[1] Arindal Vargas,[1] Katy Sánchez,[2] Guillermo Ramón,[1] Norma Bobadilla.[2] *[1]Hospital Infantil de México Federico Gómez, México, DF, Mexico; [2]Instituto Nacional de Ciencias Médicas y la Nutrición Salvador Zubirán, México, DF, Mexico.*
PURPOSE: To investigate the effect of aldosterone receptors blockade mediated by eplerenone in renal allograft function in children with biopsy proven chronic allograft nephropathy (CAN).
METHOD: A prospective, randomized and blind to the patient study. Informed consent was obtained in all cases. We included patients aged 6 to 17 years, with biopsy proven CAN and glomerular filtration rate (GFR)⟩40 mL/min/1.73m2BSA by Schwartz formula.
Group I: Placebo
Group II: Received Eplerenone (INSPRA®, Pfizer), initial dose 12.5mg/day increased to 25mg/day in two weeks.
Visits were scheduled at baseline, 1, 2, 4, 8, 12 and 24 weeks. In each visit a complete clinical examination is performed and blood sample is drawn for complete blood cell count, serum levels of creatinine, electrolytes, transaminases, cholesterol, tryglicerdes. 24h urine collection for proteinuria and urine nitrates is also obtained. GFR was estimated by Schwartz formula.
RESULTS: Seventeen patients have been included.There was no changes in serum electrolites, hepatic enzimes and blood cell count in both groups.
Patients in group I had no chages in serum creatinine and GFR, whereas patients in Group II improved their serum creatinine and eGFR values as depicted in Figure 1. There was a non significant reduction in proteinuria in the eplerenone treated group.



CONCLUSION: Eplerenone is safe and well tolerated in children with chronic allograft nephropathy and induces a significative improvement in glomerular filtration rate and a reduction in serum creatinine evident after 12 an 24 weeks of treatment.
It is necessary to include more patients and prolong the follow-up.

Ethical/Psychosocial 3: Quality of Life

Abstract# 235

COMPARISON OF QUALITY OF LIFE AND PSYCHOSOCIAL ADJUSTMENT AFTER DIFFERENT TYPES OF PEDIATRIC SOLID ORGAN TRANSPLANTATION. Anu Haavisto,[1] Marit Korkman,[1] Christer Holmberg,[2] Hannu Jalanko,[2] Jari Lipsanen,[1] Erik Qvist.[2] *[1]Institute of Behavioural Sciences, Helsinki, Finland; [2]Pediatric Nephrology and Transplantation, Hospital for Children and Adolescents, Helsinki, Finland.*

PURPOSE: Adult studies have shown differences in quality of life (QOL) and psychosocial adjustment depending on the type of transplantation (Tx). QOL has been found low particularly after kidney Tx. We compared QOL and psychosocial adjustment of children after heart-, kidney-, or liver Tx.

METHOD: 78 Tx patients (19 heart, 45 kidney, 14 liver) aged 6-16 years participated. Mean age at assessment was 12.0 (SD 3.1) years for heart-, 11.2 (3.2) for kidney-, and 12.1 (3.3) for liver Tx recipients. Time since Tx was on average 5.5 (3.6) for heart-, 7.1 (3.6) for kidney-, and 8.3 (4.4) years for liver recipients. Self-assessment of the children's health related QOL was made using standardized questionnaires (15D, 16D, or 17D®; scale 0-1, higher score indicates better QOL). For evaluation of psychosocial adjustment, we used Child Behavior Checklist (CBCL) for parents, Youth Report Form (YRF) to the patients, and Teacher Report Form (TRF®) to their teachers. The 15-17D questionnaires were returned by 91%, CBCL by 95%, YRF by 86%, and TRF by 81%.

RESULTS: No statistically significant differences emerged between the Tx groups in QOL (mean scores, heart = 0.95, kidney = 0.92, liver = 0.93, n.s.), or in CBCL or YRF. However, teacher ratings of internalizing symptoms differed between the groups, p =.011; kidney Tx children scored lower than heart and liver recipients. The cut-off point for clinical problems (T > 63) was exceeded by 9% in CBCL, 11% in YRF, and 3% in TRF. These were evenly distributed among different Tx groups. Patients with neurological sequelae rated their QOL significantly worse than children with a normal neurological outcome, p = .021. No differences were seen in psychosocial adjustment.

CONCLUSION: Thus, according to teachers, kidney Tx children had more internalizing problems than heart- or liver Tx children. No differences in self- or parental ratings of psychosocial outcome emerged. Neurological sequelae were negatively associated with QOL, regardless of Tx type.

Abstract# 236

HEALTH-RELATED QUALITY OF LIFE IN CHILDREN WITH SOLID ORGAN TRANSPLANT: LOW SELF-PERCEPTION IN KIDNEY TRANSPLANT RECIPIENT. Veronica Ferraris,[1] Alfredo M. Eymann,[3] Maria C. Sanchez,[2] Claudia C. Gorena,[1] Paula A. Coccia,[1] Lidia F.R. Ghezzi,[1] Daniel D'Agostino,[2] Jorge R. Ferraris.[1] *[1]Pediatric Nephrology, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina; [2]Pediatric Hepatology, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina; [3]Pediatric, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina.*

PURPOSE: Health perceptions of children and adolescent transplant patients should be considered in providing appropriate health-care. Despite its importance, knowledge regarding Health-Related Quality of Life (HRQOL) of children with solid organ transplant (SOT) is limited. **Objectives:** I) to investigate HRQOL in children and adolescents with SOT and to compare them with healthy controls (HC), II) to compare HRQOL of kidney transplant (KT) with liver transplant (LT); III) and both groups with control groups: End Stage Renal Disease (ESRD) and HC.

METHOD: Children and adolescent, between 8 and 18 years old, with SOT n=96 (KT n=43; LT n=53), ESRD (n=13) and HC (n=84) were surveyed using the KIDSCREEN-52 questionnaire. Mean ± SD HRQOL scores of the 10 dimensions were calculated for each group of patients.

RESULTS: SOT recipients scored lower than HC in: physical and psychologic well-being and in moods and emotions ($p< 0.01$; <0.05; <0.003 respectively). SOT children had a better parent relation and home life compared to HC ($p<0.03$). KT and LT scored similar in almost all dimensions. Compared with the HC, KT and LT had lower score only in physical well-being (KT $p<0.05$; LT $p<0.001$) and in moods and emotions (KT $p<0.05$; LT $p< 0.01$). Compared with HC and LT recipients, KT had lower scores in self-perception ($p<0.05$). Patients with ESRD scored lower than HC and KT in most dimensions with the exception of: parents' relation and home life.

CONCLUSION: HRQOL in KT and LT patients is similar; their physical and psychological perception, mood and emotion are still a challenge to improve QOL. Self-perception is significantly lower for KT, self image is important for psychological well being. SOT and ESRD children feels secure and supported by their parents, but requires attention in psychosocial fields.

Abstract# 237

ADHERENCE AND QUALITY OF LIFE AFTER PEDIATRIC ABDOMINAL TRANSPLANTATION: COMPARISON BETWEEN INTESTINAL AND LIVER TRANSPLANTATION. Diana A. Shellmer,[1] Annette DeVito Dabbs,[2] Mary Amanda Dew,[2] Lauren Terhorst,[2] Robert Noll,[2] George Mazariegos.[1] *[1]Surgery, University of Pittsburgh Medical School and the Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA, USA; [2]University of Pittsburgh, Pittsburgh, PA, USA.*

PURPOSE: Intestinal and liver pediatric transplantation are life saving procedures that require lifelong follow-up and management. Limited data exist regarding adherence patterns and quality of life (QOL) outcomes in pediatric abdominal transplant recipients, particularly in intestinal transplant recipients. In an effort to characterize and compare adherence patterns and QOL outcomes in these transplant groups we examined adherence and QOL in 18 pediatric intestinal (ITX) and 22 liver (LTX) recipients (aged 0.6-14.7 years) transplanted between June, 2003 and March, 2009.

METHOD: To assess adherence, parents completed the Medication Adherence Measure (MAM), the Parent Medication Barriers Scale (PMBS), and questions regarding medication taking patterns within the household. The transplant nurse coordinator rated the patient's level of adherence to the medication regimen, laboratory blood draws, and clinic visits. Lastly, objective data on adherence to scheduled blood draws were extracted from the medical record. To assess QOL, parents completed the PedsQL and a sociodemographic form.

RESULTS: Findings from this study suggest high rates of adherence across all areas assessed (rates of adherence ranging between 89% and 98%). No significant differences in adherence were found between ITX and LTX groups. Nurse coordinator assessed adherence was significantly associated with parent reported adherence as well as objective data on laboratory draws. QOL for both groups was consistent with levels commonly reported in other chronically ill groups with no significant differences between groups.

CONCLUSION: Findings suggest that despite the complexities involved in the long-term care and management of ITX and LTX patients, adherence patterns are favorable and QOL is comparable to that of other chronic illness groups.

Abstract# 238

QUALITY OF LIFE, SELF-CONCEPT AND LOCUS OF CONTROL IN HEART TRANSPLANT RECIPIENTS. Jo Wray, Claire Orrells, Helen Latch, Michael Burch. *Cardiorespiratory, Great Ormond Street Hospital, London, United Kingdom.*

PURPOSE: To evaluate quality of life, self-concept and locus of control in a group of children and teenagers who had undergone heart transplantation and compare them with scores of healthy children.

METHOD: Fifty-two children and adolescents (26 females) aged 9.0-18.0 years (median: 14.0 years) completed validated measures of quality of life, locus of control and self-concept 12-192 months after heart transplantation for cardiomyopathy (n=38) or congenital heart disease (n=14). Scores on each of the measures were compared with published norms for healthy children.

RESULTS: Quality of life scores for the total transplant group were lower than those of healthy norms ($t=3.45$, $p=.001$) but those transplanted for cardiomyopathy did not differ from the healthy population and had better perceived quality of life than those with a pre-transplant diagnosis of congenital heart disease ($p=.003$). There were no differences in self-concept or locus of control between those transplanted for cardiomyopathy and those transplanted for congenital heart disease but the total group of transplanted children had a more positive self-concept than healthy children ($t=2.079$; $p=.043$). Higher quality of life scores were correlated with positive self-concept ($r=.583$; $p<.001$), an internal locus of control ($r=.560$; $p=.003$) and older age ($r=.506$; $p<.001$) but there was no relationship between time since transplant and quality of life.

CONCLUSION: Many children and adolescents have an excellent quality of life after transplant, particularly those transplanted for cardiomyopathy. However, corroborating earlier findings, quality of life related to school is impaired after heart transplantation.

The relationship between quality of life, self-concept and locus of control requires further investigation longitudinally to determine causality and to inform interventions to maximise quality of life for all patients.

Abstract# 239

THE IMPACT OF DIETARY AND EXERCISE EDUCATION ON QUALITY OF LIFE POST-TRANSPLANT – A RANDOMISED CONTROLLED TRIAL. Jo Wray, Claire Orrells, Helen Latch, Michael Burch. *Cardiorespiratory, Great Ormond Street Hospital, London, United Kingdom.*

PURPOSE: To assess whether an intervention (information and advice about exercise and diet) resulted in improvements in perceived quality of life and physical wellbeing for children and teenagers who had undergone heart transplantation.

METHOD: Seventy children and teenagers (median age: 8.7 years) with no significant co-morbidities who had undergone heart transplantation at least 12 months previously were randomized to either an intervention (IG) or control (CG) group using minimization to stratify for age, gender, pre-transplant diagnosis and body-mass index. Questionnaires assessing quality of life, knowledge about diet and exercise, eating behaviours and physical activity levels were completed by parents and older children/teenagers at baseline and 12 months later. Children and teenagers in the IG and their parents received individually tailored information about diet and exercise, delivered during 4 separate sessions over a 12 month period using an approach based on the Theory of Planned Behaviour. Those in the CG received usual care.

RESULTS: The groups did not differ at baseline on any medical or demographic parameters. All children and teenagers in the IG completed the intervention satisfactorily. At follow-up the change in each of the quality of life domains (physical, emotional, social and school) was more positive in the IG compared to the CG and the difference was significant on the child ratings of school quality of life (t=2.177; p=.036). There were also improvements in reported exercise and healthy eating behaviours in the IG relative to the CG.

CONCLUSION: The diet and exercise intervention had a positive impact on quality of life and on reported levels of physical activity and healthy eating behaviours in the short term. Lack of knowledge of both young people and their parents about the benefits and importance of a healthy life-style after transplant needs to be addressed routinely.

Abstract# 240

ANXIETY, DEPRESION, QUALITY OF LIFE AND BEHAVIORAL PROBLEMS IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS. Carla Venturi,[1] Neyda Landaeta,[2] Adelaida Blanch,[2] Antonio Valencia,[2] Javier Bueno.[2] *[1]Pediatric Liver Transplant Program, Cliniques Universitaries Saint-Luc,Université Catholique de Louvain, Brussels, Belgium; [2]Pediatric Liver Transplant Unit, Hospital Universitario Valle de Hebron, Barcelona, Spain.*

PURPOSE: The aim of this study was to determine anxiety, depression, quality of life levels, and behavioral problems in pediatric liver transplant (LT) recipients.

METHOD: 32 primary LT recipients; 18 males (53.3%), 14 females (43.8%) and their parents accepted to be included in the study. Median age: 10.1 yrs (r: 5.5-16.9). mean time following LT: 7.6 ± 3.1. We divided the population in 3 groups for their evaluation; G1: 5-7 y.o (n=8), G2: 8- 12 y.o. (n=19); G3: 13-16 y.o. (n=5). Quality of life test (Kiddy-Kindl), depression (CEDI-I, CDI), anxiety (CAS and CMAS-R) and a set of behavioral checklists (BASC) standardized to the healthy spanish population were used for their evaluation.

RESULTS: Low-grade depression and anxiety symptoms were found in 6.3% and 9.4% respectively. Any meaningful difference was found between the means of children self-perceived quality of life (76.9 ± 13.8) and parents' perception quality of life (76.3 ± 12.8). Either significant difference was found in quality of life from G 2 and G 3 compared with healthy children. In the BASC tests answered by children; 7 scales should be regarded as clinically significant after p-value estimation: Negative attitude towards school ($p < 0.0046$); Social stress ($p < 0.056$); Depression ($p < 0.032$); Interpersonal relationships ($p < 0.0012$); Self-esteem ($p < 0.054$); Self-confidence ($p < 0.0003$); and Adjustment disorders ($p < 0.007$). Of the tests answered by parents, 3 scales have resulted clinically significant: Hyperactivity ($p < 0.046$); Depression ($p < 0.0034$); Somatization ($p < 0.015$).

CONCLUSION: The incidence of anxiety, depression, and the quality of life of the LT children are similar to the values in healthy population. However significant behavior disorders appear in higher frequencies than in the healthy population. LT children have shown more difficulties in different areas of social life, a negative self-perception and a tendency to somatize the stress they receive from their environment.

Liver 4: Update on Intestinal Transplantation

Abstract# 241

ISOLATED INTESTINAL TRANSPLANTS (IITx) VS. MULTIVISCERAL (MVTx) TRANSPLANTS AMONG PEDIATRIC PATIENTS IN THE UNITED STATES: A COMPARATIVE ANALYSIS OF 22 YEARS OF THE OPTN/SRTR DATABASE. Chirag S. Desai, Angelika C. Gruessner, Khalid M. Khan, Tun Jie, Melissa M. Carton, Rainer W.G. Gruessner. *Department of Surgery, University of Arizona, Tucson, AZ, USA.*

PURPOSE: Intestinal transplantation has been increasingly accepted as the modality of treatment for intestinal failure in the United States. A trend towards a more desirable outcome in the pediatric population for IITx vs. MVTx has been reported from few centers; however, there is no clear data confirming this finding on a large scale.

METHOD: United Network for Organ Sharing (UNOS) Star files were used for this analysis. All cases from October 1987 through August 2009 were included. MVTx was defined as combined liver and intestinal grafts; any additional grafts transplanted were not further categorized.

RESULTS: A total of 1822 patients received intestinal grafts; of those, 1063 (58.3%) were pediatric recipients: 316 (29.7%) underwent IITx and 747 (70.3%) underwent MVTx. The 1-, 3- and 5-year **patient** survival rates were 84%, 70% and 63% respectively for IITx vs. 65%, 54% and 50% for MVTx ($p<0.0001$). The 1-, 3- and 5-year **graft** survival rates were 77%, 58% and 46% respectively for IITx vs. 65%, 53% and 47% for MVTx. IITx graft survival was significantly higher for the first 3 yrs post transplant ($p=0.001$, Wilcoxon test). A subanalysis of the last 10 years confirmed these results, with slightly improved outcome in both groups due to changes in immunosuppressive therapy and advances in surgical techniques.

CONCLUSION: Higher survival rates of IITx vs. MVTx warrant early patient referral i.e. before development of end stage liver disease (ESLD), thus providing more liver grafts available to patients with other liver diseases.

Abstract# 242

UTILIZATION OF VIRTUAL CROSSMATCHING IN PEDIATRIC INTESTINAL TRANSPLANTATION: A CASE SERIES. Jason S. Hawksworth, Raffaele Girlanda, Stuart S. Kaufman, Sandra Rosen-Bronson, Kimberly D. Christensen, Jaqueline M. Laurin, Rohit Satoskar, Thomas M. Fishbein, Cal S. Matsumoto. *Transplant Institute, Georgetown University Hospital, Washington, DC, USA.*

PURPOSE: Given the high incidence of acute cellular rejection (ACR) following isolated intestinal transplantation (ITx), significant recipient sensitization is considered prohibitive by many centers. Virtual cross matching (VXM) may optimize organ allocation and minimize immunologic risk in highly sensitized pediatric recipients, enabling successful ITx transplantation.

METHOD: Retrospective analysis of all pediatric isolated ITx performed in at our institution. Allograft allocation in sensitized recipients was based on the results of a VXM in which the donor specific antibody (DSA) was evaluated. HLA antibody testing was performed using a Luminex-based single-antigen assay. DSA strength and specificity was evaluated by both mean fluorescence intensity (MFI) and antibody titer. All potential donors were screened against recipient DSA titers. DSA titers greater than 1:64 were considered prohibitive for isolated ITx. Sensitized recipients received thymoglobulin induction and IVIG followed by maintenance IS with tacrolimus, sirolimus, and prednisone.

RESULTS: 63 pediatric ITx were performed from 2003-2010, including 18 isolated ITx. There were 3 highly sensitized isolated ITx recipients: Patient 1 is a 5 year old male with short gut syndrome (SGS) secondary to jejunoileal atresia and a PRA of 55. He has good graft function 22 months after transplant. Patient 2 is a 3 year old male with a PRA of 25 with SGS secondary to midgut volvulus with good graft function 13 months after transplant. Patient 3 is a 10 year old female who underwent retransplantation for tufting enteropathy and a PRA of 97. She is currently weaning from TPN 2 months after transplantation. All patients are free from ACR and there were no cases of post-transplant lymphoproliferative disorder (PTLD).

CONCLUSION: Utilizing a VXM strategy to optimize organ allocation and immunosuppression protocols, highly sensitized pediatric patients can successfully undergo isolated intestinal transplantation.

Abstract# 243

EXTREME DONOR HYPERNATREMIA DOES NOT INFLUENCE PEDIATRIC INTESTINAL AND MULTIVISCERAL TRANSPLANTATION OUTCOMES. Jason S. Hawksworth, Raffaele Girlanda, Stuart S. Kaufman, Kimberly D. Christensen, Jaqueline M. Laurin, Rohit Satoskar, Kirti Shetty, Thomas M. Fishbein, Cal S. Matsumoto. *Transplant Institute, Georgetown University Hospital, Washington, DC, USA.*

PURPOSE: Extreme donor hypernatremia (peak sodium levels over 170 mEq/L) is classically described as a donor risk factor for primary non function in liver transplantation. Little is understood regarding the effects of donor hypernatremia in pediatric intestinal transplantation (ITx).

METHOD: Retrospective evaluation of our pediatric ITx experience from donors with peak serum sodium (pNa) ≥170 mEq/L.
RESULTS: 63 pediatric ITx were performed from 2003-2010, with a median follow up of 42 months. Grafts included 18 small bowel, 35 liver/intestine, and 10 multivisceral. 15/63 (23.8%) donors had a pNa of ≥170 mEq/L (High pNa) with an average of 175 ± 4.3 mEq/L, and 48/63 (76.2%) donors had a lower (Low pNa) with an average of 157.3 ± 8.9 mEq/L ($p<0.05$). Donor and recipient characteristics including recipient age, donor age, number of pediatric patients, inclusion of liver allograft, and cold ischemia time (CIT) were not significantly different ($p>0.05$) between the two groups.

Donor and Recipient Characteristics

	Mean Recipient Age (yrs)	Mean Donor Age (yrs)	Intestine + liver	Mean CIT (hrs)
Low Donor pNa (<170) n=48	3.7 ± 4.6	3.1 ± 6.5	72.9%	7:43 ± 2:14
High Donor pNa (≥170) n=15	2.6 ± 2.2	1.4 ± 1.5	73.3%	6:52 ± 1:22

There were no statistically different variables

ITx outcomes including ventilator days, and postoperative TPN days, 1 year freedom from rejection (FFR), 1 year graft survival, and 3 year patient survival were not significantly different ($p>0.05$) between the two groups.

ITx Outcome Data

	Mean Vent Days	Mean TPN Days	1yr FFR	1yr Graft Survival	3yr Patient Survival
Low Donor pNa (<170) n=48	15.3 ± 21.1	30.3 ± 23.2	81.3%	81.2%	72.9%
High Donor pNa (≥170) n=15	9.5 ± 10.6	20.3 ± 7.2	86.7%	100%	93.3%

There were no statistically different variables

CONCLUSION: Extreme donor hypernatremia does not appear to influence graft and patient outcomes and should not be used to exclude potential donors for pediatric intestinal and multivisceral transplantation.

Abstract# 244

CHRONIC REJECTION AFTER PEDIATRIC INTESTINAL TRANSPLANTATION. Navdeep Nayyar,[1] George Mazariegos,[1] Kyle Soltys,[1] Geoffrey Bond,[1] Tamara Fazzolare,[2] William McGhee,[1] Rakesh Sindhi.[1] *[1]University of Pittsburgh, Pittsburgh, USA; [2]Children's Hospital of Pittsburgh of UPMC, Pittsburgh, USA.*

PURPOSE: Chronic rejection limits graft longevity after intestinal transplantation (ITx) in children. **Purpose**: To identify risk factors associated with chronic rejection.
METHOD: Review of clinical and immunopathologic data for 195 pediatric ITx recipients at Children's Hospital of Pittsburgh 1990-2010. Chronic rejection was confirmed histologically on the basis of extramural arteriopathy, evidence of chronic intramural ischemia (chronic ulceration, mucosal atrophy and fibrosis) in the absence of a competing diagnosis.
RESULTS: Median age is 2.2 years (range 0.36- 21.4), follow-up is 8 years (range 0.6-20), male: female distribution was 107: 88, and isolated ITx: combined Liver-ITx distribution was 69: 126. All children received Tacrolimus and steroids. Lymphocyte depleting induction with rabbit anti-human thymocyte globulin (rATG) was given since 2002 to 106 of 195 children. Chronic ITx rejection was diagnosed in 26 children. Distribution of ITx: L-ITx was 6: 20. Median time to graft loss was 3.5 years (range 1-16). Among 21 children who received enterectomies, nine were retransplanted (re-Tx), five died after enterectomy, six await re-Tx, and one child declined re-Tx. All but one child are alive after re-Tx. Five of 26 children died before enterectomy could be performed. Causes of death were sepsis/multiple system failure-8, failure to thrive-1, unknown-1, aorto-enteric fistula complicating re-Tx-1. Compared with CR-free children, those with CR were more likely to have received isolated ITx (54% vs 33%, $p=0.018$), have experienced moderate or severe rejection (54% vs 32%, $p=0.016$), and a positive T-cell cross-match (9% vs 23%, $p=0.041$).
CONCLUSION: Chronic intestine transplant rejection is associated with isolated ITx, positive T-cell cross-match and increasing severity of acute cellular rejection.

Abstract# 245

THE IMPACT OF INTESTINAL REHABILITATION PROGRAM ON THE INTESTINE TRANSPLANT WAITING LIST. Y. Avitzur,[1,3] Y.J. Wang,[1] N. T. deSilva,[3] M. DeAngelis,[2] D. Grant,[2] V. L. Ng,[1,2] N. L. Jones,[1,2] P. Wales.[2,3] *[1]Division of Gastroenterology Hepatology and Nutrition, SickKids, Toronto, Canada; [2]Transplant Centre, SickKids, Toronto, Canada; [3]Group for Improvement of Intestinal Function and Treatment (GIFT), SickKids, Toronto, Canada.*

PURPOSE: The outcome of children with intestinal failure has significantly improved over the last decade following the introduction of novel medical and surgical therapies by dedicated multidisciplinary intestinal rehabilitation programs (IRP). The aim of this study was to assess whether IRP also improves the outcome of intestinal transplant (IT) candidates.
METHOD: A retrospective review of children assessed for IT (n=84). Comparisons were made between three time periods: before the establishment of our center's IRP (GIFT) (BG; 1999-2002; n=33), early era of GIFT (EG; 2003-2005; n=18), and late era of GIFT (LG; 2006-2009; n=33) that reflect the full therapeutic impact of the program. Primary endpoints were patients' listing outcome, current status, and cause of death. Secondary endpoints included etiology of IF, listing criteria, and liver function at listing.
RESULTS: After the introduction of GIFT, more patients were treated with Serial Transverse Enteroplasty, and fish oil based lipid emulsion (Omegaven). The late era of GIFT was associated with an increase in patients who were 'not listed' (42% LG vs. 27% BG, 28% EG), 'removed or held on the IT waiting list' (36% LG vs. 3% BG, 6% EG), and a decrease in those who were transplanted (18% LG vs. 24% BG and 28% EG) or died before transplant (3% LG vs. 45% BG, 39% EG) ($P<0.05$). The cause of death shifted from traditional causes like liver failure or sepsis to other contributors related to co-morbid conditions such as prematurity ($P>0.005$). For current status, LG was associated with an increase in patients who are currently 'on TPN' or 'free of TPN' ($P<0.001$). Finally, a significant improvement in patients' liver function at listing was also observed during LG ($P<0.005$).
CONCLUSION: Treatment by IRP reduces the number of children needing IT, improves survival and outcome of patients waiting for IT, and may lead to overall reduction in the number of IT in the future.

Abstract# 246

PEDIATRIC INTESTINAL TRANSPLANTATION: 16 YEAR EXPERIENCE IN A SINGLE CENTER. Florence Lacaille,[1] Christophe Chardot,[1] Laurent Dupic,[1] Sabine Irtan,[1] Nadège Salvi,[1] Florence Moulin,[1] David Grévent,[1] Danièle Canioni,[1] Jean-Pierre Hugo,[2] Yves Aigrain,[1] Olivier Goulet,[1] Yann Révillon.[1] *[1]Hôpital Necker – Enfants Malades, Université René Descartes, Paris, France; [2]Hôpital Robert Debré, Université Paris Diderot, Paris, France.*

PURPOSE: To describe the median term results of intestinal transplantation (Tx), in a single center.
METHOD: From 1994 until 2010, 88 children received 94 Tx: 53 isolated small bowel Tx (SBTx), 38 liver-small bowel Tx (L-SBTx, 2 with pancreas), 2 multivisceral Tx (stomach to colon, pancreas and liver) with both kidneys in 1, 1 modified multivisceral Tx (without liver). Indications were: 30 short bowel syndroms, 26 congenital enteropathies, 28 motility disorders, 7 re-transplantations, et 2 other diagnosis. Follow-up is 1 month to 16 years (median 8 y).
RESULTS: Of 62 children (67 Tx) transplanted more than 5 years ago, 21 (31%) have a functional graft, 2 after retransplantation: 15/30 (50%) after L-SBTx ; 6/32 (19%) after SBTx. Of 27 Tx since 2006, 14 (52%) are functional. After SBTx, 27/53 grafts (51%) were removed, mostly in the 1st year, but 7 (13%) 2 to 9 y post-Tx, for acute or chronic rejection. The mortality rate is 35% (31/88) : 10 (19%) children died after SBTx, 21(49%) after L-SBTx; 25 deaths occurred in the first year after Tx, 6 deaths 2-10 y later (1 after an traffic accident).
CONCLUSION: Mortality is higher, but median-term graft survival is better after L-SBTx than SBTx. Intestinal transplantation is still a difficult procedure, and its indications are limited to the complications of long-term parenteral nutrition. Recent improvements have reduced early mortality and detransplantations. Improvements have to be made on the understanding and control of delayed complications and late graft losses.

Heart 2: Miscellaneous

Abstract# 247

SYMBOLISM OF THE HEART AS A TRANSPLANTED ORGAN: "YOU REALIZE YOU HAVE SOMEONE ELSE'S HEART AND IT'S KIND OF WEIRD". Samantha J. Anthony,[1] Anne I. Dipchand,[1] David B. Nicholas,[2] Cheryl Regehr,[3] Radha MacCulloch,[1] Lori J. West.[4] *[1]The Hospital for Sick Children, Toronto, Canada; [2]University of Calgary, Edmonton, Canada; [3]University of Toronto, Toronto, Canada; [4]University of Alberta, Edmonton, Canada.*

PURPOSE: Throughout history, the heart has been viewed as a potent symbol, as well as a vital organ. The mythological and symbolic qualities ascribed to the heart can complicate heart transplant (HTx) patients' acceptance of the new organ. It is posited that any change to the body inevitably transforms the self, hence this study explored possible disturbances to embodiment and personal identity which may be associated with pediatric HTx.
METHOD: This qualitative research study explored perceptions of self-identity and bodily integrity in adolescent HTx patients. Participants were recruited from a large pediatric Tx centre between 2007-2009. A grounded theory approach guided data collection, data analysis and theory development.
RESULTS: A total of 27/31 HTx patients (18 female, 67%) participated (median age 15.5 yrs; range 12.218.4 yrs) with a median age at time of Tx of 12.3 yrs (range 1.7-17.5yrs) and a median time post-Tx of 3.2 yrs (range 0.311.1 yrs). Results indicated that many adolescent patients had emotional and psychological concerns regarding accepting a foreign organ as their own and the meaning they associated with the donated organ. This manifested in a range of responses such as sadness or guilt regarding the death of the donor and/or thoughts about potentially acquiring personal qualities or characteristics of the donor. Many participants speculated extensively about the donor and longed for donor information. A complex relationship with the imagined donor emerged, including a sense of identity assimilation.

CONCLUSION: Our findings point to the psychological and meaning-making processes adolescent transplant patients encounter as they grapple with the presence of a foreign, life-giving organ within their body. This research highlights the complex process of integrating and adapting to HTx and invites future exploration of the potential impact on adolescents' concept of self and identity which may emerge following HTx.

Abstract# 248

CHANGES IN BIOMARKERS OF INFLAMMATION AND OXIDATION AND CARDIAC SIGNALING MOLECULES FOLLOWING PEDIATRIC HEART TRANSPLANTATION. Anne I. Dipchand,[1] Michel White,[2] Lori J. West,[3] Cedric Manlhiot,[1] Stacey Pollock-BarZiv,[1] Tina Allain-Rooney,[1] Rhian M. Touyz.[4] *[1]Hospital for Sick Children, Toronto, Canada; [2]Montreal Heart Institute, Montreal, Canada; [3]Stollery Children's Hospital, Edmonton, Canada; [4]Ottawa Hospital Research Institute, Ottawa, Canada.*

PURPOSE: Markers of subclinical inflammation & oxidative stress are increased in adult heart transplant (HTx) recipients, but are not reported in childhood. We compare Prograf(Tac) & Neoral (CsA) on changes of markers of cellular growth, apoptosis, inflammation & oxidative stress in pediatric HTx recipients.

METHOD: 1 y, open-label RCT of CsA & Tac. Systemic markers assayed pre/post-HTx were inflammation (high sensitivity C-reactive protein,hsCRP), renal injury (Cystatin-C), & oxidative stress (F2a isoprostanes & nitrotyrosine). Cardiac signaling molecules including MAPkinases (MAPK; p-ERK1/2,p-p38 MAPK,p-JNK), c-Src (pro-growth) & Bax/Bcl-2 (pro-apoptotic) were measured at 2,4,12,26 & 52 w in heart biopsies.

RESULTS: Of 11 patients (5 Tac:8.7±6y; 6 CsA:8.8±6.4y), 9 finished (1death/group). Mean cases of 3A rejection was 0.60 (Tac) & 0.50 (CsA) [p=0.80]. Both groups showed maximal increases in the mean levels of F2a isoprostanes, hsCRP & Cystatin-C by 2 w. Nitrotyrosine stayed elevated through 52 w in CsA patients. There was no significant difference in mean levels of p-ERK 1/2, p-JNK, and p-p38 MAPK by treatment, rejection, or time post-HTx. Activation of MAPK (phosphorylation of ERK1/2, p38MAPK, JNK) changed over time, with the peak at 10 w. Responses tended to be lower in Tac vs CsA. Phosphorylation of ERK1/2 and JNK in Tac & CsA and p38 MAPK in Tac decreased after 10 w. Cardiac Bax/Bcl correlated negatively with F2a-isoprostanes and MAPKs correlated positively with hsCRP.

CONCLUSION: Children exhibited an increase in markers of inflammation and oxidative stress maximal at 2 w post-HTx. There were trends in changes of signaling molecules associated with cell growth (ERK1/2), apoptosis (Bax/Bcl2) & inflammation (p38 MAPK). CsA was associated with increased oxidative stress. Whether Tac and CsA differentially influence mitogenic and pro-inflammatory signaling warrants further investigation.

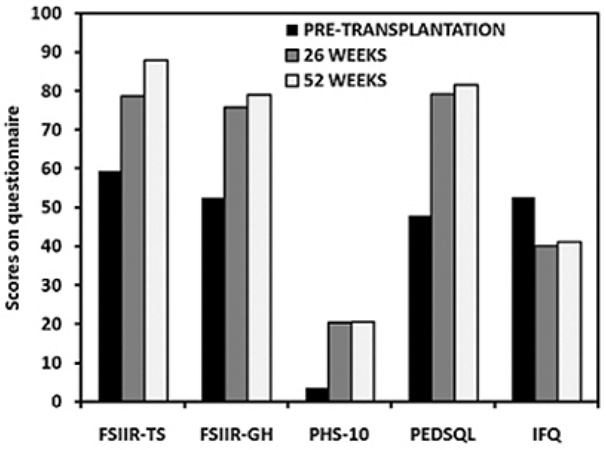
Abstract# 249

PROGRESSION OF FUNCTIONAL HEALTH STATUS AND PSYCHOSOCIAL WELL-BEING IMPROVEMENTS IN PEDIATRIC HEART TRANSPLANT RECIPIENTS AND THEIR FAMILIES. Cedric Manlhiot,[1] Samantha J. Anthony,[1] Stacey M. Pollock-BarZiv,[1] Lori J. West,[2] Tina Allain-Rooney,[1] Anne I. Dipchand.[1] *[1]Labatt Family Heart Centre, The Hospital for Sick Chidlren, Toronto, ON, Canada; [2]University of Alberta, Edmonton, AB, Canada.*

PURPOSE: Health status and psychosocial well-being of pediatric heart transplant (HTx) recipients and their parents improves following transplantation. The timing/magnitude of this increase, and consistency across health status domains has not yet been reported in a longitudinal study.

METHOD: 11 pediatric HTx patients were included in a randomized study comparing cyclosporine and tacrolimus-based immunosuppression. Enrolled participants completed 4 standardized questionnaires: Functional Health Status IIR (FSIIR-TS: total score, -GH: general health), SF-10 Health Survey (PHS-10), Pediatric Quality of Life 4.0 (PedsQL) and Family Impact Questionnaire (IFQ). Age-appropriate questionnaires, were either self-report or parent proxy and were completed prior to HTx, 26 and 52 weeks after HTx.

RESULTS: The majority of patients (n=7, 64%) were >4 years old at HTx, 2 (18%) were 2-4 years old and 2 (18%) were <2 years old at HTx, most were female (n=9, 82%). Across all age groups and regardless of underlying diagnosis, scores on all questionnaires went from substantially below population-based normal in the pre-HTx period to normal or near-normal 1 year after HTx. Patients on tacrolimus attained normal or near-normal scores at 26 weeks post-HTx for most indicators while those on cyclosporine did so only 52 weeks post-HTx.



CONCLUSION: Health status and psychosocial functioning normalized and substantially increased over the first year post-transplantation. Future studies should focus on the sustainability of this improvement and on the interaction between longitudinal progression and associated clinical factors including immunosuppressive strategy.

Abstract# 250

IMPACT OF SCARRING FOLLOWING CARDIAC TRANSPLANT OR MECHANICAL SUPPORT. Terry Hewitt, Hollie Burnett, Amy McNaughton, Asif Hasan, Massimo Griselli, Richard Kirk. *Paediatric Cardiothoracic Transplant, Freeman Hospital, Newcastle upon Tyne, United Kingdom.*

PURPOSE: 1) To investigate the scar care advice patients and carers are given.
2) To explore patient perceptions in relation to their scars.
3) To produce a scar care advice protocol based on the information obtained.

METHOD: Two questionnaires were designed:
1) Parent Scar Review Questionnaire: 44 parents (male children =18). Mean age at transplant was 6.7 years (range 0.1-15.7) and the mean age at time of response was 10.9 years (range 0.9-18.5).
2) Child Scar Review Questionnaire: 28 children (13 males). Mean age at time of transplant 9.6 years (range 1.1-15.7) and mean age at time of response=14.1 years (range 6-18.5).

RESULTS: 1) Parents rated the scars as more visible than their children $p<0.05$. This was more marked in daughters $p<0.05$
2) Overall 34% parents and 33% children reported receiving advice. Girls were more likely to have received advice (42% vs 22%).
3) Type of advice reported varied between families.
4) If advice was given 80% of parents reported it as useful.
5) Children over 12 yrs reported being more affected by scars $p<0.05$.
6) 25% of children would like to talk more about their scars (31% boys, 20% girls).
7) Parents of children who had undergone mechanical support reported the scarring was more visible than parents whose children had only undergone transplant but the children themselves reported no difference.
8) Parents and children who had not required mechanical support rated the impact of scarring greater than those who did.

CONCLUSION: These results suggest that the impact of scars on families is under recognised by transplant team. Furthermore when advice is given it is inconsistent.
The parents' perceived effect of the scarring upon their child differed from their child's own feelings.
Families, especially the children, have indicated that they would welcome advice. Accordingly a new protocol has been developed to ensure families are approached and given consistent advice.

Abstract# 251

RESPONSE TO HEPATITIS A AND B VACCINATION AFTER PEDIATRIC HEART TRANSPLANTATION. Kathy Martin, Alison Drabble, Cedric Manlhiot, Anne I. Dipchand. *The Hospital for Sick Children, Toronto, Canada.*

PURPOSE: Optimal immunization protocols for immunocompromised patients are important given limited data, the potential for decreased vaccine response and the increased threat of infection. We assessed the response to hepatitis A (HA) and/or hepatitis B (HB) vaccination in a cohort of pediatric heart transplant (HTx) recipients.

METHOD: Response to HA and HB vaccination was reviewed in 13 HTx recipients (9 males) traveling to Thailand. Vaccine response was assessed using descriptive data analysis. Additional variables that could contribute to vaccine response were also considered.

RESULTS: Mean age at HTx was 1.2 y (0.1-14.8). Prior to vaccinations, no one had received HA & 8 (62%) had received HB vaccine, 2 pre-HTx. HA IgG was positive in 2 (25%) & anti-HBS IgG was positive in 5 (38%). HA vaccination occurred in 12 (92%) with Havrix™ (42%); Twinrix™ (50%); or Twinrix™ & Twinrix Jr™ (8%). Number of doses were 1 in 2 patients (17%); 2 in 2 (17%); 3 in 6 (50%) or 4 in 1 (8%). Median age at HA vaccination was 10.0 y (6.5-15.4) and median time post-HTx was 8.2 y (0.6-12.9). HB vaccination occurred in 10 (77%) with Recombivax™ 40ug (30%), Twinrix™ (60%) or Twinrix™ & Twinrix Jr™ (10%). Number of doses were 1 in 3 (30%); 2 in 6 (60%); or 4 in 1 (10%). Median age at HB vaccination was 10.1 y (6.7-15.4) and median time post-PHTx was 8.2y (3.3-12.9). Immunosuppression included tacrolimus in 13 (100%); mycophenolate mofetil in 5 (38%); sirolimus in 2 (15%) and azathioprine in 1 (7%). HA serology 117±53 d after vaccination showed 3/12 (25%) were HA IgG positive. HB serology 99±50 d after HB vaccination showed 5/10 (50%) were anti-HBS IgG positive. Previous history of HB vaccination was associated with increased probability of HB vaccine success 7/8 (88%) vs 1/5 (20%), p=0.03. No other factors were identified as influencing seroconversion.
CONCLUSION: Vaccine response in this cohort of pediatric HTx recipients was well below rates for healthy children. Only a previous history of HB vaccination was significant in increasing the likelihood of vaccine success. Further study is needed to identify the optimal approach to vaccination for HTx recipients.

Abstract# 252

WORLD TRANSPLANT GAMES: INCENTIVE TO IMPROVE PHYSICAL FITNESS AND HABITUAL ACTIVITY IN PAEDIATRIC SOLID ORGAN TRANSPLANT RECIPIENTS. R. Deliva, C. Patterson, S. So, V. Pellow, S. Miske, C. McLister, C. Manlhiot, S. Anthony, S. Pollock-BarZiv, A. Drabble, A. Dipchand. *Hospital for Sick Children, Toronto, Canada.*

PURPOSE: Paediatric solid organ transplant (SOT) recipients have varying degrees of exercise intolerance, reduced physical fitness and decreased habitual activity. We examined the impact of training for and participating in the World Transplant Games (WTG) on measures of fitness and self-reported physical activity.
METHOD: SOT recipients were enrolled into 2 groups: participants in the WTG (intervention group) and non-participant controls. Physical fitness was assessed in both groups using the FITNESSGRAM® 4 months pre-WTG and in the intervention group 4 months post-WTG. Habitual activity of both groups was assessed with the Habitual Activity Estimation Scale (HAES) 4 months pre-WTG, immediately before and 4 months post-WTG. The intervention group received training programs prior to the WTG. Controls received no intervention.
RESULTS: There were 19 children in the intervention group (12 heart, 4 lung, 2 kidney, 1 liver; mean age at SOT 9.6±6.5y; at testing 14.5±2.7y) and 14 controls (9 heart, 4 liver, 1 multi-organ; mean age at SOT 8.0±5.3y; at testing 13.2±2.6y). There were no differences between groups at baseline. Both groups increased habitual weekday activity over the training period (intervention: $p<0.001$; control: $p=0.02$).Weekend activity increased only in the intervention group ($p=0.02$). At initial assessment only 36.8% of the intervention group versus 42.8% of controls had ≥ 1 fitness measure in the Healthy Fitness Zone (HFZ). Following the WTG 56.2% of the intervention group had ≥ 1 measure in the HFZ. All children in the intervention group improved in ≥ 1 measure of health-related fitness and 69% improved in ≥ 2 of the 3 measures. The increase in habitual activity was not sustained beyond 4 months post WTG.
CONCLUSION: Motivational tools, such as the WTG, can positively influence habitual activity and health-related physical fitness of paediatric SOT recipients in the short term. Further study is needed to determine optimal intervention strategies to sustain lifestyle changes.

Kidney: Infections

Abstract# 253

INFECTIONS AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Hee Gyung Kang,[1] Jongwon Ha,[2] Il Soo Ha,[1] Hae Il Cheong,[1] Sang Joon Kim.[2] *[1]Pedatrics, Seoul National University Children's Hospital, Seoul, Korea; [2]Surgery, Seoul National University School of Medicine, Seoul, Korea.*

PURPOSE: While the incidence of infections has decreased, infection remains as significant cause of morbidity and allograft damage after kidney transplantation. Although the prevalence and risk factors for infection after adult kidney transplantation have been well known, it is questionable if application of the knowledge onto Korean pediatric population is appropriate. The purpose of this study is to answer the question.
METHOD: Retrospective review of previous five-year's experience of our institution.
RESULTS: During the study period, 76 children (M:F 45:31, median age 10.4 years old) underwent kidney transplantation. A total of 71 episodes (63 symptomatic) of clinically significant infection accompanied by fever, hospital admission, or positivity on viral screening were noted in 46 children. Causes of symptomatic infection episodes were urinary tract infection (UTI) in 7, pneumonia in 2, cellulitis in 1, respiratory virus in 13, cytomegalovirus (CMV) in 8, Epstein-Barr virus (EBV) in 6, BK virus in 1, fever without focus in 19. Notably, bacterial infection was accountable only in 15.5% of symptomatic infection. The most common pathogen found in this study was CMV (17%), followed by EBV (14%) and influenza virus (14%). One case of post-transplant lymphoproliferative disease associated with EBV and another case of BK virus infection with impaired renal function were observed.
One third of the infection episodes were noted before six months after transplantation, with median timing of infection of 1.5 months after transplant for UTI, 4.1 months for CMV, and 8.3 months for EBV. EBV infection was documented from early after transplantation, as early as 2.2 months after operation, and until late after transplantation (up to 58 months). The risk factor for UTI of post-operative period was indwelling stent.
CONCLUSION: UTI and CMV infection were common in early after kidney transplantation, while the proportion of bacterial infection was lower than reported. On the other hand, EBV infection needs to be under surveillance until immunity against this virus is acquired without complication.

Abstract# 254

INFECTIOUS COMPLICATIONS AFTER RENAL TRANSPLANT IN PEDIATRIC PATIENTS. Sara Azevedo, Cristina Gonçalves, Leonor Mendes, Rosário Stone, Margarida Almeida. *Unidade de Nefrologia, Departamento da Criança e da Família, Centro Hospitalar Lisboa Norte, Lisbon, Portugal.*

PURPOSE: To characterize the infectious complications after renal transplant (RT), correlating them with the different immunosuppressive regimens used over time.
METHOD: Retrospective analysis of clinical records of patients that underwent RT from Sept 1995 to Aug 2010. Patients were divided by immunosuppressive regimen in groups A, B and C. Group A induction (I): anti-thymocyte globulin and methylprednisolone (MP); maintenance (M): Mycophenolate mofetil (MMF), cyclosporin A (CyA) and prednisolone (P). Group B I: baziliximab (B) and MP; M: MMF, CyA, P. Group C I: B and MP; M: tacrolimus, MMF and P. We gathered data regarding demographics, follow-up and infectious complications. Chi-square and Mann-Whitney tests were used in comparative analysis.
RESULTS: We included 78 patients (38 males). A: n=12 (15.4%), B: n=24 (30.8%), C: n=42 (53.8%). The age at RT was 11.7±4.1 years. Uro-nephropathy: 32, 41%; glomerulonephritis: 28.2%; hereditary diseases: 15.1%; unknown: 10.3%; vascular disease: 3.8%; other: 1.3%. Mean follow-up: 43.3±33.3 months. CMV serology pre-TR was positive in 61.5%. During follow-up bacterial infections were identified in 53.8% and viral in 56.4%. In the 1st 6 months post TR: bacterial 34.6% and viral 38.5%. After 6 months of RT: 26.9% bacterial and viral infections 32.1%.
Bacterial infections: recurrent urinary tract infections were the most frequent (45.2%). Viral: CMV infection in 70.4% of all viral infections, EBV n=4 (1 associated with lymphoma), polyoma BK virus n=1. In CMV receptors there were 11 primary infections and 2 reactivations. There were 8 fungal and 3 parasitic infections. We found no significant differences between groups concerning the global rate of bacterial and viral infections. CMV infection was more frequent in group A ($p = 0.02$).
CONCLUSION: Infectious complications afflicted most of the RT patients, particularly in the first six months after transplant. Urinary tract infections and CMV infection were the most common. The immunosuppressive regimen used didn't show impact on the rate of infectious complications, except for CMV.

Abstract# 255

PULMONARY FUNCTION TESTING IN CHILDREN AFTER KIDNEY TRANSPLANTATION. Rita Van Damme-Lombaerts,[1] Philip Johnson.[1] *[1]Pediatric Transplantation, University Hospital, Leuven, Belgium; [2]Pediatric Transplantation, University Hospital, Leuven, Belgium.*

PURPOSE: Kidney transplantation (Tx) improved dramatically the quality of life of children with ESRD but infections are still an important problem after a succesful Tx. Pulmonary infections are very common. Since only few data are available concerning pulmonary function testing (PFT) under IS (immunosuppressive) therapy, we analysed retrospectively the results of PFT in children after Tx.
METHOD: 165 PFT were performed in 58 children with a mean age of 14.8 years, obtained on a yearly basis after Tx and outside a period of infections; on the same day IgG and T cell CD4 count in the blood were measured.
The children are on triple IS therapy with Steroids, MMF or Imuran, Cycosporine A or Tacrolimus.
FVC (forced vital capacity), FEV1 (forced expiratory volume in one second) and the ratio FEV1/FVC are the parameters derived from the spirometry.
FVC <80% is used as cut-off suggestive for a restrictive pulmonary disorder and FEV1/FVC < 85% for an obstructive disorder.
T cell CD4 below 600/mm3 and IgG below 6.2 G/l are considered as abnormal for the mean age of the patients.
Results are expressed in mean and ranges; Fisher exact test (2 tailed) is used for the correlations.
RESULTS: The mean FVC is 95% (range 62-120) and 9 patients have a value below 80% as expected in restrictive disorders.
The mean value for FEV1/FVC is 85% (range 65-93) and 22 children have a value below 85% suggestive for an obstructed flow.

The mean IgG is 9.67 G/L (range 3.79-16) and the mean T cell CD4 is 1113/mm3(range 101-10.184).
No correlation with IS therapy could be demonstrated.
The correlation between the FEV1/FVC ratio and IgG and T cell CD4 in blood was significant: p = 0.016 and p= 0.015 respectively.
CONCLUSION: After kidney transplantation a high incidence of impaired PFT are demonstrated.
In the majority of the patients the abnormal parameters derived from spirometry are suggestive for obstructive disorders.
A correlation between FEV1/FVC and low T cell CD4 count and low IgG levels need further exploration.

Abstract# 256

IMMUNIZIATIONS IN SOLID ORGAN TRANSPLANT RECIPIENTS AND THEIR HOUSEHOLD CONTACTS. Gérard Cortina, Miriam Zettl, Ralph Geiger, Thomas Müller, Thomas Giner, Jörn Schönlaub, Johannes Hofer, Raphaela Trojer, Anne Dettmar, Monika Edelbauer, Lothar Bernd Zimmerhackl, Magdalena Riedl, Therese Jungraithmayr. *Department of Pediatrics, Medical University Innsbruck, Innsbruck, Austria.*
PURPOSE: Clear guidelines for the vaccination of solid organ transplant (SOT) recipients have been published. However it is not always possible to complete the vaccination schedule before transplantation. Household transmission of vaccine-preventable diseases represents an important source of infection for these children. Therefore newer recommendations include the adequate immunization of all household members to create a circle of protection around the transplant recipient.
METHOD: We evaluated the immunization status of 22 pediatric transplant recipients (12 kidney, 9 liver, 1 heart) and their household members (21 siblings and 16 parents).
RESULTS: 7/22 (32%) SOT recipients had completed their immunization schedule before transplantation including tetanus, diphtheria, pertussis (DTaP), poliomyelitis (IPV), haemophilus type b (Hib), hepatitis B (HBV), pneumococcus and measles, mumps and rubella (MMR). Another 10/22 (45%) had a nearly complete schedule with only one dose of MMR. 13/22children (59%) received a Menigococcus C and yearly influenza vaccinations. 5/9 varicella naive patients (55%) were vaccinated before transplantation, while 4/9 (45%) could not be vaccinated with MMR and varicella. Among the siblings 16/21 (76%) had received all their DTaP, IPV, Hib, HBV and MMR vaccines, with 5/21 (24%) missing one MMR Dose. 2 patients received vaccinations for Pneumococcus, 3 for Meningococcus C, 5 yearly influenza and none for varicella. From the parents 6 (38%) did not know their vaccinations, the other 10 (62%) had completed their DtaP, IPV and MMR vaccinations. 5/16 (31%) were vaccinated yearly for influenza, but none for Hib, HBV, Pneumococcus and Menigococcus C.
CONCLUSION: We found appropriate immunizations in most of the SOT recipients but suboptimal immunizations in the household members. The adequate immunization of the transplant recipient but also of the household members should be a prominent goal of transplant centers.

Abstract# 257

MONITORING CELLULAR IMMUNE RESPONSES TO CMV TO GUIDE THERAPY OF CMV DISEASE IN PEDIATRIC RENAL TRANSPLANT (Tx) RECIPIENTS. Dechu P. Puliyanda, Shili Ge, Artur Karasyov, Stanley C. Jordan, Elaine S. Kamil, Mieko Toyoda. *Pediatric Nephrology and Transplant Immunology Laboratory, Cedars Sinai Medical Center, Los Angeles, CA, USA.*
PURPOSE: Control of CMV replication depends primarily on anti-CMV T cell activity (CMV Tc). We have shown that CMV Tc was consistently detected in sero(+) individuals, while no detectable CMV Tc was seen in sero(-) individuals putting them at high risk for CMV disease, especially post-tx. Here we report on results of monitoring for development of CMV Tc in 3 patients (pts) who were CMV sero(-) at tx.
METHOD: 3 pts (11-19 years; CMV sero status at tx: D+/R- in pts #1 & #3, D-/R- in pt #2) developed CMV disease at 2.2 to 8.9 months post-tx, and were monitored for CMV(copies/PCR) and CMV Tc (%IFNγ+ in CD8+ cells) by intracellular cytokine flow cytometry using CMV peptides. CMV>5copies/PCR and CMV Tc>0.1% was considered (+). All 3 received Valganciclovir (vGCV) prophylaxis for 6 months post-tx.
RESULTS: Pts #2 & #3 developed CMV disease on vGCV, and pt#1 at 5.4 months after discontinuing vGCV. At presentation CMV DNA was >1000 copies. All 3 were treated with reduction of IS and therapeutic dose of vGCV(1gm/m2/day); pts #1 & #2 also got IVIg. In pts #1 and #2, CMV Tc (0.1% and 5.4%) was detected at 9 and 3 days after the CMV-PCR(+), respectively, and CMV DNA became (-) at 20 and 31 days post-CMV-PCR(+). In pt#3, CMV Tc(0.3%) was detected at 74 days post-CMV-PCR(+) and CMV DNA was still detected at 89 days, although CMV significantly decreased with treatment. Pts #1 and #2 developed rejection (AR) following treatment of CMV disease and received treatment. Pt #1 had transient viremia without disease, which cleared with anti-viral treatment, and pt#2 had no recurrence of CMV.
CONCLUSION: 1) CMV Tc efficiently develops with CMV infection in sero(-) tx pts, resulting in clearance of virus, 2) After development of CMV Tc, pts are likely at low risk for CMV disease even under treatment of AR, 3) Viral surveillance is necessary in sero(-) patients even on vGCV prophylaxis. Monitoring for development of CMV Tc is a rational test to tailor duration of treatment for CMV disease to contain infection and prevent recurrence.

Abstract# 258

CMV PROPHYLAXIS IN PEDIATRIC KIDNEY TRANSPLANTS: TIME FOR A CHANGE. Hidde Jongsma,[1] Antonia H. Bouts,[2] Elisabeth A.M. Cornelissen,[3] Marc R. Lilien,[4] Matthijs F.C. Beersma,[5] Karlien Cransberg.[1] *[1]Ped Nephrology, Erasmus MC Sophia, Rotterdam, Netherlands; [2]Emma Children's Hospital – AMC, Amsterdam, Netherlands; [3]UMC St Radboud, Nijmegen, Netherlands; [4]Wilhelmina Children's Hospital, Utrecht, Netherlands; [5]Virology, Erasmus MC, Rotterdam, Netherlands.*
PURPOSE: A large proportion of children receiving a kidney transplant are seronegative for CMV and therefore highly susceptible to infection with these viruses. The aim of this retrosective multicenter study is to evaluate the incidence, timing and severity of CMV infections in the first year post-transplantation since the introduction of CMV prophylaxis.
METHOD: We included 198 kidney transplantations performed in the Netherlands between 1999 and 2010, from the timepoint that PCR assessments were available. Clinical data and PCR measurements of CMV over 12 months post-transplant were collected. Prophylaxis in high risk patients (serostatus CMV D+R-) consisted of 3 months Valacyclovir and Megalotect, and Valgancyclovir at a later stage. Intermediate risk patients (R+) received Valacyclovir and Megalotect, and Valacyclovir at a later stage. Low risk patients (D-R-) did not receive any prophylaxis. Infection was defined as more than 1000 geq/ml plasma.
RESULTS: 24 of 65 high risk patients (37%) experienced a CMV infection; 17 of 78 with intermediate (22%), and 6 of 55 with low risk (11%). Infection occurred within 3 months in 24 (51%) of cases, equally distributed over the risk groups. Infections after 3 months mostly occurred in the high risk group: 17 of 23 (71%). Valgancyclovir provided substantially better protection than did Valacyclovir + Megalotect. Introduction of an IL2MoAb in the immunosuppressive regimen did not affect the incidence of CMV infection. In contrast to graft failure, acute rejection was in 8 of 27 episodes in time related to CMV infection, either preceding or following it within 6 weeks. Graft failure was not in time related to CMV infection.
CONCLUSION: Despite prophylaxis a high proportion of children still experience CMV infection within one year after kidney transplantation. Prolongation of prophylaxis from 3 to 6 months in D+R- patients may improve prevention of CMV disease.

Poster Session II

Abstract# 259

HEART TRANSPLANTATION IN CHILDHOOD AND ADOLESCENCE: EXPERIENCES AND LONG-TERM RESULTS IN A HIGH RISK GROUP. Wolfgang Albert,[1] Anita Hudalla,[2] Roland Hetzer.[3] *[1]German Heart Institute, Berlin, Germany; [2]German Heart Institute, Berlin, Germany; [3]German Heart Institute, Berlin, Germany.*
PURPOSE: Young patients who undergo heart transplantation (HTx) in their early childhood or adolescence are confronted with typical developmental problems, which affect their specific adjustment to HTx. This study aims at evaluating patients' health related quality of life (HRQOL), integration at work, partnerships, family and social environment and at determining the degree and sources of non-compliant behavior with its somatic and psychosocial consequences.
METHOD: The study sample consists of 38 patients (19 female, 19 male) who received HTx between the age of 1 and 17 and are now between 16 and 34 years old (mean: 22.6 y). All participants received self-rating instruments: the Short-Form Health Survey (SF-36), Giessen Subjective Complaints List (GBB), Questionnaire for Social Support (F-SozU), Medication Experience Scale for Immunosuppressants (MESI), and Health Questionnaire for Children and Young People (KIDSCREEN). Further assessment was done by semi-structured interviews directed at psychosocial outcome, compliance, relationship to family and peer-group and integration into the work environment.
RESULTS: The young heart transplant recipients showed a significantly reduced HRQOL (SF-36) in all psychological (p=.004) and somatic domains (p=.001). In the KIDCSREEN patients emphasized a very close and satisfying relationship to their parents and pronounced overall social support. They felt well accepted at school or at work (F-SozU).
In contrast almost 50% reported some reduced adherence and 29% are to be seen as a high risk group for nonadherence (MESI), simultaneously characterized by poor physical and mental status.
Contradictory to the tests, in the interviews patients described considerable problems regarding school and work. In particular, patients who showed reduced compliance also reported marginal social support and trouble in accepting the new organ associated with emotional insecurity.
CONCLUSION: Young adult transplant patients are to be carefully evaluated for psychosocial risks to avoid noncompliance and reduced QoL in the long-term follow up.

Abstract# 260

QoL AND FATIGUE IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS. Marion M. Aw,[1] Deborah Wan,[2] Agatha Garcia,[1] Mohamed Amir bin Abd Majid,[2] Seng-Hock Quak,[1] Lynette Tay.[2] *[1]Dept of Paediatrics, University Children's Medical Institute, National University Health System, Singapore; [2]Dept of Psychology, National University of Singapore, Singapore.*

PURPOSE: To evaluate Health Related Quality of Life (HRQoL) in pediatric liver transplant (LT) recipients using the PedsQL™ 4.0 Generic Core Scale and PedsQL™ Multidimensional Fatigue Scale.

METHOD: LT recipients aged 1-18 years were invited to participate. The PedsQL™ 4.0 Core Scale encompasses 4 domains (physical, emotional, social and school functioning). The PedsQL™ Multidimensional Fatigue Scale has 3 subscales (general, sleep/rest, cognitive); each consists of 6 items. Participants rated each item using a 5 point-Likert scale (0 = never, 4 = almost always a problem). Items were reversed-scored and linearly transformed to a 0-100 scale, with higher scores indicating better HRQoL. A modified LT disability score (LTDS) was used to semi-quantify disability attributable to liver disease. This assessed 5 areas; infections, synthetic function, cholestasis, portal hypertension and hospitalizations.

RESULTS: Thirty-seven children (20 male, 73% Chinese) with a median time of 5.3 (range 0.1-14.3) years from LT were included. Their mean age was 7.82 (SD 4.82) years. Twenty-five were school going. Overall PedsQL™ score was 78.4 (range 39.1-100), with patients reporting good physical and social functioning (mean scores 82.1 and 82.9 respectively). School function was rated the lowest with a mean score of 69.5. Of the cohort, 59.4% had a LTDS of 0, indicating no significant disability related to LT. There was no correlation between PedsQL™ and LTDS or family income. There was a significant correlation between PedsQL™ and fatigue scores ($r=0.827$, $p<.001$); children reporting more fatigue have lower PedsQL™ scores. There was a correlation between longer time from transplant and higher HRQoL ($r=0.85$, $p<0.01$).

CONCLUSION: This study shows that stable children following LT report good HRQoL. This is positively correlated with time from transplant and lower fatigue scores. School functioning appears to be the domain with the lowest scores, and may be an area for evaluation to see how these children can be further helped.

Abstract# 261

EXERCISE CAPACITY & ACCELEROMETRY-BASED PHYSICAL ACTIVITY IN PEDIATRIC KIDNEY TRANSPLANT PATIENTS. C. G. Clark,[1] M. Cantell,[2] S. Crawford,[2] L. A. Hamiwka.[1] *[1]Pediatric Nephrology, Alberta Children's Hospital, University of Calgary, Institute of Child & Maternal Health, Calgary, AB, Canada; [2]Behavioral Research Unit, Alberta Children's Hospital, Institute of Child & Maternal Health, University of Calgary, Calgary, Canada.*

PURPOSE: Evidence is accumulating that children and youth could benefit from a more active lifestyle as they potentially have few physical limitations following organ transplantation. However, information is limited on the day to day physical activity of these children. The purpose of this study was to examine exercise and fitness capacity in a pediatric sample of children with a kidney transplant using gold standard physiological measures. In addition daily physical activity was quantified with accelerometers.

METHOD: Sixteen PTx (9 females), 4.9 years (2.9) post-transplant, mean age 13.1 years (SD=4.0) were recruited. Mean DPTA GFR = 76.7 ml/min/1.73m² (SD=18.0). Laboratory data included assessment of cardiopulmonary functioning (VO_{2peak}) from cycle ergometry and body composition (DEXA). Field testing (FITNESSGRAM) included PACER (progressive aerobic cardiovascular endurance run), curl ups and sit and reach tests. Sex and age based criterion standards were used as reference (Healthy Fitness Zone, HFZ). Physical activity (PA) was assessed by tri-axial accelerometry (mean=3 days).

RESULTS: Below normative values for VO_{2peak} for 8 children (mean=27.4, SD=3.3). 21% of children (N=16) achieved the HFZ for PACER, 46% for curl-up and 64% for sit and reach. Accelerometry data identified only 4 children who fulfilled the daily recommended > 60 min/day moderate-vigorous PA level for children/youth. Sedentary behavior amounted to 62% of daily activity.

CONCLUSION: In our study, PTx showed compromised exercise capacity and below physical fitness levels. Accelerometry data supports the notion that PTx are significantly inactive even when there are no physical or medical explanations. These results suggest the need for assessing PA barriers among PTx and for recommendations and standards of PA for PTx in order for health care providers and parents to work to increase the long-term health benefits of PA following transplantation.

Abstract# 262

ORGAN TRANSPLANTATION...NOT ALWAYS THE DESIRED OUTCOME. Camilla M. Cook, Kristen Cheatle, Kirsten Getchell, Jamie Moore, Deborah Powers. *Children's Hospital Boston, Boston, MA, USA.*

PURPOSE: "More than 100,000 Americans are waiting for lifesaving organ transplants and many more wait for donated tissues". The hope for all of these men, women and children is to receive a life-saving organ transplant and live a long and fulfilling life. We will briefly examine four case scenarios and discuss the ways in which we as a multidisciplinary team, work with the family to help preserve a quality of life for our patients when their hopes and dreams are changed dramatically.

METHOD: We will highlight four case studies of lung transplant patients, who dealt with chronic rejection post transplant and lack of choices regarding life-saving treatments. Study drug therapies, alternative medications, holistic approaches, developmental and expressive play interventions, and psychotherapy will be discussed which helped these patients and their families cope with their ever-changing health. We will outline how we as a team partnered with patients and families to provide support throughout the course of their care.

RESULTS: Although these four patients had to redefine their lives goals and aspirations with chronic rejection, all four patients and their families stated that they would not have changed their decision to have a transplant. A second chance of life, with the opportunity for new adventures and memories made it all worth while. As a staff member, we have learned from these patients and families how hope is redefined. In addition, we have learned how to best support patients, families, each other and ourselves while caring for an end-of-life patient, while preserving their dignity.

CONCLUSION: Quality of Life is measured differently for every individual. Whether traveling around the world, or spontaneously driving an hour for a meal without worrying about medications and treatments, these patients were able to make their dreams come true. Preparing and caring for patients and families with end-of-life care, has proven to be one of the most gratifying and humbling experience. These experiences provide a sense of closure to an otherwise grieving state.

Abstract# 263

HOW TO IMPROVE MOTIVATION AND MEDICATION ADHERENCE IN ADOLESCENTS? A CASE STUDY. Anneloes Decorte,[1] Fabienne Dobbels,[2] Noël Knops,[1] Rita Van Damme-Lombaerts.[1] *[1]UzLeuven, Leuven, Belgium; [2]Kuleuven, Leuven, Belgium.*

PURPOSE: Medication adherence is challenging for most adolescents. We present an adherence-enhancing strategy in a 16 years old male renal Tx recipient, using regular assessment, motivational interviewing and intensive self-management coaching by a clinical nurse specialist (NS).

METHOD: Using the BAASIS interview to assess medication adherence, our patient presented with severe non-adherence, but was not aware of his problematic behavior. First, we gave education on healthy lifestyle and medication.

Two months later, adherence did not change, but perceived importance of medication largely improved up to a score 8 on a 10-points VAS scale. Yet, the confidence scale indicated low self-efficacy with medication taking (i.e. score 3). Using the principles of motivational interviewing, the patient disclosed the following adherence barriers: "wanting to be like his peers, feeling a burden to his family and not receiving help with medications". We used these insights to agree upon the following plan: 1) consultations bi-weekly to discuss adherence and possible solutions; 2) pill box; 3) informing a friend about his Tx and 4) a weekly e-mail to the NS.

Five months later, his confidence and adherence improved. However, regularity of medication intake remained problematic. We discussed new strategies and he agreed to set an alarm on his phone. He also learned that his adherence decreased when the conflicts between his parents worsened. In month 8-9, he was hospitalized twice to reboot his confidence. To avoid becoming too dependent from the team, he agreed to set goals for himself, like following a cycling program for Tx patients.

RESULTS: At age 18, his adherence strongly improved. He feels capable of managing his health and life, and makes realistic plans for the future. In difficult times he is able to request help from the team and still regullary meets with the NS, yet, less frequently.

CONCLUSION: Findings from this case suggests that an intensive follow-up using adequate adherence assessment, motivational interviewing, personal coaching, contact with peers and sports can help to bridge the difficult years from adolescence to adulthood.

Abstract# 264

PARTNERING WITH CHILDREN'S PROTECTIVE SERVICES TO ENSURE SUCCESSFUL TRANSPLANTS. Joanne C. Dupuis,[1] Rebecca Marocco,[2] Andrea M. Martinovich.[1] *[1]Pediatric Heart Transplant, Children's Hospital of MI, Detroit, MI, USA; [2]Social Work, Children's Hospital of Michigan, Detroit, MI, USA.*

PURPOSE: Patient Profile: JJ, diagnosed at 8 months of age with dilated cardiomyopathy, began a pattern of sporadic follow-up in cardiology clinic. Following two hospitalizations for worsening heart failure, JJ was admitted to the ICU where his condition deteriorated rapidly requiring mechanical and ventilator support.

METHOD: Case study.

RESULTS: Initial transplant evaluation raised concerns regarding JJ's mother's resources, support systems and history of non-adherence. Ms Q received referrals for community resources & close follow-up was planned. Prior to her sons final admission Ms Q disclosed that she was the victim of ongoing spousal abuse. The social worker located a shelter for Ms. Q & her children but Ms Q reconciled with her partner. After several weeks of concerns related to non-adherence & inability to reach Ms Q, JJ presented to the emergency department and began his final pre-transplant admission. Ms Q visited her son sporadically, and finally abandoned JJ and his siblings. This absence as well as to inability to obtain consent for essential procedures lead to protective services consult.

CONCLUSION: This complex case illuminates several strategies. First, it is essential to document expectations clearly and in writing for transplant candidates & families. A behavioral contract can address this need. It is essential to document issues completely & objectively as they arise, as these notes will be of benefit when presenting the case to PS and in the event of legal proceedings. While PS workers are well educated individuals, it is important to remember that they are typically not well versed in the needs of medically fragile/chronically ill children and will therefore require assistance in determining the appropriate resources. Collaborating with PS staff to develop resource guides or dedicated teams may be of benefit. Implications for both social work and nursing are discussed.
(No confidential information has been disclosed in this case study. Permission to publish has been granted by this child's adoptive family.)

Abstract# 265

ETHICAL ISSUES AND THE PUBLICATION OF SRTR DATA.
Dawn A. Freiberger. *Children's Hospital Boston, Boston, MA, USA.*
PURPOSE: The purpose of this abstract is to review the ethical and practical issues related to the public availability of the Scientific Registry of Transplant Recipients (SRTR) data, to the requirement that this information be given to all listed patients every 6 months, and to the use of this data to compare pediatric center outcomes.
METHOD: Center SRTR data is updated every 6 months and is not risk adjusted. This data is published on the website, US Transplant.org. All the transplant centers' data can be viewed by the public, insurance companies, and regulatory bodies.
RESULTS: In 2008, it became a UNOS requirement that SRTR data be given to listed patients every 6 months at transplant centers.
It is important that families have knowledge of a transplant centers' outcomes to complete the informed consent process. These statistics can be confusing to families in times of crisis. With the small volume of patients at most pediatric transplant programs, these numbers can demonstrate significant fluctuations when compared to adult centers, and are rarely of statistical significance. These outcomes are not risk adjusted to reflect the referral patterns of most pediatric centers.
These numbers are also utilized by insurance companies and CMS for accreditation purposes.
All transplant centers have specific patient selection criteria. However, there are degrees of risk among patients who fit these guidelines. Thus programs with small volumes may decide to forgo accepting higher risk patients because of the potential effect it could have on that specific programs' outcomes. This is especially true for centers which have already accepted other high risk patients and might have as a result, less than expected outcomes. The practical consideration is that, without transplant, these high risk children will die, which further complicates the decision process.
There is no method to assess risk when looking at the centers statistics.
CONCLUSION: SRTR data is currently mandated to be used by transplant centers for accreditation and insurance purposes. However, given the emphasis placed on the SRTR data, it could be argued, less children are being accepted for transplant and more children are dying with out the potential benefit of transplant.

Abstract# 266

EVALUATION OF A NURSE-LED TRANSITION PROGRAMME FOR HEART AND LUNG PATIENTS.
Amanda Hawkyard, Helen Latch, Jo Wray. *Cardiorespiratory, Great Ormond Street Hospital, London, United Kingdom.*
PURPOSE: To implement and evaluate a transition intervention for young people, their parents and nursing staff from both paediatric and adult transplant centres.
METHOD: Following feedback from previous workshops with patients and parents, a transition event was designed and implemented by paediatric clinical nurse specialists to which staff from adult transplant centres were invited, together with young people preparing to transition and their parents. The intervention involved educational sessions covering aspects such as lifestyle issues and the impact of transplantation; breakout sessions on health promotion, fears and concerns about transition and participant requirements from the adult and paediatric centres; an expert panel session; and facilitating contact between families and staff from the adult centres. All participants completed an evaluation of the day.
RESULTS: Thirteen patients, their parents and nursing staff from 3 adult centres participated. The intervention was positively perceived by all participants. In particular, the opportunity for families to meet staff from several adult transplant centres was highly valued and families reported feeling less anxious about the impending move to an adult centre and more able to make an informed decision about where they wanted their adult care to take place. The adult staff gained insight into families' experiences in a paediatric setting and were able to begin to build relationships with those families in a non-medical environment. Although the structured education sessions were rated highly, it was evident that families had different information needs and that the breakout and expert panel sessions were more useful for some. All families and staff wished to attend further transition days in the future.
CONCLUSION: Young people due to transition to adult care, their parents and staff have complex needs which need to be addressed to facilitate a smooth transition process. This nurse-led intervention was designed to address some of those identified needs and was positively perceived by all participants. Ongoing evaluation of its effectiveness in terms of successful transition is now required.

Abstract# 267

FACTORS RELATED TO MEDICATION ADHERENCE AMONG ADOLESCENTS POST KIDNEY TRANSPLANT.
Stanley P. Hmiel,[1] Lisa A. McCleave,[2] Verna L. Hendricks-Ferguson.[3] *[1]Washington University School of Medicine, St. Louis, MO, USA; [2]St. Louis Children's Hospital, St. Louis, MO, USA; [3]Goldfarb School of Nursing, St. Louis, MO, USA.*
PURPOSE: Research has shown a high rate of medication non-adherence among adolescents post transplant. Limited research has been conducted to evaluate factors that impact medication adherence in these patients. The purpose of this study is to describe:
1: Adolescents' perspectives on medication adherence.
2: Adolescents' experiences receiving education about medication adherence from the primary health care providers (HCP).
3: Adolescents' perspectives of the HCP's role in providing education about medication adherence post transplant.
METHOD: A descriptive, exploratory (retrospective) design was used for this pilot study. A convenience sample included 14 adolescents between 11 and 19 years old who are 6 to 48 months post kidney transplant. Data was collected using semi-structured audio-taped telephone interviews.
RESULTS: The data was analyzed using semantic content analysis methodology. Preliminary findings show several factors related to medication adherence among the adolescents: (a) forgetting to take medications and (b) difficulty remembering to take medications during school breaks. Factors associated with promoting medication adherence include using alarms and reminders from parents. Adolescents report that the HCP have helped educate them by: (a) having them name their medications and doses at each clinic visit, (b) explaining the importance of the medications, (c) explaining the side effects, and (d) giving strategies to remember to take their medications. Adherence factors were gathered by semi-structured audio-taped telephone interviews. Adherence was self reported from the adolescents.
CONCLUSION: Findings may provide evidence that proves valuable when planning nursing interventions, communication, and support to improve medication adherence in adolescents post kidney transplant. The transplant coordinator and other HCPs can address the factors that were expressed by assisting the adolescents with skill building and problems solving skills to improve their medication adherence.

Abstract# 268

BEHAVIOR DISORDERS AND QUALITY OF LIFE IN CHILDREN AND ADOLESCENTS WITH RENAL TRANSPLANTATION.
Luis E. Lara, Sara S. Chocron, Ramon Vilalta, Carlos C. Herrero, Marina M. Muñoz, Jose L. Nieto. *Pediatric Nephrology, Hospital Vall d'Hebron, Barcelona, Spain.*
PURPOSE: Medical advances have helped the majority of pediatric renal transplant patients to survive into adulthood, so the optimal care of these patients includes not only medical management but ensuring adequate psychosocial development to achieve a successful transition to adulthood.
METHOD: 41 patients were selected with a working graft between 5 to 18 years of age. The measurement instrument was the survey with closed questions. The following conclusions were obtained:
RESULTS: A.- ***Nursing evaluation:*** Good motivation on the part of the patient to follow the treatment, but the patient also feels exhausted by the chronic nature of it.
B.- ***Nutritional evaluation:*** Percentage of patients with obesity and excess weight superior to that of the healthy population, with major predominance in the early post transplant (<6 months) and those that were receiving steroids. This associated with other factors as dyslipidemias, arterial hypertension and scarce physical activity increase the cardiovascular risk, therefore the evaluation and education pre and post transplant will help to prepare the co-morbid states.
C.- ***Educational level:*** A negative effect was stated in most areas of learning and school aspects, interfering with the acquisition of basic knowledge, more so the longer and more severe the base illness was pre transplant.
D.- ***Socio-familiar evaluation:*** Illness situation increased the chance of labor loss of one of the progenitors in some cases. The principal needs perceived by the familial group were the need for major socio-familiar support, economic support, orientation and advice.
E.- ***Assessment of behavioral and emotional disorders:*** High predominance of psychiatric disorders arose with co-morbidity, which highlights the need for paido-psichiatric evaluation pre and post transplant. The quality of life was significantly below average compared to the healthy population. Although with the age it improves in the patient, the evaluation on the part of the parents remains very negative.

Abstract# 269

TRANSPLANT NURSING COMPETENCY: ONE PEDIATRIC TRANSPLANT CENTER'S SOLUTION.
Laura E. O'Melia, Marilyn M. Moonan. *Pediatric Transplant Center, Children's Hospital Boston, Boston, MA, USA.*
PURPOSE: Nursing education and orientation for transplant patient care is an ongoing endeavour. A literature review produced many articles about education for recipients, but

there was little focusing on education for nurses. A computerized system was utilized as a competency tool to enhance nursing education as well as document compliance for regulatory purposes.
The purpose of this competency is to provide a standardized solid organ transplantation curriculum for the orientation of new RN staff, but also as an annual competency.
METHOD: In order to prepare a comprehensive document for our five program pediatric solid organ transplant center (heart, lung, liver, kidney & intestine) in a large metropolitan hospital, clinicians from each specialized area were given the task of developing a learning module for nurses who care for recipients. This module had to be appropriate for all levels of nurses (novice - expert). Topics in the module include basic immunosuppression, anatomy and physiology, regulatory requirements, nursing considerations, complications as well as resources. Upon completion of the module, users were required to take a test which documents their competency.
RESULTS: A retrospective review of computerized results between 5/1/09 - 4/30/10 showed a total of 780 nurses completed the course 1,021 times. These individuals attempted the course 1,782 times, meaning that some users failed and retook the test. These nurses were from a variety of locations including the infusion center, hemodialysis/ pheresis, IV team, all intensive care units, radiology, preoperative clinic, main/cardiac operating rooms, recovery unit, research unit, heme/onc unit, cardiac floor, solid organ transplant floor and all solid organ transplant clinics.
CONCLUSION: The field of transplant is highly regulated. Because of requirements by federal accreditors (The Center for Medicare and Medicaid Services), nurses who care for transplant patients must maintain baseline and routine competency. Through this computerized Learning Management System (LMS) program, we found an opportunity to improve both competency documentation and education for this specialized nursing staff.

Abstract# 270

FAMILIAL STRAIN AFTER PEDIATRIC LIVER TRANSPLANTATION. Irene Petersen,[1] Tanja Kaller,[1] Nadine Langguth,[1] Rainer Ganschow,[2] Björn Nashan,[3] Karl-Heinz Schulz.[1,3]
[1]Medical Psychology, University Hospital Eppendorf, Hamburg, Germany; [2]Children's Hospital, University Hospital Eppendorf, Hamburg, Germany; [3]Transplantation Center, University Hospital Eppendorf, Hamburg, Germany.
PURPOSE: Only little is known about the psychosocial adjustment of families with a liver transplanted child. In this study we focused the familial strain and the association with several transplant-related variables.
METHOD: Parents of 170 liver transplanted children (50.6% girls, aged 8.4±4.6 years) were examined late postoperatively (i.e., 5.9±3.9 years after liver transplantation (Ltx)). The mean age at Ltx was 2.5±3.1 years. 39,4% received a live-related donor. Assessment included a semi-structured interview and the German version of the Impact on Family Scale (FaBel).
RESULTS: Regarding the familial strain, the results of our sample were comparable with a normative German sample of 271 parents with a chronically ill or disabled child. In the subscale "Burden of the siblings" the present sample showed significantly more strain (t=3.01, p=.003). "Time on waiting list" was significantly correlated with the "Total Scale" (r=.24, p=.002) and the subscales "Financial Burden" (r=.22, p=.005), and "Problems with Coping" (r=.23, p=.003). Parents who reported financial problems because of the Ltx (35%), and parents with familial problems after Ltx (42%) scored significantly higher in the "Total Scale" (r=.42, p<.001 resp. r=.26, p=.001). The comparison of two groups (A: postoperative period < 5years, B: ≥ 5) showed lower strain in group B in all subscales except in "Problems with Coping" (t=.45, p=.66).
CONCLUSION: The results corroborate our hypotheses that parents of liver transplanted children have to sustain a high familial strain. For long term medical success coping is vitally important, and problems with coping may lead to non-adherence. However, the only score remaining high even years after Ltx was assessed in the subscale "Problems with Coping". Our results underline the importance of psychosocial diagnostics and support pre and post Ltx to ensure the best possible adjustment to the chronic condition after pediatric Ltx.

Abstract# 271

SELF MANAGEMENT 101 FOR YOUTH. Rita Pool,[1] Judith VerSloot,[1] Geraldine Cullen-Dean,[1] Margot Mitchell,[2] Elizabeth Dettmer,[1] Norma D'Agostino,[3] Corrine McCurdy,[2] Sharon Lorber,[1] Jeffrey Schiff,[2] Miriam Kaufman.[1] *[1]Transplant Centre, Renal Program, The Hospital for Sick Children, Toronto, ON, Canada; [2]Division of Nephrology, University Health Network/TGH, Toronto, ON, Canada; [3]Pyschology, University Health Network/PMH, Toronto, ON, Canada.*
PURPOSE: In 2007 like minded health care professionals (MDs, RNs, psychologists, social workers) from two institutions joined to discuss the challenges facing youth with chronic health care conditions as they transition to adult care.
METHOD: An extensive literature review to determine the scholarly and scientific evidence related to this matter was undertaken. We determined that our experiences were not unique. For both adults and youth with chronic conditions there is ample documentation that greater skill in self-management related to improved health outcomes. Based on existing self-management programs, the expertise of local advocates and focus groups with youth with chronic health care conditions we developed a self-management program to help youth acquire and improve necessary skills to navigate the adult health care model. For our first pilot group we recruited youth aged 15- 25 years, (youth as divined by the World Health Organization). We learned much from that experience about the relevancy of the content, the length of the program and (un) successful recruitment strategies. Re-evaluation of this program led to new insights which changed the dynamics of the program. The program has now been tested with two other youth groups with program formatting re-defined and recruitment strategies adjusted.
RESULTS: The latest group with 33 participants has just completed. Our experience to date outlines the many challenges encountered and the various strategies employed and this information will be shared. Changes to identified challenges included re-formatting the timing of the program, focusing on identified sections deemed most relevant, and face to face recruitment strategies.
CONCLUSION: Using the youth themselves as experts and sounding boards throughout all stages of program development is essential to make any self-management program tailored to this age group a success.

Abstract# 272

DEVELOPMENT OF A PEDIATRIC MEDICAL ADHERENCE PROTOCOL TO ASSESS, MONITOR AND IMPROVE POST TRANSPLANT OUTCOMES. Rose Rodriguez, Tara Giblin, Rakesh Singh, Marc Richmond, Jonathan Slater, Annette Burke, Alison Heffer, Linda Addonizio. *Pediatric Cardiology, Children's Hospital of New York-Presbyterian, New York, NY, USA.*
PURPOSE: Our pediatric heart transplant (tx) program observed an increase in hospitalizations for cardiac graft rejection (n=30) due to nonadherence (NA) (n=28) from 2007 to 2010. Medication-related NA was prominent (n=25), followed by missed clinic visits (n=19) and NA with both (n=16). In response, a medical adherence protocol (MAP) was developed to improve outcomes that incorporated multidisciplinary assessment methods and multilevel intervention strategies to monitor risk factors for NA. Thirteen patients (pts) required inotropic support, 11 pts received anti-thymocyte immunoglobulin, and 7 pts required mechanical circulatory support.
METHOD: Clinicians from nursing, cardiology, psychiatry, social work, and child life developed a MAP that addressed multi-factorial risk factors for NA, including demographic, psychological, financial, social, and behavioral components, with corresponding adherence-enhancing strategies. Risk for NA was stratified into four categories: standard; increased; high and severe. Families were assessed and risk category was documented at every clinical encounter. Those with more than standard risk were discussed at weekly interdisciplinary meetings. Standardized stepwise interventions included: family meetings with the interdisciplinary team; increased monitoring via frequent blood tests, clinic visits and/or diagnostic tests; and heightened medical surveillance with the pediatrician, school nurse, visiting nurse or administration for children's services as needed.
RESULTS: Twelve months prior to implementing the MAP, our program had 12 hospital admissions related to NA. One year following the MAP, admissions secondary to NA decreased to 4.
CONCLUSION: Our MAP was successfully created and implemented in a large pediatric heart tx program. We observed a decrease in hospital admissions related to graft rejection in pediatric NA pts. This tool may be useful to other tx programs to track NA risk factors and provide adherence initiatives to reduce admissions and improve pt outcomes.

Abstract# 273

SUPPORT THROUGH SPORT. Grainne Walsh, Cathy Gill, Will Thornhill, Pat Hayes, Janet Bennett, Mignon McCulloch, Judy Taylor, Geoff Koffman. *Paediatric Renal Unit, Evelina Children's Hospital, London, United Kingdom.*
PURPOSE: We have developed informal peer support at the British Transplant Games. Families support each other and we encourage our patients to be confident with positive body image and self esteem, aspects often difficult in a clinical environment. Recently we have seen a 33% growth in team size with currently 40% of our patients participating.
METHOD: Description of our experience taking a team to this national event with staff volunteers.
RESULTS: 2010 saw team of 36 transplant recipients (aged 4-17 years) with families/ staff totalling 154. The Games has become a year round project including multiple fund-raising events to provide financial subsidies to encourage families and siblings to attend.
Planning includes sourcing of child friendly accommodation for the whole team to stay together including site visits, national management meetings, transportation, team gear and publicity to highlight transplantation.
Children are encouraged to actively support their peers throughout the weekend whilst participation in at least 4 sports (Games maximum is 5) is expected. Evening team functions are arranged to foster support including a barbeque, activities, disco and shared meals.
Our camp acts as a motivational base during events, with parental participation and feedback actively encouraged.

We end the Games with our closing ceremony hosted by our participants. It is an emotive time when they get opportunity to tell what the Games means to them. During this meeting we present our team sportsmanship and sibling awards.
CONCLUSION: Parent and participant comments testify to success of event by helping them positively manage their child's condition. Long term benefits include a supportive network and better relationships between clinical team, patients and families. To maintain support throughout the year we host a team reunion, coffee mornings, family events and have an active Facebook group which motivates and supports.

Abstract# 274

THE SUBJECTIVE IMPACT OF SWITCHING FROM PROGRAF TO ADVAGRAF IN ADOLESCENTS AND YOUNG ADULTS. I. Aujoulat,[1,2] M. Janssen,[2] R. Reding.[2] *[1]Institute of Health & Society, Université Catholique de Louvain, Brussels, Belgium; [2]Pediatric Liver Transplant Program, Pediatric Surgery and Transplant Unit, Université Catholique de Louvain, Cliniques Universitaires Saint-Luc, Brussels, Belgium.*
PURPOSE: Forgetfulness is a major factor of non-adherence. There is some evidence that patients do better taking their medication once a day over twice a day. We aimed to assess the subjective impact of switching from Prograf twice daily to Advagraf once daily in pediatric patients aged 16 and over.
METHOD: We conducted semi-directed interviews 6 months post-switch, and inquired about cognitive, behavioural and emotional factors associated with the switch. Self-reported adherence was assessed using the Basel Assessment of Adherence Scale (BAASIS).
RESULTS: 9 patients were included, with a mean age of 20 [16-27]. Taking of medication: 1 patient reported one missed dose over the last month. The other 8 patients reported to not have missed a dose. Timing of medication: 4 patients reported to take their medication 2 hrs late or more at least once a week, but did not see it as a problem. One patient took it unintentionally late once, and experienced a high level of stress as a consequence. Cognitive & psychosocial aspects: All were able to name their medication, but only 4 were fully aware that they were still receiving tacrolimus at the same level. All considered that Advagraf was easier to take. 3 patients had experienced some fears associated with the switch. 3 patients reported fewer headaches. All appreciated the increased opportunities for dialogue with the healthcare team due to more frequent visits to monitor the medical parameters. All reported and increased sense of self-efficacy in relation with taking their medication, and one patient reported an increased feeling of self-determination and responsibility.
CONCLUSION: Our results suggest a positive impact of the switch from Prograf to Advagraf on the quality of life and sense of responsibility in young patients over 16 who are otherwise medically stable. The switch may be a good opportunity to open a dialogue around self-management and adherence issues in the transition period from pediatric to adult care.

Abstract# 275

STEROID FREE IMMUNOSUPPRESSION EXPERIENCE IN PEDIATRIC KIDNEY TRANSPLANT RECIPIENTS. John P. Barcia, Bethany M. Coyne, Bartholomew Kane, Sean Kumer, Harry Dorn, Kenneth L. Brayman. *University of Virginia Health System, Charlottesville, VA, USA.*
PURPOSE: Steroid free immunosuppression (SFIS) became the standard for pediatric kidney transplant recipients at the University of Virginia in 2010. The purpose of the study was to compare short term outcomes with this regimen to prior immunosuppression protocols.
METHOD: We compared short term outcomes and side effects with immunosuppressive protocols from 2008-2010. SFIS protocol included solumedrol x 5 days only with antithymocyte globulin induction x 4 doses. Prior immunosuppression protocols employed steroids with induction therapy of either 3 doses of daclizumab (D+S) or 4 doses of antithymocyte globulin (ATG+S). All pts were maintained on tacrolimus and mycophenalate mofetil and received valganciclovir treatment for viral prophylaxis x 3 months. Screening for viruses was done routinely at 4 months or if signs of viral infection were noted.
RESULTS: A total of 15 pts were transplanted under the 3 protocols, with 5 in each group. The mean age for SFIS was 6.2 (range of 2-10), 15.8 for ATG+S (range of 13-18) and 11.6 for D+S (range of 1-19). 60% of the SFIS group were on antihypertensive therapy (HTN) by 1 month and 20% by 3 months versus 80% of the ATG+S group at 1 and 3 months and 60% of the D+S group at 1 and 3 months. None of the pts developed viral infections by 3 months, 4 SFIS pts had evidence of viral infection by 6 months vs 1 D+S pt and 0 ATG+S pts. By 12 months all SFIS had evidence of viral infection vs 2 D+S pts and 1 ATG+S pts. 2 SFIS pts developed clinical symptoms and 1 pt was diagnosed with PTLD at 6 months post-transplant. 1 SFIS developed a mild acute rejection at 1 month, while moderate acute rejection was found in 2 pts on other regimens by 12 months.
CONCLUSION: Short term outcomes are good and there is minimal rejection on SFIS. Pts who were transplanted under the SFIS regimen were on fewer antihypertensive medications by 6 months. Viral infections have been seen more frequently and earlier in patients under SFIS, however, these pts were younger than the other 2 cohorts. Because of these results we have extended valganciclovir therapy x 6 months post-transplant.

Abstract# 276

PEDIATRIC LIVER TRANSPLANTATION AND FOOD ALLERGY: CYCLOSPORINE COMPARED TO FK506 IMMUNOSUPPRESSION. Hugo Chapdeleine, Marie-Jeanne Lebel, Fernando Alvarez, Anne Des Roches, Louis Paradis. *CHU Sainte-Justine, Montreal, QB, Canada.*
PURPOSE: New-onset food allergy is an uncommon but serious complication of organ transplantation. Its pathogenesis is poorly understood and probably multifactorial. This study was undertaken to compare the incidence of food allergy in cyclosporine (CsA) and tacrolimus (FK 506) -treated children post-orthotopic liver transplantation.
METHOD: We reviewed the medical charts of all patients who underwent liver transplantation at our institution. Data collected included age at transplant, immunosuppression protocol, presence of food allergy or atopy pre and post-transplantation, onset and type of symptoms, allergens, maximum eosinophil count and total IgE.
RESULTS: Between February 1985 and May 2010, 218 liver transplantations were performed on 188 pediatric recipients. Preliminary results were obtained by reviewing the medical records of 121 patients. Seventy-six patients received CsA as primary immunosuppression and 44 patients received FK 506. Both groups were comparable for the indication and age at transplant. Three patient receiving CsA developed food allergy (3.9 %), compared with 7 patients receiving FK 506 (16.3 %) ($\chi 2 = 5.17$; $p < 0.05$), the latter exceeding the incidence of food allergy usually reported in the general population. No statistical difference was observed between the two groups for total serum IgE levels and eosinophilia.
CONCLUSION: The preliminary results indicate a statistical significance regarding an excess of food allergy in FK 506-treated patients after orthotopic liver transplantation compared to CsA. Also, all patients treated with KF-506 that developed food allergy had their liver transplant while they were infants.

Abstract# 277

THE USE OF EVEROLIMUS IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS: FIRST EXPERIENCE IN A SINGLE CENTER. Rainer Ganschow,[2] Dirk Nielsen,[1] Andrea Briem-Richter,[2] Marijke Sornsakrin,[1] Lutz Fischer.[3] *[1]Department of Pediatrics, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [2]Pediatric Hepatology and Liver Transplantation, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; [3]Department of Hepatobiliary Surgery, University Medical Center Hamburg-Eppendorf, Hamburg, Germany.*
PURPOSE: The role of m-TOR inhibitors, such as everolimus (EVL), has not been established for pediatric liver transplant recipients up to now, although data from adult solid organ graft transplantation are very promising. Major complications post pediatric liver transplantation in the long-term course include chronic graft rejection and CNI associated nephrotoxicity.The purpose of our current study was to report first results using EVL as a rescue therapy in pediatric liver transplant recipients.
METHOD: We used EVL based immunosuppression prospectively in children for the following indications: Chronic graft dysfunction n=12, suspected CNI toxicity n=3, Hepatoblastoma post Ltx n=2, and recurrence of primary sclerosing cholangitis post Ltx n=1.
RESULTS: Four patients with chronic graft dysfunction developed completely normal liver function tests using EVL, six patients showed partial improvement, and two patients did not respond at all. One patient with CNI induced nephropathy showed a slightly improved GFR. Both patients with hepatoblastoma did not develop any metastasis post Ltx.
CONCLUSION: First experience with EVL in pediatric liver transplant recipients show promising results in patients with chronic graft failure when standard immunosuppression has failed. The future role of EVL in immunosuppressive protocols for children post Ltx has to be proved by controlled clinical trials.

Abstract# 278

THE COMPARISON OF LIPID PROFILE AND OXIDATIVE STRESS MARKERS BETWEEN SIROLIMUS AND TACROLIMUS IN PAEDIATRIC RECIPIENTS AFTER LIVER TRANSPLANTATION. I. Jankowska,[1] J. Pawlowska,[1] M. Teisseyre,[1] P. Czubkowski,[1] J. Teisseyre,[1] A. Wierzbicka.[1] *[1]Department of Gastroenterology, Hepatology, CMHI, Warsaw, Poland; [4]Department of Surgery and Organ Transplantation, CMHI, Warsaw, Poland; [5]Department of Biochemistry and Experimental Medicine, CMHI, Warsaw, Poland.*
PURPOSE: Sirolimus (SRL) is an immunosuppressive drug increasingly used in children after liver transplantation. Lipid disturbances are the most frequent side effect of the drug. We compared the effect of oral administration of SRL and tacrolimus (TAC) on the lipid profile and oxidative stress markers in liver-transplanted children.
METHOD: In 17 children with stable liver function who received SRL on average for 4,1 years (SD±2,9) and in 16 children who received TAC for 6,3 years (SD±2,9) the concentrations of lipids and oxidative stress markers were estimated: cholesterol (Ch),

triglycerides (TG), lecithin-cholesterol acyltransferase (LCAT), apolipoprotein A-I (Apo AI), apolipoprotein B (ApoB), apolipoprotein E (ApoE), lipoprotein (a) [Lp(a)], low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), high-density lipoprotein (HDL), total cholesterol to HDL ratio (TC/HDL), reducted glutathione (GSH), glutathione peroxidase activity (GPX), oxidized low-density lipoprotein (oxyLDL) and asymmetric-dimethylarginine (ADMA).
RESULTS: There were statistical differences between patients from SRL and TAC groups in cholesterol levels (175,7 mg/dl vs. 144, 5 mg/dl (p<0,05), TG (92,2 mg/dl vs. 144, 5 mg/dl, p<0,02), ApoAI (1,3g/l vs. 1,5g/l, p<0,01), VLDL (16,9mg/dl vs. 11,7 mg/dl, p<0,01) and TC/HDL ratio (3,8 vs. 3,0, p<0,01). LCAT, ApoB, ApoE, Lp(a), LDL, HDL.GSH, GPX, oxyLDL and ADMA values were similar between the groups and didn't differ statistically.
CONCLUSION: There is a stronger influence of sirolimus on lipid profile in comparison with tacrolimus. Oxidative stress parameters are similar in both groups.

Abstract# 279

USE OF SIROLIMUS IN PAEDIATRIC RENAL TRANSPLANT RECIPIENTS. Mignon McCulloch, Judy Taylor, Grainne Walsh, Geoff Koffman. *Evelina Children's Hospital, London, United Kingdom.*
PURPOSE: Sirolimus (SRL) is an alternative immunosuppressant to calcineurin inhibitors with benefits due to reduced nephrotoxicity. Paediatric renal transplant experience is limited in UK centres.
METHOD: Retrospective review of paediatric renal transplant patients on SRL-based therapy at a single centre from 2002 –2009.
RESULTS: 21 Paediatric renal transplant recipients. Gender: M: F 14:7.
Age at SRL commencement 3.5-16.2 years (mean 8.9 years, median 7.8 years)
Deceased donor: Live related donor: 13:8. De novo use of SRL: 5%(1/21) only.
Reasons for switch: rejection (both cellular and vascular), calcineurin toxicity including seizures, chronic allograft nephropathy, glucose intolerance and gingival hypertrophy.
Patients loaded with Sirolimus for 3 days at 3mg/m^2 bd and then 3mg/ m^2 daily with dose adjustment according to levels. In patients < 7yrs, a twice-daily dosing regime was continued.
Side effects included less bone marrow suppression than described in adults.
Lipid studies showed raised cholesterol requiring statins in 48%(10/21) patients.
Infections were a frequent complication especially when SRL levels > 8ug/l – bacterial specifically skin 29%(6/21), recurrent UTI's 19%(4/21), mouth ulcers 10%(2/21) and chest infections 19%(4/21). Viral infections also seen.
Renal complications significant, including haematuria 43%(9/21), proteinuria 38%(8/21) and thrombotic microangiopathy 5%(1/21).
Surgical complications - only 1 lymphocoele seen.
Period of time on SRL 0.2-6.5 years(mean 2.8 years) with levels of 3.6-14.2 ug/l (mean 8.9) before this drug was stopped as a result of renal problems in 10/21. The remaining group 52%(11/21) remain on SRL for a mean of 3.5 years with levels between 2.5-10ug/l (mean 4.8), stable renal function and non-active urine findings.
CONCLUSION: In the biggest series in paediatric renal transplants using SRL in UK, we found SRL useful in rejection provided the GFR was still well maintained and haematuria or proteinuria did not develop.
Infections are a significant problem and aiming for lower drug levels in range of 4-7ug/l is recommended. Sirolimus is useful provided there is careful monitoring of urine, adequate GFR and low dosing.

Abstract# 280

IMPROVED GIT TOLERANCE OF ENTERIC-COATED MYCOPHENOLATE SODIUM IN PAEDIATRIC RENAL TRANSPLANT PATIENTS: A RETROSPECTIVE REVIEW. Peter Nourse, Lynn Savage, Priya Gajjar. *Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa.*
PURPOSE: To assess change in GIT symptoms and stability of graft function after conversion from mycophenolate mofetil (MMF) to enteric-coated mycophenolate sodium (EC-MPS).
METHOD: A retrospective folder review of all renal transplant patients who have been converted to EC- MPS was undertaken.
RESULTS: 9 patients were converted to EC-MPS from MMF. Gender: 6 males, 3 females. Mean age 14.1 yrs (Range 8-19 yrs). Six patients had received MMF for an average of 2.65 years (range1-4.8yrs) and 3 patients had received MMF for less than 2 months. Symptoms prior to conversion: diarrhea and abdominal pain: all patients; vomiting: 6 patients; weight loss: 3 patients; dehydration: 2 patients. Post conversion to EC-MPS, 6 patients (60%) had no further GI symptoms in the following 12 months. 4 patients (40%) continued to complain of intermittent diarrhea, abdominal pain and nausea over the next 12 months. Two of this latter group had concomitant cytomegalovirus viraemia.Two patients developed leucopenia while on EC-MPS. Both were also receiving Valgancyclovir for cytomegalovirus infection. Graft function: 3 patients had stable graft function. 4 patients had rejection at time of conversion and of these 2 stabilized and two continued to have rise in creatinine over time. 2 patients with chronic allograft nephropathy continued to have a rise in creatinine over time.
CONCLUSION: MMF causes significant GIT side-effects in our paediatric population. Conversion to EC-MPS improves symptoms and well-being in most patients. Graft function is maintained to at least an equivalent level as compared to when patients were on MMF.

Abstract# 281

BEHAVIOURAL PROBLEMS AS INDICATION FOR SWITCHING CALCINEURIN-INHIBITORS (CNI) TO MYCOPHENOLATE MOFETIL (MMF) AFTER PEDIATRIC LIVER TRANSPLANTATION (LTx). Sebastian Schulz-Juergensen, Uta Schniewind, Martina Kohl, Martin Burdelski. *General Pediatrics, University Hospital Schleswig-Holstein, Campus Kiel, Kiel, Germany.*
PURPOSE: Excellent survival rates in pediatric LTX under CNI have been achieved. However, arterial hypertension and nephrotoxicity are relevant side effects. Neurological and behavioral problems induced by CNI therapy have been described. Apart from medical reasons for switching, the occurrence of behavioral problems prompted us to switch from CNI-based immunosuppression to MMF.
METHOD: All patients after pediatric LTX treated in our clinic that were switched to MMF monotherapy were reviewed. Indications for LTX, time after LTX, previous medication, reasons for switching therapy were depicted. Changes in blood pressure, renal function, blood count, liver function tests, hirsutism and gingival hyperplasia as well as changes in behaviour were evaluated.
RESULTS: Between 2008 and 2010, 8 patients (out of 127) were switched to MMF monotherapy. Median age was 107 months (range 78-208), median time after LTX 78 months (range 59-152). Medication prior to switching was CSA in all patients, with 2 receiving additional MMF and 1 additional Everolimus. Reasons for switching were behavioural problems in all patients, with 5 showing additional hypertension, 2 additional renal impairment and 3 gingival hyperplasia. By the time of analysis, switching was completed in 6 of the 8 patient with a median follow-up of 24 months (range 6-33). Behavioural problems had resumed in 4 patients and improved in the other 4, including those in transition. Arterial hypertension, renal impairment and gingival hyperplasia had improved in 4/5, 2/2 and 3/3, respectively. No adverse events or signs of rejection were observed.
CONCLUSION: Our first experiences with switching IS from CNI to MMF for behavioural problems indicate that this problem can be improved by MMF monotherapy. Concomittant side effects of CNI therapy also improved, without evidence for increased risk of rejection. A prospective psychological and psychomotoric evaluation before and after switching should be undertaken to validate these findings.

Abstract# 282

IN SITU HEPATOCELLULAR CARCINOMA IN LIVING RELATED LIVER TRANSPLANTATION. Ali I.M. Al Mehaidib,[1] Wajeeh A. Al Dekhail.[1] *[1]Pediatrics, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia; [2]Pediatrics, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia.*
PURPOSE: To review our experience with in situ hepatocellular carcinoma in living related liver transplantation in childen.
METHOD: This is a retrospective study reviewing the medical records of all children diagnosed with in situ hepatocellular carcinoma in living related liver transplantation. clinical data included age, sex, diagnosis, pre transplant work up, poist transplant outcome as well as radiological, biochemical and histological data.
RESULTS: A total of 3 children with in situ hepatocellular carcinoma (HCC) were identified.Tow girls and one boy.Age at transplantation were 2 years 2 months, 2 years 7 months and 3 years and 1 month respectively.One patient was diagnosed with Allagile syndrome on clinical ground and confirmed by gene testing.One patient was diagnosed with progressive familial intrahepatic cholestasis type II (PFIC II) on clinical ground and gene testing also. and the third patient has no clear diagnosis although he was thought to have PFIC II on clinical ground. However, gene testing was negative.One patient has vascular invasion on histology.All patients pre transplant abdominal ultrasound and ct scan showed no evidence of HCC as well as normal alpha fetoprotien levels.All patient were diagnosed with in situ HCC on ex-planted livers immediately after transplantation and received tacrolimus immunesuppresion. One patient(with vascular invasion) died 16 months after transplantation with disseminated HCC. The other 2 patient are 11 months and 7 months post transplant and having no evidence of recurrence on close monitering with ct scans and serial alpha fetoprotien levels
CONCLUSION: In situ hepatocellular carcinoma is a serious complication of chronic liver disease in adults.This report emphasize this fact in children which was thought to be extremely rare in infants and children.Every effort should be done to discover in situ HCC in order to avoid post transplant morbidity and mortality.

Abstract# 283

MENINGOCOCCAL POLYSACCHARIDE VACCINE FAILS TO PROTECT A RENAL TRANSPLANT RECIPIENT RECEIVING ECULIZUMAB FROM DEVELOPING MENINGOCOCCAL DISEASE. Antonia H. Bouts,[1] Geertrude H. Struijk,[2] Ger T. Rijkers,[3] Jean-Claude Davin,[1] Frederique J. Bemelman.[2] *[1]Pediatric Nephrology, Emma Children's Hospital/Acadamic Medical Center, Amsterdam, Netherlands; [2]Renal Transplant Unit, Academic Medical Center, Amsterdam, Netherlands; [3]Medical Microbiology and Immunology, St Antonius Hospital, Nieuwegein, Netherlands.*

PURPOSE: Guidelines for the use of eculizumab, an anti-C5 mAb, recommend vaccination against meningococcal disease, because *N. meningitidis* establishes severe infections in patients deficient in complement components. Here, we describe failure of a tetravalent meningococcal polysaccharide vaccine to protect against meningococcal disease in a 19-year old renal transplant recipient receiving eculizumab to prevent aHUS recurrence.

METHOD: Our patient received her third transplant in February 2008. Immunesuppression: basiliximab, prednisolone, mycophenolate mofetil and tacrolimus. To prevent aHUS recurrence she was initially treated with plasma exchange (PE). PE was substituted for eculizumab due to severe allergic reactions to plasma in January 2009. Two weeks before initiating eculizumab therapy, patient was vaccinated with polysaccharide vaccine Mencevax® (ACYW135). In June 2010 patient developed meningococcal sepsis (serotype W135) which was treated with iv penicillin G. She recovered completely.

RESULTS: Since our patient developed meningococcal sepsis with serotype W135, for which she was vaccinated 1.5 years prior to this disease episode, we analysed *N. meningitides*-specific immunoglobulin (Ig) G in plasma in several pre- en postvaccination samples. The results showed that our patient had only made a humoral response against *N. meningitides* serotype C, but not against serotypes A, Y and W135.

CONCLUSION: Our patient was not able to mount a humoral response after vaccination due to the use of immunosuppressive therapy, possibly in combination with PE, since several studies have shown that different immunosuppressive regimens vary in their effects on immune responses after vaccination. We therefore, strongly advice transplant physicians to monitor meningococcal vaccination efficacy after initiation of eculizumab therapy.

Abstract# 284

PROPOSED STRATEGY FOR RISK STRATIFICATION TO PREDICT SEVERE RESPIRATORY SYNCYTIAL VIRUS DISEASE IN IMMUNOCOMPROMISED PAEDIATRIC PATIENTS. Michelle E. Bridge, Upton Allen. *Department of Paediatrics, Division of Infectious Diseases, The Hospital for Sick Children, Toronto, ON, Canada.*

PURPOSE: Respiratory Syncytial Virus (RSV) infection is associated with increased morbidity and mortality in immunocompromised patients. Once established, RSV infection in these patients can be difficult to treat. As a result, current guidelines suggest that these patients may benefit from prophylaxis with palivizumab to prevent severe disease. However, from a cost-effectiveness perspective, additional data are needed to guide the optimal approach to RSV prevention in this population. The objective of this study is to develop a clinical instrument for risk stratifying immunocompromised patients in order to prioritize prophylactic strategies to those at highest risk for severe disease. In this report, we share the stages in the development of this instrument which is expected to be available 06/2011.

METHOD: An RSV risk scoring tool is proposed to identify and quantify risk factors for severe RSV disease in immunocompromised patients. First, RSV disease severity will be defined by an expert panel and literature review. Risk factors for severe disease will then be identified in the literature and by the expert panel. Probabilities of developing severe disease will be assigned to each risk factor for each immunocompromised patient population (bone marrow transplant, solid organ transplant, immunodeficiency). The overall score for a given patient will be the sum of the weighted probabilities for each risk factor.

RESULTS: The risk stratification tool will include several risk factors for different groups of immunocompromised patients. Each risk factor will be associated with a score for its presence or absence. Cut-offs for the overall score will be developed to classify patients into low-, moderate-, and high risk groups for severe RSV disease.

CONCLUSION: The RSV risk stratification tool for immunocompromised patients provides an overall score to stratify patients into low, moderate and high risk for severe RSV. This will provide guidance for prioritizing patients to receive prophylactic agents used in the prevention of severe RSV disease.

Abstract# 285

THE INCIDENCE OF TUBERCULOSIS IN PATIENTS REFERRED FOR LIVER TRANSPLANT ASSESSMENT AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL. Ronalda J. De Lacy, Elizabeth Goddard, Catherine W.N. Spearman, Alistair J.W. Millar. *Paediatric Gastroenterology, Red Cross War Memorial Children's Hospital, Cape Town, Western Cape, South Africa.*

PURPOSE: To determine the incidence of tuberculosis (TB) in patients referred for liver transplant assessment over a 5 year period.

METHOD: A retrospective review of referral forms and folders of patients referred to the Liver Transplant Clinic at Red Cross War Memorial Children's Hospital (RXH) from June 2004 to June 2009.

RESULTS: During this period 156 patients were referred for liver transplant assessment, of which 95 were seen at RXH. There were 60 female and 35 male patients. All the patients are screened for tuberculosis and 20 patients were diagnosed with TB, 16 female and 4 male. Twelve patients were started on first line TB treatment – Rimcure and 8 patients were started on second line TB treatment.

Outcome- 6 patients died from chronic liver disease, not secondary to TB. Five had liver transplants, 2 patients were not accepted onto the list and 3 were deferred. The rest are on the inactive transplant list.

CONCLUSION: Although a small group of patients, the incidence of tuberculosis was 21% and the majority of patients tolerated first line TB treatment. None of the patients died secondary to TB but the fact that they were started on TB treatment does take them off the active transplant list for 6 months in patients who need a transplant urgently. These patients need frequent screening for TB as they may not present with the common symptoms of TB.

Abstract# 286

REGULAR VIRAL SURVEILLANCE CAN PREVENT FULL BLOWN VIRAL DISEASES IN PEDIATRIC KIDNEY TRANSPLANT PATIENTS. Vikas Dharnidharka, Eihab Al Khasawneh, Carlos Araya. *Pediatrics, University of Florida, Gainesville, FL, USA.*

PURPOSE: Opportunistic viruses such as cytomegalovirus (CMV), Epstein-Barr virus (EBV) and BK virus (BKV) represent the major viral infections post kidney transplant. Children are especially susceptible to disease effects since they are at higher risk for primary infection (seronegative recipients receiving virus transported in the allograft from a seropositive donor). Detection of early viral replication potentially allows for early intervention but benefit is unclear.

METHOD: In our clinical practice we initiated monthly viral surveillance for CMV, EBV and BKV in the first twelve month post transplant in July 2008. We retrospectively analyzed data from 21 consecutive children with kidney transplants at our center in these last 2 years. We compared the outcome of the patients who had regular monthly viral surveillance against patients who missed three or more surveillances in the first twelve month post transplant. Data were analyzed with GraphPad Prism 5.0.

RESULTS: Out of the 21 patients, five patients had missed three or more surveillances. Of these 5, two developed full blown viral disease, one developing biopsy-proven BK nephropathy and the other developing EBV-positive post-transplant lymphoproliferative disorder (PTLD). Of the remaining 16 patients who had regular monthly surveillance, 8 experienced viral replication. Interventions consisted of reduction of immunsouppression first, followed by specific anti-viral therapy if no response. With these interventions, none of these subjects with early viral replication developed full blown disease. By Fisher exact test, the odds ratio of having full blown viral disease if viral surveillances were missed was 23.57 (p value = 0.047).

CONCLUSION: Our data lends support to the concept that regular monthly viral surveillance of post transplant patient allows for early detection of viral replication and early intervention to prevent full blown viral disease. Patient who missed regular viral surveillance were more likely to suffer from full blown disease.

Abstract# 287

CO-INFECTION WITH CRYPTOSPORIDIUM SPP AND GIARDIA LAMBLIA IN A PEDIATRIC KIDNEY TRANSPLANT RECIPIENT. Ximena Ibarra, Monica Cuevas, Daniela Carrillo, Regina Perez, Pedro Zambrano, Andrea Vogel. *Pediatric Nephrology, Pontificia Universidad Catolica de Chile, Santiago, Chile.*

PURPOSE: To report a case of co-infection with Cryptosporidium spp and Giardia lamblia in a kidney transplant recipient.

METHOD: Chart review of a pediatric transplant recipient.

RESULTS: A 12 y/o girl, with history of preemptive kidney transplant 4 years earlier presented to our out-patient unit complaining of abdominal pain, drowsiness and diarrhea (12 stools/day). She did not have history of travel, ingestion of raw foods, recent antibiotics or contact with persons with diarrhea. Because of dehydration she was admitted in the pediatric unit of our hospital.

Her clinical history included a chronic humoral rejection diagnosed 4 months earlier. Ten days before admission she received a dose of immunoglobulin. Her immunosupresive regimen comprised tacrolimus, mycophenolate mofetil and steroids. Baseline serum creatinine ranged from 1,2 to 1,3 mg/dl.

Symptoms increases developing hyponatremic dehydration and increase of serum creatinine to 2,4 mg/dl. Stool samples were gathered for studying Salmonella spp, Shigella spp, Yersinia spp and Vibrio cholerae by stool culture;Campylobacter jejuni by Hucker stain; Rotavirus; Clostridium difficile toxin; Cytomegalovirus by PCR and Entamoeba hystolytica, Giardia lamblia, Cyclospora and Cryptosporidium by microscopic inspection and Ziehl Neelsen stain. The specimens were positive for Cryptosporidium spp and Giardia lamblia.
She was treated with azithromicyn and metronidazole because there is no nitazoxanide available in Chile. The symptoms resolved within a week and her serum creatinine decreased to 1,3 mg/dl. After recovery a new stool test identified persistence of Cryptosporidium spp and treatment with nitazoxanide for 14 days was started.
CONCLUSION: The differential diagnosis of acute diarrhea in an immunocompromised patient is difficult to make. It is important to remember that cryptospiridiosis is an enteric parasitic infection that is associated with significant morbi-mortality, especially among these population. To our knowledge this is the first report of co-infection with parasites in pediatric transplant patients.

Abstract# 288

MUCORMYCOSIS: A RARE CAUSE OF GASTROINTESTINAL NECROSIS AFTER MULTIVISCERAL TRANSPLANTATION.

Sabine Irtan, Fabrice Lesage, Virginie Verkarre, Marie-Elizabeth Bougnoux, Fanny Lanternier, Rocio Ortego, Cécile Talbotec, Florence Lacaille, Christophe Chardot. *Hôpital Necker – Enfants Malades, Université René Descartes, Paris, France.*

PURPOSE: Mucormycosis (Zygomycosis) is an emerging fungal infection in immunocompromised patients. The ubiquitous spores are inhaled or ingested, germinate and fungi develop very quickly with vascular invasion and thrombosis, leading to tissue necrosis. Prognosis is often fatal.
METHOD: Case report: 4 year-old girl presenting with Chronic Intestinal Pseudo Obstruction, dependency on total parenteral nutrition, recurrent central venous line infections, recurrent jaundice and moderate liver fibrosis, megacystis. She underwent a modified multivisceral transplantation, including half stomach, duodeno-pancreas, small bowel and right colon. On post-operative day 5, digestive content appeared in the wall dressing. The child was apyrexial with normal inflammatory markers. Surgical exploration revealed a small necrotic area on the native stomach, which was externally drained. On following day, a massive gastric bleeding occurred, with haemodynamic instability and haemoglobin falling to 4g/dl. Emergency laparotomy found two haemorragic ulcers on the transplanted stomach. Both were resected, as well as the perforated area in the native stomach, and a new gastro-gastric anastomosis was performed.
RESULTS: Histological analysis and mycological culture showed mucormycosis (Lichtheimia corymbifera). High dose liposomal Amphotericin B IV was immediately started, associated with intragastric amphotericin. No extension was found on total body CT and nasofibroscopy. The child recovered after this episode and work-up after 6 weeks therapy showed no evidence of residual disease. She is alive and well, off parenteral nutrition, 1 year after transplantation.
CONCLUSION: Mucormycosis is a life threatening invasive fungal infection in the immunocompromised patient. Due to vascular thrombosis and tissue necrosis, it may lead to surgical complications, especially in the gastro-intestinal tract. Urgent therapy includes resection (if possible) of the invaded areas and high dose anti-fungal agents.

Abstract# 289

THE NECESSITY OF SCREENING FOR CMV AND EBV VIRAEMIA IN SMALL BOWEL TRANSPLANT RECIPIENTS.

Lauren Johansen, Girish Gupte, Patrick McKiernan, Deirdre Kelly, Khalid Sharif, Sue Beath, Indra van Mourik, Darius Mirza, Carla Lloyd, Jane Hartley. *Liver Unit, Birmingham Children's Hospital NHS Foundation Trust, Birmingham, United Kingdom.*

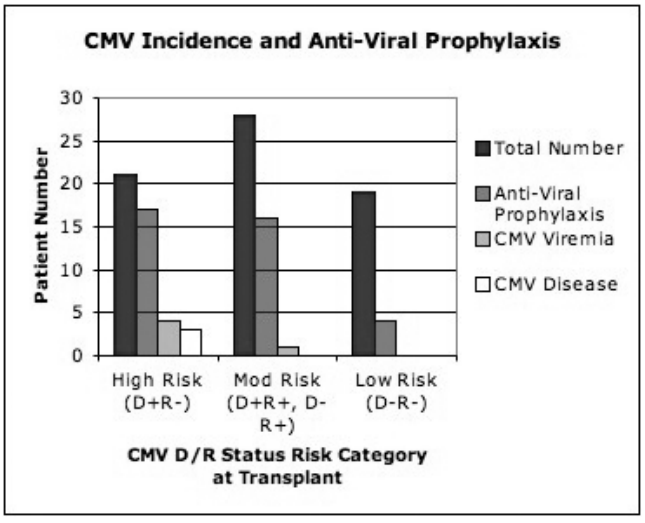
PURPOSE: The high intensity of immunosuppression required for intestinal transplant (ITx) puts children at risk of infection. Cytomegalovirus (CMV) can lead to graft loss through CMV enteritis. Epstein Barr Virus (EBV) can lead to post transplant lymphoproliferative disease (PTLD). Serial monitoring for viraemia may facilitate optimal medical management of infections.
We aim to identify the usefulness of monitoring for CMV and EBV viraemia post ITx.
METHOD: Retrospective analysis was performed in children undergoing ITx from January 2005-February 2010. EBV and CMV serology and PCR levels were obtained from microbiology records.
RESULTS: 42 children were identified: 10 had an isolated ITx, 26 had a liver and ITx and 6 had a modified multivisceral transplant. Median age at time of transplant was 1.91 years (range 0.64-16.18).
Donor status of CMV was recorded in all cases. 10 children developed CMV viraemia; 1 subsequently developed CMV enteritis and 2 had concurrent PTLD. Donor recipient mismatch (D-R-M) was present in 4/32 of the CMV negative group, 5/10 of the CMV viraemia group and in the 1 child who subsequently developed CMV disease. 63% of children in the CMV negative group had an episode of rejection vs. 100% in the CMV viraemia group, p =0.02. Median time between rejection and CMV viraemia was 30 days.
Donor status of EBV was recorded in 21/42 (50%). 21 children developed EBV viraemia, of which 5 developed EBV driven PTLD. 1 child had EBV negative PTLD. 4 (19%) children were asymptomatic of their EBV viraemia. Median age in years at transplant was 1.76 for the PTLD group and 3.39 for the non-PTLD group, p=0.0004. 1 child died as a consequence of brain PTLD.
CONCLUSION: Regular EBV and CMV PCR screening should be performed on ITx recipients to enable early detection and management of viraemia. D-R-M increases the incidence of viraemia; however, during periods of rejection high intensity immunosuppression puts children at risk of viral reactivation, irrespective of D-R-M.

Abstract# 290

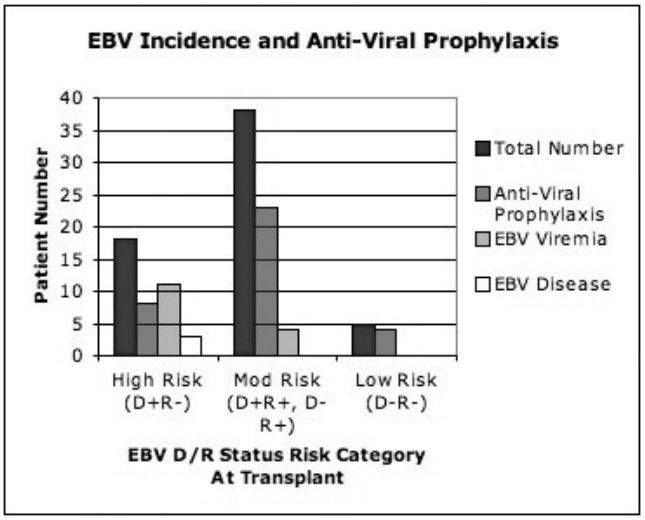
CMV ANTIVIRAL PROPHYLAXIS IN RENAL TRANSPLANTATION.

Chanel Prestidge, Kathy Lee-Son, Mina Matsuda-Abedini. *Division Nephrology, BC Children's Hospital, Vancouver, Canada.*

PURPOSE: Humar et al showed that extending antiviral prophylaxis (Px) to 200d in high risk (HR) adult transplant patients provides a relative risk reduction (RRR) of 56% for CMV disease (CMVD) & number needed to treat of 5. We aim to establish CMV viremia & disease incidence out to 12mths post pediatric renal transplant & to examine if extended Px may benefit our patients.
METHOD: Retrospective chart review of patients undergoing renal transplant Apr 02-Sept 10. Data collected for 12mths post-transplant. Px defined as valganciclovir or ganciclovir for ≥100d. CMV & EBV viremia defined as positive antigenemia or PCR. CMVD defined as viremia & new onset fever/malaise/leucopenia or localized infection on biopsy. EBV disease defined as viremia & new onset fever/malaise/lymphadenopathy or PTLD.
RESULTS: N=67; male 55%; mean age at transplant 12.2±1.2yr; living donor 55%; mean cold ischemia time 6.2±1hr; induction immunosuppression 100%.
Figure 1. CMV incidence & Px by risk status (N=67). Incidence of CMV viremia 7% & CMVD 4%.



In high risk patients with Px, 12% developed CMVD & 17% CMV viremia (vs 25% without Px developing both CMVD & viremia). For CMVD (N=3), 2 received Px & had disease onset ≤3mths of cessation.
Figure 2: EBV incidence & Px by risk status (N=61). Incidence of EBV viremia 25% & disease 5%.



60% with EBV viremia had Px, 44% of these developed during Px therapy. No patients with EBV disease had Px.
CONCLUSION: Assuming the same RRR as per Humar, we conclude that extending Px in HR patients to 200d would reduce our CMVD incidence from 12 to 6.6%.

Abstract# 291

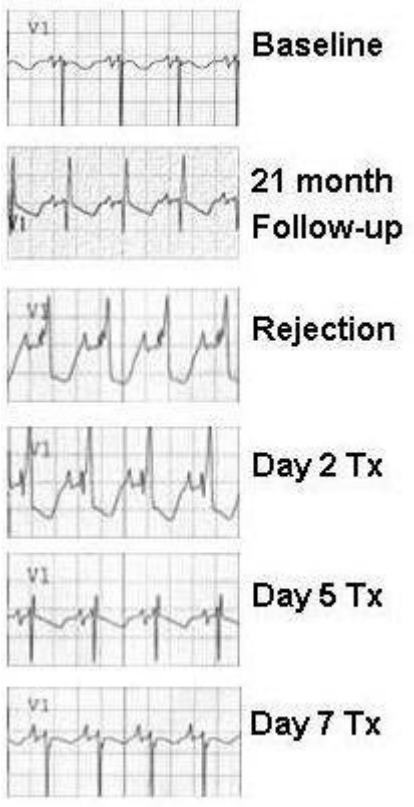
SEVERE SEPTIC SHOCK IN PATIENT WITH INTESTINAL PTLD SUCCESSFULLY TREATED WITH CONTINOUS HAEMODIAFILTRATION (CHDF). Brankica Spasojevic-Dimitrijeva,[1] Mirjana Kostic,[1] Amira Peco-Antic,[1] Divna Kruscic,[1] Mirjana Cvetkovic,[1] Zoran Krstic,[2] Dusan Paripovic,[1] Gordana Milosevski-Lomic.[1]
[1]Nephrology, University Children Hospital, Belgrade, Serbia; [2]Urology, University Children Hospital, Belgrade, Serbia.
PURPOSE: We report the case of a fifteen year old boy with intestinal PTLD developed 11 months after renal transplantation. Multi organ system failure (MOSF) which developed during therapy with rituximab required CHDF during one week.
METHOD: We reviewed all medical records from this patient during conservative and intensive care treatment.
RESULTS: This boy was Epstein-Barr virus (EBV) sero-negative and received an EBV positive organ. 11 months posttransplant, the patient presented with fever, leucopenia, anemia and worsening of graft function. No source for his fever was identified. Two months later, he presented with significant gastrointestinal symptomatology: epigastric pain, dysphagia and melena. Esophagogastroduodenoscopy reveald gastroesophageal reflux of grade II. Since the clinical picture of acute abdomen developed, the patient was taken for exploratory laparotomy. At operation, multiple perforations of distal ileum were seen. Pathological examinations of those lesions demonstrated a diffuse large B-cell lymphoma positive for CD20, as well as CD 79a. Following PTLD diagnosis, the patient's immunosuppression was withdrawn and he was treated with six doses of rituximab (375 mg/m^2). Six weeks following operation, he developed pseudomonas aeruginosa septic shock with multi organ system failure (MOSF). He treated with broad spectrum antibiotics, dopamine and other supportive therapy. He spent seven days on mechanic ventilation and due to anuric renal failure spent seven days on CHDF. Also, he underwent successful reanimation due to cardiac arrest. Total parenteral nutrition was applied for two months. Sirolimus was introduced 1,5 year following diagnosis.
At the time of his most recent follow-up, he is now 4 year post-transplant and 3 year after PTLD diagnosis. He is in complete remission with stabile graft function.
CONCLUSION: CHDF may be additional salvage therapy in patient with MOSF caused by severe form of intestinal PTLD.

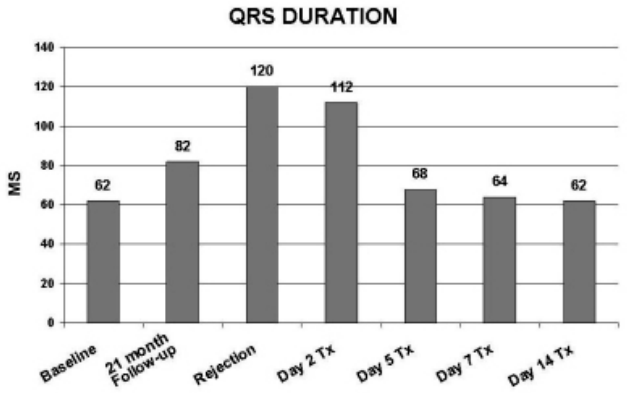
Abstract# 292

COMBINED HEART- AND KIDNEY TRANSPLANTATION (HRTx) IN A 6 YEAR OLD GIRL. Marcus R. Benz,[1] Rainer Kozlik-Feldmann,[1] Manfred Stangl,[3] Christoph Schmitz,[4] Henry Fehrenbach,[5] Maike Buettner,[6] Robert Dalla-Pozza,[1] Lutz T. Weber.[1] *[1]Pediatrics, University Children's Hospital, Munich, Germany; [2]Transplant Surgery, University Hospital, Munich, Germany; [3]Cardiac Surgery, University Hospital, Munich, Germany; [4]Children's Hospital, Memmingen, Germany; [5]Renal Pathology, University Hospital, Erlangen, Germany.*
PURPOSE: Successful HRTx of the same donor had first been reported in 1978. Since then it has become a treatment option in patients with concomitant heart and kidney failure. HRTx is, however, rarely performed in pediatric patients.
METHOD: The currently 6.3 years old girl has been treated with peritoneal dialysis because of prerenal renal failure since the age of 4 months and had received an ABO-incompatible heart transplant at the age of 7 months due to hypoplastic left heart syndrome. On account of graft vasculopathy and obstructive left ventricular outlet the girl had prevailingly been accepted for HRTx. After 12 months waiting time she received an ABO-compatible heart at first that was matched for body weight and height and had one match on HLA-DR 13. Cold ischemia time was 4.5 hours. At second a kidney of the same donor was transplanted after a cold ischemia time of 12 hours. Immunosuppressive therapy consisted of steroids, tacrolimus (target trough levels 10-15 ng/mL) and azathioprine.
RESULTS: The immediate postoperative fluid supply had to be further limited owing to severe insufficiency of the right heart. Nevertheless primary function of the kidney transplant was observed. 35 days after HRTx a biopsy proven severe steroid resistant acute rejection of the kidney transplant occurred (Banff type IIb). After therapy with anti-thymocyte globulin that was well tolerated despite pre-existing anti-rabbit antibodies kidney function recovered completely.
CONCLUSION: HRTx is a treatment option for pediatric patients with concomitant heart and kidney failure. The limited fluid supply for cardiac protection postoperatively is a potential risk factor for primary function of the kidney transplant. In HRTx a high number of HLA mismatches can be expected that potentially result in a higher risk for acute rejection of the kidney transplant.

Abstract# 293

PROGRESSIVE RIGHT BUNDLE BRANCH BLOCK IN A CHILD WITH ACUTE CARDIAC ALLOGRAFT REJECTION. Amie Gray, Michael P. Carboni. *Pediatric Cardiology, Duke University Medical Center, Durham, NC, USA.*
PURPOSE: We present the description of a child with progressive right bundle branch block (RBBB) associated with acute cellular and antibody-mediated rejection 21 months after orthotopic heart transplant.
METHOD: A 34-month-old underwent heart transplant at 11 months of age for severe systemic RV dysfunction. Pre- and post-transplant HLA antibody screens were negative and cardiac biopsies without rejection. Post-transplant EKGs demonstrated QRS duration 62-65 ms with no T-wave abnormality. Echocardiograms demonstrated normal ventricular function and trace tricuspid valve regurgitation. Routine EKG 21 months post-transplant demonstrated incomplete RBBB with QRS duration 82 ms and normal ventricular function by echocardiogram. Ascites developed 3 weeks later, and echocardiogram demonstrated severe ventricular dysfunction with dilated RV and severe tricuspid valve regurgitation. EKG demonstrated RBBB with QRS duration 120 ms and diffuse T-wave abnormality. Ventricular end-diastolic pressures were 16 mmHg at catheterization. Biopsy demonstrated diffuse cellular rejection (Grade 3R) with diffuse C4D staining. RBBB improved with rejection therapy and QRS became normal after 5 days. Ventricular function was normal after 2 days. Follow-up biopsy at 10 days demonstrated Grade 2R rejection with reduced C4D staining. Hemodynamics were normal. Right ventricular dilation and tricuspid regurgitation resolved.
RESULTS: Figures





CONCLUSION: Acute cardiac allograft rejection should be considered with the development of new bundle branch block.

Abstract# 294

USE OF SILDENAFIL IN TWO PEDIATRIC HEART TRANSPLANT CANDIDATES WITH CARDIOMYOPATHY AND ELEVATED PULMONARY VASCULAR RESISTANCE.

Marie Osmerova, Petr Malik, Petr Nemec. *Centre of Cardiovascular and Transplant Surgery, Brno, Czech Republic.*

PURPOSE: Pulmonary hypertension complicating cardiomyopathy has been shown to be a significant risk factor for graft failure after heart transplantation. We describe successful use of oral sildenafil (Revatio) - phosphodiesterase-5 inhibitor to decrease pulmonary vascular resistance (PVR) in two children with cardiomyopathy requiring heart transplantation.

METHOD: We present the data from right heart catheterization of two children, one with restrictive cardiomyopathy, another with dilated cardiomyopathy aged 11 and 4 years. Pulmonary vascular reactivity was assessed because of significantly elevated indexed pulmonary vascular resistance (PVRI) 11,8 and 11,1 W.U.m2 was found. The vasodilator tests involved prostanoids (alprostadil to 150 ng/kg/min) and inhaled nitric oxide in doses up to 40 ppm. In both children elevated PVRI persisted (8,7 and 10 W.U.m2). We administred oral sildenafil in increasing doses of 1 to 2,5 mg/kg /day. Complete hemodynamic measurements obtained after 3-months of sildenafil use in both children showed a reduction in pulmonary vascular resistance after sildenafil use (PVRI 5,8 and 5,6 W.U.m2). Sildenafil treatment was discontinued 1 - 3 months post heart transplantation after gradual dose reduction.

RESULTS: Both children underwent successful orthotopic heart transplantation. We did not observe any side effects or adverse interactions between vasodilatation treatment and the immunosuppressive medications.

CONCLUSION: Our experience in both pediatric patiens have shown that treatment with sildenafil in conjunction with other treatment modalities can lower PVR and allow safe transplantation in children with PVRI above 6 W.U.m2.

Abstract# 295

ORGANIZATIONAL STRUCTURE AND PROCESSES IN PEDIATRIC HEART TRANSPLANTATION: A SURVEY OF PRACTICES.

Gail L. Stendahl,[1] Kathleen Bobay,[2] Stuart Berger,[3] Steven Zangwill.[3] *[1]Herma Heart Center, Children's Hospital of Wiscsonsin, Milwaukee, WI, USA; [2]College of Nursing, Marquette Universtiy, Milwaukee, WI, USA; [3]Pediatrics, Medical College of Wisconsin, Milwaukee, WI, USA.*

PURPOSE: Despite emerging literature on pediatric heart transplantation (PHTx), there continues to be wide variation in current practices. The degree of variability amongst programs has not been previously characterized. The purpose of this study was to systematically delineate current organizational structure and practices of PHTx programs.

METHOD: A 65-item web-based electronic survey was designed by the investigators which focused on organizational structure, pre-tx processes, post-tx infection, rejection, medications, and social aspects. In Jan 2010, tx coordinators from 50 PHTx programs were invited to participate (one coordinator/center). The UNOS database was queried to identify and target institutions according to volume ranking.

RESULTS: 35 coordinators from 50 PHTx programs replied, yielding a 70% response. Centers were grouped by volume (mean Tx/yr over last 3 years) into four groups. Participation skewed toward higher volume centers. Some institutional practices were dominated by clear volume trends. 95% percent of larger volume centers routinely tx patients with known antibody sensitization and report a broader range and acuity of recipients. 69% of centers routinely require prospective crossmatches. There was dramatic variation in the use of steroids across centers with the 4 busiest programs in the country all having entirely different practices. 65% of centers routinely transition adolescents to an adult program. 94% report problems with nonadherence. Viral and fungal prophylaxis protocols were also highly inconsistent.

CONCLUSION: This survey provided comprehensive insight into current practices at PHTx programs. The results systemically delineated remarkably variable strategies for routine aspects of care. Analysis of divergence along with uniformity across protocols is a valuable exercise and may serve as a stepping-stone toward ongoing cooperation, knowledge sharing, and clarity in identifying state of the art practices.

Abstract# 296

SUCCESSFUL BRIDGE TO LUNG TRANSPLANTATION USING BILEVEL VENTILATION IN CHILDREN WITH END STAGE CYSTIC FIBROSIS LUNG DISEASE.

Jackson Wong,[1] Manisha Witmans,[1] Kenneth Stewart,[2] John Mullen,[2] Dale Lien,[3] Alf Conradi.[1] *[1]Department of Pediatrics, University of Alberta, Edmonton, AB, Canada; [2]Department of Surgery, University of Alberta, Edmonton, AB, Canada; [3]Department of Medicine, University of Alberta, Edmonton, AB, Canada.*

PURPOSE: The use of non-invasive ventilation to bridge patients to lung transplantation (LTx) has not been reported in children (< 18 years). This study reports 3 children successfully bridged to LTx on bilevel ventilation (BiPAP).

METHOD: This is a retrospective study of 3 children with end stage CF lung disease safely initiated onto BiPAP in the PICU during an acute exacerbation.

Case 1 needed 50% oxygen (O_2) on nocturnal BiPAP and 7-8 L/min (lpm) by non rebreathing mask (NRM) O_2 during the day. By 38 days pre LTx BiPAP became continuous escalating to 80% O_2 and BiPAP pressures 12/4 (IPAP/EPAP) for 10 days pre LTx. Case 2 had a persistent bilateral lower lobe collapse along with fever (39C) requiring 15 lpm NRM O_2 to maintain oxygen saturation (SpO_2) above 90%. He was placed on 8 cm H_2O CPAP but SpO_2 rapidly dropped to 80% when CPAP was off. Nocturnal BiPAP and daytime nasal O_2 at 3 lpm allowed him to maintain SpO_2 at 93%. BiPAP pressure was increased to 12/5 following a polysomnography titration study (PSG). Case 3 had a cleft lip and palate repair during infancy. He had a massive secretion problem pre LTx. Nocturnal BiPAP was initiated after his O_2 requirements increased to 8 lpm and he lost 2 kg in 8 days. A PSG showed transcutaneous CO_2 68 (mean) and 77 (max) mmHg while on BiPAP. BiPAP slowly increased to 16/5 pre LTx.

RESULTS: Table1.

Demographic and Pre / Post BiPAP Data

	Case 1	Case 2	Case 3
Age (years)	15	9	7
BiPAP to LTx (days)	79	332	189
Listing to LTx (days)	22	272	156
Hospital days 12 months pre LTx	146	217	245
IPAP/EPAP pressures (cm H2O)	8/4	10/4	13/5
pCO2 (mmHg)†*	82/53	53/39	47/55
Lactate†*	0.6/1.2♣	0.8/2.3♣	4.7/1.7
O2 requirement (lpm)*	6/6	13/5	4.5/3
Heart rate/minute*	94ζ/90ζ	120/60	108ζ/99ζ
FEV1%*	27/16	27/39	29/24
FVC%*	49/30	34/58	37/33

†Capillary blood gases taken within 1 week on BiPAP. * Pre/Post LTx data. ζOvernight mean. ♣Off BiPAP

CONCLUSION: BiPAP can successfully bridge sick CF children to LTx.

Abstract# 297

CASE STUDY: AN UNUSUAL CAUSE OF GRAFT DYSFUNCTION AFTER RENAL TRANSPLANTATION IN A CHILD.

Badria M. Al Ghaithi, Valerie Langlois, Diane Hebert, Elizabeth Harvey, Christoph Licht, Lisa A. Robinson. *Department of Nephrology, The Hospital for Sick Children, Toronto, ON, Canada.*

PURPOSE: To describe an unusal presentation of primary hyperoxaluria type 1 (PH-1) in a child following renal transplantation.

METHOD: Retrospective review of the medical record.

RESULTS: A 15 year old male presented with one month history of vomiting,weakness and was found to have renal failure.The remainder of the systemic inquiry was negative. Family history was unremarkable and parents were non-consanguineous. Physical examination revealed pallor and was otherwise unremarkable including ophthalmologic evaluation. Laboratory investigations showed serum creatinine 1048 umol/l, urea 30.5 mmol/l, potassium 4.7 mmol/l, hemoglobin 94 g/l, and normal complements. Urinalysis was negative for blood, protein, and crystals. Ultrasound showed bilateral echogenic relatively small kidneys consistent with end-stage renal disease (ESRD). Renal biopsy showed severe tubulointerstitial fibrosis. Hemodialysis was initiated and then peritoneal dialysis. Six months later, he underwent living related donor kidney transplantation. Graft function was initially normal but deteriorated on day 5. Extensive investigations were performed to determine the etiology of the allograft dysfunction including three allograft biopsies over 6 weeks which all showed acute tubular necrosis but no rejection. The third biopsy also showed tubular crystal deposition. Subsequent measurements of urine and plasma oxalate were markedly elevated with urine oxalate of 3091 umol/day (normal range 161-483 umol/d) and plasma oxalate of 24 umol/l. Genetic testing demonstrated AGXT mutations involving G170R and G161C, confirming the diagnosis of PH-1. Therapy was commenced with hydration, pyridoxine, and intensive hemodialysis to prevent further oxalate deposition. He is currently awaiting combined liver-kidney transplantation.

CONCLUSION: For children who present with ESRD of unknown etiology,(i) measurement of urine and/or plasma oxalate should be performed, and (ii) examination of the renal biopsy for crystals under polarized light should be routine.

Abstract# 298

KIDNEY FAILURE IN SICKLE CELL DISEASE – DIALYSIS OR TRANSPLANT? Abdullah Alabbas,[1] Jeffrey Davis,[2] Mina Matsuda-Abedini.[1] *[1]Nephrology, BCCH, Vancouver, Canada; [2]Hemoatology, BCCH, Vancouver, Canada.*

PURPOSE: To describe a case of sickle cell disease (SCD) with ESRD requiring renal replacement therapy and the effects of transplantation on SCD.

METHOD: The patient is a 17-year-old African-Canadian male, diagnosed with SCD at age 4. He was well for 7 years with infrequent vaso-occlusive crises (VOC). He was also diagnosed with moyamoya disease and arteriovenous malformation (AVM) on brain imaging at 11 years of age. He was then commenced on a monthly blood transfusion protocol to target HbSS < 30%, with subsequent iron overload. At 14 years of age, his nGFR had declined to 51 ml/min/1.73m^2. He developed nephrotic range proteinuria and hypertension. Renal biopsy showed focal segmental glomerulosclerosis. Ramipril was initiated as anti-proteinuric, anti-hypertensive agent. He progressed to ESRD in 5 months. He was treated with peritoneal dialysis for one year until he received a living related kidney transplant (tx) from his brother with sickle cell trait. He received basiliximab for induction, and prednisone, mycophenolate mofetil, and tacrolimus for maintenance immunosuppression. His immediate post-operative recovery was unremarkable.

RESULTS: 6 weeks after tx he presented with first of many VOCs where his HbSS increased dramatically from 7% pre-tx to 51% post-tx. Hydroxyurea treatment was attempted but not tolerated. Regular isovolemic venesection and exchange blood transfusions, alternating every 2 weeks, were used to maintain Hb 80 -90 g/l and HbSS < 30%. His course has been further complicated by a deep vein thrombosis of the left upper limb, a left frontal subarachnoid hemorrhage from his pre-existing AVM, and a left MCA territory ischemic cerebral infarct at 8 months post-transplant.

CONCLUSION: Despite previously reported encouraging results on survival advantage of renal transplantation over maintenance dialysis in SCD, renal transplantation is not without significant morbidity in this patient population. An increase in the frequency of VOC, likely due to increased endogeneous hematopoiesis with consequent increase in blood viscosity, is an important potential morbidity associated with a functioning graft post successful kidney transplantation.

Abstract# 299

SUCCESFUL KIDNEY TRANSPLANTATION IN TWO INFANTS WITH BODY WEIGHT BELOW 5 KG. Oliver Amon,[1] Marcus Weitz,[1] Alfred Koenigsrainer,[2] Silvio Nadalin.[2] *[1]Pediatrics, University Hospital of Tuebingen, Tuebingen, Germany; [2]General, Visceral and Transplant Surgery, University Hospital of Tuebingen, Tuebingen, Germany.*

PURPOSE: In June 2007 and July 2009 we performed a succesful kidney transplantation in two infants weighing 3.9 kg and 4.7 kg at that time.

Patient 1 had renal insufficiency caused by urethral valves. Birth weight was 2700 g at 33 weeks of gestation. Peritoneal dialysis was started. At the age of 3 months he had to be switched to hemodialysis because of multiple complications. After he had undergone cardiopulmonary resuscitation twice - presumably with hypertensive crises - we aimed at a renal transplantation: 6 weeks after bladder augmentation cystoplasty a kidney transplantation could be performed at the age of 5 months /body weight of 3.9 kg. His new kidney has been working properly since then and at the age of 3.5 years his serum creatinine is stable at 0.4 mg/dl. The immunosuppressive regimen consists now of tacrolimus and azathioprine. With a central movement disorder (caused by the repeated hypertensive crises/cardiopulmonary resuscitations) he has to be treated with Levodopa.

Patient 2 also suffered from renal insufficiency with urethral valves. He was small for gestational age (birth weight 2180 g at 37 weeks of gestation). Peritoneal dialysis was started. Because of pulmonary hypoplasia mechanical ventilation was necessary for 2 weeks. The urethral valves were removed. Because of multiple complications he had to be treated with both peritoneal dialysis and hemodialysis. After 2 instants of circulatory shock during dialysis we prepared him for renal transplantation, which took place at the age of 6 months with a body weight of 4.7 kg. The transplanted kidney has been functioning properly ever since. His serum creatinine is now stable at 0.4 mg/dl. He showed a normal psychomotor development His immunosuppressive regimen consists now of tacrolimus and mycophenolate mofetil.

METHOD: Case report.

RESULTS: See above

CONCLUSION: Our experinece with these two boys shows that, if life-threatening complications arise during dialysis,

renal transplantation can be performed sucessfully in infants with a body weight below 5 kg.

Abstract# 300

TREATMENT OF ANTIBODY MEDIATED REJECTION. Esra Baskin, Umut Selda Bayrakci, Kaan Gulleroglu, Hamdi Harakayali, Munire Turan, Handan Ozdemir, Mehmet Haberal. *Ped Nephrology, Baskent University, Ankara, Turkey; Transplant Surgery, Baskent University, Ankara, Turkey; Pathology, Baskent University, Ankara, Turkey.*

PURPOSE: Antibody mediated rejection (AMR) is a rare complication which often results in the lost of the kidney grafts. Treatment options of this condition include plasmapheresis (PP), intravenous immnunoglobuline (IVIG) and the use of rituximab (RTX). We present results of our patients with AMR.

METHOD: We retrospectively evaluated data files from 86 pediatric transplant patients in last two years. AMR developed in 7 patients(8.7%). All patients with AMR had severe acute rejection and extensive C4d staining in peritubular capillaries.Donor specific antibodies were evaluated in the recipients.

RESULTS: Six patients received living related donor allografts and remaining 1 was from cadaveric donor. The mean time between All patients were treated with high dose metil prednisolone and IVIG. Five session of plasmapheresis were used in 4 patients together with IVIG. In 3 resistant patients RTX was prescribed after PP and IVIG. Donor specific antibodies demonstrated in three patients and progressively decreased after treatment. Two patients were refractory to treatment and lost their transplants. Interstitial fibrosis and tubular athrophy developed in other 2 patients at 16 months after AMR. Four patients recovered renal function.

CONCLUSION: Early diagnosis and treatment with IVIG, PP and RTX may resolve AMR. Although effective therapy is available for acute AMR, allografts remain at risk for chronic AMR and shortened survival.

Abstract# 301

GASTROINTESTINAL SYMPTOM BURDEN IN PEDIATRIC PATIENTS AFTER RENAL TRANSPLANTATION. Danith Blumenthal, Roxana Cleper, Irit Krauze, Miriam Davidovits. *Pediatric Nephrology Institute, Schneider Children's Medical Center of Israel Affiliated with Sackler School of Medicine, Petah Tiqwa, Israel.*

PURPOSE: Determine the prevalence of gastrointestinal complications in pediatric renal transplant recipients and their association with immunosuppressive drugs.

METHOD: The medical charts of children after renal transplantation being followed in the Institute of Nephrology from 1994 to 2009 were reviewed. Data were collected on gastrointestinal symptoms and severity, immunosuppressive therapy and biochemical profile. The glomerular filtration rate (GFR) was calculated according to the Schwartz formula.

RESULTS: Of the initial study sample of 59 patients, 5 were excluded because of a malformation of the gastrointestinal tract. The mean age of the 54 patients was 17 years (range 2-24 years).Thirty patients (55%) had gastrointestinal complications. The most common symptom was diarrhea, in 24 patients (80%), followed by abdominal pain (n=17), vomiting (n=5), oral ulcers (n=3), constipation (n=2), and dyspepsia (n=1). The mean time from transplantation to appearance of the gastrointestinal symptoms was 3.6 years (range 1month -17 years). Three of the 30 patients were being treated with a nonstandard immunosuppressive protocol. In 2 patients, a switch to Myfortic (Mycophenolate Sodium) led to resolution of the gastrointestinal symptoms. Another 5 patients acquired gastrointestinal complications during treatment with Myfortic. 40 patients had mild self limited symptoms. 14 patients had moderate symptoms, 7 required admissions and IV fluids treatment, one with oral ulcers was taken off Rapamune (Rapamycin) and 6 required only admission.

CONCLUSION: To our knowledge, this is the first large survey of gastrointestinal complications of renal transplantation in the pediatric population. The results indicate a higher rate of gastrointestinal symptoms than reported previously in adult renal-transplant recipients (around 20%).The symptoms in children appear to be mostly mild and self-limited. They are probably independent of the immunosuppressive regimens, drug doses and treatment duration.

Abstract# 302

EXPERIENCE OF RENAL TRANSPLANTATION IN TWO PATIENTS WITH NEPHROPATHIC CYSTINOSIS IN TAIWAN. Cheng-Hsu Chen,[1,2,3] Ming-Ju Wu,[1,3] Chi-Hung Cheng,[1,3] Tong-Min Yu,[1,2] Ya-Wen Chuang,[1] Shih-Ting Huang,[1] Kuo-Hsiung Shu.[1,3] *[1]Division of Nephrology, Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan; [2]School of Medicine, College of Medicine, China Medical University, Taichung, Taiwan; [3]School of Medicine, College of Medicine, Chung Shan Medical University, Taichung, Taiwan.*

PURPOSE: Cystinosis is a rare autosomal recessive disease due to a defect in the lysosomal cystine. The intracellular cystine accumulation causes multiple organs damage and renal failure. We retrospected to evaluate the outcome and complications of patients with nephropathic cystinosis after renal transplantation in Taiwan.

METHOD: There are only two siblings with nephropathic cystinosis after renal transplantation (RTx) out of 1196 RTx in our hospital in the past 30 years. The younger sister received the living-related RTx from her mother. The elder sister just received the second cadaveric RTx due to chronic allograft rejection half year ago.

RESULTS: They was diagnosed as cystinosis at age 5 and 9, and received allograft at age 13.4 (younger) and 19.8 and 26.4 (elder). The young one had hemodialysis for 2 months before RTx, but none in the elder. They both experienced one episode of acute rejections at 6-month after first RTx. The elder sister suffered from obstructive nephropathy and recurrent urinary tract infections (UTIs) with progressive graft failure in age 26.4, and was treated with vulvar condyloma and carcinoma in situ of cervix grade I to II 2 year ago. The second graft was function well to keep creatinine (Cr) level 1.0 mg/dL. The younger sister delivered a girl without proteinuria or hypertension during the gestation at her age 25.4, and her Cr level was 0.9 mg/mL. They only have crystalline keratopathy and nephropathy without other system involvement till now.
CONCLUSION: The extra-renal complications with nephropathic cystinosis are high, but these two siblings did not receive the cysteamine therapy to attenuate the intracellular cystine accumulation and only ocular involvement was found now. The complications and prognosis are still need long-term follow-up, especially such a small sample size.

Abstract# 303

PEDIATRIC RENAL TRANSPLANT PRACTICES BY MIDWEST PEDIATRIC NEPHROLOGY CONSORTIUM (MWPNC)

AFFILIATED CENTERS. M. Ferris,[1] D. Hooper,[2] A. Jain,[3] D. Hebert,[4] H. Patel,[5] D. Chand,[6] C. Nailescu,[7] M. Vehaskari.[8] *[1]UNC at Chapel Hill, Chapel Hill, USA; [2]Cincinnati Children's Hospital, Cincinnati, USA; [3]Children's Hospital of Michigan, Detroit, USA; [4]University of Toronto, Toronto, Canada; [5]Nationwide Children's Hospital, Columbus, USA; [6]Akron Children's Hospital, Akron, USA; [7]Riley Hospital for Children, Indianapolis, USA; [8]Louisiana State University, New Orleans, USA.*

PURPOSE: Little is known regarding actual practice patterns of pediatric kidney transplant providers. We characterized the current practices among pediatric transplant programs affiliated with the MWPNC.
METHOD: Closed and open-ended questions were used in a commercially available web-based survey.
RESULTS: 30 of 32 practices follow pediatric transplant patients and 15/30 (50%) responded. Average (SD) prevalent patients in each practice was 69 (42); with an average of 14 (8) incident cases per year.
Immunosuppression: Induction agents used with steroid based and steroid free protocols are depicted in Table 1. All centers use mycophenolate mofetil.and calcineurin inhibitors. Cyclosporine is used by 20% of centers. Antibody-mediated rejection is treated with: steroids (60%), thymoglobulin (46%), IVIG and plasmapheresis (92%), rituximab (72%) and bortezomib (23%).
Prophylaxis: 77% use valganciclovir in all recipients (average of 6 months). 40% use PCP Prophylaxis (average of 4 months) and 50% use anti-fungals (average of 4 months).
Surveillance Studies: 53% perform protocol renal ultrasound and 60% echocardiograms (most annually). 40% of perform pharmacokinetics of immunosuppression agents and 33% follow MPA levels. Chest X-Ray, pharmaco-genomics and protocol biopsies are all performed by 13% of respondents. Routine surveillance of EBV and CMV is done by 66%, plasma BK PCR by 25% and urine decoy cells by 13%.

Table 1: Induction Agent and Steroid Use

Induction Agent	Steroid-free or < 7 days	Steroids > 7 days
Thymoglobulin	6	8
Basiliximab	3	8

CONCLUSION: The pediatric nephrology practices vary widely in this cohort in terms of induction, immunosuppression, prophylaxis, and surveillance.

Abstract# 304

HIGH-DOSE OMEGA-3 FATTY ACID SUPPLEMENTS REDUCE HYPERLIPIDEMIA IN TRANSPLANT RECIPIENTS.

Guido Filler, Shelley Casier, Ajay P. Sharma, Joanne Grimmer. *Paediatrics, Division of Paediatric Nephrology, University of Western Ontario, London, ON, Canada.*

PURPOSE: Hyperlipidemia is a common complication after renal transplantation and is a harbinger for future cardiovascular disease. Statins may reduce total cholesterol but do not alter hypertriglyceridemia. We report on the use of Omega-3 fatty acid (Ω3 FA) supple¬men-tation as a lipid-lowering strategy.
METHOD: All renal transplant recipients currently followed in our clinic were included in this chart review. The latest lipid profile before start of Ω3 FA (range 400-1600 mg of eicosapenic acid/day) and on Ω3 FA were recorded. Two of 21 patients on a calcineurin-based immu-no¬suppressive regiment (tac or csa) and 4 of 5 patients with a sirolimus-based immunosuppressive protocol (sir) received Ω3 FA. Using standard statistical tests, we compared patients on sir with the other patients and the cholesterol profiles before and on Ω3 FA supplementation.
RESULTS: Total, LDL, HDL cholesterol and triglycerides were 4.17±1.05, 2.09±0.81, 1.39±0.59 and 1.56±0.98 mmol/L. Patients on sir had significantly lower Cystatin C eGFR (54.6 vs.77.7 mL/min/1.73 m2), whereas steroid doses were not different (0.05 vs. 0.07 mg/kg/day). Two patients on sir and one patient on tacrolimus were on statins. Nine patients (4 on sir) had a cholesterol above the recommended 4.4 mmol/L and 8 patients (3 on sir) had triglycerides >1.7 mmol/L. Total cholesterol was significantly higher on sir (5.20 vs. 3.92 mmol/L, p=0.0056, unpaired t-test), and there was a trend towards higher triglycerides. Interestingly, HDL cholesterol was significantly increased in patients on sir (2.00 vs. 1.27 mmol/L, p=0.0101). In the patients on Ω3 FA, the total cholesterol fell significantly from 5.34±0.93 to 4.27±0.56 mmol/L, and there was a trend towards lower LDL cholesterol and triglycerides (2.23±1.74 to 1.34±0.94 mmol/L). No side effects were observed.
CONCLUSION: Our data confirm a higher prevalence of hyperlipidemia in patients on sir and demonstrate a beneficial and well-tolerated effect of high-dose Ω3 FA supplementation.

Abstract# 305

LEFLUNOMIDE FOR MAINTENANCE IMMUNOSUPPRESSION IN RENAL RE-TRANSPLANT RECIPIENTS WITH PRIOR POLYOMA BK NEPHROPATHY.

Roshan P. George, Barry L. Warshaw, Leonard C. Hymes. *Pediatric Nephrology, Emory University and Children's Healthcare of Atlanta, Atlanta, GA, USA.*

PURPOSE: Polyoma BK nephropathy (BKN) is a serious problem that occurs in 3-8% of renal transplants and may lead to allograft failure. Leflunomide is effective against BKN due to its immune modulating and anti-viral properties. We present 3 patients who lost renal transplants from BKN and were successfully re-transplanted with a regimen that included leflunomide instead of mycophenolate mofetil (MMF).
METHOD: Retrospective chart review.
RESULTS: Three patients, 10, 17 and 19 years of age, developed biopsy proven BKN at 47, 22 and 3 months post renal transplant, respectively. Despite clearance of BK viremia with cidofovir and leflunomide, graft failure requiring maintenance dialysis occurred 49, 22 & 44 months, respectively, after developing BKN in these patients. Each child demonstrated nondetectable BK viral load by serum PCR for 12 months before being considered for re-transplantation. All received successful 2nd transplants with a regimen that included induction with basiliximab and maintenance immunosuppression with prednisone, tacrolimus and leflunomide. Leflunomide dose was adjusted to target blood levels of 20,000-40,000 ng/ml in the youngest child, and 40,000-60,000 ng/ml in the 2 older patients. Adverse events attributed to leflunomide did not occur. All 3 patients remain without detectable BK by serum PCR at 8, 11 and 22 months post-transplant and display satisfactory graft function (serum creatinine <1.5 mg/dl). Leflunomide was discontinued in 1 patient at 18 months post transplant and replaced with MMF without developing BK viremia. This patient experienced acute cellular rejection (Banff score 1A) 20 months post-transplant, which was successfully treated with high dose methylprednisolone without developing BK viremia.
CONCLUSION: In 3 consecutive patients, leflunomide was effective both as a maintenance immunosuppressant and as an antiviral agent for preventing recurrence of BK virus and was well tolerated without significant adverse effects.

Abstract# 306

REVIEW OF DIABETES IN PAEDIATRIC TRANSPLANT RECIPIENTS.

Liz A. Goddard,[1] Jenisha Nandhlal,[1] Priya Gajjar,[1] Mignon McCulloch,[1] Ceri Davies,[1] Michelle Carrihill,[1] Catherine W.N. Spearman,[2] Ronalda De Lacy,[1] Del Kahn,[2] Alastair J.W. Millar.[1] *[1]School of Child and Adolescent Health, University of Cape Town, Red Cross War Memorial Children's Hospital, Cape Town, South Africa; [2]Liver Research Unit, Groote Schuur Hospital, Cape Town, South Africa.*

PURPOSE: Post Transplantation Diabetes Mellitus (PTDM) is a complication of transplantation associated with the use of steroids and calcineurin inhibitors. In this study we assessed the incidence of PTDM and the factors associated with its development.
METHOD: We retrospectively reviewed the records over the period 1997-2010 of all paediatric kidney and liver transplant recipients who developed PTDM and required treatment with insulin.
RESULTS: Eleven (8.5%) patients out of 202 transplants developed PTDM. Of these seven were kidney transplants and four liver transplants. Race included five black, five mixed race and 1 white patient of which the male to female ratio was 1.2. Mean age: 14 years (range 9-26). Only one patient of the eleven was obese.The BMI of the patients at the time of diagnosis of PTDM ranged from 16.2 - 42.8. Three of the eleven patients had concomitant hypercholesterolaemia. The mean time for the development of diabetes after transplant was 4 years (3 days -19 years). All patients were on Tacrolimus with an average Tacrolimus level of 9.3 micrograms/l (range 4.6-16) at the time of diagnosis. All patients were treated for rejection with a pulse of methylprednisone and/or an increase in their oral steroid dose prior to the onset of diabetes. All patients required insulin for control of their diabetes. Four of the eleven patients were successfully weaned off insulin, one of whom later died from chronic rejection. The remaining seven have continued to require low dose insulin.
CONCLUSION: Diabetes Mellitus has a high incidence (8.5%) in our transplant population. It is associated with the use of tacrolimus and high dose steroids. Only 1 patient was diagnosed in the immediate post transplant period. There was no association with the development of diabetes and a high Body Mass Index.

Abstract# 307

COMPLICATIONS OF PEDIATRIC RENAL TRANSPLANTATION. Cristina Gonçalves, Sara Azevedo, Ana Sandes, Rosário Stone, Margarida Almeida. *Unidade de Nefrologia, Departamento da Criança e da Família, Centro Hospitalar Lisboa Norte, Lisboa, Portugal.*

PURPOSE: Renal transplantation (RT) is the treatment of choice for children with chronic renal failure (CRF). It has a positive impact on survival when compared with dialysis. However some complication affect morbidity and mortality. This study examines the RT complications profile in pediatric patients (<18A).

METHOD: Retrospective analysis of clinical files from RT patients in follow-up in our Pediatric Nephrology Unit from September 1995 to August 2010. Collection of data regarding: demography, CRF etiology, previous renal replacement therapy, infectious and non-infectious (surgical complications, chronic and acute rejection, hypertension, hyperlipidemia, diabetes, primary disease recurrence, graft loss and death). Descriptive statistical analysis was performed.

RESULTS: 78 children (male: 48,7%), mean age at RT: 11,7±4,1 years. Five patients (6,4%) without previous renal replacement therapy. Previous peritoneal dialysis: 62,6%; previous hemodialysis: 16,7%, HD+DP: 12,8%. Mean follow-up: 43,3±33,3 months (1-169). Primary kidney disease: urologic condition: 41%; glomerular disease: 28,2%; congenital: 15,1%;unknown: 10,3%; vascular disease: 3,8%; other: 1,3%. Infectious complications in 74%: bacterial 54% – mainly urinary tract infections; viral: 56%–cytomegalovirus in 40%. Non-infectious complications: surgical complications 19%; acute graft dysfunction 32%; chronic rejection 18%, graft loss 15%. Hypertension in 86%, hyperlipidemia in 17% and diabetes in 8% child. In the first month after RT, the surgical complications 15% and the bacterial infections were the more prevalent complications. Between the 1st and the 6th month there were more bacterial 22% and viral 36% infectious complications. From 6th month on, cardiovascular complications became the more prevalent. There were two deaths.

CONCLUSION: The more prevalent complications were the urinary tract infections, CMV infection, acute graft dysfunction and hypertension. New morbidities are emerging with the evolution of new diagnostic, prophylactic and therapeutic strategies for RT.

Abstract# 308

USING DONOR-SPECIFIC HLA ANTIBODY TITERS TO ASSESS FOR ACCOMODATION AFTER LATE HUMORAL REJECTION. Joanne Grimmer,[1] Ajay P. Sharma,[1] Edward J. Ball,[2] Guido Filler.[1] *[1]Department of Paediatrics, University of Western Ontario, Children's Hospital – LHSC, London, ON, Canada; [2]Department of Pathology, University of Western Ontario, London, ON, Canada.*

PURPOSE: Management of late humoral rejection remains challenging, and donor-specific HLA antibodies (DSA) may persist. A case report illustrates how monitoring DSA intensities may help to assess for accommodation.

METHOD: A 14-year old male cystinosis patient received a cadaveric renal transplant at 12 years of age. Cross-match was negative, and immunosuppression consisted of Daclizumab induction, tacrolimus, mycophenolate mofetil (MMF) and steroids. Seventeen months post transplant, antibody-mediated rejection (AMR) Banff grade III was diagnosed. Treatment consisted of daily plasmapheresis, IVIG 100 mg/kg and pulse steroids 5 mg/kg. IgG DSA (DR 53, DQ 2 and 4) did not respond until the plasma exchange volume was increased from 1 to 2.5 plasma volumes. Serum creatinine returned to baseline. Plasma exchange frequency was tapered while IVIG was continued. A second rise of creatinine occurred and 2 doses of Rituximab (375 mg/m^2) were given with re-initiation of daily plasma exchange. DSA intensities were monitored using a solid-phase bead assay.

RESULTS: Subsequently, all DSA dropped, but only DR53 antibodies returned to negative. DQ antibodies stayed positive and rebounded to very strong levels. With follow-up of over 5 months post Rituximab, on immunosuppression with tacrolimus, MMF, prednisone and continued IVIG, the patient's creatinine remained stable between 45-50 umol/L while DQ DSA remained strong to very strong. Most recent biopsy was done 21 months post transplant and showed persisting C4d peritubular capillary staining but no definitive evidence of rejection.

CONCLUSION: We conclude that the patient is in a state of accommodation. DSA titers should be monitored when managing late humoral rejection.

Abstract# 309

EARLY PROTEINURIA AFTER RENAL TRANSPLANTATION AND ALLOGRAFT OUTCOMES. Kaan Gulleroglu,[1] Esra Baskin,[1] Umut Bayrakci,[1] Sema Aktas,[2] Hamdi Karakayali,[2] Mehmet Haberal.[2] *[1]Pediatric Nephrology, Baskent University, Ankara, Turkey; [2]General Surgery, Baskent University, Ankara, Turkey.*

PURPOSE: Proteinuria after renal transplantation has been associated with poor allograft outcomes. We have evaluated the utility of early proteinuria in the management of pediatric renal transplant recipients.

METHOD: We analyzed the effect of early proteinuria on predicting allograft rejection, graft loss and estimated glomerular filtration rate (GFR) at posttransplant 3 years. Sixty-seven pediatric renal transplant recipients (33 males, 34 females) from a single center divided into 2 groups based on the 24-hour urine protein excretion during the 3rd posttransplant month. [Proteinuria≤ 4 mg/m^2/hour (group 1 n=28), proteinuria >4 mg/m^2/hour (group 2 n=39)]. The impact of early proteinuria on the various outcomes was studied.

RESULTS: Recipients were 13.7±4.2 years old (min-max:3.5-21.5 years) at the time of transplantation. There was not any difference for transplantation age between 2 groups (13.5±4.3 years for group 1 and 13.8±4.2 years for group 2, p=0.6). 43 patients received living related donor allografts (group1=19, group2=24) and the remaining 24 were from cadaver donors (group 1=9, group 2=15). Early proteinuria was significantly high for the cadaver donor group (mean 14.25 versus 7.08 mg/m^2/hour, p=0.002). Mean follow-up time after transplantation was 38.8±33.1 months. Transplant renal biopsy was performed to 24 patients and 11 was reported as acute rejection. Median proteinuria of the group with rejection (11.25mg/m^2/hour min-max:2.3-101.8 mg/m^2/hour) was significantly high when compared with non-rejection group (4.13 mg/m^2/hour, min-max:0.13-39.42 mg/m^2/hour) (p<0.05). There was a significant positive correlation between acute rejection and the early posttransplant proteinuria (r=0.34, p=0.005). This relationship could not be shown with other outcomes parameters as graft loss and lower estimated GFR. There was not any relationship between posttransplant early proteinuria and immunosuppressive regiment.

CONCLUSION: Posttransplant early proteinuria can be used as a prognostic marker of poor renal outcome, especially for acute rejection.

Abstract# 310

LIVING RELATED RENAL TRANSPLANTATION IN A 14 YEAR OLD BOY WITH FACTOR H ANTIBODY ASSOCIATED aHUS. Johannes Hofer,[1] Magdalena Riedl,[1] Alejandra Rosales,[1] Gerard Cortina,[1] Walter Mark,[2] Reinhard Würzner,[3] Birute Pundziene,[4] Therese Jungraithmayr.[1] *[1]Pediatrics I, Medical University, Innsbruck, Austria; [2]Operative Medicine, Medical University, Innsbruck, Austria; [3]Hygiene, Mycrobiology and Social Medicine, Medical University, Innsbruck, Austria; [4]Pediatrics, Medical University, Kaunas, Lithuania.*

PURPOSE: Many patients with CFH Ab associated aHUS are awaiting renal transplantation. Without knowledge of the underlying cause or with inadequate therapy they are at high risk for disease recurrence and transplant failure.

METHOD: Case Report.

RESULTS: A 12 year old boy was admitted to hospital on April 2007. Laboratory examination showed hemolytic anemia, thrombocytopenia and acute renal failure. The patient was diagnosed with Factor H antibody (FH-Ab) associated aHUS. The patient did not regain renal function. The initial FH-Ab level was high (1600 AU/ml) and even increased during the following months (1800 AU/ml). Under HD the titer dropped to 800 AU/ml. However, renal function did not recover and the patient required chronic dialysis, thus, renal transplantation from a living donor (father) was planned. To reduce FH-Ab titers prior to kidney transplantation plasma exchange was initiated, but had to be cut short due to allergic reaction. Additionally, a single infusion of i.v. IgG on the day before transplantation was given. In 11/2009 the living related renal transplant was performed. ATG was administered as induction therapy for 4 days and maintenance immunosuppression consisted of Tacrolimus, MMF and Steroids. 12 months after transplantation renal function and complement levels (C3, terminal complement complex) were normal and FH-Ab titers were in the low range (<200).

CONCLUSION: At present, evidence based therapy recommendations for FH-Ab aHUS are missing. However, i.v.IgG plus induction therapy plus maintenance immunosuppression seems to be a promising regimen enabling successful renal transplantation.

Abstract# 311

THE USE OF RITUXIMAB IN PAEDIATRIC RENAL TRANSPLANT RECIPIENTS. Helen E. Jones, Sue Patey, Stephen D. Marks. *Department of Paediatric Nephrology, Great Ormond Street Hospital, London, United Kingdom.*

PURPOSE: To review the indication, treatment and subsequent outcomes with rituximab in all paediatric renal transplant recipients (RTR).

METHOD: Retrospective case note analysis of all RTR who received rituximab in a single renal transplant centre.

RESULTS: 19 patients aged 5.7-17.5(median 13.3)years(y) with 20 rituximab treatment episodes were identified from 2002 to 2011.

5 received rituximab at 43-90(median 65)days with other treatments to manage post-transplant recurrence of focal and segmental glomerulosclerosis of which 3 cases were treated with a single dose of 750mg/m², 1 received 2 doses and 1 given 4 weekly doses of 375mg/m². 60% responded (one with Stage V(T)-CKD and another requiring graft nephrectomy) with resolution of proteinuria and estimated glomerular filtration rates(eGFR) of 20-76mls/min/1.76m² at 0.75-1.25y post-transplant.

6 cases received rituximab for biopsy proven rejection with donor specific antibodies at 0.04 - 12.5 (median 6.3)y post-transplant. 5 patients have functioning grafts (eGFR = 30-76mls/min/1.76m² with time from transplantation of 3.7-9.9y).

3 patients received rituximab for rejection without donor specific antibodies at 15 days, 2y and 8y post-transplant.

4 weekly doses of intravenous rituximab at 375mg/m² were used to treat post-tranplant lymphoproliferative disease(PTLD) in 5 cases presenting 0.5-7(median 0.8) y post-transplant. 2 patients have resolution of disease at 0.8 and 1.3y post diagnosis,

1 patient responded to treatment and transitioned to adult services. 2 patients died; one had B-cell Burkitt phenotype non-Hodgkin's lymphoma receiving two doses of rituximab before care was withdrawn. The other had atypical HUS and developed PTLD 0.5y post-transplant requiring chemotherapy due to aggressive disease but was unresponsive to therapy.
One case of ABO incompatible transplant received rituximab (375mg/m² 4 weeks prior to transplantation. At 1.3y follow up graft function is stable (eGFR of 52mls/min/1.73m²).
CONCLUSION: Rituximab therapy has been given for a variety of indications in paediatric RTR. Further analyses need to be performed on larger groups patients to determine its indications and benefits.

Abstract# 312

CASE REPORT OF A CHILD DEVELOPING ACUTE DISSEMINATED ENCEPHALOMYELITIS FOLLOWING KIDNEY TRANSPLANTATION. Fariba Khodapanahandeh, Saba Arshi. *Pediatrics, Rasool Akram Hospital, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran; Immunology, Rasool Akram Hospital, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran.*

PURPOSE: Acute disseminated encephalomyelitis (ADEM) is an acute demyelinating disorder of the central nervous system, mostly seen in children, affecting mainly the white matter of brain and spinal cord. Cases of ADEM have been reported in renal transplant recipients. The pathophysiology of posttransplant ADEM remains unclear but has been hypothesized to be due to aberrant T-cell reactivity to myelin basic protein triggered by a bacterial or viral infection. We report an unusual case of ADEM in an 8 year old girl developing 1 year after renal transplant.
Key words: ADEM, renal transpantation.

Abstract# 313

MATURITY-ONSET DIABETES OF THE YOUNG (MODY5) IN FEMALE PATIENT AFTER KIDNEY TRANSPLANTATION. Mirjana Kostic,[1] Ivana Ivaniševic,[1] Brankica Spasojevic-Dimitrijeva,[1] Amira Peco-Antic,[1] Vera Zdravkovic,[2] Ivana Pela,[3] Dušan Paripovic,[1] Divna Kružic,[1] Marko Petrovic,[1] Mira Cvetkovic.[1] *[1]Nephrology, University Children's Hospital, Belgrade, Serbia; [2]Endocrinology, University Children's Hospital, Belgrade, Serbia; [3]Pediatrci Nephrology Unit, Department of Health Science of Women and Child, University of Florence, Florence, Italy.*

PURPOSE: The aim of our study was to investigate detailed clinical features and the type of hepatocyte nuclear factor 1 beta (HNF1 β) gene anomaly in one pediatric case report.
METHOD: We analyzed physical examination, laboratory tests, including assessment of glycosylated hemoglobin, liver enzymes, ions serum levels, renal function, oral glucose tolerance test, abdominal and urinary tract ultrasonography, liver biopsy, and screening of the HNF1β.
RESULTS: A 15-year-old female patient had been diagnosed bilateral renal dysplasia with right kidney hypoplasia and mild renal insufficiency at the age of 1 year. It was progressing slowly and was treated with symptomatic therapy. As a part of the preparation for growth hormone therapy, diabetes mellitus was diagnosed by pathological oral glucose tolerance test (OGTT) and oral sulfonylureas therapy was started and lasted 2 years. At the age of 13 years the patient reached ESRD (end stage renal disease). After one year of hemodialysis, cadaveric kidney transplantation was performed and post-operative period was complicated by diabetes mellitus. Since then she is on human insulin therapy, but her glycemic profile is not quite satisfactory. The patient family history was negative for diabetes. Direct sequencing of the HNF1β gene revealed a heterozygous deletion of the whole gene (exons 1-9), c. [237-?_2115+?del]+[=]*.
CONCLUSION: HNF1 β gene mutation should be considered in children with congenital kidney anomalies and glucose metabolism abnormalities. This diagnosis is important because of possibility to modify steroid and other immunosuppressive therapy on time to avoid maturity onset diabetes after kidney transplantation.

Abstract# 314

IMPLEMENTATION OF A NOVEL WEB-BASED REGISTRY FOR PEDIATRIC KIDNEY TRANSPLANTATION IN CENTRAL EUROPE – THE CERTAIN REGISTRY. Lukasz Plotnicki,[1,2] Britta Hoecker,[1] Christian Kohl,[3] Burkhard Toenshoff.[1] *[1]Univ. Children's Hospital Heidelberg, Heidelberg, Germany; [2]Med. Informatics, Univ. of Heidelberg, Heidelberg, Germany; [3]Coord. Center for Clin. Studies, Univ. of Heidelberg, Heidelberg, Germany.*

PURPOSE: Long-term data collection for pediatric RTx recipients is crucial for clinical research, quality assurance and improved patient care, yet a proper registry in central Europe is lacking. Therefore, the German Paediatric Nephrology Association (GPN) decided in 2009 to initiate such a registry, which was named CERTAIN (Central European Paediatric Renal Transplant Initiative) Registry.
METHOD: The registry has been developed as a distributed system using modern software technology. Data protection and security have been considered from the beginning. The developed concepts are based on the work of the German TMF – Technology, Methods and Infrastructure for Networked Medical Research organization (www.tmf-ev.de). The registry's architecture and functionality assure the separation between personal and medical data on all levels incl. separate servers, strict data access policies and traffic encryption. The system offers a convenient web-application to access all registry functions. To minimize manual data input and workload in the participating centers, bidirectional data interchange with other systems, such as CTS, Eurotransplant and ESPN registry has been realized.
RESULTS: CERTAIN Registry is offering not only data entry functionality and, therefore, long-term data collection of pediatric RTx patients but also the possibility of patient record creation, real-time data analysis, patient & clinic benchmarking and automatic calculation of relevant clinical values. Thanks to the state of the art architecture and system modularity, it can be easily extended with new features. The registry is online since October 2010 (www.certain-registry.eu) and accessible for all RTx centers, who wish to participate.
CONCLUSION: The CERTAIN Registry provides a novel platform for clinical research in the field of pediatric RTx by use of modern IT methods, which will hopefully find a wide acceptance across central Europe. First registry reports are planned for mid-2011.

Abstract# 315

GASTROINTESTINAL PERFORATION AFTER PEDIATRIC LIVER TRANSPLANTATION: A SINGLE CENTER EXPERIENCE. Sema Aktas,[1] Hamdi Karakayali,[1] Gokhan Moray,[1] Figen Ozcay,[2] Adnan Torgay,[3] Mehmet Coskun,[4] Mehmet Haberal.[1] *[1]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [3]Anesthesiology, Baskent University, Faculty of Medicine, Ankara, Turkey; [4]Radiology, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: The aim of this study was to evaluate the incidence, clinical presentations, and outcomes of gastrointestinal perforation after pediatric liver transplantation.
METHOD: Since September 2001, 135 pediatric liver transplantations were performed for 132 children at our center. Four (2.6%) experienced gastrointestinal perforation in the follow-up which were analyzed retrospectively. The age of children was less than 12 months in 3 children, and 10 year in 1. The etiology for liver transplantation was biliary atresia in 3 and Wilson disease in 1. Three had a history of portoenterostomy and 1 had splenectomy before liver transplantation.
RESULTS: All perforations occurred in the first postoperative week. They were found to have fever, increased leukocytes, mild abdominal pain, tenderness and distention. We performed abdominal CT to all patients to diagnose perforation. The perforations were unrelated to the Roux-en Y hepaticojejenostomy, which had been perfromed on all children. The sites of perforation were duodenum in 1 child, jejunum in 2, and colon-hepatic flexura in 1. Primary repair using two-layer suture was performed in all children. Additionally omentopexy was done in 1 who had colon perforation. We did not encounter any morbidity and mortality after operations. Children were followed 93,77,49 and 34 months respectively. At the time of this writing all children are alive with good graft function.
CONCLUSION: Bowel perforation is relatively frequent after pediatric liver transplantation. Among risk factors, history of abdominal surgery may have a role. Fever, increased leukocytes and abdominal distention are important findings, although they may be seen in other cases also. Abdominal CT should be done for rapid diagnosis of perforation. Early diagnosis is essential to decrease morbidity and mortality.

Abstract# 316

HEMATOGICAL PROBLEMS IN PEDIATRIC PATIENTS AFTER LIVER TRANSPLANTATION. Zekai Avci,[1] Figen Ozcay,[2] Ferda Ozbay Hosnut,[2] Namik Ozbek,[1] Gokhan Moray,[3] Hamdi Karakayali,[3] Mehmet Haberal.[3] *[1]Pediatric Hematology, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [3]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: Hematological problems can be detected in 1/3 of patients after liver transplantation (LT). Anemia is the main problem that can be encountered in 60-80% of this population. Our aim was to search for the prevalance and etiology of pretransplantation and posttransplantation hematological problems in pediatric LT patients.
METHOD: 35 liver-transplanted children (20F/15M), median age 75 months (2 months-16 years) were included. Their investigations included CBC, reticulocyte count, peripheral blood smear, serum vitamin B12, folic acid, iron studies, Coomb's tests. These tests were studied before and first and 7th days and first, 3rd, 6th months and at the end of study (median 27 months) after LT.
RESULTS: In our study, 80% of children before LT were anemic. Etiologic factors of anemia were hypersplenism, hemolytic anemia, gastrointestinal bleeding, iron deficiency anemia, acute inflammation, iatrogenic factors, chemotherapeutics, viral infections,

Helicobacter pylori infection, and hemophagocytosis. After 6 months of LT 45% of children were anemic; etiological factors of anemia included immunosuppressive drugs (36%), iron deficiency anemia (47%), viral infections (%13), PTLD (13%), hypersplenism (13%), eosinophilic colitis (13%), GI bleeding (13%), and hemolytic anemia (7%).

Pre and post transplantation hematological problems

	1.month n=33	3.month n=33	6.month n=33	End of the study n=27
Anemia	11(%33)	6 (%18)	15 (%45)	11 (%41)
Leukopenia	6(%18)	7 (%21)	9 (%27)	4 (%15)
Thrombocytopenia	7(%21)	8 (%24)	7 (%21)	6 (%22)
Coagulopathy	6(%18)	2 (%6)	3 (%9)	1 (%4)

CONCLUSION: Children with end stage liver diseases had hematological problems frequently. There were several etiological factors caused anemia in children after LT. Iron deficiency is a easily preventable problem with iron supplementation in this children.

Abstract# 317

FROM PN TO P.O.: THE NUTRITIONAL COURSE OF ONE MULTIVISCERAL TRANSPLANT PATIENT. Sara Farnan Colleary. *Pediatric Transplant Center, Children's Hospital Boston, Boston, MA, USA.*

PURPOSE: The nutritional course of multivisceral transplant patients can be a complicated one, often with many setbacks. The goal of the dietitian is to convert the pre-transplant parenteral nutrition-dependent patient to a post-transplant one who is able to attain all nutrition by mouth. Challenges to reaching this goal can include obstacles such as PTLD, rejection, and intolerance to enteral nutrition. The purpose of this analysis was to explore the nutritional course of one multivisceral transplant patient.

METHOD: A retrospective review of the medical chart was completed by the dietitian, beginning when the patient was first seen at Children's Hospital Boston and ending with present day. Special attention was paid to past medical and nutritional history, post-transplant complications, diagnostic studies, laboratory values, and medical nutritional therapy interventions and outcomes, including components and methods of nutrition provision. The steps taken in the transition from parenteral nutrition to full nutrition by mouth was discussed.

Post-Transplant Complications Affecting Nutritional Course

Bacterial translocation
Chylous effusion
Dumping syndrome
Food aversion
Hyperglycemia
Increased energy needs
Increased vitamin and mineral needs
Intolerance to enteral nutrition
Obstruction
PTLD
Rejection
Risk of de novo food allergies
Sepsis
Stoma prolapse
Weight loss

RESULTS: A review of the multivisceral transplant patient revealed the many challenges faced when trying to achieve parenteral nutrition independence, as well as evidence that full nutrition provision by mouth is attainable. The various interventions highlighted in this review represent the often complicated nutritional course of the multivisceral transplant patient.

CONCLUSION: Analyzing the nutritional course of multivisceral transplant patients provides valuable information about pitfalls often encountered in this population. Using this knowledge, dietitians can be better prepared to assess nutritional concerns and make appropriate interventions. Retrospective reviews such as this can enhance medical nutrition therapy and improve nutritional outcomes for future multivisceral transplant patients.

Abstract# 318

AMOXICILLIN/CLAVULANIC ACID INDUCED CHOLESTATIC LIVER INJURY AFTER LIVER TRANSPLANTATION SUCCESSFULLY TREATED WITH METHYLPREDNISOLONE AND URSODEOXYCHOLIC ACID. Piotr Czubkowski,[1] Monika Studniarz,[2] Joanna Cielecka-Kuszyk,[1] Joanna Pawlowska,[1] Irena Jankowska,[1] Mikolaj Teisseyre.[1] *[1]The Children's Memorial Health Institute, Warsaw, Poland; [2]National Institute of Food and Nutrition, Warsaw, Poland.*

PURPOSE: Amoxicillin/clavulanic acid (AC) toxicity is well recognized but rare complication in children. The course of disease is usually mild and self-limiting, however progressive cholestatic liver damage instead of drug withdrawal were reported previously.

METHOD: We present the case report of AC cholestatic toxicity in a pediatric liver transplant recipient.

RESULTS: 8-year-old boy with biliary atresia who at the age of 4 years underwent deceased donor liver transplantation. Post transplant period was uneventful and immunosuppressive regiment was based on tacrolimus and steroids. 4 years after transplantation the patient developed upper respiratory tract infection and was treated with amoxicillin/clavulanic acid for two weeks.Two days after cessation he developed cholestasis with total bilirubin 6,9mg%, direct 5.3 mg%, ALT was 227 I/U. The main infectious agents were ruled out. There was functional impairment in liver scintigraphy and delayed intestinal bile flow. Liver biopsy was performed which showed normal architecture of the lobules and mild portal fibrosis in some portal tracts. Intrahepatic cholestasis was mild and low hepatocellular degeneration with focal lobular necrosis was seen only in a few pericentral areas. Inflammatory infiltrates were not observed. There was no evidence of bile ducts injury. At this moment total bilirubin reached 11.4 mg% and we commenced methylprednisolone for 3 days (10mg/kg/day) and ursodesoxycholic acid (20 mg/kg/day). It resulted in improvement of cholestatic markers during hospitalization, however full resolution was achieved 12 weeks after the onset of illness. During 7 year follow-up two liver biopsies performed on other occasions did not show previously observed abnormalities.

CONCLUSION: Drug toxicity should be always considered after inconclusive work-up of cholestasis. In severe cases unresponsive to drug withdrawal administration of corticosteroids may be considered.

Abstract# 319

FATTY LIVER IN CHILDREN POST LIVER TRANSPLANTATION: "A NEW ENTITY." Victoria P. Fernandez de Cuevas, Claudia P. Sanchez Franco, Camila Sanchez, Gustavo Boldrini, Daniel D'Agostino. *Division of Pediatric Gastroenterology, Hepatology, Liver and Intestinal Transplant Center, Hospital Italiano, Buenos Aires, Argentina.*

PURPOSE: Fatty liver is a post liver transplantation recognized entity in adults and it has been recently described in children.

Objectives: To evaluate the presence of fatty liver in the post liver transplantation in children, and to correlate it with different variables.

METHOD: A retrospective study from December 2000 to March 2010, was performed on 130 liver transplant children, 40.7% (n53) were biopsied for alteration of liver profile laboratory within 3 months post transplant. Patients were grouped according to the presence or absence of steatosis. Results were correlated with the following three variables: 1st immunosuppressive scheme: Group 1: Cyclosporine/steroids, Group 2: Tacrolimus/steroids and Group 3: Thymoglobulin/Tacrolimus/steroids; 2nd weight gain at the time of biopsy, 3rd the type of donor.

RESULTS: Of the 53 biopsies performed, 22.6% (n12) had steatosis. In this group the median age was 1.75 years (r 0.8 - 6 y), 91% (n 11) were girls.

By comparing the two groups (with or without steatosis) we found a significant difference for immunosuppressive scheme group 3 versus group 1 and 2 (p 0.001) and for living-related versus cadaveric donor (p 0.002). There was no significant difference for weight gain (p 0.39) between both groups.

CONCLUSION: This study showed that Fatty liver is a new entity after liver transplantation in children. The use of Tymoglobulin in the immunosuppressive scheme and the living related donor may be predisposing factors to develop this entity. Further studies are needed to confirm the etiology and prognosis.

Abstract# 320

TECHNIQUE FOR IN-SITU LIVER SPLITTING ASSOCIATED WITH MODIFIED-MULTIVISCERAL GRAFT RECOVERY. Thomas Gelas, Cristina Dopazo, Ahmed Taha, Evelyn G.P. Ong, Khalid Sharif, Paolo Muiesan, Darius F. Mirza. *Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Intestinal transplantation is a well established treatment in the management of intestinal failure. Some cases of intestinal motility disorders requires combined transplantation of the stomach and pancreaticoduodenal complex (modified multivisceral graft - MMV). The simultaneous performance of an in-situ split liver with recovery of a separate MMV graft poses challenges of vascular allocation in order that none of these organs are compromised.

METHOD: The recovery was performed dividing the arteries as follows: the superior mesenteric (SMA) and celiac trunks were retrieved with a single aortic patch; the main hepatic artery was divided just above the GDA for the right liver graft and the left hepatic artery was divided close to its origin for the left lateral segment (LLS) graft. The recipients were a 12 years old male with intestinal motility disorder, a 6 month old male with biliary atresia and a 30 years female with acute intermittent porphyria. All the recipients are alive after a 12 months follow-up. The adult recipient presented a late arterial stenosis with intra-hepatic biliary stenosis and is actually waiting for retransplantation.

RESULTS: We chose to maintain integrity of the gastroduodenal inflow for the MMV graft, but this attitude may potentially shorten or reduce the calibre of the vessel for liver transplantation. Compared to ex-situ liver splitting, the in-situ technique has theoretical advantages because it minimizes the cold ischemic time and allows excellent haemostasis on the cut surface.

CONCLUSION: We have demonstrated that in-situ liver recovery can be combined with safe recovery of an MMV graft. The hepatic artery can be transected just above the GDA providing a sufficient arterial length for the liver graft. The different grafts obtained were of good quality and implantation of these organs was performed without using complex vascular reconstruction.

Abstract# 321

CATCH-UP GROWTH AFTER LIVER TRANSPLANTATION IN ALAGILLE SYNDROME. Dorota Gliwicz-Miedzinska, Joanna Pawlowska, Irena Jankowska, Maciej Dadalski. *Gastroenterology, Hepatology and Immunology, Children's Memorial Health Instituite, Warsaw, Poland.*

PURPOSE: Alagille syndrome (AGS) is a multiorgan disease inherited in an autosomal dominant manner, associated with five major features: chronic cholestasis, characteristic facial features, cardiovascular abnormalities, ophthalmologic anom-alies and skeleton defects. Growth failure is a common manifestation of AGS, which has been attributed mainly to malabsorption in the course of cholestasis, but also to other factors, such as genetic predisposition, pancreatic insufficiency, cardiovascular anomalies. Children with chronic cholestasis of other etiology usually improve their growth status after liver transplantation (LTx). The aim of our study was to analyze the pre- and post-transplant growth pattern of children with AGS observed in our unit.

METHOD: Out of 55 children with AGS, 10 patients underwent LTx. Two patients died in the early postoperative period and were excluded from the study. The mean age at LTx of the remaining 8 patients was 7.31±4.13 (SD) years. At the moment of LTx all children were cholestatic. The mean follow up time after Ltx is 7.06±2.63 (SD) years. Presently, all 8 patients are alive, with good liver function. Two patients obtain small dosages of steroids. The standardized height (z score) before LTx and at present has been compared using the Wilcoxon matched pair test.

RESULTS: We found significant improvement of height after Ltx ($p<0.05$): median (quartile) standardized height z score was -3.34 (-5.56; -1.12) before Ltx and is -1.76 (-3.08; -0.81) at present.

CONCLUSION: LTx has a positive impact on growth in children with AGS. However, a complete normalization of growth after LTx should not be expected. Additional factors, except for liver damage, seem to play a significant role in the etiology of growth failure in this group of patients.

Abstract# 322

TYROSINEMIA TYPE I IN THE NITISINONE ERA: WHICH FACTORS CAN PREDICT HEPATOCELLULAR CANCER? Sara Gozzini,[1] Khalid Sharif,[1] Paul Gissen,[2] Patrick J. McKiernan.[1] *[1]Liver Unit, Birmingham Children's Hospital, Birmingham, United Kingdom; [2]Deprtment of Inherited and Metabolic Disorders, Birmingham Children's Hospital, Birmingham, United Kingdom.*

PURPOSE: Tyrosinemia type I (T1) is a metabolic disorder associated with high risk of hepatocellular carcinoma (HCC). Nitisinone has changed the outcome of T1 but has not abolished the risk of HCC. Monitoring for HCC includes imaging and alpha-fetoprotein (AFP) levels. Orthotopic liver transplant (OLT) is indicated for those with proven or suspected HCC. In our centre 6 children treated with Nitisinone underwent OLT for suspected HCC which was subsequently confirmed only in 1 case.

METHOD: We retrospectively reviewed 6 patients analyzing age at Nitisinone, duration of treatment and plasma levels, biochemical control and AFP trend, histopathology and radiological findings.

RESULTS: All presented with liver disease. The average age at diagnosis and starting Nitisinone was 1.3 years with 2 patients starting before 6 months old. The child with HCC started treatment at 21 months. No difference was found in the Nitisinone levels or measures of biochemical control between all patients.In the one with HCC, AFP normalised and showed a secondary increase. In 4 level decreased but failed to normalise and 1 patient had normal levels. Radiological findings showed multinodular liver with a dominant nodule in 3 patients including the one with HCC, and a multinodular liver without dominant lesions in 3. Histopathology of the explanted liver showed macronodular cirrhosis in 4 with hepatocyte dysplasia in 3, in 1 cirrhosis with a hepatocellular adenoma and in the last one poorly differentiated HCC.The mean follow up is 7.2 years. All patients are alive. The one with HCC had a retransplant after 9 months because of chronic rejection and then developed a lung metastasis 3 years later requiring resection.

CONCLUSION: OLT is effective in T1. In our experience the incidence of HCC is low in Nitisinone treated patients however, once HCC is proven there is a risk of metastatic disease. Rising AFP is the only specific marker for established HCC. There is a need for more specific markers of HCC in patients with T1 treated with Nitisinone.

Abstract# 323

THE RETROSPECTIVE VALIDATION OF SELECTED SCORES PREDICTING OUTCOME IN CHILDREN POISONED WITH AMANITA PHALLOIDES. Diana Kaminska-Gocal, Maciej Dadalski, Irena Jankowska, Joanna Pawlowska, Józef Ryzko. *Department of Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: The aim of the study was retrospective validation of selected (Ganzert's, Escudie's, Kleine's and King's College Hospital) scores predicting outcome in children with acute liver failure due to Amanita phalloides poisoning.

METHOD: We retrospectively estimated data of 78 children with acute liver failure (INR>2,0 or INR >1,5 and encephalopathy) due to Amanita phalloides poisoning hospitalized in our center from 1983 to 1990 (before LTx and extracorporeal liver support therapy in children were available in Poland). 35 (aged 8,2±3,5) died, 43 (aged 8,9±3,6) remained alive. The sensivities and specificities of selected scores in this group of patients were assessed.

RESULTS: The results of selected scores were as follows: [sensivity (95%CI; specifity (95%CI)]

Ganzert's criteria: 0,48 (0,29 to 0,67); 0,97 (0,85 to 0,99) ·
Escudie's criteria: 0,37 (0,21 to 0,55); 0,97619 (0,87 to 0,99) ·
Kleine's criteria: 0,97 (0,85 to 0,99); 0,581395 (0,42 to 0,72) ·
King's College Hospital criteria: 0,45 (0,28 to 0,63); 0,90 (0,77 to 0,97)

CONCLUSION: As it is crucial to establish which patients require LTx, the Klein's scores is the most sensitive to select them, despite it's the lowest specifity.

Abstract# 324

PEDIATRIC LIVER TRANSPLANTATION FOR ACUTE LIVER FAILURE: ANALYSIS OF LONG-TERM PATIENT OUTCOME. Hamdi Karakayali,[1] Sema Aktas,[1] Gokhan Moray,[1] Figen Ozcay,[2] Gulnaz Arslan,[3] Mehmet Haberal.[1] *[1]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [3]Anesthesiology, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: Acute liver failure (ALF) in children is a life-threatening condition. Liver transplant (LT) is a life-saving option for ALF. We evaluated the long-term patient outcome in patients who underwent a LT for ALF.

METHOD: Between September 2001 and December 2010, we performed 25 LTs for ALF in 23 children (mean age, 8.6 ± 3.6 years; age range, 18 months to 17 years; 12 males, 11 females) at our center. Four of 23 children received right lobe grafts, 10 received left lateral segment grafts, 8 received a left lobe graft, and remaining 1 received whole liver graft. The most frequent known etiology was non-A non-E hepatitis in 7 cases, other reasons were acute hepatitis A in 6, Wilson's disease in 5, autoimmune hepatitis in 1, Amanita phalloides (mushroom) poisoning in 1, toxic hepatitis with leflunomide treatment in 1, CMV hepatitis in 1, and toxic hepatitis with Ritalin in 1.

RESULTS: The mean follow-up was 41.5 ± 30.2 months (range, 1 to 104 months). Three children needed reoperation for biliary stenosis, hepatic artery thrombosis and intra abdominal bleeding. Two children were retransplanted 7 and 8 months after liver transplant due to chronic rejection. These two children died 1 month after LT due to sepsis and cardiac arrest. Additionally 4 children died in the follow-up. The reasons for death in these 4 children were ARDS in 1, sepsis with multiorgan failure in 1, brain death in 1, and drug overdose in remaining 1. At the time of this writing remaining 17 (74%) children are alive with good graft function.

CONCLUSION: LT has revolutionized the management of ALF and improved survival rates considerably. Living donors must be considered in countries with low donation rates where experienced teams can offer low complication and low mortality rates.

Abstract# 325

DISEASE SEVERITY AND PROGNOSTIC SCORING SYSTEMS: A COMPARISON BETWEEN PAEDIATRIC END-STAGE LIVER DISEASE SCORE (PELD) AND THE PAEDIATRIC HEPATOLOGY DEPENDENCY (PHD) SCORE. Deirdre A. Kelly,[1] Girish L. Gupte,[1] Paul Davies,[2] Carla Lloyd,[1] Arindam Mukherjee,[1] Patrick J. McKiernan,[1] Indra D. van Mourik,[1] Khalid Sharif,[1] Susan V. Beath.[1] *[1]The Liver Unit, Birmingham Children's Hospital, Birmingham, West Midlands, United Kingdom; [2]Statistics Office, The Institute of Child Health, Birmingham, West Midlands, United Kingdom.*

PURPOSE: We compared the PHD score with the PELD score, in order to identify children at higher risk of death while awaiting transplantation.

METHOD: 67 consecutive children were listed for transplant: 42 for liver graft of which 11 were fulminant cases; 3 were listed for liver/kidney grafts; 20 were listed for liver/bowel grafts and 2 for isolated bowel graft. The PHD score was developed from parameters relating to liver biochemistry (AST; albumin, bilirubin); hepatic decompensation (prothrombin time, presence of ascites) and nursing dependency (requirement for nutritional support; blood product support; additional organ dysfunction, sepsis, type of intravenous access). Each PHD parameter scored 0-4 (maximum theoretical score 40). PELD was calculated using the published formula. Analysis included linear regression. Waiting list mortality was studied by Receiver Operating Curves (ROC), proportional hazards regression and cross classification aspects using Fisher's Exact Test.

RESULTS: Seven patients died without receiving a transplant (5 awaiting liver/bowel transplant; 1 with cystic fibrosis, 1 from fulminant liver failure). The two scores correlated well ($r=0.71$, $p=0.001$), but the PHD score predicted waiting list mortality better than PELD. ROC analysis showed that a PHD score >15.5 was associated ($p<0.001$) with waiting list mortality with a sensitivity of 86% and specificity of 85%. ROC analysis for PELD >8 had a sensitivity of 86% and specificity of 40%. Cox proportional hazard regression of time spent on the waiting list prior to either death or transplant/delisting showed a significant association with both PHD ($p=0.006$) and PELD ($p=0.008$).

CONCLUSION: PHD score was able to discriminate waiting list deaths at least as well as the PELD score and appeared to be especially useful in patients with co-morbidity such as intestinal failure.

Abstract# 326

CHOLESTEROL METABOLISM AFTER PEDIATRIC LIVER TRANSPLANTATION IS CHARACTERIZED BY INCREASED SYNTHESIS AND DECREASED ABSORPTION OF CHOLESTEROL.

Silja Kosola,[1] Hanna Lampela,[1] Helena Gylling,[2] Tatu Miettinen,[2] Mikko Pakarinen.[1] *[1]Hospital for Children and Adolescents, Helsinki University Central Hospital, Helsinki, Finland; [2]Department of Medicine, University of Helsinki, Helsinki, Finland.*

PURPOSE: The liver essentially regulates cholesterol homeostasis and serum lipids. We assessed how different donor and recipient related factors modify serum lipids, cholesterol metabolism, and liver function following pediatric liver transplantation (LTx).

METHOD: We measured serum lipids and noncholesterol sterol to cholesterol ratios, surrogate estimates of cholesterol synthesis and absorption, in 41 pediatric LTx recipients a mean of 10.0 years after LTx and in 92 controls matched for age and sex. Among LTx recipients, results of liver function tests (LFTs), immunosuppressive medication, age, sex, BMI, and graft type (reduced/full size) as well as donor age and sex were recorded.

RESULTS: Serum concentrations of total, HDL, and LDL cholesterol were similar between the groups. The liver recipients had lower campesterol and sitosterol ratios (markers of cholesterol absortion) and higher lathosterol ratios (marker of cholesterol synthesis; P<0.01 for all) than controls. Total and LDL cholesterol and lathosterol levels rose with increasing age (P<0.01 for all), whereas sitosterol levels decreased. Lathosterol showed a strong negative correlation to campesterol and sitosterol (P<0.001 for both) suggesting intact cholesterol homeostasis. Steroid use and high BMI were associated with increased lathosterol ratios. Markers of cholesterol absorption showed negative correlation with the patients' prealbumin levels and prothrombin ratio. Donor age was positively related to serum concentrations of alanine aminotransferase and gamma-glutamyltransferase (P< 0.01 for both), but not to noncholesterol sterol ratios. Graft type had no effect on LFTs or markers of cholesterol synthesis and absorption.

CONCLUSION: LTx may shift the balance of cholesterol metabolism from intestinal absorption to more efficient hepatic synthesis, but serum lipoprotein levels may remain normal due to maintained homeostasis of cholesterol metabolism.

Abstract# 327

LIVER TRANSPLANTATION FOR A CASE OF HOMOCYSTINURIA.

Chinsu Liu,[1] Dau-Ming Niu,[2] Cheng-Yuan Hsia,[1] Che-Chuan Loong,[1] Niang-Cheng Lin.[1] *[1]Department of Surgery, Taipei Veterans General Hospital, Taipei, Taiwan; [2]Department of Pediatrics, Taipei Veterans General Hospital, Taipei, Taiwan.*

PURPOSE: To evaluate the 1-year result of liver transplantation for a case of a 22-year-old man with poor control of homocystinuria (HCU).

METHOD: A deceased donor whole liver transplantation (LTx) was performed in our hospital for a 22-year-old HCU patient in Nov, 22, 2009. The peri-operative course is reevaluated and the post-operative liver function test, tacrolimus trough levels, the blood homocysteine levels and clinical symptoms are followed.

RESULTS: Two weeks before LTx, the patient was hospitalized for diet control of high serum homocysteine. The level was reduced from 140.6 to 23.6 umole/L. The operative course was smooth without any pre-operative dialysis. The post-LTx day 1 serum homocysteine was 16.3 umole/L and he started to have normal diet at post-LTx day 3. He was discharged at post-LTx day 20. At the 1-year follow up, the liver functions were almost normal. The fluctuations of tacrolimus trough levels were noted due to poor drug compliance and two times of rejections were suspected by abnormal liver functions which were normalized by strong supervision of prograf intake. The blood homocysteine levels were normal without diet control even in the rejection episodes. The subjective clinical symptoms such as strength of tendons and tolerance of reading improved significantly.

CONCLUSION: In spite of very limited case reports for LTx in HCU patients, we still recommend early LTx for HCU patient with poor control to avoid severe sequales.

Abstract# 328

SURGICAL INTERVENTIONS AFTER SMALL BOWEL AND MULTIVISCERAL ORGAN TRANSPLANTATION IN A PEDIATRIC PATIENT POPULATION.

Juan C. Mejia, Han Li, George Mazariegos. *Liver and Intestine Transplant, Children's Hospital of Pittsburgh, Pittsburgh, PA, USA.*

PURPOSE: The purpose of this study is to describe the etiology, management, outcome, and resource utilization of surgical complications post intestine transplant (ITX) in a consecutive cohort of pediatric ITX recipients.

METHOD: All pediatric ITX recipients from 2001-2009 were reviewed for incidence of non-elective abdominal surgical interventions (ASI), management and outcome.

RESULTS: During the study time period 127 pediatric patients underwent ITX (71 liver-intestine, 51 isolated small bowel and 5 modified multivisceral). The most common indications for transplantation were Short Gut Syndrome secondary to Volvulus (n=29), Gastroschisis (n=28) and Necrotizing Enterocolitis (n=13). Overall patient and graft survival was 81.1%% and 66.9% respectively with a mean follow-up time of 55 months (range= 2 to 106). One hundred and sixty non-transplant ASI were required for 127 patients during this time period. Seventy four of the operations were considered elective (ileostomy closures), 86 operations were classified as non elective and occurred at a mean time of 23 months following transplantation. The predominant non-elective surgical intervention was abdominal exploration for obstruction. Following the first year after transplantation 82% of the operations were non-elective, exploratory laparotomy for obstruction being the most frequent. Excluding elective operations, 34% of the patients in this cohort required an ASI. As expected, graft survival was lower in the group requiring non-elective abdominal exploration (41% vs. 83%, p < 0.05), but with timely management patient survival was similar (73 % vs. 86%, p = 0.281).

CONCLUSION: In our experience further ASI will be required in approximately a third of the pediatric patients undergoing intestinal and multivisceral transplantation. Most of those interventions will be non-elective and occur following the first year after transplantation. Chronic rejection is the most common finding associated with exploration for obstruction and may lead to graft enterectomy; however timely intervention results in good long term patient survival.

Abstract# 329

ETHANOL LOCK THERAPY TO PREVENT CATHETER-RELATED BLOODSTREAM INFECTIONS IN PARENTERAL NUTRITION PATIENTS WITH INTESTINAL FAILURE: A SYSTEMATIC REVIEW AND META-ANALYSIS.

Carol Oliveira,[1] Ahmed Nasr,[1] Mary Brindle,[2] Paul W. Wales.[1] *[1]Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada; [2]Department of Surgery, Alberta Children's Hospital, Calgary, AB, Canada.*

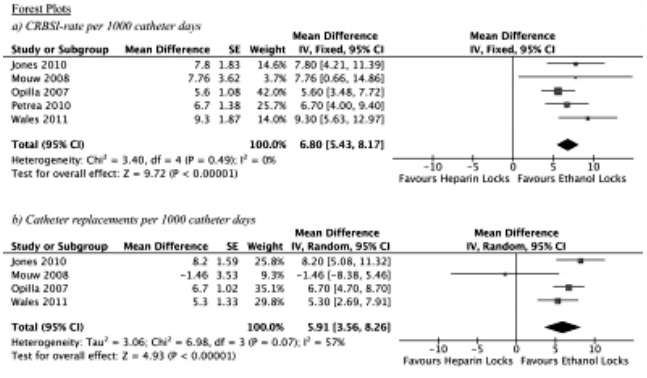
PURPOSE: Patients with intestinal failure are depend on parenteral nutrition (PN) for growth and survival, but are at risk for complications such as catheter-related bloodstream infections (CRBSI). CRBSI-prevention is crucial here, as it endangers the already reduced liver function and survival. Herein, we estimate the pooled effectiveness and safety of ethanol locks (EL) in comparison to heparin locks in regards to CRBSI–rate and catheter replacements.

METHOD: A systematic review without language restriction was performed on MEDLINE (1950-2010), EMBASE (1980-2010) and trial registries up to December 2010. Double, independent data extraction using predefined data fields was performed. 5 retrospective studies and 1 ongoing randomized-controlled trial were identified. 5 studies included pediatric patients, 1 adults only. The Follmann's method was applied. One-way sensitivity analysis was performed. Heterogeneity was assessed by the Q-Test and I^2. Number needed to treat and adverse events were described.

RESULTS: EL reduced the CRBSI-rate per 1000 catheter days by 6.8 (±5.43-8.17) events and catheter replacements by 5.91 (±3.56-8.26) (see Figure "Forest Plots"). EL therapy compared to Heparin decreased the CRBSI-rate by 77% (RR 0.23, ±0.15-0.35) and replacements by 88% (RR 0.12%, ±0.02-0.075). 108 to 150 catheter days of EL exposure were necessary to prevent one CRBSI and 122 to 685 days of exposure avoided one catheter replacement. Adverse effects were rare, while an increased rate of thrombosis was discussed.

CONCLUSION: In PN-patients, EL is a more effective and safe alternative to Heparin locks.

Forest Plots



Abstract# 330

EVALUATION OF BRAIN DEVELOPMENT USING 1H-MRS-DETECTABLE METABOLITES AS BIOMARKERS IN CHILDREN WITH LIVER DISEASE. Tulpesh Patel,[1] Deirdre Kelly,[2] Sue V. Beath,[2] Jacqueline Blyth,[2] Jade N. Thai,[1] Jaswant Sira,[2] Gareth Griffiths,[3] Joel B. Talcott.[1] *[1]School of Life and Health Sciences, Aston University, Birmingham, United Kingdom; [2]Birmingham Children's Hospital, Birmingham, United Kingdom; [3]Chemical Engineering and Applied Chemistry, Aston University, Birmingham, United Kingdom.*

PURPOSE: Proton Magnetic Resonance Spectroscopy (1H-MRS) is a non-invasive imaging technique that enables quantification of neurochemicals in vivo, with potential diagnostic value and facilitating investigations of brain development. This study evaluated the extent to which 1H-MRS can add information to the study of children with liver disease pre- and post-transplant (Tx) by revealing abnormalities in cerebral metabolism, and to evaluate if performance on measures of cognitive ability is related to concentrations of 1H-MRS-detectable neurometabolites.

METHOD: In a sample of 23 children with liver disease (pre-Tx n=13, mean age 13.1; post-Tx n=10, mean age 15.1) and 11 healthy controls (mean age 12.2), single-voxel 1H-MRS in occipitoparietal and frontal cortical white matter was used to assay concentrations of four principal metabolites: N acetyl aspartate, choline, myo-Inositol and glutamate-glutamine, in parallel with assessments of Full-scale IQ (FSIQ).

RESULTS: No differences in cerebral metabolites were observed between the pre- and post-Tx groups, nor between these patients and age-matched healthy controls. This suggests that neurodevelopment, assayed by surrogate neurometabolite markers detected by 1H-MRS, is normal in the liver disease patient cohort and is unaffected by Tx intervention. No correlations were observed between any of the metabolite measures and FSIQ.

CONCLUSION: 1H-MRS may supplement neuropsychological tests to enable evaluation of the patient's progress before and after transplantation and holds promise as a screening tool for biomarkers in liver disease because of the increased precision gained through using continuous measures rather than ordinal or categorical ones. The use of 1H-MRS is still largely exploratory and further normative 1H-MRS metabolite values are required to provide context for the clinical data.

Abstract# 331

LIPID PROFILE AND OXIDATIVE STRESS IN PAEDIATRIC AND ADULT LIVER TRANSPLANT RECIPIENTS. J. Pawlowska,[1] A. Wierzbicka,[2] P. Socha,[1] I. Jankowska,[1] P. Czubkowski,[1] M. Teisseyre,[1] J. Teisseyre,[3] M. Krajewska,[4] U. Oldakowska-Jedynak.[5] *[1]Gastroenterology & Hepatology, CMHI, Warsaw, Poland; [2]Bichemistry & Experimental Medicine, CMHI, Warsaw, Poland; [3]Pediatric Surgery & Organ Transplantation, CMHI, Warsaw, Poland; [4]Internal Disease, Immunology & Transplantology, WMU, Warsaw, Poland; [5]General Transplant & Liver Surgery, WMU, Warsaw, Poland.*

PURPOSE: According to our previous study (Transplant Proc 2007, 39: 1523-5) lipids disturbances due to recently used immunosuppressant regiment are less common than seen before. **Objective:** To assess the cardiovascular risk factors in pediatric and adults patients 1-5 years after liver transplantation.

METHOD: The study group consisted of 67 children (48 girls and 19 boys) aged 10.4 ± 4.9 years and 44 adults (17 woman and 27 man) aged 46.5 ± 7.6 y after liver transplantation with good liver function. In all patients lipid parameters were measured on fastum.

RESULTS: Few children presented with abnormal lipid profile: hipertriglicerydemia (>150 mg/dl) was present in 9/67 pts, hipercholesterolemia (>200mg/dl) in 19/67, low HDL-C (<45 mg/dl) in 13/67. Abnormal lipid parameters were present in a significant but a small number of adults: hipertriglicerydemia in 12/44, hypercholesterolemia in 14/44, low HDL-C in 22/44. There were no differences in serum total cholesterol -TC (180.6 ± 49.4 vs. 167.7 ± mg/dl), TG (88.0 ± 54.80 vs. 81.1± 42.4 mg/dl), LDL-C (110.8 ± vs. 104.9 ± 24.5 mg/dl), HDL-C (53.2 ± 10.1 vs. 46.8 ± 11.0 mg/dl), Apo A1 (1,4 ± 0.24 vs. 1.3 ± 0.33 g/l), Apo B (1,1 ± 1.73 vs. 0.8 ± 0.20 g/l), LCAT (151.1 ± 64.3 vs. 129.2 ± 21. nmol/ml/h), glutathione (745.2 ± 88.9 vs. 729.8 ± 121.0 µmol/ml) and GPx (33.8 ± 5.8 vs. 31.5 ± 4.3 6U/gHb) between transplanted children and a control group of 67 healthy children (mean values presented with SD).

CONCLUSION: Lipid disturbances are not very common in children and adult liver transplant recipients. Pediatric population of liver transplant recipients does not present with increased risk of disturbed lipid metabolism and increased oxidative stress.

The study received financial support of the Polish Ministry of Science PB 1977/ P01/2007/32.

Abstract# 332

VASCULOBILIARY ANATOMY IN LIVING RELATED DONOR LIVER TRANSPLANTATION LIVING-LIVE MODE. Elena Pestana,[1] Maria Conchita Diaz,[1] Dafne Del Valle,[1] Tomoaki Kato,[2] Pedro Rivas-Vetencourt,[1] Hildemaris Atienza,[1] Bruno Díaz,[1] Franco Bisignano,[1] Damelys Marin,[1] Hermogenes Malave,[1] Miguel Vasallo.[1] *[1]PMTH, Caracas, Venezuela; [2]Presbyterian/Columbia Hospital, New York, USA.*

PURPOSE: To describe the vascular anatomy in living related donor liver transplantation living-live mode of the Metropolitan Liver Transplant Program.

METHOD: Retrospective studied where we evaluated the vascular anatomy of living related donors for liver transplants performed between April 2005 to December 2010 (36 patients) by the Metropolitan Liver Transplant Program through the analysis of CT scans angiographies or angiograms for vascular anatomy: arterial distribution pattern was assessed according to the classification of Michels, the portal venous distribution pattern was assessed according to the classification of Cheng and the suprahepatic veins were evaluated based on the presence or absence of variants and or accessories.

RESULTS: We evaluated 36 living donor liver segments in a row, including the examination of 25 CT scans angiographies and 2 angiograms. The average age of donors was 35.36 years, of which 66.6% were male and 33.3% women. The most common arterial distribution was the type I of Michels with a 55.55%, in second place with 22.22% type III, the most common portal distribution was Cheng´s type I with 81.48% and were considered normal 40.74% of the suprahepatic veins with the presence of accessories in 25.92% and variants in 22.22%.

CONCLUSION: The prevalence of vascular anatomic variations in the case of the arterial distribution is compatible with the rates reported by Michels in his work on variation by CT scans angiographies. The portal vein shows a percentage of anatomic variations less than 20% and suprahepatic veins were found variants and or accessories in 59% of all cases. In related volunteer living donors for liver transplantation should be taken into account thorough study prior to surgery to avoid complications. To evaluate the vascular anatomy is essential for surgical planning.

Abstract# 333

FIRST REPORT OF MESO-REX SHUNT FOR IMMEDIATE PORTAL RECONSTRUCTION IN PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION. Jairo E. Rivera,[1,3] Fabio Fusaro,[1] Catherine De Magnee,[1] Philippe Clapuyt,[2] Raymond Reding.[1] *[1]Pediatric Surgery and Transplant Unit, Saint-Luc University Clinics, Brussels, Belgium; [2]Pediatric Radiology Unit, Saint-Luc University Clinics, Brussels, Belgium; [3]Transplant Unit, Fundacion Cardioinfantil I.C., Bogota, Colombia.*

PURPOSE: To describe a new option for portal vein (PV) revascularization during a pediatric liver transplant (LT).

METHOD: A 13-month-old girl with biliary atresia (BA) was transplanted using a maternal left liver lobe. Portal hypoplasia was confirmed during surgery. A portoplasty using a latero-lateral anastomosis between the donor inferior mesenteric vein was performed before conventional implantation of the left PV(L-PV). Intraoperative echoDoppler found absent portal flow (PF), and a second anastomosis was made but was unsuccesful. Considering the insufficient extra-hepatic length of the remaining L-PV of the allograft, we performed a meso-Rex shunt using the left internal jugular vein of the recipient, who allowed adequate PF through the liver.

RESULTS: At 6 months liver tests and echoDoppler are normal.

CONCLUSION: Meso-Rex shunt is used to treat extrahepatic portal hypertension in children, and constitutes the preferred technique to cure chronic thrombosis of the PV following LT. Early portal complication (PC) is one of the most challenging technical problems during or after pediatric LT. PV hypoplasia in the context of BA constitutes the main risk factor to PC. In this specific case, the main technical incident precluding the use of any of the classical techniques of PV reconstruction was the impossibility to get enough length on the allograft PV stump, a rare condition in the context of a left liver lobe allograft from a living donor. Meso-Rex shunt offers a valid alternative to troncular anastomosis in order to solve some intraoperative PC during the living donor LT. It is recommended that surgeons involved in this field acquire expertise in this alternative technical option, and that access to the recipient left jugular vein is prepared during any pediatric LT procedure.

Abstract# 334

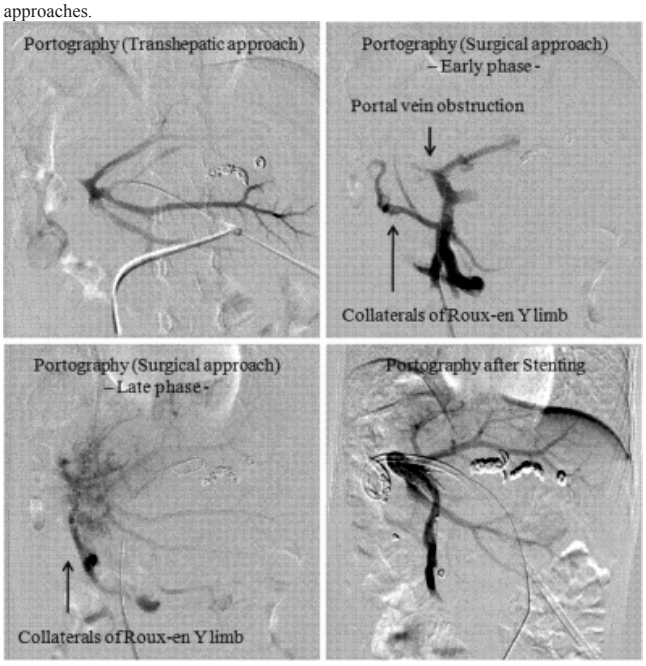
EOSINOPHILIC GASTROINTESTINAL DISEASE IN THE LONG TERM FOLLOW UP AFTER PEDIATRIC LIVER TRANSPLANTATION: A NEW DISEASE OR TOXICITY. Claudia Sánchez, Camila Sánchez, Gustavo Boldrini, Victoria Fernandez de Cuevas, Daniel D'Agostino. *Pediatric Gastroenterology, Hepatology Division, Liver and Intestinal Transplantation Center, Hospital Italiano, Buenos Aires, Capital Federal, Argentina.*

PURPOSE: Calcineurin inhibitors (cyclosporine and tacrolimus) are the most frequent immmunossupresants used in liver transplant children. Previous studies have linked the use of tacrolimus with peripheral eosinophilia and food allergies.

METHOD: Of the 284 liver transplant patients at our institution, two had gastrointestinal symptoms secundary to eosinophilic gastrointestinal disease.
RESULTS: In patient 1 (P1), symptoms appeared when he was 3 years old, two years after liver transplantation. In patient 2 (P2), when he was 6 year old, five years after transplantation. Tacrolimus was used for immunosuppression, with mean trough levels during the last 3 months of 4.4ng/ml in P1 and 6.3ng/ml in P2, plus corticosteroids on tapering doses. The most important symptom was recurrent diarrhea. Infectious etiologies were ruled out. Both patients had elevated IgA transglutaminase levels. Upper GI endoscopy was performed, showing eosinophilic infiltration in the esophageal and gastric mucosa in both patients. In esophageal mucosa, P1 had microabscesses and P2 basal hyperplasia. The P2 had eosinophilic infiltration in the colon with inflammation of the lamina propia. The development of duodenal villi was normal in both children. The two patients had hyper peripheral eosinophilia between 12 -16% (1500-1800 eos/mm3), elevated IgE and food sensibilization with positive tests (IgE Rast): P1 to soybeans and P2 to egg, milk and wheat. Both patients improved with the addition of budesonide, but the second one required shift to cyclosporine to definitely have a symptomatic relief.
CONCLUSION: In pediatric liver transplant patients with gastrointestinal symptoms, it is important to consider the possibility of eosinophilic gastrointestinal disease. The role of tacrolimus in food allergy should be determined. New studies are necesary to determine the prevalence and characteristics of this disease and to better understand the management and treatment.

Abstract# 335

PORTAL VEIN OBSTRUCTION AFTER PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION. Seisuke Sakamoto,[1] Shunsuke Nosaka,[2] Akinari Fukuda,[1] Takanobu Shigeta,[1] Toshihiko Kakiuchi,[1] Osamu Miyazaki,[2] Yoshinori Isobe,[3] Mureo Kasahara.[1] *[1]Transplant Surgery, National Center for Child Health & Development, Tokyo, Japan; [2]Radiology, National Center for Child Health & Development, Tokyo, Japan; [3]Radiology, Tokyo Medical Center, Tokyo, Japan.*
PURPOSE: Although portal vein obstruction (PVO) has been usually treated by surgical intervention, it could be invasive and technically-demanding. To contrary, transluminal angioplasty has been utilized, but its success rate could be low, depending on the extent of PVO. Herein, we report a case of PVO after living donor liver transplantation (LDLT), treated successfully by combined surgical and percutaneous transhepatic approaches.
METHOD: 8-year-old male, undergoing LDLT for acute liver failure in infancy, suddenly presented gastrointestinal bleeding, and referred to our hospital. An angiography showed complete obstruction of the portal vein trunk with developed collaterals through the Roux-en Y limb draining into the graft. Varicose veins on the limb were identified as the source of bleeding. Splenic arterial embolization was performed to decrease high portal vein pressure as the first therapeutic option. However, bleeding recurred after resumption of oral intake.
RESULTS: At this point, we considered surgical intervention, transluminal angioplasty, or re-transplantation as the next option. We successfully performed portal vein dilatation and stenting by using the combined surgical and percutaneous transhepatic approaches.



At 6-month follow-up, he was asymptomatic on oral anticoagulation with a good portal venous flow.
CONCLUSION: This combined surgical and percutaneous transhepatic approaches can be alternative to surgical intervention or retransplantation for PVO.

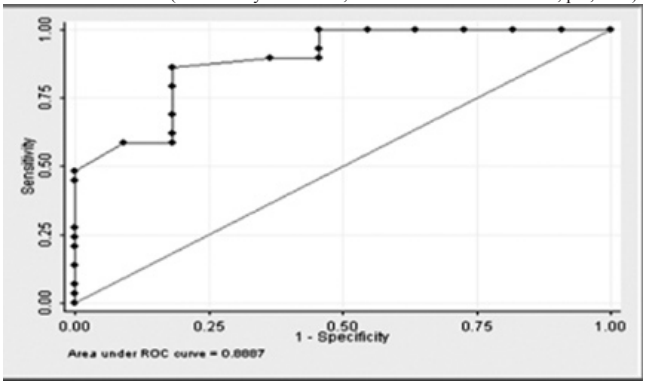
Abstract# 336

PELD SCORE IN ACUTE LIVER FAILURE TO ASSESS BAD PROGNOSIS. Camila Sanchez, Daniel D'Agostino, Gustavo Boldrini, Victoria Fernandez. *Liver Transplant Center, Hospital Italiano, Buenos Aires, Argentina.*
PURPOSE: The goal of the present study was to investigate the prognostic accuracy of the PELD in children with ALF admitted to our liver transplant center.
METHOD: PELD score was calculated based on the results of blood tests obtained on hospital admission in 40 consecutive patients aged <18 years who presented with ALF from June 1999 to January 2009. Bad outcome was defined as liver transplantation or death.
RESULTS: Mean age of the patients was 5.3±4.4 years (range 6m-17 years) and 52.5% were females (n=21). Etiologies of ALF were: Hepatitis A in 17 (42.5%), indeterminate in 14 (35%), autoimmune hepatitis in 7 (17.5% (type 1:12.5% (n5), type 2: 5% (n2)), and toxic in 2 (5%). PELD mean score was 34.92+-10.48 (range 6-55). PELD scores obtained on admission were significantly higher among nonsurvivors (39.8+-9.5) and patients receiving transplants (39+-7.1) compared to those who survived without OLT (31.3 +-3) (p 0.001).

Outcome of children with Fulminant Hepatic Failure

	Listed (n=35)	Survived not listed (n=5)	Survived listed (n=7)	Underwent OLT (n=23)	Died without OLT (n=6)	OLT/Died (n=29)
PELD	37.2±8.3	18.8±10.6	31,1±10.3	39.6±7.1	39.8±9.5	39±6.8

A cutoff of 33 in PELD score using ROC curve showed a specificity 81% and sensitivity 86% for bad outcome (PPV 92% y NPV 69%, AUC 0.8895% IC 0.77- 1.0, p 0,0001).



CONCLUSION: PELD score obtained upon admission may be of help to establish the optimal timing for pre-OLT evaluation and listing. Further validation in larger and different populations is needed.

Abstract# 337

IMPLICATIONS FOR THE USAGE OF THE LEFT LATERAL GRAFT FOR INFANTS <10kg BASED ON A SINGLE CENTRE EXPERIENCE IN PEDIATRIC LIVER TRANSPLANTATION: ARE MONOSEGMENTAL OR HYPERREDUCED GRAFTS REDUNDANT? Maren Schulze,[1] Bettina Dresske,[1] Martina Kohl,[2] Dieter Bröring,[3] Felix Braun,[1] Martin Burdelski.[2] *[1]Dep. of General and Thoracic Surgery, University Hospital of Schleswig Holstein, Campus Kiel, Kiel, Germany; [2]Dep. of Pediatric Gastroenterology, University Hospital of Schleswig Holstein, Campus Kiel, Kiel, Germany; [3]Department of Surgery, MBC-40, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia.*
PURPOSE: The shortage of organ donors for infant liver transplant recipients has lead to an increase in splitting and living donation. For cases in which even transplantation of the left lateral graft (Couinaud's segments II+III) results in a "large for size situation" with an estimated graft to body weight ratio (GBWR) of > 4%, the technique of monosegmental liver transplantation was developed. This technique however bears other complications due to a greater parenchymal surface and suboptimal vascular in and outflow.
METHOD: Our technique for pediatric liver transplantation is the use of the left lateral graft from either living donors or preferably split grafts. In cases of restricted intraabdominal space a silicon foil was inserted for temporary closure.
RESULTS: In our series of 41 pediatric transplants in 38 children ≤10kg we predominantly used left lateral grafts. Within this group there were 23 cases with a GBWR of ≥4 and 15 cases with a GBWR <4. There was no statistical difference in vascular or biliary complications. Despite a more frequent rate of temporary abdominal closure we did not find a higher rate of intraabdominal infections. Overall patient and graft survival was excellent in both groups (one death, three re-transplants). We noticed, however that the ventro-dorsal diameter of the graft appears to be more relevant to potential graft necrosis than and the actual graft size.

CONCLUSION: In conclusion, the usage of monosegmental grafts seems unnecessary if transplantation of left lateral grafts is performed by an experienced multidisciplinary team, and temporary abdominal closure is favoured in cases of increased abdominal pressure.

Abstract# 338

ANALYSIS OF PROGNOSTIC FACTORS IN PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION FOR BILIARY ATRESIA. Takanobu Shigeta,[1] Mureo Kasahara,[1] Seisuke Sakamoto,[1] Akinari Fukuda,[1] Toshihiko Kakiuchi,[1] Atsuko Nakazawa,[2] Akira Matsui.[3] *[1]Transplant Surgery, National Center for Child Health and Development, Tokyo, Japan; [2]Pathology, National Center for Child Health and Development, Tokyo, Japan; [3]Director, National Center for Child Health and Development, Tokyo, Japan.*

PURPOSE: The aim of this study is to evaluate the perioperative prognostic factors for the pediatric patients of biliary atresia (BA) undergoing living donor liver transplantation (LDLT).

METHOD: Fifty-one pediatric patients underwent LDLT for BA from Nov. 2005 to Aug. 2010 at our institute. The median age and body weight at LDLT were 11 months (4 months-16 years) and 7.4 kg (5.3-53.1 kg), respectively. Postoperative complications were classified according to the Clavien- Dindo scoring system (Dindo D et al. Ann Surg. 2004), and divided into 2 groups (Group A, n=26; no complications or Grade 1-2, mild complications without interventional procedure vs. Group B, n=25; Grade 3-5, life-threatening complications required interventional procedure -death). The perioperative prognostic factors were analyzed by univariate analysis between 2 groups.

Clavien- Dindo scoring system

Grade	Definition	n
1	Mild complications	3
2	Requiring pharmacological treatment	9
3	Requiring interventional or radiological intervention	16
4	Life threatening complications requiring ICU management	3
5	Death of a patient	6

No complicatons in 14 patients

RESULTS: Complications in group B consisted of abdominal abscess in 6, sepsis in 5, portal vein thrombosis in 4, biliary complications in 4, gastrointestinal perforation in 3, respiratory failure in 2. The analysis showed the preoperative cholinesterase values (GroupA; 187 IU/L vs. GroupB; 131.6 IU/L), the use of SEPRAFILM (Genzyme Corporation) at the portoenterostomy (84.2% vs. 52.9%), and the requirement of antibiotics before LDLT (7.7% vs. 44.0%) were significant prognostic factors ($p<0.05$).

CONCLUSION: SEPRAFILM is effective to prevent intraperitoneal adhesions, and reduces the risk of bowel injury. The preoperative management for the severely-malnourished patients, such as the prevention of infection, is important to decrease the complications in pediatric LDLT for BA.

Abstract# 339

EVALUATION OF LIVER AND PULMONARY FUNCTION IN CHILDREN WITH CYSTIC FIBROSIS AFTER LIVER TRANSPLANTATION. Mikolaj Teisseyre,[1] Hanna Dmenska,[2] Joanna Teisseyre,[3] Piotr Kalicinski,[3] Joanna Pawlowska,[1] Irena Jankowska,[1] Malgorzata Markiewicz-Kijewska,[3] Dorota Broniszczak,[3] Piotr Czubkowski,[1] Przemyslaw Kluge.[4] *[1]Department of Gastroenterology, Hepatology, and Immunology, The Children's Memorial Health Institute, Warsaw, Poland; [2]Department of Lung Physiology, The Children's Memorial Health Institute, Warsaw, Poland; [3]Department of Pediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [4]Department of Pathology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Evaluation of liver and pulmonary function in children with cystic fibrosis after liver transplantation.

METHOD: 8 children with cystic fibrosis, at a mean age of 10.6 years (ranging from 7.25 to 18), underwent liver transplantation. Liver function tests and spirometry were performed before and after liver transplantation.

RESULTS: Indications for liver transplantation were portal hypertension in all patients, uncontrolled variceal bleeding in two of them. Three patient had chronic pulmonary colonisation with Pseudomonas aeruginosa. One patient dead 2.5 months after liver transplantation and retransplantation due to septic complications. Follow-up of 7 survival patients ranging from 0.5 to 9.5 years (mean value – 4,5). Immunosuppression consist of tacrolimus and mycophenolate mofetil in 4 patients, tacrolimus alone in 1 patient, and cyclosporine in 1patient. Two patients developed insulin-dependent diabetes. Liver function test (ALT, INR, bilirubin, albumin) was normal and no signs of portal hypertension was observed after liver transplantation. FEV_1, in 7 survival patients, ranging from 62.1 to 130.6 (% of predictive value) before liver transplantation and ranging from 54.4 to 112 after liver transplantation (no statistical difference).

CONCLUSION: Liver transplantation should be offered to patients with cystic fibrosis and end-stage liver disease who have mild to moderate pulmonary dysfunction. Deterioration of pulmonary function wasn't observed after liver transplantation.

Abstract# 340

GRAFT FIBROSIS PROGRESSION IN PATIENTS WITH BILIARY ATRESIA AFTER PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION. Takehisa Ueno, Yoshiyuki Ihara, Yuichi Takama, Masahiro Fukuzawa. *Pediatric Surgery, Osaka University Medical School, Suita, Osaka, Japan.*

PURPOSE: Biliary atresia (BA) is characterized by obliteration or discontinuity of the extrahepatic biliary system, sometimes resulting in hepatic fibrosis. Pediatric living donor liver transplant (LDLT) promises successful treatment for BA patients. However some patients develop liver fibrosis even if biliary atresia is not thought to be a recurrent disease. The nature of the graft fibrosis is unknown. The progression of graft fibrosis was evaluated by means of a serial protocol biopsy after pediatric LDLT.

METHOD: Twelve BA patients who received pediatric LDLT had graft fibrosis under protocol biopsies. They were followed up by serial protocol biopsies. All patients received standard tacrolimus based immunosuppression. The biopsies were assessed with H&E and Masson's trichrome stains. Patient demographics and data were gathered from a prospectively recorded database and chart review. The progression of graft fibrosis was compared with the patient's demographic data and immunosuppression.

RESULTS: All patients received LDLT from their relatives. There were 8 females and 4 males. The mean patient age at transplant was 3.9 year olds. The first protocol biopsies were performed at a mean age of 7.8 year old and 3.9 years after liver transplant. The mean time interval between the first and last protocol biopsies was 2.0 years. The graft vs. body weight ratio ranged from 0.8 to 4.5% (Mean 2.3%) No complications were observed with the serial protocol biopsy. The first protocol biopsy showed F1 in 6 patients (50%) and F2 in 6 patients (50%). Fibrosis was improved in 4 patients (33%) and there was no change in 8 patients (67%) in the last available biopsies. No progression was observed. All improved patients were administered steroids whereas only 3 patients showed no improvement (38%).

CONCLUSION: BA is not a recurrent disease. Biopsy-proven fibrosis can occur in the context of normal liver function blood tests in BA patients after LDLT. Such graft fibrosis did not show progression. Further analysis is thus required to determine the prognosis of graft function and its associated risk factors.

Kidney 5: Hypertension/Aneamia/Growth

Abstract# 341

PREVALENCE AND PREDICTORS OF ANEMIA FOLLOWING RENAL TRANSPLANTATION IN EUROPEAN CHILDREN. Leah A. Krischock, Karlijn van Stralen, Kitty Jager, Enrico Verrina, Jaap W. Groothoff, Franz Schaefer, Jane Tizard, On Behalf of the ESPN/ERA-EDTA Registry Study Group. *Department of Medical Informatics, J1B, Academic Medical Center, Amsterdam, Netherlands.*

PURPOSE: Determine the prevalence of anemia in children with a renal allograft, and identify potential determinants of anemia within this population.

METHOD: The ESPN/ERA-EDTA registry was used to derive data for 2192 children with a renal transplant from 15 European countries, aged <18 years between 1999 and 2009, providing 8964 measurements. Anemia was defined as hemoglobin (Hb) level <11mg/dL for children 2 years and older, and <10.5mg/dL for those younger than 2 years.

RESULTS: Mean Hb level was 11.9g/dL, with 5th and 95th percentiles of 9.3 and 14.4g/dL respectively. Anemia was present in 26.8% of patients, despite 17.7% receiving an Erythropoietin Stimulating Agent (ESA), and 27.8% receiving iron supplements.

The risk of anemia was higher in females, younger patients, and patients with cystic kidney disease as compared to all other causes of renal failure. No differences were found between patients who received a renal allograft from a living versus a deceased donor. After adjustment for age, gender and cause of renal failure, there was no difference in the prevalence of anemia between patients who had a pre-emptive transplant compared to those who received dialysis prior to transplantation, nor between patients with a duration of dialysis under a year compared to those on dialysis for more than a year prior to transplantation. There was no difference in the prevalence of anemia between patients who received haemodialysis as compared to peritoneal dialysis before receiving their transplant.

CONCLUSION: Despite increased awareness of the importance of anemia and advances in anemia therapies, including the use of ESAs, anemia remains a common problem in European children following renal transplantation. Continued improvement in the management of anemia in children following renal transplantation is needed.

Abstract# 342

BLOOD PRESSURE PROFILE IN RENAL TRANSPLANT RECIPIENTS AND ITS RELATION TO DIASTOLIC FUNCTION: TISSUE DOPPLER ECHOCARDIOGRAPHIC STUDY. Mitra Basiratnia,[1] Gholam Hossein Ajami.[2] *[1]Shiraz Nephrology Urology Research Center, Shiraz University of Medical Sciences, Shiraz, Fars, Islamic Republic of Iran; [2]Division of Pediatric Cardiology, Shiraz University of Medical Sciences, Shiraz, Fars, Islamic Republic of Iran.*

PURPOSE: Hypertension is a common complication after renal transplantation and is associated with increased risk of cardiovascular disease. The aim of the current study was to investigate the diurnal blood pressure pattern and its relation to structural and functional cardiac changes in renal transplant recipients.

METHOD: Sixty six stable renal transplant patients (34 females, 32 males), aged 7 to 25 years (mean 17.4±4.3 years) were enrolled in this study. Cardiac function assessed by tissue Doppler echocardiography and blood pressure measurement performed using both ambulatory and casual method.

RESULTS: Hypertension was demonstrated in 57% of recipients by casual method and in 75.7% by ambulatory blood pressure monitoring (ABPM). The efficacy of BP control among patients on antihypertensive drugs was 60%. The prevalence of nondipping was 73%. There was significant inverse correlation between systolic or diastolic daytime or night time BP index and post transplant duration ($p<0.001$, $r=-0.386$), but no correlation between ABP parameters and BMI, gender, and e GFR. There was significant relationship between all ABP parameters and left ventricular mass index (LVMI) ($p=0.025$- 0.007, $r=0.28$- 0.38). LVMI was significantly higher in hypertensive than in normotensive cases ($p=0.034$). There was no difference in diastolic function between hypertensive and normotensive patients and also in patients with and without LVH.

CONCLUSION: In conclusion our study showed the advantage of ABPM over casual method for diagnosis of hypertension. LVH is common in transplant patients and is likely associated with arterial hypertension. Hypertension and LVH can not differentiate transplant patients with diastolic malfunction.

Abstract# 343

CARDIOVASCULAR EVENTS IN PEDIATRIC RENAL TRANSPLANT PATIENTS. Andrea Soo,[1] Bethany J. Foster,[2] Susan M. Samuel.[1] *[1]Pediatrics, University of Calgary, Calgary, Canada; [2]Pediatrics, McGill University, Montreal, Canada.*

PURPOSE: Cardiac death rates in renal transplant patients are markedly higher than the general population. However, there is limited information about major fatal and non-fatal cardiovascular events in pediatric renal transplant patients.

METHOD: Using a population-based retrospective cohort design utilizing both the Canadian Organ Replacement Register and national health administrative databases, incident pediatric (ages 0-18) end-stage renal disease (ESRD) patients (from 1992 to 2007) who received a kidney transplant were followed from first transplant until death or date of last contact. Primary outcome was major fatal or non-fatal cardiovascular event (defined as either acute myocardial infarction (AMI), congestive heart failure (CHF), or stroke) obtained from hospitalization discharge diagnoses data in national health administrative databases. We report the proportion of events observed according to selected characteristics (transplant donor source, ethnicity, and gender).

RESULTS: A total of 506 patients (50.2% males) were followed for a median of 5.9 years (IQR: 2.9-9.0). During 3163 patient-years of follow-up, 29 (5.7%) patients experienced 51 cardiovascular events, for an incidence rate of 16.1 per 1000 patient-years. Thirty-nine (76.5%) events were due to CHF, 5 (9.8%) due to AMI, and 7 (13.7%) due to stroke. 7.5% (19 out of 252) of females and 3.9% (10 out of 254) of males experienced at least one cardiovascular event ($p=0.08$). A significantly greater proportion of deceased donor (8.5%) than living donor (3.1%) transplant recipients experienced at least one event ($p=0.01$). 15.1% of Aboriginal children experienced an event compared to 5.0% of white children ($p=0.01$). Median time to first cardiovascular event following transplantation was 3.7 (IQR 0.5-6.0) years and median age at first event was 18.2 (IQR 13.5-21.2) years. Five patients had fatal cardiovascular events (2 stroke and 3 CHF).

CONCLUSION: CHF is the most common cardiovascular event post kidney transplantation in pediatric ESRD patients. Deceased donor transplant recipients and Aboriginal children are at higher risk for cardiovascular events.

Abstract# 344

LIVING RELATED DONATION LEADS TO A DECREASED SEVERITY OF ARTERIAL HYPERTENSION AFTER PEDIATRIC KIDNEY TRANSPLANTATION. Nele A. Heidotting, Thurid Ahlenstiel, Lars Pape. *Pediatric Nephrology, Medical School of Hannover, Hannover, Germany.*

PURPOSE: Hypertension after pediatric renal transplantation (KTX) is one of the main risk factors for chronic allograft nephropathy and cardiovascular diseases. Until now there is no study about the influence of pre-transplant and transplant factors.

METHOD: Retrospective chart review of 485 children (1- 17 years) who underwent KTX from 1974-2007. Patients with height < 120 cm were excluded as no validated percentiles for 24h-ambulantory blood pressure monitoring (ABPM) exist. Complete data sets for 3 years were available for 144 patients. Data was drawn 1, 3, 6, 12, 24 and 36 months afte KTX. We analysed the influence of donor age, recipient age, pre-emptive KTX, and living or deceased KTX on ABPM, the numbers of antihypertensive medication used and end organ damage. Data was analysed by multiple testing and ANOVA.

RESULTS: We found a statistical significant association between higher donor age and a higher need of antihypertensive medication ($p=0.001$), and more long term organ damage ($p=0.001$). In multiple testing, living donation was associated with a lower amount of antihypertensives needed ($p=0.001$).

Time post KTX	1 DD, 2 LD	n	antihypertensives (n)	MBP percentile
3m	1	61	2.8 ± 1.2	64 ± 28
	2	51	1.9 ± 1.3	60 ± 29
6m	1	67	2.8 ± 1.4	65 ± 28
	2	54	1.6 ± 1.2	56 ± 29
12m	1	71	2.5 ± 1.5	60 ± 29
	2	68	1.8 ± 1.5	65 ± 28
24m	1	75	2.4 ± 1.6	71 ± 26
	2	61	1.7 ± 1.3	68 ± 26
36m	1	75	2.5 ± 1.6	66 ± 27
	2	58	1.7 ± 1.3	68 ± 26

Mean number of antihypertensives and mean blood pressure percentile according to donor type

As expected, lower recipient age was the only factor associated with lower 24hABPM in multiple testing ($p=0.00$) but not with a lower number of antihypertensives ($p= 0.87$). The immunosuppressive regimen and pre-emptive transplantation had no influence of any of the factors

CONCLUSION: Blood pressure was generally well controlled in our patients. The severity of arterial hypertension in children after KTX can be reduced by the use of organs from living related donors and deceased donors of young age but not by pre-emptive KTX or the immunosuppressive regimen applied.

Abstract# 345

CAROTID AND FEMORAL INTIMA-MEDIA THICKNESS IN CHILDREN AND YOUNG ADULTS AFTER KIDNEY TRANSPLANTATION. Miraiam Davidovits,[1,3] Maital Kaidar,[1,3] Osnat Konen.[2,3] *[1]Institute of Nephrology, Schneider Children's Medical Center, Petach-Tiqva, Israel; [2]Institute of Radiology, Schneider Children's Medical Center, Petach-Tiqva, Israel; [3]Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel.*

PURPOSE: Cardiovascular complications account up to 40% of all deaths in pediatric renal transplant recipients. Vascular damage is associated with accelerated atherosclerosis and evolvement of arteriosclerosis (Monckeberg-type medial sclerosis) leading to elevated intima media thickeness (IMT). These processes lead to vascular stiffness, hypertension and left ventricular hypertrophy (LVH). We aim to evaluate the IMT of renal transplant recipients compared with healthy individuals.

METHOD: 46 children after kidney transplantation (AKT) and 41 age and sex matched control subjects were enrolled. All patients IMT of common carotid artery (CCA) and common femoral artery (CFA) were measured by linear B-Mode ultrasound. IMT data was compared between renal transplant and control groups. Correlation between IMT and patient's clinic blood pressure (BP) and LVH measurements were evaluated.

RESULTS: CCA IMT and CFA IMT were significantly higher in renal transplant recipients than in control patients with mean measurements of 6.04±2.08mm VS 3.69±0.69mm ($p<0.001$) and 5.90±1.78mm VS 3.95±0.69mm ($p<0.001$) respectively. Significant correlation was found between CCA IMT and systolic BP 6 month AKT ($r=0.307$ and $p<0.05$) and between CFA IMT and systolic BP 2 and 6 month AKT ($r=0.35$ with $p<0.05$ and $r=0.40$ with $p<0.05$ respectively). No significant correlation was found between CCA IMT or CFA IMT and LVH. No significant difference between CCA and CFA measurement was seen.

CONCLUSION: Although, the prognosis of pediatric renal transplantation recipients has noticeably improved, the vasculopathy that had evolved in the course of CRF remains significant after renal transplantation.CCA and CFA measurements apply similar data concerning IMT thickness.The correlation between elevated IMT and systolic hypertension reflects probably the interaction between different cardiovascular risk factors and accentuates the need for precise monitoring and control of BP after renal transplantation.

Abstract# 346

THROMBOPHILIA EVALUATION AND PROPHYLAXIS IN PEDIATRIC KIDNEY TRANSPLANTATION. Massimiliano Spaliviero, Neda Sadeghi, Troy M. Sofinowski, Blake W. Palmer, Bradley P. Kropp, Puneet Sindhwani. *Pediatric and Adult Renal Transplant Section, OUHSC Department of Urology, Oklahoma City, OK, USA.*

PURPOSE: Undiagnosed thrombophilia in pediatric end stage renal disease (ESRD) patients can lead to graft thrombosis and loss. No standardized workup or prophylaxis regimen exists. We present our thrombophilia evaluation and prophylaxis protocol.

METHOD: Pediatric ESRD patients, transplanted or currently on candidate list, were prospectively evaluated. Patients stratified into a high or low risk category for graft thrombosis were treated with postoperative heparin drip followed by low molecular weight heparin subcutaneously for 6 and 3 months, respectively. Patients at no risk were observed. Post-transplant complications were recorded.

RESULTS: 48 pediatric patients were transplanted since 2005. Prior to this protocol, 3 (20%) of 15 grafts were lost due to thrombosis; subsequent thrombophilia workup

revealed high risk. Since 2007, pre-transplant thrombophilia evaluation detected 14 high-risk, 23 low-risk, and 3 patients at no risk for post-transplant thrombosis (Table 1). To date, 34 children have been transplanted successfully with no graft losses (including 2 of the 3 previous thrombotic graft losses) following this novel protocol; 9 are awaiting transplantation; and 3 are currently undergoing thrombophilia workup. One bleeding complication occurred and required operative intervention.

Findings of Thrombophilia Workup

Finding	No. of Pts. (n = 40)	%
Negative workup	3	7.5%
Personal History of Thrombosis	3	7.5%
Family History of Thrombosis	5	12.5%
Deficiency of Protein C Activity	7	17.5%
Deficiency of Protein S Activity	6	15.0%
Elevated Factor VIII level	28	70.0%
Elevated Homocysteine	19	47.5%
PT 20210A Prothrombin Gene Mutation	2	5.0%
Positive Lupus Anticoagulant Panel	6	15.0%
MTHFR C/T heterozygous mutation	19	47.5%
MTHFR T/T homozygous mutation	4	10.0%
Factor V Leiden Deficiency	2	5.0%

CONCLUSION: Pre-transplantation thrombophilia evaluation detected a high rate of undiagnosed thrombophilia in our potential transplant recipients. The thrombophilia protocol significantly decreased graft thrombosis rates with acceptable bleeding complication rates.

Abstract# 347

THE USE OF TRANSFERRIN RECEPTOR FERRITIN INDEX TO DIAGNOSE IRON DEFICIENCY IN PEDIATRIC RENAL TRANSPLANT PATIENTS. Anne K. Tsampalieros,[1] Nathalie Lepage,[2] Janusz Feber.[1] *[1]Department of Pediatrics, Children's Hospital of Eastern Ontario, Ottawa, ON, Canada; [2]Department of Genetics, Children's Hospital of Eastern Ontario, Ottawa, ON, Canada.*

PURPOSE: The objective of this study was to assess the prevalence of iron deficiency (ID) in our patients post renal transplant using various markers including serum soluble transferrin receptor (sTfR) to log ferritin. We hypothesized that the sTfR/log ferritin index would be more sensitive to detect ID in patients post Tx compared to currently used KDOQI criteria (ferritin <100 µg/L and transferrin saturation (TSAT)<20%).

METHOD: We performed a retrospective chart review of all renal Tx patients (n=25) currently followed at our institution. All available serum ferritin, TSAT and sTfR values were collected from the post transplant follow-up period in each patient; an average value per patient was used for analysis. ID was determined based on KDOQI criteria and sTfR/log ferritin index >0.6*.

RESULTS: Complete data was obtained on 21 children (11 males, aged 1.6 to 16.7 years at Tx, followed for an average of 2.4±1.3 yrs). Median Schwartz GFR was 63.18 mL/min/1.73 m^2 (range 34 – 92); 81% of patients received iron supplementation. Based on KDOQI guidelines only 5/ 21 children (24%) were found to be iron deficient. However based on sTfR/log ferritin index 16/21 (76%) of patients were iron deficient (Fischer exact test p=0.0017). Mean ± SD sTfR/log ferritin index was 0.88±0.29 (iron deficiency if sTfR/log ferritin index ≥0.6).

CONCLUSION: The prevalence of iron deficiency was significantly higher when using the sTfR/log ferritin index. It seems to be a more sensitive marker of iron deficiency in renal transplant patients.

Abstract# 348

FINAL HEIGHT AFTER RECOMBINANT GROWTH HORMONE THERAPY (rhGH) IN CHILDREN WITH CHRONIC RENAL FAILURE: A SINGLE CENTRE EXPERIENCE. Rita Van Damme-Lombaerts, Maria Van Dyck, Jean Herman. *Department of Paediatric Nephrology, University Hospital, Leuven, Belgium.*

PURPOSE: Recombinant human growth hormone (rhGH) is able to reverse progressive growth failure in chronic kidney disease (CKD).

Objective of the study: The final height after rhGH therapy in children with CKD stage 3 and 4, during dialysis and after renal transplantation has been analysed.

METHOD: Between 1988 and 2007 rhGH therapy was given to 83 growth retarded patients for at least 1 year. Twelve patients received rhGH therapy for a second and third period. Final height was reached in 46 patients (28 boys/18 girls). Patients were grouped according to the stage of chronic renal failure, in which rhGH has been initiated for the first time. Group A consisted of 16 patients, with CKD ≥ 3. In group B, 8 patients were on dialysis. In group C, 22 patients initiated rhGH after the first year after transplantation. Median age and range at the start in group A, B and C was respectively 7.8 (2.8 to 16.4), 10.3 (6.1 to 16.4) and 13.6 (9.0-17.3) years (yrs). Growth data were collected every 6 months; bone age was performed every year. Non-parametric tests were used for statistical analysis.

RESULTS: At the start median values of height SDS were respectively -2.3, -1.3 and -3.0 for group A, B and C. Median duration of rhGH was 5 yrs in group A and C and 1.6 yrs in group B. After rhGH has been discontinued, median height SDS was -0.4 in group A, -0.8 in group B and -1.9 in group C. Median gain in height SDS was +1.6 (group A), +0.8 (group B) and +1.1 (group C). The median adult final height was 172 cm in boys and 159,8 cm in girls of group A and B and 164, 2 cm in boys and 150,2 cm in girls of group C. Final adult height was within 0 and -2.0 SDS in group A and in group B; in group C normal final adult height range was reached in only 11 of the 22 patients.

CONCLUSION: Growth retardation was more severe in group A and C. rhGH therapy leads to a catch-up growth in all stages of renal insufficiency but was much better in group A. Final height was suboptimal in the transplanted group. Normal adult height can be reached when rhGH is started in the prepubertal period and before dialysis.

Abstract# 349

PUBERTAL DEVELOPMENT AFTER PEDIATRIC RENAL TRANSPLANTATION. Juuso Tainio, Reeta Vehmas, Helena Valta, Timo Jahnukainen, Hannu Jalanko. *Hospital for Children and Adolescents, University of Helsinki, Helsinki, Finland.*

PURPOSE: Normal pubertal development and growth are important for the quality of life in adolescence. Immunosuppressive medication with known long-term side-effects as well as deteriorating graft function can interfere with normal maturation in subjects with renal transplantation (RTx). This study was conducted to scrutinize the pubertal development in adolescents who received RTx during childhood.

METHOD: We performed a retrospective review of medical records of 105 RTx recipients transplanted at the median age of 4.5 (range 0.9–15.9) years. Data on the clinical signs of pubertal development, growth, bone age, medication, and graft function were analyzed. Furthermore, serum levels of reproductive hormones of 91 subjects were assessed in order to evaluate the progression and outcome of pubertal development.

RESULTS: The mean age at the onset of puberty was 12.8 (range 9.4–16.2) years in 68 males and 10.7 (range 8.9–12.7) years in 37 females. The mean age at menarche was 12.6 years in females. Twenty-three percent of the boys and none of the girls had a delayed onset of puberty. Only three males were treated with testosterone for pubertal hastening. Adolescents who had received RTx before the age of 5 years reached the onset of puberty earlier compared with the others in both boys and girls (12.3±1.2 vs. 13.5±1.5 years, $p<0.005$ and 10.3±0.9 vs. 11.0±1.0 years, $p>0.05$). No significant correlation was found between the onset of puberty and the measured GFR, height, weight, cortisone dose prior to puberty or growth hormone therapy after RTx. Onset of growth spurt and peak height velocity were normal, but growth continued relatively long and final height was reached at the age of 16.0 years in females and 18.1 years in males. Hormonal levels were quite normal compared with healthy controls.

CONCLUSION: Pubertal development is generally normal in adolescents with RTx in comparison with healthy adolescents.

Heart 3: Observations and Outcomes

Abstract# 350

CLINICAL UTILITY OF HEART RATE VARIABILITY (HRV) ANALYSIS FOR THE ASSESSMENT OF AUTONOMIC REINNERVATION IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. Rachel D. Vanderlaan, Jennifer Conway, Cedric Manlhoit, Brian W. McCrindle, Anne I. Dipchand. *Labatt Family Heart Centre, Hospital for Sick Children, Toronto, ON, Canada.*

PURPOSE: Following heart transplantation (HTx), loss of autonomic input to the allograft results in an elevated resting heart rate (HR) and decreased chronotropic reserve in response to exercise. Enhanced exercise capacity and HR recovery post exercise are suggestive of reinnervation and have been correlated with graft survival in adults. Heart rate variability (HRV), a non-invasive method for assessing autonomic control, was used to assess reinnervation and its functional correlates in a large cohort of pediatric patients following HTx.

METHOD: HTx recipients with ≥3, 24-hr holter recordings post-HTx, between 2005-10 were analyzed using time and frequency domain analysis of HRV. Evidence of reinnervation was demonstrated by >1 holter with a wideband power spectrum >150$msec^2$ with no subsequent holter showing <150$msec^2$. Progression of HRV over time and associations with covariates and outcomes were assessed in regression models adjusted for repeated measures.

RESULTS: Of 112 patients (median follow-up 5 yrs), 68 (57%) showed evidence of reinnervation. Reinnervation was not associated with age at HTx, previous surgery or gender. Patients with congenital heart disease were significantly less likely to have reinnervated (OR: 0.18,p=0.002). Evidence of reinnervation was associated with a significant increase in low frequency oscillations with time post-HTx (p=0.001), suggesting sympathetic reinnervation. Increasing time post-HTx was also associated with decreased resting HR (p=0.001). Patients with reinnervation showed improved maxVO_2 on exercise test (+12%,p=0.05) and improved HR recovery at 3 mins (-9bpm,p=0.007), but no difference in percent of maximum HR achieved. Graft reinnervation had a significantly lower hazard of death or reTx (HR:4.65,p=0.06).

CONCLUSION: Evidence of reinnervation is seen in a substantial number of pediatric HTx recipients and correlates with functional outcomes and graft survival. Studies to assess graft reinnervation as a marker of long-term prognosis are warranted.

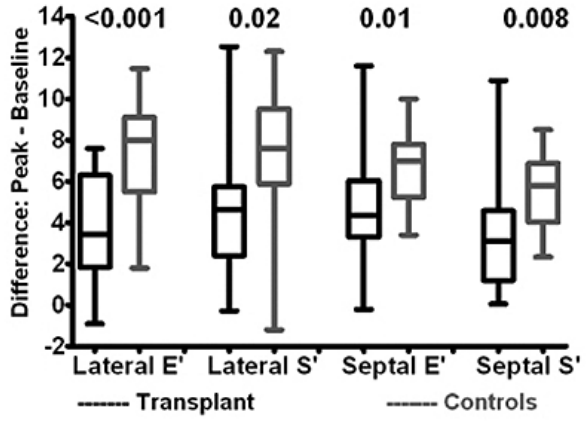
Abstract# 351

LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. Anne I. Dipchand, Henrik Brun, Laurens Koopman, Cedric Manlhiot, Cheryl T. Fackoury, Stephen Truong, Brian W. McCrindle, Luc Mertens. *Labatt Family Heart Centre, The Hospital for Sick Children, Toronto, ON, Canada.*

PURPOSE: Graft failure characterized by progressive LV dysfunction is an important problem after pediatric heart transplant (HTX); early detection could be helpful in optimizing management. Dobutamine Stress Echocardiography has been used in the past; however, as exercise testing is more physiological and less invasive, we investigated the use of bicycle exercise echocardiography to evaluate LV function during exercise stress.

METHOD: 23 HTX recipients and gender/BSA matched controls underwent standardized supine bicycle exercise protocol. Baseline and peak exercise maximal systolic and diastolic velocities were obtained from the lateral and septal basal segments. Tissue Doppler velocities were expressed versus heart rate for both patients and controls. Peak VO2 measurements were collected using a standardized treadmill exercise testing.

RESULTS: HTX patients peak heart rate was lower (148 ±14 bpm vs 164±18 bpm, p=0.0006) while peak systolic BP was not significantly different. HTX patients baseline resting left ventricular E' velocities were lower in both the lateral wall and septum while S' was only lower in the septum. S' and E' peak velocities were lower in HTX patients. Difference between peak and baseline E' and S' was lower in HTX patients compared to matched controls. The diastolic response in the lateral wall and septum correlated significantly with VO2 max (r=0.44, p<0.001).



CONCLUSION: This study suggests that there is a significant reduction in the normal increase in early relaxation and a decreased systolic response in HTX patients versus controls during exercise. In addition to chronotropic insufficiency, diastolic function may contribute to exercise capacity limitation after HTX.

Abstract# 352

AIRWAY NITRIC OXIDE IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. Glenda N. Bendiak,[1,2] Fiona Kritzinger,[1,2] Dhenuka Radhakrishnan,[1,2] Anne Dipchand,[1,2] Melinda Solomon,[1,2] Hartmut Grasemann.[1,2] *[1]Transplant Centre, Department of Pediatrics, Hospital for Sick Children, Toronto, ON, Canada; [2]University of Toronto, Toronto, ON, Canada.*

PURPOSE: Nitric oxide (NO) measured as fractional exhaled NO (FENO) at a single expiratory flow of 50 mL/sec has been reported as normal in adults following cardiac transplantation. This study sought to confirm this finding in a pediatric cohort. In addition, FENO measurements at multiple expiratory flow rates can be used to characterize flow-independent airway NO parameters, including bronchial NO flux (JNO) and alveolar NO concentration (Calv). This study determined JNO and Calv in pediatric cardiac transplant recipients.

METHOD: Cardiac transplant recipients were recruited during routine pulmonary function testing. After obtaining informed consent, subjects underwent FENO measurements at various flows (30, 50, 100, 150, 200 and 250 mL/sec), and nasal NO measurements, using published standard procedures. For those patients able to complete measurements at multiple flows, JNO and Calv were determined using flows of 50, 100, and 150mL/sec. Comparisons were made between the transplant population and healthy controls using Student's t- test.

RESULTS: Thirteen cardiac transplant recipients and 21 controls completed NO measurements. Eight (62%) transplant patients and 9 (43%) controls were male. Transplant patients were 12.6±2.8 (mean ±SD) years old, and controls were 11.5±3.9 years old at the time of study. Time from transplant was 4.8±3.9 years. There were no differences between groups in nasal NO (936±769 vs. 980±303 ppb) or FENO at 50mL/sec (11.4±4.8 vs. 10.8±4.0 ppb). Seven transplant patients and all controls were able to complete FENO measurements at multiple flows. JNO was not different between groups (384.8±155.4 vs. 430.7±180.8 pl/sec). In contrast, Calv was significantly increased in transplant patients (4.3±2.5 vs. 1.7±0.6 ppb, p<0.001).

CONCLUSION: This study demonstrates normal upper airways NO, standard flow FENO, and JNO, but increased alveolar NO in pediatric cardiac transplant recipients as compared to healthy controls. This suggests an increase in NO production in the peripheral airways of these patients.

Abstract# 353

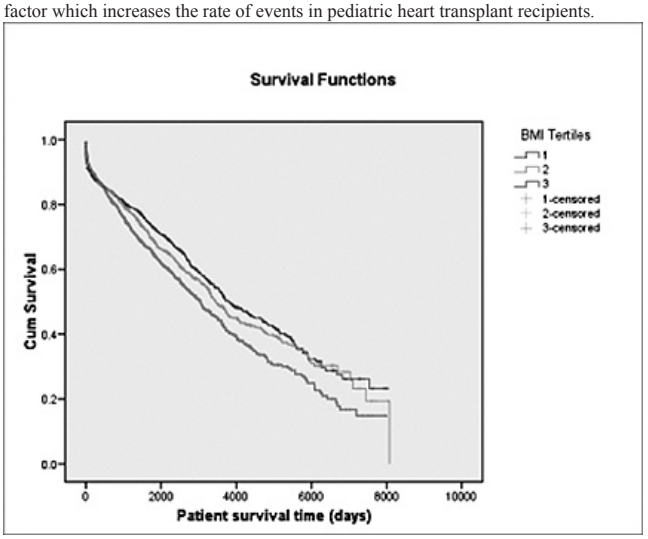
EFFECT OF BODY MASS INDEX ON OUTCOMES IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. Rajeev Sudhakar,[1] Kashish Goel,[1] Adeeba Khan,[2] Palaniappan Manickam,[1] Pawan Hari,[1] Luis Afonso.[3] *[1]Internal Medicine, Wayne State University, Detroit, MI, USA; [2]Pediatrics, Childrens Hospital of Michigan, Detroit, MI, USA; [3]Cardiology, Wayne State University, Detroit, MI, USA.*

PURPOSE: High body mass index (BMI) is known to negatively influence the outcomes in patients undergoing cardiac surgeries. We sought to evaluate the effect of BMI on outcomes in pediatric heart transplant recipients.

METHOD: Post-hoc analysis of the dataset of United Network for Organ Sharing (UNOS)/Organ Procurement and Transplantation Network (OPTN). 3780 pediatric heart transplant recipients were included. The study population was divided into 3 tertiles based on BMI. Cox-proportional hazards regression was used to the association of BMI tertiles with outcomes after adjusting for potential confounders and the lowest BMI tertile was used as a reference in the stepwise forward regression analysis. Primary end-point was death or re-transplant.

RESULTS: Mean age of the recipients was 10.75 years (± 5.05), Mean BMI 19.08 (± 7.31), 58 % were males and 42 % females. Total number of events were 776. Using Tertile 1as reference, Tertiles 2nd and 3rd were found to have higher number of events post-transplant-1.22 (1.01-1.49)[0.04] and 1.38 (1.12-1.71)[0.003] respectively{HR (95% CI) [p value]}. Final values were adjusted for variables like donor and recipient age, recipient gender, donor BMI, life support with ventilator, ECMO, year of transplant, HLA mismatch >5, serum creatinine, ischemic time.

CONCLUSION: The final model showed that in the highest BMI tertile had a 38% significantly higher chance of mortality and re-transplant. Higher BMI is a potential risk factor which increases the rate of events in pediatric heart transplant recipients.



Abstract# 354

BRONCHIOLITIS OBLITERANS SYNDROME (BOS) IS NOT SPECIFIC FOR BRONCHIOLITIS OBLITERANS IN PEDIATRIC LUNG TRANSPLANT (LTx). Christopher Towe,[1] Arthur C. Ogborn,[2] Thomas Ferkol,[1] Stuart Sweet,[1] Charles Huddleston,[3] Albert Faro.[1] *[1]Pediatrics, Washington University, St. Louis, MO, USA; [2]Pediatrics, University of New Mexico, Albuquerque, NM, USA; [3]Cardiothoracic Surgery, Washington University, St. Louis, MO, USA.*

PURPOSE: BO is the leading cause of mortality beyond the first year after transplant in pediatric LTx recipients. BO is a histologic diagnosis and often mandates an open lung biopsy. BOS is a clinical diagnosis based on spirometric data and is the standard for staging chronic allograft dysfunction. The use of predicted values for pediatric recipients has not been validated. We determined the sensitivity, specificity, positive and negative predictive values (PPV and NPV) of the BOS stages for predicting BO in children.

METHOD: A chart review was conducted on the 139 open lung biopsies and 43 lung explants performed at our center from 1990 through June 2010 on pediatric LTx recipients. Data collected included age, gender, date of LTx, date and result of biopsy/explant, best 2 previous FEV1 percent predicted taken at least 3 weeks apart and

simultaneous FEF 25-75 percent predicted and 2 most recent FEV1 percent predicted taken at least 4 weeks apart and simultaneous FEF 25-75 percent predicted. Results were excluded from analysis if insufficient data existed to calculate a stable BOS stage prior to biopsy/explant. Sensitivity, specificity, PPV and NPV were then determined for patients meeting the minimum requirements for the BOS stages (i.e. patients in BOS stage 2 were also included in BOS stage 1 and 0p analysis).

RESULTS: 67 open lung biopsies and 31 lung explants met criteria for inclusion in the study of which 41 (61.2%) and 26 (83.9%) had BO respectively. Sensitivity, specificity, PPV and NPV are reviewed in Table 1.

	BOS 3	BOS 2	BOS 1	BOS 0p
Sensitivity	49.3%	65.7%	91.0%	97.0%
Specificity	74.2%	51.6%	25.8%	9.7%
PPV	80.5%	74.6%	72.6%	69.9%
NPV	40.4%	41.0%	57.1%	60.0%

Table 1

CONCLUSION: We found that early declines in lung function are sensitive but not specific for BO. The low specificity for BOS stage to identify BO illustrates the challenge facing clinicians in determining the etiology of pulmonary decline following LTx.

Abstract# 355

NT-proBNP CORRELATES WITH INTRACARDIAC PRESSURES AND REJECTION IN PEDIATRIC HEART TRANSPLANT PATIENTS.

Levi J. Novero, David A. Ludwig, Satinder Sandhu, Teresa Bueno, Gabriela Lopez-Mitnik, Steven E. Lipshultz, Paolo G. Rusconi.
Pediatrics, University of Miami Miller School of Medicine, Miami, FL, USA.

PURPOSE: In pediatric heart transplant patients elevated B-type natriuretic peptide has been associated with acute rejection (AR); we found elevated amino-terminal B-type natriuretic peptide (NT-proBNP) also in the absence of AR. We hypothesize that elevated NTproBNP may be related to elevated intracardiac pressures, not only to AR.

METHOD: We reviewed the medical records of the pediatric heart transplant patients in our center with at least 3 measurements of NT-proBNP and simultaneous measurement of mean right atrial pressure (RAP), right ventricular systolic (RVSP) and end-diastolic pressures (RVEDP), pulmonary capillary wedge pressure (PCWP) and myocardial biopsy. A within-subjects linear regression analysis was done between the natural log of NT-proBNP and each of the pressure variables. Unweighted NT-proBNP by pressure slopes were averaged and tested against zero using a single sample t-test. A two-group independent sample t-test was used to assess the difference in slopes between patients with AR (grade 2R) and without AR.

RESULTS: There were 24 children (50% male, mean age 12.2 ± 9.2 years at the time of transplant) with a total of 156 NTproBNP levels and corresponding hemodynamic parameters. AR was detected in 12 patients. There was a statistical relationship between NT-proBNP and RAP (p=.02) and RVSP (p=.047). For a 1% increase of the natural log of NTproBNP there is an increase of 1.78 mmHg in RAP and 1.69 mmHg increase in RVSP. The mean NT-proBNP was higher in patient with AR (12,517 pg/ml versus 1851 pg/ml, P<.001). There was no significant difference in RAP, PCWP, RVSP, or RVEDP between patients with AR versus no AR.

CONCLUSION: NTproBNP correlates with RAP and RVSP and is higher in patients with rejection. Although patients with AR tend to have higher NT-proBNP, an elevated NT-proBNP does not necessarily identify rejection; it may indicate elevated RAP or RVSP. More patients and observations may help determine the NT-proBNP threshold for AR.

Abstract# 356

HYPOALBUMINEMIA & POOR GROWTH PREDICT WORSE OUTCOMES POST HEART TRANSPLANT IN CHILDREN.

C. Castleberry,[1] C. White-Williams,[2] D. Naftel,[2] M. Tresler,[2] S. Miyamoto,[3] K. Ainley,[4] D. Murphy,[5] R. Spicer,[6] G. Jellen,[7] L. Bannister,[8] K. Schowengerdt,[9] L. Gilmore,[10] B. Kaufman,[11] S. Zangwill.[1] *[1]Children's Hospital of Wisconsin, Milwaukee, USA; [2]University of Alabama, Birmingham, USA; [3]Children's Hospital Heart Institute, Aurora, USA; [4]Arkansas Children's Hospital, Little Rock, USA; [5]Riley Hospital for Children, Indianapolis, USA; [6]Cincinnati Children's Hospital Medical Center, Cincinnati, USA; [7]Children's Memoral Hospital, Chicago, USA; [8]Hospital for Sick Children, Toronto, Canada; [9]Cardinal Glennon Children's Medical Center, St. Louis, USA; [10]Columbia University, New York, USA; [11]Children's Hospital of Philadelphia, Philadelphia, USA.*

PURPOSE: To study the effects of hypoalbuminemia (HA) & poor growth in children with endstage heart disease on post-heart transplant (HTx) outcomes.

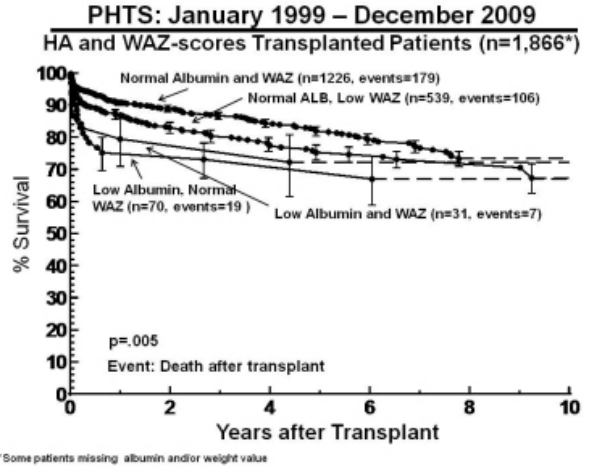
METHOD: Analysis of HA & growth data on outcomes in 2,775 HTx patients from the PHTS multicentre registry (01/99-12/09). HA: serum albumin ≤2.5. Poor growth: weight for age z score (WAZ) ≤2.

RESULTS: HA pts were more likely to require ECMO or vent support, to have CHD and low WAZ(Table1). Pts with HA & low WAZ had decreased survival postHT(figure 1); especially HA<2gm/dl & age<1y. Despite more CHD in the HA group, HA was univariately significant in the non-CHD group (p=0.02). WAZ was an independent risk factor(p=0.008).

CONCLUSION: HA & low WAZ are risk factors for death after HT, especially in infants and albumin<2. While pts with HA & normal WAZ had the worst outcomes postHT, the early survival appears similar for those with HA & low WAZ.

Patient Characteristics (HA)

	HA (n=103)	nl alb (n=1799)	p-value
Age	5.2	6.5	0.04
WAZ	-1.5	-1.2	0.04
Status 1 (%)	92	87	0.1
Vent (%)	37	22	<0.0001
ECMO (%)	20	7	<0.0001
VAD (%)	12	12	0.8
Congenital (%)	73	43	<0.0001



Abstract# 357

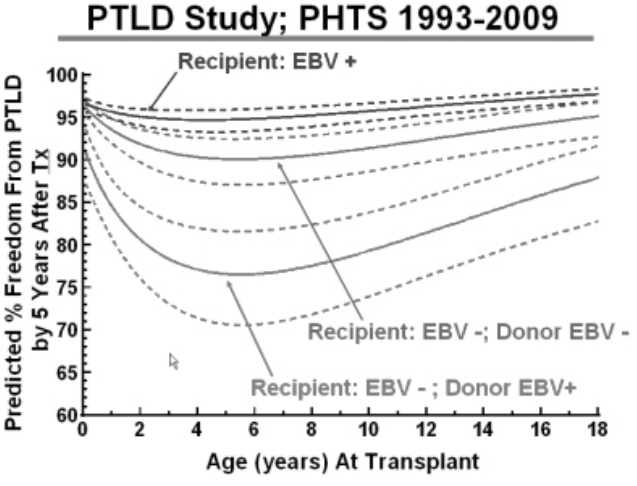
THE ROLE OF AGE, EBV STATUS AND ERA ON PTLD INCIDENCE IN PEDIATRIC HEART TRANSPLANT RECIPIENTS: A 16 YEAR MULTI-INSTITUTIONAL RETROSPECTIVE REVIEW.

Richard E. Chinnock,[1] Steven A. Webber,[2] Anne I. Dipchand,[3] Robert N. Brown,[4] James F. George.[4] *[1]Loma Linda University Children's Hospital, Loma Linda, CA, USA; [2]University of Pittsburgh, Pittsburgh, PA, USA; [3]Hospital for Sick Children, Toronto, Canada; [4]The University of Alabama at Birmingham, Birmingham, AL, USA.*

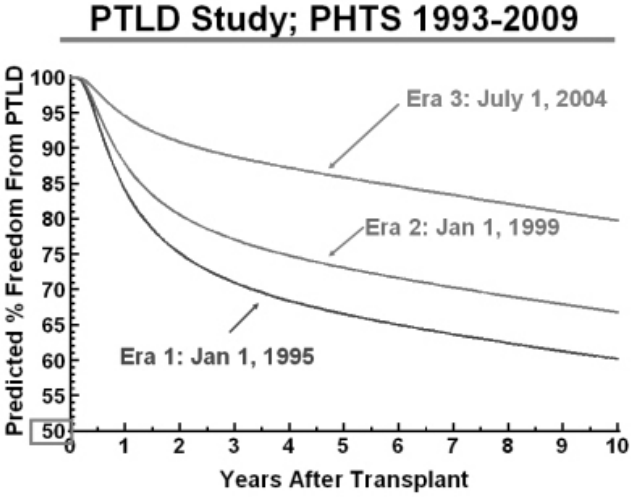
PURPOSE: To determine the incidence of PTLD in pediatric heart transplant recipients as a function of age at transplant, EBV serology and transplant era.

METHOD: Malignancy data were obtained and analyzed from 3,170 patients transplanted from 0-18 yo who were enrolled by 35 institutions in the Pediatric Heart Transplant Study between 1993 and 2009.

RESULTS: In this cohort there were 147 cases of PTLD. Actuarial freedom from PTLD at 5 years was lowest in younger children, with the peak hazard occurring at 5.45 yo at transplant. This was especially true for EBV+ donor into EBV- recipient.



Three eras were compared; 1993-1996, 1997-2001, 2001-2007. In this analysis, all recipients were EBV- and donors were EBV+. There was a significant reduction in PTLD in the most recent era (p=0.04).



CONCLUSION: Age at transplant correlates with risk for subsequent PTLD, with greater risk for those transplanted in childhood (1-9 yo) versus those transplanted during infancy (0-1yo) or adolescence (10-18yo). EBV mismatch with D+/R- increases PTLD risk at 5 years after transplant. And, the risk for PTLD is lower in the most recent era.

Abstract# 358

OUTCOMES OF PEDIATRIC HEART TRANSPLANT RECIPIENTS WITH ELEVATED PRE-TRANSPLANT PULMONARY VASCULAR RESISTANCE. Anjuli Sinha, Gerard Boyle. *Cleveland Clinic, Cleveland, USA.*

PURPOSE: Elevated pulmonary vascular resistance (PVR) has been shown to be associated with post heart transplant (HT) morbidity and mortality in adult HT recipients but has been poorly studied in the pediatric population. This study aimed to determine a cutoff for pre-transplant PVRI that can predict short or long term morbidity and mortality.

METHOD: A retrospective review was conducted on all HT patients from 1985 to 2010 at a single center to select those with a pre-transplant PVRI greater than 2units/m2 and ascertain their post-transplant short and long term outcomes. Short term morbidity was defined as clinical evidence of RHF within 30 days post transplant, prolonged ICU stay (>5 days), prolonged use of inotropes (>4 days), prolonged intubation (>48 hours), and/or the need for mechanical circulatory support. Long term morbidity was defined as persistent pulmonary hypertension (PVRI>2 units/m2 at 1 year) or the development of right heart failure >30 days post transplant. Death <30 days was considered short term and >30 days was long term mortality.

RESULTS: A total of 116 patients, median age 11.8 (range 0.5-18.7 yr) underwent HT. Baseline PVRI greater than 2 units/m2 was noted in 44 patients with median PVRI of 3.91 (range 2.3-9). 29 patients had a poor short term outcome, including 5 deaths. Median PVRI in those with a poor short term outcome was 4.1 (3.1-5.2), compared to 3.6 (2.7-5.5) in those without ($p<0.68$). No association was found between any marker of short term morbidity or mortality and PVRI. A poor long term outcome occurred in 22 patients, of whom 10 died >30 days post-transplant. Median PVRI in those with a poor long term outcome was 4.5 (3.3-6.1), compared to 3.6 (2.9-4.9) in those without long term outcomes ($p<0.18$). 15 patients died post-transplant. Their median PVRI was 4.2 (2.6-5.4) compared to 3.8 (2.9-5.2) ($p<0.68$) in those still living.

CONCLUSION: Elevated pre-transplant PVRI is not a predictor of poor morbidity or mortality and no cutoff value was found to predict poor short or long term outcomes. This confirms the impression that PVRI levels considered prohibitive for adult HT candidacy are not applicable to the pediatric HT patient.

Basic Science/Stem Cells

Abstract# 359

MESENCHYMAL STROMAL CELLS CAN PREVENT GRAFT-VERSUS-HOST DISEASE IN A NOD/SCID γc- XENOGENEIC MOUSE MODEL. Joëlle Gregoire-Gauthier,[1] Silvia Selleri,[1] François Fontaine,[1] Elie Haddad.[1,2] *[1]CHU Sainte-Justine Research Centre, Montreal, Canada; [2]Pediatrics, Microbiology and Immunology, University of Montreal, Montreal, Canada.*

PURPOSE: Graft-versus-host disease (GvHD) is a major complication of allogeneic hematopoietic stem cell transplantation (HSCT). Since the incidence of GvHD may approach 100% in the absence of prophylaxis, GvHD prophylaxis is essential in all patients undergoing HSCT. Albeit effective in GvHD prophylaxis by reducing its incidence, traditional immunosuppressive agents impair the quality and rapidity of immune reconstitution and therefore enhance the risk of morbidity and mortality. Mesenchymal stromal cells (MSC) have shown to be capable of exerting a strong immunosuppressive effect, and therefore have become usefull as salvage therapy for steroid refractory GvHD. However, no study has yet clearly shown if MSC could be efficient in GvHD prophylaxis and their limited use in clinical setting makes it is difficult to determine their specific effect.

METHOD: NOD/SCID/γc- (NSG) mice lack functional T, B and NK cells. Therefore, NSG mice injected with human peripheral blood mononuclear cells cannot reject these cells and said cells will proliferate in the mice and mimic human GvHD. Using the NSG mice, we developed a xenogeneic model of GvHD, allowing the study of a single-injection treatment of MSC in the context of GvHD prevention, without the concomitant use of immunosuppressive agents.

RESULTS: Our results suggest that MSC can significantly delay GvHD-related mortality, notably by reducing its incidence. Moreover, our results suggest that MSC do not inhibit T cell proliferation as it has been suggested in the literature, but rather induce the expansion of human T lymphocytes in mice. Furthermore, we have observed a reduction of available IFN-γ in the plasma of mice following MSC injection.

CONCLUSION: We can therefore conclude that MSC exert an immunomodulatory effect in the context of GvHD prevention in our xenogeneic model. This reduction of incidence of GvHD and mortality does not seem to be mediated by inhibition of T cell proliferation, therefore suggesting a different mechanism of action potentially acting on cytokine secretion.

Abstract# 360

USE OF IMMUNOGLOBULINS IN THE PREVENTION OF GRAFT-VERSUS-HOST DISEASE IN A XENOGENEIC NOD/SCID γc- MOUSE MODEL. Joëlle Gregoire-Gauthier,[1] Ludovic Durrieu,[1] Arnaud Duval,[1] François Fontaine,[1] Mame Massar Dieng,[1] Elie Haddad.[1,2] *[1]CHU Sainte-Justine Research Centre, Montreal, Canada; [2]Pediatrics, Microbiology and Immunology, University of Montreal, Montreal, Canada.*

PURPOSE: Graft-versus-host disease (GvHD) is a major complication of allogeneic hematopoietic stem cell transplantation (HSCT). Since the incidence of GvHD may approach 100% in the absence of prophylaxis, GvHD prophylaxis is essential in all patients undergoing HSCT. Albeit effective in GvHD prophylaxis by reducing its incidence, traditional immunosuppressive agents impair the quality and rapidity of immune reconstitution and therefore enhance the risk of morbidity and mortality. Immunoglobulins (IVIG) are known immunomodulatory agents, however their efficacy in preventing GvHD has never been clearly demonstrated clinically.

METHOD: NOD/SCID/γc- (NSG) mice lack functional T, B and NK cells. Therefore, NSG mice injected with human peripheral blood mononuclear cells cannot reject these cells and said cells will proliferate in the mice and mimic human GvHD. Using the NSG mice, we developed a xenogeneic model of GvHD, allowing the study of IVIG in the context of GvHD prevention, without the concomitant use of immunosuppressant agents. We also developed a humanized murine model of immune reconstitution, by injection of human $CD34^+$ stem cells into NSG mice.

RESULTS: Our results show that weekly administration of IVIG significantly reduced both the mortality and the incidence of GvHD. Unlike Cyclosporine A (CsA) and OKT3, IVIG were not associated with an inhibition of human T-cell proliferation in mice. Instead, IVIG inhibited significantly the secretion of human IL-2, IFN-γ, IL-6, IL-8, IL-15 and IL-17, suggesting that IVIG prevented GvHD by means of immunomodulation. This pattern was very different from one obtained by CsA and OKT3. Moreover, we showed that IVIG transiently inhibited B-cell reconstitution while peripheral T-cell reconstitution and thymopoiesis were not affected.

CONCLUSION: Together these *in vivo* data debate the use of IVIG in GvHD prophylaxis. This model should also give the opportunity to determine the precise mechanism(s) by which IVIG inhibit GvHD.

Abstract# 361

BIOMARKERS IN ACUTE REJECTION IN PEDIATRIC KIDNEY TRANSPLANTATION. Daniel Hevia,[1] M. Ignacia Busnter,[1] Angela Delucchi,[2] Francisco Cano,[2] Viola Pinto,[3] Paulina Salas,[3] Magdalena Gonzalez,[1] Luis Michea.[1] *[1]Biomedical Science Institute, Molecular Cell Studies, University of Chile, Santiago, Chile; [2]Luis Calvo Mackenna Hospital, Santiago, Chile; [3]Exequiel Gonzalez Cortes Hospital, Santiago, Chile.*

PURPOSE: Acute rejection (AR) in pediatric kidney transplantation (TX) occurs in 8 to 15 %, histological analysis of renal allograft is the best predictor. Children protocol biopsy to survey the graft function is difficult to perform and has motivated non-invasive markers produced by immune cells in plasma and urine. Molecules that characterize different mediators of rejection as Interleukin-17, FOXP3 and GATA3 mRNA are interesting candidates. We propose that changes in urine and biopsies mRNA lymphocytes differentiation markers could be used for AR.

METHOD: Twenty tx (2-15years) were randomized to steroid withdrawal (SW) or steroid control (SC), 15 completed 1 year of follow-up. Urine samples were collected monthly for 1year. Protocol bx was performed at month 12. Transcripts levels in urine were compared with matched healthy controls. The abundance of mRNAs FOXP3, IL-17, GATA3 and CD4 in urine and kidney tissue by qRT-PCR was performed.Informed consent was obtained according to prevailing ethical standards of the country.Mean, student-t, Mann-Whitney, Wilcoxon test; significance $p<0.05$.

RESULTS: FOXP3 mRNA levels in urine and bx increased in AR (~100 and ~40-fold vs. non-AR and healthy controls, respectively) mRNA GATA3 (~ 24-fold increase) compared without AR. Two patients in SW group showed a borderline rejection in protocol bx; no increase in markers was found. One patient in SW group had humoral C4d (+) rejection no increase in plasma creatinine and markers were found. mRNA IL-17 was not associated with AR. No significant differences in FOXP3 mRNA levels by group were showed.
CONCLUSION: These results suggest mRNA FOXP3 and mRNA GATA3 could be useful as early indicators of cellular AR, independent of steroids. Urine sample would be a promising non-invasive diagnostic in cellular AR.
This research was funded by Fondecyt Grant # 1080166.

Abstract# 362

SEQUENTIAL HEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT) FOLLOWING SOLID ORGAN TRANSPLANTATION IN CHILDREN, FEASIBILITY AND OUTCOMES IN A SINGLE CENTRE.

Muhammad Ali,[1] Stacey Pollock-BarZiv,[2] Adam Gassas,[1] Sheila Weitzman,[1] David Grant,[1] Anne Dipchand,[3] Sarah Alexander,[1] John Doyle,[1] Tal Schechter.[1] *[1]Division of Hematology/Oncology, The Hospital for Sick Children, Toronto, ON, Canada; [2]Transplant Center, The Hospital for Sick Children, Toronto, ON, Canada; [3]Division of Cardiology, The Hospital for Sick Children, Toronto, ON, Canada.*

PURPOSE: Hematopoietic stem-cell transplantation (HSCT) following solid organ transplant (SOT) has been described in adults, primarily as case reports. We sought to describe the 10 year experience at a large Canadian pediatric tertiary care center of the use of allogeneic HSCT following SOT.
METHOD: Outcomes of pediatric recipients of allogeneic HSCT following SOT between 2000- 2010 were reviewed. Indications, conditioning regimen, donor type, morbidity and mortality were described.
RESULTS: Four children (median age 9.5-yrs (range 1.75-14yrs)) received allogeneic HSCT following SOT. Indications for allogeneic HSCT were: T-cell lymphoma/PTLD in the 2 patients post heart transplant and severe aplastic anemia (SAA) in the 2 patients post liver transplant. The mean time between SOT and HSCT was 4.2 yrs (range: 1.8-7.8yrs). All patients engrafted after HSCT. All 4 patients died in a range of 37days to 1year after HSCT. Causes of death were multi-organ failure (1 pt), infection and MOF (2 pts) and solid organ rejection (1 pt). Though 3 patients survived beyond day+100, multiple infectious complications occurred including Ebstein-barr virus (EBV) reactivation, adenovirus infection, and gram-negative sepsis. The two patients with prior liver transplantation had liver complications during HSCT. One had veno-occlusive disease and one had portal hypertension and liver failure. One patient developed EBV positive B cell PTLD post HSCT. The 2 patients transplanted for lymphoma did not have evidence of recurrence at 7 months and 1 year after HSCT.
CONCLUSION: Though feasibility has been shown, we conclude that allogeneic HSCT following SOT is a high risk procedure that resulted in severe morbidity and mortality in children and other therapeutic options should be explored.

Abstract# 363

LIMITED SAMPLING STRATEGIES FOR ESTIMATION OF ORAL CYCLOSPORINE EXPOSURE IN HEMATOPOIETIC STEM CELL TRANSPLANT CHILDREN.

S. Sarem,[1,2] A.-L. Lapeyraque,[2,3] F. Nekka,[1] Y. Théorêt,[2,4] M. Duval,[3] P. Teira,[3] H. Bittencourt,[3] E. Haddad,[3] C. Litalien.[2,3,4] *[1]Faculty of Pharmacy, Univ. Montréal, Montréal, Canada; [2]Clinical Pharmacology Unit, CHU Ste-Justine, Montréal, Canada; [3]Dept. of Pediatrics, CHU Ste-Justine/Univ. Montréal, Montréal, Canada; [4]Dept. of Pharmacology, Univ. Montréal, Montréal, Canada.*

PURPOSE: Trough concentration (C_0) is commonly used for cyclosporin A (CsA) dosing optimization in pediatric hematopoietic stem cell transplant (HSCT) recipients but there is no clear evidence that it is the best marker to assess CsA exposure. Since routine measurement of the area under the concentration-time curve ($AUC_{0\text{-}12h}$) is often impractical, we aim to develop validated LSS equations which accurately estimate CsA AUC in our patients.
METHOD: HSCT children (N=20) with a median age of 12.6 yrs (1.2 -18.3) receiving oral CsA twice a day at a median post-transplantation time of 1.3 months (0.7 - 9) were included in the study. Forty AUC (9 time-point concentrations for each) were calculated at steady state and all possible equations based on 4 time-point concentrations or less were defined using multiple regression analysis. Selected LSS equations (high R^2, time-point concentrations within 4 h post-dose and inclusion of C_0) were validated using Jackknife technique.
RESULTS: C_0 correlated poorly with AUC (R^2=0.47) while single time point C_4 had the highest correlation with AUC (R^2=0.85). Selected LLS equations along with their predictive performance are summarized in Table 1.

Table 1

LSS equations estimating AUC	Bias (95% CI)	Precision (95% CI)	R^2
$57.4 + 5.1\ C_0 + 1.0\ C_1 + 1.2\ C_2 + 4.3\ C_4$	0.6 (-2.3, 3.4)	8.8 (5.0, 11.4)	0.97
$110.9 + 5.4\ C_0 + 1.8\ C_{1.5} + 4.5\ C_4$	1.0 (-2.4, 4.4)	10.5 (7.5, 12.9)	0.95
$944.2 + 4.0\ C_0 + 6.5\ C_4$	3.1 (-2.6, 8.9)	18.0 (13.4, 21.7)	0.87

C_0, C_1, $C_{1.5}$, C_2 and C_4 are CsA concentrations before and 1, 1.5, 2 and 4 h after its administration, respectively

CONCLUSION: LSSs of 3 and 4 time point-concentrations within 4 h post-dose accurately estimate CsA exposure after oral administration in HSCT children. Further studies are required to evaluate whether or not AUC based-monitoring is superior to C_0 for short- and long-term outcomes in this population.

Abstract# 364

"OLD" AND "NOVEL" ASSAYS FOR PREDICTION OF CHRONIC ACTIVE T-CELL MEDIATED REJECTION: LONG TERM MLC AND ELISPOT.

Jorge R. Ferraris,[1] Rita L. Cardoni,[2] Virna Barcala,[3] Lidia Ghezzi,[1] Paula Coccia,[1] Verónica Ferraris,[1] Mónica Tambutti.[4] *[1]Servicio de Nefrología Pediatrica, Hospital Italiano, Buenos Aires, Argentina; [2]CONICET, Buenos Aires, Argentina; [3]CITOMLAB, Buenos Aires, Argentina; [4]Histocompatibilidad, Instituto de Ciencias Básicas y Medicina Experimental del Hospital Italiano, Buenos Aires, Argentina.*

PURPOSE: The indirect pathway of allorecognition may be responsible for chronic active T-cell mediated rejection (CR). Our purpose was to study 3 assays for the evaluation of CR: long-term (7 days) mixed lymphocyte culture (LT-MLC) against disrupted donor lymphocytes, ELISPOT and *in vitro* IFN-γ secretion (by ELISA) by PBMC.
METHOD: 20 pediatric renal LRD transplant (Tx) patients and 9 healthy pediatric controls were studied.
RESULTS: PRA was negative in all patients. In patients with no acute and CR (n=11, time after Tx 24±7 months), the LT-MLC Stimulation Index (SI) was 2.4±0.5 vs 15±7 ($p<0.02$) in those with biopsy-proved CR (n=9, time after Tx 66±23 months). The SI against third-party in controls and patients without CR vs with CR were 2.1±0.4 and 4.0±1.0 vs 18.0±7 ($p<0.02$). The percentage of CD4+CD25+ high T-cells before and after depletion of CD25+ cells were 1.5±0.4 and 0.3±0.3 ($p<0.05$) in healthy controls, 0.6±0.2 and 0.1±0.0 ($p<0.01$) in patients without CR and 0.6±0.2 and 0.1±0.1 in patients with CR ($p<0.03$). The frequency of IFN- γ producing reactive donor cells/300.000 PBMC (ELISPOT) of patients without CR vs patients with CR were 3±1 vs 20±10 ($p<0.04$). 36% of patients without CR and low ELISPOT response and 43% of patients with CR and high ELISPOT response showed increased donor cell specific IFN- γ frequencies after depletion of CD4+CD25+ high T-cells. The *in vitro* release of IFN- γ in patients without CR vs patients with CR were 14±8 vs 100±56 pg/ml in culture supernatant ($p<0.05$). After CD4+CD25+ high T-cell depletion, the *in vitro* release of IFN- γ increased in 54 % of patients without CR and 56% of patients with CR.
CONCLUSION: The data suggest that CD4+CD25+ high T-cells persist for a number of years and may play a role in both patients with and without CR, and that LT-MLC and ELISPOT may be useful assays to predict CR.

Abstract# 365

SOLUBLE DONOR-LIKE MHC CLASS I PROTEINS INDUCE CD4CD25FOXP3 POSITIVE CD8 NEGATIVE CELLS WITH POTENTIAL TO SUPPRESS CARDIAC TRANSPLANT CHRONIC REJECTION.

Sigrid Burruss,[1] Arthur Andakyan,[1] Xiu-Da Shen,[1] Michael C. Fishbein,[2] Natalya V. Semiletova.[1] *[1]Surgery, UCLA Medical School, Los Angeles, USA; [2]Pathology and Laboratory Medicine, UCLA Medical School, Los Angeles, USA.*

PURPOSE: Conventional therapies failed to prevent allograft chronic rejection (CR). New approaches are needed. Donor-like MHC class I soluble proteins (sMHC-I) demonstrated therapeutic potential to suppress CR. The present study clarifies the ability of sMHC-I to induce T -regs in a fully allogeneic rat cardiac transplant model.
METHOD: We used direct multi-site mutagenesis to introduce mutations into the a_1-helix of a_1-region of MHC class I RT1.A^a to that of RT1.A^u produced [$a_{1h}{}^u$]-RT1.A^a donor-like chimeric molecule. To analyze regulatory potential of emerging T cells we performed adoptive transfer of $CD4^+$ splenocytes into a new cohort of syngeneic cardiac recipients. Analysis was performed at day 100 post-grafting.
RESULTS: sMHC-I upregulate small population of splenic $CD8^-$ negative $CD4^+CD25^+FoxP3^+$ positive cells. $CD4^+$ splenocytes after MHC therapy suppress lymphocyte proliferation against donor antigens *in vitro*. ACI hosts of WF hearts treated with $CD4^+$ cells, induced with sMHC-I (CD4-MHC), demonstrated stable survival of the transplanted organ (MST >120 d; n=17). Cardiac recipients treated with CD4-MHC had only 23.6% vessels affected compared with hearts obtained from hosts treated with $CD4^+$ cells induced by high-dose CsA (CD4-CsA) 50-70% of affected vessels. CD4-MHC treated hearts were mostly $CD3^-$ negative, had low level of mast and FoxP3 cells compared to CD4-CsA treated hearts. Intragraft $CD4^+$ cells were close to mast cells in morphology. CD4-MHC and CD4-CsA treated hearts had similar number of $CD4^+$ and mast cells suggesting existence of $CD4^+$ positive mast cells. On the other hand, negligible number of FoxP3 positive cells in the grafts after CD4-MHC treatment supports the idea of $CD4^+$ positive $FoxP3^-$ negative mast cells population.

CONCLUSION: We demonstrate that sMHC-I therapy induces population of $CD4^+CD25^+CD8^-FoxP3^+$ cells with potential to ameliorate development of transplant CR and evoke $CD4^+$ positive $FoxP3^-$ negative mast cells in the secondary hosts.

Abstract# 366

Slit2 IMPAIRS NEUTROPHIL ADHESION AND IMPROVES RENAL FUNCTION IN ISCHAEMIA REPERFUSION INJURY.

Swasti Chaturvedi,[1] Soumitra Tole,[2] Liping Huang,[2] Yi-Wei Huang,[2] Guan-Ying Liu,[2] Mark Okusa,[3] Lisa Robinson.[1] *[1]Nephrology, The Hospital for Sick Children, Toronto, Canada; [2]Sick Kids Research Institute, The Hospital for Sick Children, Toronto, Canada; [3]Medicine, University of Virginia Health System, Charlottesville, USA.*

PURPOSE: Acute Kidney Injury (AKI) is a significant problem in transplant patients and may impact allograft and patient survival. Circulating leukocytes, particularly neutrophils are recruited to the injured tissue and exacerbate the inflammatory damage in AKI caused by ischemia-reperfusion injury (IRI). The neuronal guidance cue, Slit2 and its receptor roundabout prevents axonal migration in a developing brain. Recently it has also been shown that Slit2 inhibits chemotaxis of leukocytes towards diverse chemoattractants by preventing activation of small GTPases, Rac and Cdc42. We wished to explore whether Slit2 reduces inflammation and improves function in IRI. Additionally we also tested the effect of Slit2 on important immuno-protective functions.

METHOD: Human umbilical endothelial cells (HUVECs) were grown to confluence and exposed to 1% hypoxia followed by variable periods of re-perfusion. Fluorescent labelled human neutrophils were ncubated with HUVEC in presence or absence of Slit2. The flourescence emitted by the adherent neutrophils was measured using a plate reader. To test the effect of Slit2 *in vivo*, Slit2 was administered prior to inducing injury in mouse model of AKI. To determine the effect of Slit2 on phagocytosis, opsonised latex particles were incubated with neutrophils in presence or absence of Slit2 and the number of internalised particles was counted. Superoxide production was analysed by Superoxide dismutase inhibitable reduction of cytochrome c in presence or absence of Slit2.

RESULTS: Slit2 reduced neutrophil adhesion in IRI. Pre-treatment with Slit2 led to improvement in serum creatinine in mouse AKI model. Slit2 did not alter neutrophil phagocytosis or Superoxide production.

CONCLUSION: Our findings suggest Slit2 inhibits neutrophil adhesion and improves renal function in IRI whilst preserving phagocytosis and superoxide production. Thus Slit2 may have a role in prevention and treatment of AKI.

Abstract# 367

URINARY PEPTIDOMICS IN KIDNEY TRANSPLANTATION IDENTIFIES NOVEL PEPTIDE BIOMARKERS FOR ACUTE REJECTION.

Tara Sigdel, Bruce Ling, Ken Lau, Lihua Ying, Irwin Lau, James Schilling, Minnie Sarwal. *Pediatrics -Nephrology, Stanford University, Stanford, CA, USA.*

PURPOSE: We used an integrative approach to identify novel peptide biomarkers for AR of renal transplant patients.

METHOD: A total of 70 archived urine samples from 50 renal transplant patients including biopsy proven AR, stable graft (STA), BK virus nephropathy (BKV), and 20 control including non-specific proteinurea (NS) or healthy controls (HC). We used MALDI-TOF mass spectrometry in the discovery step. A quantitative multiple reaction monitoring (MRM) assay was used to verify two potential candidate peptides of uromodulin (UMOD). Available Affymetirx GeneChips data on matched kidney transplant biopsies (20 AR and 20 STA) (NCBI GEO: GSE14328) was used for transcriptomic analysis. cDNA was synthesized from total RNA and Q-PCR were performed on 5 ng of cDNA.

RESULTS: Urine peptidomic analysis identified a specific panel of 53 peptides for acute rejection (AR). Peptide sequencing revealed underlying mechanisms of graft injury with a pivotal role for proteolytic degradation of uromodulin (UMOD) and a number of collagens including COL1A2 and COL3A1. The 40 peptide panel discriminated AR in both training (n=46) and test (n=24) sets (ROC, AUC>0.96). Integrative analysis of transcriptional data from paired renal biopsies revealed coordinated transcriptional changes for the corresponding genes, in addition to dysregulation of extracellular matrix proteins in AR (MMP7, SERPING1 and TIMP1). Q-PCR on an independent set of biopsies, validated a 6 gene biomarkers (COL1A2, COL3A1, UMOD, MMP7, SERPING1, TIMP1) that can classify AR with high specificity and sensitivity (ROC, AUC 0.98). Validation of of collagen peptides by selected reaction monitoring (SRM) in AR is underway.

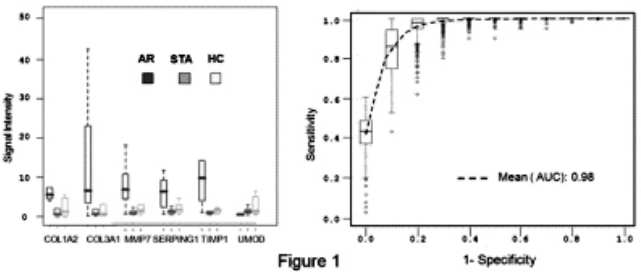


Figure 1

CONCLUSION: Integrated urine peptidomic and biopsy transcriptional analyses identified potential AR.

Immunosuppression 2

Abstract# 368

RELATIONSHIP OF QTc INTERVAL TO TACROLIMUS LEVEL IN PEDIATRIC KIDNEY TRANSPLANT RECIPIENTS.

Aviva M. Goldberg, Patricia E. Birk, Ilan Buffo. *Department of Pediatrics and Child Health, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada.*

PURPOSE: Tacrolimus has been shown to elongate the QTc interval in animal studies, and there are case studies of QT prolongation in patients with tacrolimus toxicity. We wanted to determine whether tacrolimus level was associated with prolongation of QTc in a series of pediatric kidney transplant recipients in a clinical setting.

METHOD: We examined the electrocardiograms (ECGs) of 37 pediatric kidney transplant recipients who were on tacrolimus immunosuppression and correlated them to proximate tacrolimus trough levels. The cardiologist reading the ECGs was blinded to the subject's transplant status (pre- or post-), tacrolimus level and other laboratory results.

RESULTS: None of the subjects were known to have congenital prolonged QTc syndrome. Mean pre-transplant QTc (n=14) was 428 ms, and 3/14 subjects had prolonged QTc (defined as >440 ms for males and >450 ms for females). Post transplant, 35 subjects had ECGs, with a mean QTc of 403 ms, and 6 subjects were identified as having a prolonged QTc on at least one ECG. Correlation of tacrolimus level to QTc was 0.44 for all trough levels ($p < .01$). At higher tacrolimus levels (> 8) correlation was 0.80 ($p< 0.01$) There was not a significant change in pre-transplant QTc to post-transplant ECG. Those with prolonged QTc intervals pre-transplant reverted to normal QTc post transplant.

CONCLUSION: In this study of pediatric kidney transplant recipients, trough tacrolimus level was correlated with QTc at standard trough levels of tacrolimus but most subjects remained within the clinically normal range for QTc. There was a stronger correlation at higher trough levels, with several subjects exhibiting clinically significant prolongation of QTc. This suggests that careful monitoring of ECGs may be important for patients in the early post transplant period or during periods of rejection (when goal tacrolimus level is higher) or in subjects with tacrolimus toxicity. Subjects with aquired prolonged QTc pre-transplant may revert back to normal QTc post transplant even when treated with tacrolimus.

Abstract# 369

GENETIC ASSOCIATIONS OF EXTRARENAL TOXICITIES OF IMMUNOSUPPRESSIVES.

Sylwester Prokurat,[1] Ryszard Grenda,[1] Andrzej Ciechanowicz.[2] *[1]Nephrology and Kidney Transplantation, Children's Memorial Health Institute, Warsaw, Poland; [2]Western Pommeranian Medical University, Szczecin, Poland.*

PURPOSE: The purpose was to evaluate the association of specific gene polymorphism to extrarenal toxicities of common immunosuppressives in 207 children with primary renal transplantation.

METHOD: Polymorphisms of genes for MDR1,CYP3A5,IL-1β, IL-1RN, IL-6, MCP-1, TGF β and CCR5 were evaluated with PCR i PCR-RFLP technique.

RESULTS: 9 patients presented convulsions under cyclosporine (CsA) therapy. They showed higher C0 at 6-months post-transplant (216,33±48,95 vs 153,51±42,4 ng/ml; p=0,012). In carriers if CC allele for IL-6 the neurotoxicity was more frequent, than in CG+GG carriers (p=0.04). 47 (21%) patients showed gingival hypertrophy under CsA therapy. The C0 beyond 1 month post-transplant was not different compared to patients with no hypertrophy. Pathology was seen more frequently in carriers of TT allele of TGFbeta gene (92,3% vs 58,97% for allele CC+CT; p=0,02).

Mylotoxicity was present in 10 (6,6%) of patients under MMF therapy and was not related to the dose/kg, which was lower in these patients (30,66±21,83 vs 41,48±12,72 mg/kg; p=0,016). It was seen more frequently in carriers of AG+GG vs AA allele of TNFalpha gene (p=0.003). Gut disorders were seen in 17 (11.3%) of MMF treated patients. There was no relation to dose/kg, and they were less frequent in AA allele homozygotes of THFalpha gene (p=0.01).

CONCLUSION: Specific IL-6, TGFbeta and TNFalpha gene polymorphisms are associated with specific extrarenal toxicities of cyclosporine and mycophenolate mofetil.

Abstract# 370

THREE YEARS FOLLOW UP OF TWO METHODS OF TACROLIMUS BASED IMMUNOSUPPRESSION WITH OR WITHOUT MMF FOR EARLY STEROID WITHDRAWAL IN CHILDREN AFTER LIVER TRANSPLANTATION. Joanna Teisseyre,[1] Piotr Kalicinski,[1] Malgorzata Markiewicz-Kijewska,[1] Dorota Broniszczak,[1] Marek Szymczak,[1] Mikolaj Teisseyre,[2] Joanna Pawlowska,[2] Irena Jankowska,[2] Przemyslaw Kluge.[3] *[1]Pediatric Surgery and Organ Transplantation, The Children's Memorial Health Institute, Warsaw, Poland; [2]Gastroenterology, Hepatology and Immunology, The Children's Memorial Health Institute, Warsaw, Poland; [3]Pathology, The Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: To compare the efficacy and safety of steroid free immunosuppression based on tacrolimus and MMF to tacrolimus and steroids treatment regimen in children after LTx.

METHOD: Group A 22 pts aged 0.2-18 yrs treated: tacrolimus and MMF, group B 22 pts aged 0.12-18.1 yrs treated: tacrolimus and steroids. MMF was administered from 0-90 day and then reduced and discontinued finally 4 months after LTx. In group B steroids were administered according to a low-dose scheme and at the end of month 7 steroid withdrawal was started.We estimated incidence of acute rejections, liver and renal function, serum glucose, blood presssure, frequency of viral infections and liver biopsy: 0-6 months, 1, 2 and 3 years after LTx.

RESULTS: Liver and renal function, blood glucose and incidence of CMV infections were similar in both groups 1,2 and 3 yrs after LTx. Patients in group A showed reduced need for antihypertensive treatment $p<0.05$ in the early posttransplant period and 1 and 2 yrs post transplantation. Less incidences of EBV infection was obserwed in group without steroids in 1,2 and 3 yrs after LTx $p<0.05$. Acute rejection episodes were more frequently recognized in group A in second year post LTx $p<0.05$. Steroid resistant AR was not obserwed in both groups. More patients from group A showed normal liver histology one year post LTx however this difference was not significant.

CONCLUSION: Immunosuppression without steroids is feasible and safe in children after LTx.Tacrolimus effectively prevented development of steroid AR in both groups independently of other immunosuppressants used. Individualization of treatment is unavoidable and depends on primary diagnosis and post-transplant complications.

Abstract# 371

CONVERSION OF MYCOPHENOLATE MOFETIL (MMF) TO ENTERIC COATED MYCOPHENOLATE SODIUM (EC-MPS) IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Mina Matsuda-Abedini,[1] Tony K.L. Kiang,[2] Mary H.H. Ensom.[2] *[1]Pediatrics, Division of Nephrology, BC Children's Hospital, University of British Columbia, Vancouver, BC, Canada; [2]Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC, Canada.*

PURPOSE: Conversion from MMF to EC-MPS might improve gastrointestinal (GI) symptoms in children with kidney transplant receiving concomitant calcineurin inhibitors (CNIs).

METHOD: In this prospective single center study, we used the validated GI Symptom Rating Scale (GSRS) to measure GI symptoms of children with stable graft function receiving MMF and a CNI. Those who consented to switch to EC-MPS were converted to an equimolar dose and the change in GI symptom burden was reassessed after 3 months. Pharmacokinetics (PK) of mycophenolic acid (MPA) and its glucuronidated metabolites were measured in a subgroup on MMF and after 3 months on equimolar EC-MPS.

RESULTS: 32 pediatric renal allograft recipients (mean age 14.5 yrs, sd 3.2) receiving MMF, prednisone, and a CNI (tacrolimus n = 31 or cyclosporine n = 1) were enrolled. Median GSRS on MMF was 7 (IQR 4-14.5) indicating moderate GI discomfort. Most patients had not voiced GI complaints in clinic. Median GSRS score of children who converted to EC-MPS (n = 9) was 16 (IQR 10-17), higher than those who elected to remain on MMF (median 7 (IQR 4-9); p=0.02). Three months post-conversion, the 9 children who switched to EC-MPS no longer had a different GSRS (median 7 (IQR 3-19); p=0.7) compared to those who chose to remain on MMF. In four patients with pharmacokinetic data, dose-normalized PK parameters of MPA (AUC, Cmax, Cmin) and its glucurondated metabolites (AUCs) from steady-state doses of MMF and EC-MPS were similar.

CONCLUSION: Pediatric renal transplant recipients often "suffer in silence" with GI symptoms. In a small number of pediatric transplant recipients we observed improved GSRS scores in those who volunteered to convert to EC-MPS from MMF. Similar PK parameters of MPA and its metabolites following steady-state, equimolar doses of MMF and EC-MPS were observed in this pilot crossover study and warrant confirmation in a larger population.

Abstract# 372

AGE PREDICTS MONOTHERAPY IMMUNOSUPPRESSION IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS AT ONE YEAR POST TRANSPLANT. David W. Rittenhouse,[1] Leslie J. Krueger,[2] Jobayer Hossain,[3] Louise Flynn,[3] Stephen P. Dunn.[3] *[1]Surgery, Thomas Jefferson University, Philadelphia, PA, USA; [2]TARC Inc., Freehold, NJ, USA; [3]Surgery, Alfred I. duPont Hospital for Children, Wilmington, DE, USA.*

PURPOSE: The goal in managing pediatric liver transplant recipients is to minimize immunosuppression as soon and as safely as possible. There are no standard guidelines for immunosuppression minimization although more rapid steroid tapering in the first year post transplant has been accepted by most centers. We chose to retrospectively characterize those children who have been able to achieve stable steroid free monotherapy immunosuppression at 1 year post liver transplant. We hypothesized that analysis of these patients might suggest patient groups or characteristics which would correlate with less immunosuppressive needs.

METHOD: After obtaining IRB approval we performed a retrospective review of liver transplant recipients at our institution from 2000-2010. We defined monotherapy immunosuppression as a child being on either tacrolimus or sirolimus and off of steroids. We then analyzed clinical parameters for statistical significance in predicting steroid free monotherapy immunosuppression at 1 year post transplant. Statistical tests were two tailed with significance set at $p<0.05$.

RESULTS: We identified 81 patients that underwent liver transplantation at our institution with available follow up data. Among the many studied variables, age at transplant was statistically significant for predicting successful steroid free monotherapy immunosuppression at 1 year post transplant ($p<0.03$). The median age of patients on monotherapy (n=51) at 1 year post transplant was 2 years and of patients on more than one drug (n=30) was 8 years. The younger the age at liver transplant, the greater the likelihood of achieving monotherapy immunosuppression with 68% of children < 2 years old and 82% of children ≤ 6 months old on monotherapy.

CONCLUSION: Younger liver transplant recipients have a higher chance of achieving steroid free monotherapy immunosuppression at 1 year post transplant. These patients should be further studied as candidates for immunosuppression reduction.

Abstract# 373

INDUCTION THERAPY WITH DACLIZUMAB IN PEDIATRIC HEART TRANSPLANTATION. Alexandra T. Fuchs, Julia Birnbaum, Nina Egermann, Rainer Kozlik-Feldmann, Heinrich Netz. *Pediatric Cardiology, University Hospital Großhadern, Munich, Germany.*

PURPOSE: Daclizumab is a humanized monoclonal antibody which binds with high affinity to the Tac subunit of the Il-2 receptor complex. Effective immunosuppression with Daclizumab in adult patients encouraged the initiation of the administration of Daclizumab as induction therapy in pediatric heart transplantation.

METHOD: Sixteen patients (9 boys, 7 girls, age 8 7 yrs, BMI 1.75 0.52 m2), received Daclizumab as induction therapy in a dosis of 1 mg/kg intravenously perioperatively and on day 7 and 21 after orthotopic heart transplantation. Additional immunosuppression was cyclosporine (CsA, n=14) or tacrolimus (TAC, n=2), mycophenolate mofetil (MMF) and prednisolone. Prednisolone was tapered rapidly in the first six months after heart transplantation.

RESULTS: The administration of Daclizumab was not associated with any side effect. Owing to the blockade of the IL-2-receptor the dosage of calcineurin inhibitors could be reduced leading to less renal and hepatic toxicity. Instead of aiming at CsA trough levels of 350-400 ng/ml/TAC trough levels of 12-15 ng/ml in the first weeks after transplantation we reduced to 250 in the CsA group and to 10 in the TAC group. CD25+ T-lymphocytes began to be re-expressed after 2-3 months after administration of Daclizumab.

In a mean follow-up time of 50 2 months no acute or chronic episode of rejection could be experienced. The incidence of opportunistic infections was not elevated (5 bacterial, 4 viral and 3 fungal infections which responded well to adequate treatment). No de novo malignancies, especially no lymphoproliferative disease (PTLD) was noticed. Actually patient and graft survival is 100%.

CONCLUSION: Our results show that immunoprophylaxis with Daclizumab induction therapy in pediatric heart transplantation is safe, effective and well tolerated and does not lead to increased opportunistic infections or malignancies. The reduction of calcineurin inhibitors led to less calcineurin related side effects and raised the quality of life of transplanted patients.

Abstract# 374

CONCENTRATION CONTROLLED MYCOPHENOLATE DOSING IN PEDIATRIC RENAL TRANSPLANTATION. Anjali Mohapatra,[1] Gopal Basu,[1] M. V. Annapandian,[2] Binu S. Mathew,[2] Vinoi G. David,[1] Santosh Varughese,[1] Chakko K. Jacob,[1] George T. John,[1] Tamilarasi Veeraswamy.[1] *[1]Nephrology, Christian Medical College, Vellore, Tamil Nadu, India; [2]Clinical Pharmacology, Christian Medical College, Vellore, Tamil Nadu, India.*

PURPOSE: To compare the relationship between the weight adjusted mycophenolate (MPA) dose and drug exposure (AUC) among pediatric and adult renal allograft recipients.

METHOD: Patients who received mycophenolate mofetil (MMF) /sodium (MPS) along with prednisolone and tacrolimus, were studied. Extrapolated MPA-$AUC_{0\text{-}12h}$ were measured after transplant (between D5-10, at third month, sixth month, one year, later than one year and ad-hoc)by HPLC and the MMF/MPS dose were adjusted to maintain it between 30-60mg.h/L. The drug exposure and MPA dose and dose controlled AUC (Dc-AUC defined as AUC achieved per unit weight based dose = MPA-$AUC_{0\text{-}12h}$/$Dose_{mg/Kg}$) were calculated.
RESULTS: Of the 235 renal allograft recipients,221 among pediatric patients. Among the pediatric patients 92.9% received(94.0%) adult (age>18 years) and 14 (6.0%) pediatric recipients.Prednisolone with tacrolimus (71.4%) and MMF (57.1%) or MPS (42.9%).For the pediatric patients, at months 1,3,6,9,12,18,24 and >24 respectively, the mean dose were (43.8±17.2, 45.6±14.9, 32.5±12.5, 23.8±12.1, 24.9±11.9, 23.6±12.0, 20.1±13.6 and 23.4±8.0mg/kg), the mean MPA-$AUC_{0\text{-}12h}$ were (35.8±15.9, 62.2±34.7, 66.8±36.1, 42.4±29.5, 55.7±28.3, 45.3±18.3, 51.7±49.8 and 56.7±20.2 mg.h/L). Overall, patients taking MPS achieved significantly higher Dc-AUC than MMF among pediatric patients (2.3±1.3 vs. 1.6±0.9 Kg.h/L: p=0.04). The Dc-AUC was substantially lower during the immediate post transplant period (<1 month) among the pediatric patients compared to the adult patients (0.7±0.2 vs. 1.1±0.5, p=0.04).
CONCLUSION: Among Indian renal allograft recipients, pediatric patients achieve a lower MPAA$UC_{0\text{-}12h}$ per unit dose used compared to adult patients especially during the immediate post transplant period but not later. Considering that adequate MPAA$UC_{0\text{-}12h}$ in the early post transplant period is important to reduce acute rejection rates, this finding is of importance and calls for a larger study to confirm the findings.

Abstract# 375

STEROID-FREE IMMUNOSUPPRESSION (SFI) IN PEDIATRIC RENAL TRANSPLANTATION: A SINGLE CENTER EXPERIENCE. V. Chadha,[1] W. S. Andrews,[2] A. Kats,[3] B. S. Brewer,[1] F. Long,[1] B. A. Warady.[1] *[1]Pediatric Nephrology, Children's Mercy Hospital, UMKC, Kansas City, MO, USA; [2]Pediatric Surgery, Children's Mercy Hospital, UMKC, Kansas City, MO, USA; [3]Pathology, Children's Mercy Hospital, UMKC, Kansas City, MO, USA.*
PURPOSE: Steroids have been an integral component of immunosuppression. Concerns about steroid toxicity and availability of newer immunosuppressive agents has prompted consideration of SFI in pediatrics. However, there is a paucity of data regarding the efficacy of SFI.
METHOD: We conducted a retrospective review of 56 kidney transplant recipients who received SFI over a period of 6.5 yrs. and had > 1 yr. follow-up.
RESULTS: Mean age at transplant was 13.5 ± 4.8 yrs with the majority of patients (68%) being males and Caucasian (75%); 10 (18%) were AA. The majority (62.5%) of allografts were from living donors. All patients received induction therapy with thymoglobulin or daclizumab, and maintenance therapy with tacrolimus and MMF. The overall incidence of acute rejection (AR) at 1 yr was 20%, with the highest percentage in AA patients (4/11; 36%). By the end of 1 yr, 13 of 56 (23%) patients had failed SFI (AR-7; recurrent disease-1; other-6) and were converted to steroid-based therapy. AA ethnicity and deceased donor recipients had a RR of 2 and 1.4, respectively, for SFI failure. While mean estimated GFR at 12 months for all patients was 88.5 ± 25.3 ml/min/1.73m^2, it was lower (65.5 ± 29.8) in patients who failed SFI (Gr. A) vs. those who did not (84.9 ± 22.2) (Gr. B) (p=0.01). Likewise, overall graft survival was 92.8 %, but lower in Gr. A (76.9%) as compared to Gr. B (97.7%) (p=0.02). Surveillance biopsies were performed in a portion of the patients at 6 and 12 months and evaluated with CNIT scoring. At 6 months, mean ± SD score was 1.72 ± 2.4 (n=25) and increased to 2.63 ± 2.5 (n=19) at 12 months. One patient died during the study period (patient survival 98.2%).
CONCLUSION: Based on our preliminary short-term data, SFI appears to be safe and effective in the majority of pediatric kidney transplant recipients. Better identification of risk factors that can be used preemptively to avoid failure of SFI is warranted.

Abstract# 376

PHARMACODYNAMIC MONITORING OF IMMUNOSUPPRESSIVE (IS) DRUGS IN PEDIATRIC KIDNEY TRANSPLANT PATIENTS: IDENTIFICATION OF TWO PROFILES OF IMMUNE RESPONSE. A.L. Lapeyraque,[1,2,3] R.M. Brito,[3,4] M.J. Clermont,[2] V. Phan,[2] I. Fernandez,[3,4] V. Durrieu,[3,4] Y. Théorêt,[1,3] F. Le Deist.[1,2,3,4] *[1]Unité de Pharmacologie Clinique, CHU Sainte Justine, Montréal, Canada; [2]Département de Pédiatrie, CHU Sainte Justine, Montréal, Canada; [3]Centre de Recherche, CHU Sainte Justine, Montréal, Canada; [4]Département de Microbiologie et d'Immunologie, CHU Ste-Justine, Montréal, Canada.*
PURPOSE: Tacrolimus (Tac) and mycophenolate mofetil (MMF) are used to prevent allograft rejection but their IS effects vary widely within and among individuals. The measurement of residual T-lymphocyte (TL) functions in patients treated with Tac and MMF may be useful in individualizing dosage to improve efficacy and tolerability.
METHOD: 43 blood samples from 27 pediatric kidney transplant recipients treated with Tac (27/27), MMF (26/27) and prednisone (27/27) were drawn. TL functions were measured following stimulation with ConA (27/43) and OKT3 (43/43). CD4 and CD8 TL activation was quantified by CD25 expression and TL proliferation was measured after propidium iodide incorporation.
RESULTS: We observed a wide inter and intra-individual variability in residual TL functions. The percentage of CD25 expression in CD4 TL showed a bimodal distribution, with two distinct TL activation levels and thus two groups of patients (low (21/43) and high (22/43) responder). Time variability in TL activation levels was observed in 5 out of 9 patients.Surprisingly, C_0Tac level and age were lower in the low responder group: respectively 6.18 vs 7.9 ng/mL (p=0.02) and 12.78 (± 4.76) vs 15.97 (±2) years (p= 0.023). Other clinical (time post transplantation, weight, prednisone, Tac and MMF dose) and biological parameters (albumin, haematocrit and lymphocyte blood counts) did not differ between the two groups.
CONCLUSION: This study confirms a wide inter and intra-individual variability in TL response to IS drugs in children. Younger children may be at risk for over-immunosuppression according to this pharmacodynamic assay.
Correlation between TL function values, clinical outcome, pharmacokinetic and pharmacogenetic parameters needs to be performed to confirm the relevance of this test in clinical practice.

Kidney 6: Immunology

Abstract# 377

THE IMPACT OF A DE-EMPHASIS OF HLA MATCHING ON SENSITIZATION RATES AFTER 1ST GRAFT FAILURE IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Jane Gralla, Suhong Tong, Alexander C. Wiseman. *University of Colorado, Denver, USA.*
PURPOSE: With improvements in immunosuppression, US allocation policies currently place less emphasis on HLA matching in pediatric renal transplant (tx) candidates to minimize dialysis time. The impact these policies may have on sensitization rates in pediatric recipients following graft failure has not been extensively examined.
METHOD: Using the SRTR database, we examined HLA sensitization after graft loss and re-graft survival of all pediatric 1st renal tx recipients aged 0-17 yrs transplanted 1990-2008, stratified by peak panel reactive antibody (%PRA) and HLA mismatch (MM) of 1st and 2nd tx.
RESULTS: Of 13,227 pediatric 1st renal tx recipients, 1,943 received a re-tx following 1st graft failure (mean waiting time to re-tx 19 months), and 948 recipients were relisted but did not receive a re-tx (re-tx WL) by June 2009 (mean waiting time 56 months). 50% of the re-tx patients received a tx within 1 yr and 71% within 2 yrs of relisting, but this was only 28% and 41%, respectively, of all patients awaiting re-tx. Mean PRA increased from 7% prior to 1st tx to 53% after 1st graft failure. PRA increased from 6% to 44% for the re-tx cohort and from 8% to 75% for the re-tx WL cohort. The risk of sensitization increased with number of 1st tx HLA MM (RR 1.12 for 3-6 vs. 0-2 MM, p<0.001). Re-tx graft survival at 5yrs was significantly worse for patients sensitized following first graft failure (p<0.001), irrespective of whether the PRA prior to 1st tx was 0% or >0%. The number of HLA MM at 1st and 2nd tx adversely affected re-graft survival, even for re-tx in 2000-2008.
CONCLUSION: HLA sensitization in pediatric recipients increases with increasing number of mismatches, and is associated with a decreased likelihood of re-tx. Graft survival is adversely affected by the number of MM in 1st and 2nd grafts and by increasing sensitization. The risks of sensitization vs. the benefits of earlier transplantation with a de-emphasis of HLA matching require further study, but these preliminary data suggest that pediatric transplant programs may benefit from evaluating local waiting times when considering HLA mismatched kidneys for transplant.

Abstract# 378

DIFFERENTIAL IMMUNOGENICITY AND CLINICAL RELEVANCE OF KIDNEY COMPARTMENT SPECIFIC ANTIGENS AFTER RENAL TRANSPLANTATION. Li Li, Tara Sigdel, Matthew Vitalone, Sang ho Lee, Minnie Sarwal. *Pediatric Department, Stanford University, Stanford, CA, USA.*
PURPOSE: To evaluate the pathogenic role of non-HLA antibodies and to identify the differential immunogenicity and clinical relevance of kidney compartment specific antigens after organ transplantation.
METHOD: 81 unique serum samples from renal transplant patients, were analyzed by protein array technology on integrative genomics approach, validated by ELISA and the results correlated with clinical relevance with time post-transplantation or post-transplant graft function.
RESULTS: There was a significant association of *de novo* non-HLA ab. with time post-transplantation (n=1,785) and decline in graft function over the subsequent year (n=105). There was an enrichment of immunogenic antigens in the renal cortex (p=0.01) with post-transplant time, and for glomerular specific targets (p=0.02) with decline in graft function. Two targets with very strong correlation in each category (AGT and SPDYA), were validated by customized ELISA assays in independent patient sera and their localization confirmed by IHC. In addition, only 12 overlapping targets between the 2 data-sets correlated with both time post-transplant and transplant functional decline when the most significantly correlated non-HLA antibodies were compared across

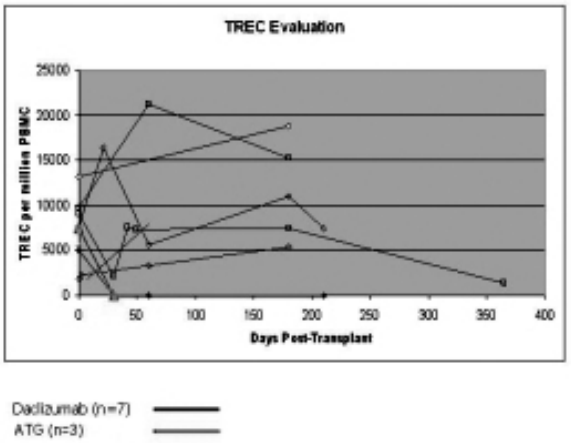
all data sets based correlating with either sample time post-transplant or a decline in subsequent graft function. Three of the antibodies have corresponding antigenic epitopes which provide key targets for modulation by three currently used immunosuppressive agents, namely, RPTOR, TRMU, and ITPRIP, which are expressed highly in the renal glomerulus by IHC.
CONCLUSION: Defined profiles of these non-HLA ab. to renal cortical proteins develop with increasing length of engraftment, and may reflect the increasing recognition of altered localization or exposure of renal tubular and interstitial proteins, affected by advancing chronic non-immune graft injury. The panel of non-HLA ab. to glomerular targets is most interesting, as these corresponding antigenic targets may be important pathways in functional graft injury and could provide novel targets for drug design.

Abstract# 379

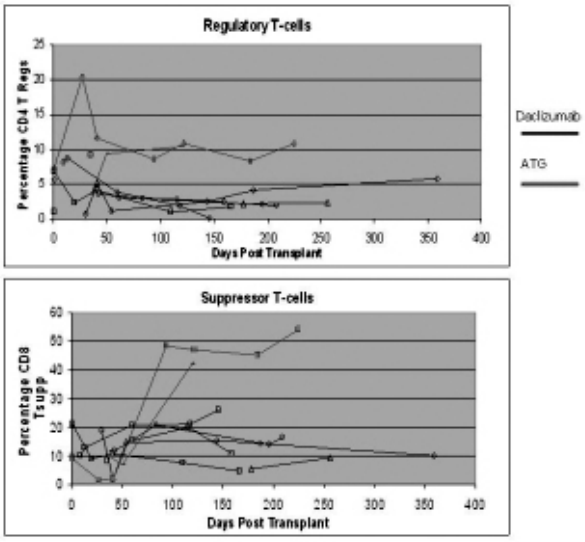
SURVEILLANCE OF ANTI-HLA ANTIBODIES IN STABLE PEDIATRIC RENAL TRANSPLANT RECIPIENTS. J. Smith,[1] P. Warner,[2] K. Nelson,[2] P. Healey,[1] C. Davis,[1] L. Finn,[1] R. McDonald.[1]
[1]University of Washington, Seattle, USA; [2]Puget Sound Blood Center, Seattle, USA.
PURPOSE: HLA single antigen bead (SAB) assays have increased the sensitivity and specificity of monitoring for donor-specific antibody (DSA). The correlation of allograft histology with surveillance DSA in the setting of stable renal function is not well established. We performed a study of stable pediatric renal transplant recipients to determine the histopathologic findings associated with detection of DSA.
METHOD: All pediatric renal transplant recipients had sera tested for DSA using a SAB assay every 3 months. Subjects with DSA tested for renal dysfunction were excluded. DSA were defined as specific for donor antigens above a threshold of 1000 MFI. Surveillance biopsies were performed at 3-6m, 12m, 24m post-tx and at time of DSA detection.
RESULTS: A total of 68 non-sensitized stable pediatric renal transplant recipients had prospective DSA surveillance. Sixteen subjects (24%) had DSA detected at a mean of 15m (SD 10 m) post-transplant. Univariate analysis demonstrated no difference in demographics, donor source, immunosuppression, or acute rejection. Seven subjects had antibodies to HLA-DQ alone (mean MFI 5433±3533). Five subjects had DSA to both HLA-DR and HLA-DQ (mean MFI 8017±6180). Allograft histology at time of DSA positivity demonstrated that subjects with DSA to both HLA-DQ and HLA-DR had significantly higher C4d scores than those with DSA to HLA-DQ alone (p=0.04). Allograft histology at 2 years post-tx revealed higher grades of interstitial fibrosis and tubular atrophy among subjects with DSA to HLA-DQ and HLA-DR than those with antibodies to HLA-DQ alone (p=0.05). Comparing the HLA-DQ alone group to the HLA-DQ and HLA-DR group, there was no significant difference in demographics, donor source, HLA mismatch, acute rejection, or renal function.
CONCLUSION: Among pediatric renal transplant recipients with stable renal function, detection of DSA is common. DSA restricted to HLA-DQ were not associated with significant C4d deposition or interstitial fibrosis and tubular atrophy. Further study of the correlation between DSA specificity and histopathology is warranted.

Abstract# 380

THE EFFECTS OF DIFFERENT INDUCTION REGIMENS ON THYMOPOIESIS AND T CELL RECONSTITUTION IN PEDIATRIC RENAL TRANSPLANTATION. S. Narayan, E. W. Tsai, Y. Korin, P. Cooper, M. Holloway, E. F. Reed, R. B. Ettenger. *UCLA, Los Angeles, CA, USA.*
PURPOSE: Use of induction immunosuppression has increased in order to minimize the risk of rejection and improve graft survival. The effect of these medications on thymopoiesis and T-cell reconstitution remains unclear. We aimed to study the difference in both thymopoiesis and T-cell reconstitution in pediatric renal transplant patients induced with daclizumab and anti-thymocyte globulin (ATG).
METHOD: Pediatric renal transplant patients induced with either ATG or daclizumab were prospectively enrolled. Fresh whole blood was obtained serially. Thymopoiesis was evaluated with TREC (T-cell receptor excision circles) quantification by RT-PCR using isolated PBMC. T-cell immunophenotyping was done using multi-parametric flow-cytometry using cell surface proteins to identify various types of T-cells.
RESULTS: Despite similar average TREC values at baseline, TREC values significantly decreased to undetectable levels and remained suppressed up to 6 months post-transplant in ATG induced patients.



Patients induced with ATG had higher percentage of regulatory and suppressor T-cells compared to those induced with daclizumab.



CONCLUSION: ATG induces a prolonged and sustained suppression of thymopoiesis, much longer than previously described, as indicated by undetectable TREC values. ATG induction favors expansion of suppressor and regulatory T-cells. These findings may have important clinical implications in supporting use of ATG for rejection and promoting tolerance.

Abstract# 381

ABO INCOMPATIBLE KIDNEY TRANSPLANTATION IN CHILDREN. Michael M. Kaabak,[1] Nadezda N. Babenko,[1] Stanislav V. Kirillov,[1] Emin L. Salimov,[2] Ilya A. Nechayev.[2] *[1]Kidney Transplantation, Russian Scientific Center of Surgery, Moscow, Russian Federation; [2]Transfusiology, Russian Scientific Center of Surgery, Moscow, Russian Federation.*
PURPOSE: ABO incompatible (ABOi) kidney transplantation competes with pair exchange chains (domino) and is intended to increase the availability of live donor organ transplantation. In Russia we have a legislation ban for interfamily organ exchange so ABOi transplantation is the only option for recipients with incompatible donors.
METHOD: From December 2005 to May 2009 we performed 21 ABOi kidney transplantations in patients 0.9 – 20 (10±5) years old. Campath (18 pts) and Mabtera (3 pts) were used for B-cell depletion and plasmapheresis - for antibody removal. Antibody titer less than 1:8 considered as acceptable. Maintenance immunosupression was CsA or tacrolimus (1:1) and mycophenolates. Since June 2007 early steroid withdrawal was applied. Patients were followed 393-1868 (967±454) days, protocol biopsies were performed at one month, one and three years. Infrared video records of graft reperfusion were used for detection the early contact of graft endothelium with isoantibodies.
RESULTS: One and two years patient and graft survival was equal – 95%. The rate of acute rejection was 18% at one year and 38% at two years. In 50 analyzed biopsies CADi was calculated - it was 2.0 at one year and 3.2 at two years. When compared with CADi in database (1326 biopsies) of compatible grafts it didn't change from 1 to 2 year and was 2.6 (p>0.05 with ABOi).

The kidney worming after reperfusion in the temperature range between 15 and 20°C proceeded with speed 10.3±2.2 and 26.8±1.8°C/min/1.73 for ABOi and compatible kidneys respectively ($p<0.05$).
CONCLUSION: ABOi kidney transplantation leads to satisfactory early results and can be considered as acceptable option in case of absence compatible donors. Meanwhile the reduced speed of warming during reperfusion as well as trend to increased CADi score from first to second year in ABOi grafts may be a signs of not enough control of rejection.

Abstract# 382

HLA CLASS II ANTIBODIES AND C4D PERITUBULAR CAPILLARY DEPOSITION IN PEDIATRIC RENAL TRANSPLANTATION. INFLUENCE ON ESTIMATED GFR AND GRAFT SURVIVAL. Alicia Chaparro, Marta Monteverde, Ziomara Balbarrey, Juan Ibañez, Amalia Turconi, Mario Diaz. *Nephrology Unit, Hospital JP Garrahan, Buenos Aires, Argentina.*
PURPOSE: C4d peritubular capillary deposition and donor specific HLA class II antibodies (abs) have been associated with vascular rejection and significant risk for transplant dysfunction and failure.
1. To know the incidence of C4d and HLA class II donor specific abs in kidney transplanted children.
2. To know the influence of C4d and HLA abs on graft survival and estimated GFR (eGFR).
METHOD: We reviewed 52 children (29 males, mean age at RTX 10.37 ± 3.77 years) biopsied at 22 months after renal transplantation (RTX, r: 0.33-145.70) because of: creeping creatinine n=47, CNI withdrawal, n= 3, and nephrotic proteinuria: n=2. Thirty nine patients received a graft from a deceased donor, 51 underwent a first transplant. Mean HLA mm were 3.0±09. All children were on steroids and MMF/MPS with CYA (n=43), SRL (n=5) or TAC (n=4). Median follow-up after kidney biopsy was 15.20 (r: 0.58-63.8) m. Class II HLA abs was analyzed by Luminex and C4d by monoclonal antibody-immunofluorescence techniques.
RESULTS: Histological findings were: ACR: n= 18 (34.6%), IFTA: n= 25 (48%), ATN: n=4 (7.69%), de novo membranous Glomerulopathy: n= 3 (5.77%), TX Glomerulopathy: n=1 (1.92%), TMA: n= 1 (1.92%). Positive C4d: 27 pats (51.9%). HLA class II abs was present in 21 pats (41.18%). There was a significant association between HLA class II abs and c4d capillary deposits (r2=0.82). The association of ACR with HLA class II abs (p=0.001) and c4d positive (p=0.000) was also statistically significant. Twenty eight pats (53.85%) showed no adherence. Five children lost the graft (9.8%). Graft survival after biopsy in pats without and with HLA abs was: 100% and 90% at 12m, 100% and 48% at 36m (p=0.021). Both, the presence of HLA abs (p=0.011), c4d (p=0.021) and ACR (p=0. 002) were associated with transplant failure. eGFR was lower in pats with HLA abs (mean: 91.20± 6.88 vs. 50.96 ± 7.99, p= 0.0004).
CONCLUSION: HLA class II abs were frequently associated with c4d+ peritubular capilar deposits, worst eGFR and graft survival.

Ethical/Psychosocial 4: Adolescents and Adherence

Abstract# 383

PEDIATRIC THORACIC TRANSPLANTATION: A TRANSFORMATIVE PROCESS. Samantha J. Anthony,[1] David B. Nicholas,[2] Cheryl Regehr,[3] Anne I. Dipchand,[1] Melinda Solomon,[1] Radha MacCulloch,[1] Lori J. West.[4] *[1]The Hospital for Sick Children, Toronto, Canada; [2]University of Calgary, Edmonton, Canada; [3]University of Toronto, Toronto, Canada; [4]University of Alberta, Edmonton, Canada.*
PURPOSE: Despite the growth of heart and lung transplantation (Tx) as life-saving therapies in children and adolescents, little research has focused on the biopsychosocial impact of the Tx process. This study addresses a significant gap in knowledge and captures subjective, quality of life experiences of pediatric patients, providing much needed insight into the impact of care trajectory and life changes following Tx.
METHOD: This qualitative study explored how adolescent patients construct their worlds and the meanings they ascribe to their Tx experience. A grounded theory approach was implemented and guided data collection, data analysis and theoretical formation.
RESULTS: A total of 32/37 heart or lung Tx patients (21 female, 66%) participated (median age 15.9 yrs; range 1218.4 yrs) at a median time of 2.7 yrs post-Tx (range 0.311.1 yrs). Results illuminate pediatric thoracic Tx in its potentially transformative nature. Findings unveil three dimensions of positive transformations experienced by participants: 1) enhanced self-perception, including a greater sense of personal strength and recognition of coping abilities, 2) greater meaningfulness in interpersonal relationships, including enhanced appreciation for relationships with family and friends, and 3) perceived improvement in one's view and philosophy of life. Accordingly, these findings uniquely point to an emerging 'transplanted self', and a theoretical model that posits Tx as a potential catalyst for growth and personal transformation.
CONCLUSION: These results offer an emergent expansive role of positive experience yielded from pediatric Tx. These data – reflecting the words and perceptions of adolescents embodying the experience of Tx – suggest that Tx has offered hope, personal change and reflectiveness. Recasting Tx as potentially a generative, hopeful condition and opportunity offers important implications for practice and research.

Abstract# 384

SELF-MANAGEMENT EDUCATION NEEDS IN ADOLESCENT LIVER TRANSPLANT RECIPIENTS: A QUALITATIVE RETROSPECTIVE STUDY. I. Aujoulat,[1,2] M. Janssen,[2] C. Struyf,[2] A.-S. Charles,[2] E. Sokal,[2] R. Reding.[2] *[1]Institute of Health & Society, Université Catholique de Louvain, Brussels, Belgium; [2]Pediatric Liver Transplant Program, Pediatric Surgery and Transplant Unit, Université Catholique de Louvain, Cliniques universitaires Saint-Luc, Brussels, Belgium.*
PURPOSE: Learning to self-manage a chronic condition is a major challenge. We aimed to better understand the factors which impact on self-management in adolescents, from the perspective of the patients.
METHOD: We conducted a retrospective qualitative study through in-depth interviews, and used an inductive approach of thematic content analysis. Self-reported adherence was assessed using the Basel Assessment of Adherence Scale (BAASIS).
RESULTS: We included 15 patients with a mean age of 21 years (16-30). Independently of the self-reported level of adherence, a certain number of common needs, challenges or difficulties emerged during our process of analysis:
- To be able to name and explain the disease which had induced the need for transplantation;
- to understand how immunosuppression works, in particular when fluctuations in blood tests require an adaptation of the level of immunosuppression;
- to find the right balance between parental supervision and self-managed care at different ages;
- to have a clear indication of what a risk-behaviour is in terms of both general health behaviours and non-adherence to treatment;
- to anticipate how to react in the event of non-intentional non-adherence;
- to understand the possible impact of the treatment on fertility;
- to assess the risk to transmit one's condition to descendants;
- to come to terms with the idea of being a survivor;
- to come to terms with feelings of obligation toward one's family or the donor;
- to maintain hope in the event of other concomitant adverse health circumstances.
CONCLUSION: Our study suggests several avenues for setting up a comprehensive self- management education programme, and demonstrates the need to tackle not only behavioural aspects of adherence, but also general health education needs, reproductive health issues, transition tasks within the family, the patient's condition prior to transplantation, and the donation process.

Abstract# 385

ADHERENCE AND HEALTH STATUS AFTER THE TRANSFER FROM A PEDIATRIC TO ADULT LIVER TRANSPLANT CLINIC. Emily M. Fredericks, M. James Lopez, Andrew Well, Dawn Dore-Stites, Sally J. Eder, Victoria Shieck, Hari Conjeevaram, John C. Magee. *University of Michigan Health System, Ann Arbor, MI, USA.*
PURPOSE: This study retrospectively examined changes in adherence and health status following the transfer from pediatric to adult liver transplant care.
METHOD: We completed a chart review of pediatric liver transplant recipients (LTR) who transferred to adult care. 24 LTR who were ≥12 months post-transfer were identified. Medication adherence (standard deviations [SD] of immunosuppressant blood levels), rate of clinic attendance, and health status (liver function, biopsies, rejection, and hospitalizations) were examined for the year pre-transfer and first year post-transfer. Regression analyses and t-tests were used to assess changes over time.
RESULTS: Mean age at transfer was 19.7 years (range 18-22). Mean time since transplant was 14.2 years (range 4-24). Primary immunosuppressants were tacrolimus (N=16) and cyclosporine (N=8). Tacrolimus SD significantly increased from the year pre- to the year post-transfer (2.1 vs. 3.8, p=0.019). Age at transfer predicted 21.5% of the variance in post-transfer tacrolimus SD (F=3.84, p=0.07). Pre-transfer tacrolimus SD predicted an additional 33.5% of the variance in post-transfer adherence (F change=9.66, p=0.008). The total model predicted 55% of the variance in tacrolimus SD (p=0.006) after transfer. Increases in cyclosporine SD post-transfer were not significant (36.1 vs. 67.4, p=0.35). There were no significant changes in clinic attendance rates (84% vs. 77%, p=0.11). Post-transfer tacrolimus SD was positively correlated with post-transfer ALT (r=0.55, p=0.03) and AST (r=0.57, p=0.02). There were no significant changes in measures of health status across time.
CONCLUSION: Preliminary results of this ongoing study suggest that medication adherence worsened in the year following transfer to adult transplant care. Younger age at transfer and medication nonadherence pre-transfer predicted increased nonadherence after transfer. No significant adverse events were observed in the short term; yet, prospective studies investigating adherence and health outcomes after the transfer to adult care are needed.

Abstract# 386

DEPRESSIVE SYMPTOMS AND NON-ADHERENCE IN ADOLESCENT RENAL TRANSPLANT PATIENTS. Nataliya Zelikovsky,[1,2] Tracey Dobson,[1,2] Melody Miller,[1,2] Kathryn Skira.[1,2] *[1]The Children's Hospital of Philadelphia, Philadelphia, USA; [2]La Salle University, Philadelphia, USA.*

PURPOSE: Past psychiatric history and behavioral and emotional problems have shown some association with poor adherence. The National Comorbidity Study reported a lifetime prevalence of major depression of 14% for 15-18 year olds and an additional 11% reporting minor depression, exceeding that of younger children (<1%) and adults (2-4%). Changes in emotions, behaviors, and cognitions that occur during depression can affect an individual's ability to follow complex and timed medication regimens. The purpose of this study was to examine the relationship between depressive symptoms and immunosuppressant medication adherence in adolescent renal transplant patients.

METHOD: Thirty-two adolescent renal transplant patients ages 13-19 (mean age 17.1 years, 53.1% female, 62.5% Caucasian) were recruited from a northeastern children's hospital. The current study examined the relationship between adherence and adolescent depression. The Child Depression Inventory (CDI) was administered and a semi-structured interview, the Medical Adherence Measure, was conducted to obtain patient report of missed and late doses during the previous week.

RESULTS: Immunosuppressant medication non-adherence (% weekly missed doses) was associated with several subscales of the CDI: negative mood (r=.421, p=.016), interpersonal problems (r=.398, p=.024), ineffectiveness (r=.385, p=.029), and anhedonia (r=.360, p=.043).

CONCLUSION: Non-adherence to immunosuppressants has been cited as a major cause of acute rejection episodes and graft loss among adolescent transplant patients. The heightened risk for depression in this age group seems to be related to poor adherence. It is possible that depressed adolescents who sleep for large portions of the day are likely to miss a morning dose, or feel unmotivated to make an optimal health decision if they perceive their life as hopeless. Depressed adolescents may also be resistant to support from parents and peers. Continued research is essential in this area for developing targeted interventions to support adolescents through challenging times.

Abstract# 387

TACROLIMUS PERCENT COEFFICIENT OF VARIATION AS A MARKER OF ACUTE REJECTION ASSOCIATED WITH NONADHERENCE IN ADOLESCENT RENAL TRANSPLANT RECIPIENTS. Hilda E. Fernandez,[1] David Gjertson,[2] Caitlin Date,[1] In-Kyu Choi,[1] Robert B. Ettenger,[1] Eileen W. Tsai.[1] *[1]Mattel Children's Hospital, UCLA, LA, USA; [2]Dept of Pathology and Laboratory Medicine, UCLA, LA, USA.*

PURPOSE: We previously demonstrated tacrolimus percent coefficient of variation (TAC CV%) is a superior marker compared to TAC standard deviation (SD) for detecting the likelihood of acute rejection (rej) associated with medication nonadherence in pediatric (ped) renal transplantation (Tx). We aimed to validate this and determine time intervals for which TAC CV% could be predictive of rej associated with nonadherence in adolescents.

METHOD: TAC SD and CV% were measured in 31 ped renal Tx recipients (ages 11-21; mean = 15.8 yrs) who underwent Tx between 2004 and 2008 with a mean post-Tx follow-up time of 3.7 years. Rejection was confirmed by biopsy classified by updated Banff 2007 criteria. In rejectors, SD and CV% were calculated from trough TAC levels measured 6 mo prior to the first rej. In non-rejectors, SD and CV% were calculated from trough TAC levels measured 6 mo prior to the last post-Tx clinic follow-up date. Patients (pts) were induced with daclizumab or thymoglobulin and maintained on steroid-free or steroid-based immunosuppression with TAC and mycophenolate mofetil.

RESULTS: Nine pts had acute rej in an average of 3.4 years post-Tx, and 22 pts without rejection had a mean follow-up time of 3.8 years. The TAC CV% was significantly higher in rejectors vs non-rejectors (58.2% vs 26.9%, p = 0.021). The mean TAC SD was not significantly different between rejectors and non-rejectors (2.52 vs 1.79, p = 0.098). In a subanalysis, 8 rejectors were paired according to date of Tx to 8 non-rejectors. Rejectors had a significantly higher TAC CV% (54.2% vs 21.7%, p = 0.013) compared to non-rejectors, but not in TAC SD (2.52 vs 1.39, p=0.08).

CONCLUSION: In this validation cohort, TAC CV% appears to be superior to TAC SD in detecting late acute rej associated with medication nonadherence, especially 6 months prior to allograft rej. Frequent monitoring with TAC CV% may be required to decrease acute rejection and allograft failure due to medication nonadherence in adolescent recipients.

Abstract# 388

HEALTH LITERACY AND ITS ASSOCIATION WITH ADHERENCE IN PEDIATRIC LIVER RECIPIENTS AND THEIR PARENTS. Dawn Dore-Stites,[1] Andrew Well,[1] Victoria Shieck,[1] M. James Lopez,[1] John C. Bucuvalas,[2] Kathleen Campbell,[2] John C. Magee,[1] Emily M. Fredericks.[1] *[1]University of Michigan Health System, Ann Arbor, MI, USA; [2]Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.*

PURPOSE: Health literacy is the ability to understand health information. Poor health literacy is correlated with decreased adherence in adult populations yet is understudied in pediatrics. The current project aimed to determine the relationship between health literacy, adherence and outcomes in pediatric liver transplant recipients (LTR).

METHOD: Participants were recruited during visits in a pediatric transplant clinic. Parents and/or patients (>13 years old) completed 2 measures of health literacy (Test of Functional Health Literacy in Adults [TOFHLA] and Newest Vital Sign [NVS]). Adherence variables (tacrolimus standard deviation [SD], immunosuppressant lab values out of range [OOR] and clinic attendance) and health outcomes (AST, ALT, tBili, hospitalizations and rejection episodes) were obtained from medical records. Correlational analyses were used to examine relationships between variables.

RESULTS: 41 parents and 34 adolescents participated**.** Mean time since transplant was 9.8 years (±5.1 years). The association between parent and patient health literacy as well as adolescent health literacy and adherence was not statistically significant. There was increased variability in patient scores relative to parents. The NVS was correlated with tacro SD (p = 0.007), OOR (p=0.000) and ALT average (p = 0.001). Similar associations were not observed between the TOFHLA and adherence.

CONCLUSION: This study found a significant relationship between pediatric LTR parent NVS scores and adherence. Similar associations were not observed with the TOFHLA; however, the literature suggests this measure lacks sensitivity to detect low health literacy. The health literacy skills of adolescents were more highly variable and reflects subsets of patients who require more support in understanding their medical care. Future studies should focus upon developing interventions that address health literacy skills and examine their impact on adherence.

Liver 5: A Potpourri

Abstract# 389

RURALITY AND HEALTH OUTCOMES IN PEDIATRIC LIVER TRANSPLANTATION. K.T. Park,[1] Rachel Bensen,[2] Pranav Nanda,[1] Carlos Esquivel,[3] Kenneth Cox.[1] *[1]Stanford University Medical Center, Palo Alto, CA, USA; [2]Stanford University, Palo Alto, CA, USA; [3]Department of Abdominal Transplantation, Stanford University Medical Center, Palo Alto, CA, USA.*

PURPOSE: Rural status of patients may impact health in pediatric liver transplantation (LT). The objective of this study was to determine whether rural patients have worse health outcomes than urban patients in pediatric LT.

METHOD: We used urban influence codes published by the USDA to stratify patients as urban or rural depending on the county of residence. 3,307 pediatric patients in the United Network of Organ Sharing (UNOS) database between 2004 and 2009 who had received a LT were included in our study. Acute graft rejection before hospital discharge, graft rejection within 6 months and 1 year after transplant, patient death, and graft failure were used as primary outcome measures of post-LT health. PELD/MELD scores > 20 was used as a secondary outcome measure of worse pre-LT health. Univariate and multivariate logistic regression models used to determine associations.

RESULTS: In a multivariate analysis, controlling for age, gender, ethnicity, wait-times before transplant, and multi-organ transplant status, we found significantly higher graft rejection rates in rural patients within 6 months of LT (OR 1.27; 95% CI 1.05 – 1.53; P = 0.013). This difference is eliminated at one year of LT. Rurality did not impact other outcome measures, including acute rejection rates before hospital discharge, patient survival, or graft failure. Patients from rural areas did not have higher PELD/MELD scores (>20) prior to LT. Secondary analysis shows that multi-organ LT patients were less likely to have graft rejection by 1 year (OR 0.71, 95% CI 0.53 – 0.95; P = 0.022), but had more than 4-fold increased risk for patient death (OR 4.15, 95% CI 3.25 – 5.31; P < 0.0001) and almost 2.5-fold increased risk of graft failure (OR 2.41, 95% CI 1.93 – 3.01).

CONCLUSION: From a 5 year national UNOS data sample, we conclude that rurality makes a significantly negative impact on patient health by increasing the risk for graft rejection within the first 6 months of LT.

Abstract# 390

RELATIONSHIP BETWEEN SERUM INSULIN LIKE GROWTH FACTOR-1, INSULIN LIKE GROWTH FACTOR BINDING PROTEIN-3 AND ANTHROPOMETRIC MEASUREMENTS IN CHILDREN WITH CHRONIC LIVER DISEASE BEFORE AND AFTER LIVER TRANSPLANTATION. Ferda Ozbay Hosnut,[1] Figen Ozcay,[1] Hamdi Karakayali,[2] Gokhan Moray,[2] Mehmet Haberal.[2] *[1]Pediatric Gastroenterology, Baskent University, Faculty of Medicine, Ankara, Turkey; [2]General Surgery and Transplantation, Baskent University, Faculty of Medicine, Ankara, Turkey.*

PURPOSE: Our aim is to evaluate nutritional status of children with CLD before and after LT, determine serum IGF-I/IGFBP-3 levels and analyze the relationship between them.

METHOD: 33 LT patients (median 34.24 m (5 m-11 y) and 54 healthy children were included.IGF-I/IGFBP-3 levels and weight(w), height(h), weight for height(w/h), TST, MAC, MAMA (mid arm muscle area) were obtained before and 1, 3, 6 and 12 months after LT.

RESULTS: H/age Z score was under -2SD in 30%.All measurements except w/h Z score were lower in CLD patients.A significant negative relationship was detected between Child-Pugh score and TST(r=-0.387,p=.026,and MAC (r=-0.448,p=.009) Z scores.3 months after LT a significant increase in MAMA,TST,and MAC measurements were detected.After 6 months an increase in w/age, h/age,andw/h Z scores were seen.1 year later,no difference was detected for w/age,w/h,and MAC Z scores between study and control groups.TST and MAMA measurements were better in the LT group. However, h/age Z scores(-0.7±1.46) of LT patients were lower than that of healthy children(0.08±0.9)p<.05.The shorter the patient, the higher the growth rate after LT (r=-0.381,p=.02). IGF-1 and IGFBP-3 levels were lower in CLD patients than the controls(35.24±14.68 vs 69.88±67.45ng/ml,p<.001).There was no relationship between IGF-I, IGFBP-3 levels and any of the measurements, or between these proteins and Child-Pugh score (IGF-1 r=0.194, p=.280),IGFBP-3 (r=-0.27,p=.882).IGF-1 levels were found to increase 1 month after LT,with peak levels in 3rd month.1 year after LT,it was still higher than the controls.

CONCLUSION: In CLD,TST,MAC,MAMA were reliable.Before LT,IGF-1 and IGFBP-3 levels didn't reflect the severity of malnutrition in CLD group.No relationship was detected after LT between IGF-1/IGFBP-3 levels and anthropometry.Improvement of nutrition parameters after LT couldn't explained only by growth factors.

Abstract# 391

BLOOD PRESSURE ELEVATION AMONG LONG TERM SURVIVORS OF LIVER TRANSPLANTATION. Valérie A. McLin,[1] Ravinder Anand,[2] Stephen Daniels,[3] Estella M. Alonso.[4] *[1]Pediatrics, University Hospitals Geneva, Geneva, Switzerland; [2]Emmes Corporation, Rockville, MD, USA; [3]Pediatrics, Aurora Children's Hospital, Aurora, CO, USA; [4]Pediatrics, Children's Memorial, Chicago, IL, USA.*

PURPOSE: Little is known about long term complications of immunosuppression in pediatric liver transplant (LT) recipients. **The aims of this study** were 1) to estimate the prevalence of elevated blood pressure (BP) in children and adolescents having survived liver transplantation at least 5 years and 2) to identify factors predictive of elevated BP 5-10 years following pediatric LT.

METHOD: Patients enrolled in the blood pressure arm of the Studies in Pediatric Liver Transplantation (SPLIT) cohort participated in the study. All patients were >5 yrs of age, and at least 5 years post LT but ≤ 10 years. Single, automated BP measurements were obtained at anniversary visits and recorded in the SPLIT database. BP measures were classified as normal, borderline or elevated according to standard criteria (normal <90%, borderline 90%-95%, and elevated >95%). Patients taking antihypertensive medications were classified as elevated. Standardized height for age, weight for age, BMI Z-scores and blood-pressure percentiles were calculated in reference to age- and gender- specific normative charts. Statistical analysis was performed using SAS System for Windows 9.01.

RESULTS: 815 patients participated in the study. The prevalence of elevated BP measurements 5-10 years post OLT was 17.5-27.5% according to time since transplant. Among those patients who had one elevated BP measurement, 62.5% presented with at least another elevated BP in at an ulterior follow up visit 5-10 years post LT. Multivariate analysis determined the following predictors of elevated BP: age at transplant, steroid use at last BP measurement, and cGFR at last BP measurement.

CONCLUSION: Pediatric LT patients show a high prevalence of elevated BP measurements 5-10 years following LT. Age at transplant, decreased cGFR and recent steroid use are predictive of elevated BP in long term survivors. Improved diagnosis and follow up of these patients and their long term complications is warranted.

Abstract# 392

LONG-TERM FOLLOW-UP OF PEDIATRIC LIVER TRANSPLANT RECIPIENTS WITH PORTAL VEIN THROMBOSIS. Dorota Broniszczak,[1] Marek Szymczak,[1] Hor Ismail,[1] Joanna Tesseyre,[1] Joanna Pawlowska,[2] Mikolaj Tesseyre,[2] Agnieszka Lembas,[3] Andrzej Kosciesza,[3] Piotr Kalicinski.[1] *[1]Pediatric Surgery and Organ Transplantation, Children's Memorial Health Institute, Warsaw, Poland; [2]Gastroenterology, Children's Memorial Health Institute, Warsaw, Poland; [3]Diagnostic Imaging, Children's Memorial Health Institute, Warsaw, Poland.*

PURPOSE: Portal vein thrombosis (PVT) is one of the most serious complications after liver transplantation (LTx) which can lead to life threatening hemorrhage.
The aim of the study was to analyze long-term management of PVT after LTx in single center experience.

METHOD: Between 1990 and 2010 we identified 20 children with PVT (4,3%) after LTx among 466 liver transplantation performed in our center. Within them in 9 children (1,9%) PVT was permanent. Permanent PVT was diagnosed in the early posttransplant course in 5 pts and late after Tx in 4 children. Clinically significant hemorrhage was observed in 6 patients. In 2 patients emergency surgical intervention for bleeding varices was performed (Sugiura procedure). In 1 child meso-rex shunt was attempted, in 3 patients mesocaval shunts were performed (using splanchnic collateral veins) and in 1 splenorenal shunt (in 2 of them goretex graft was used). In one child with chronic rejection and PVT liver retransplantation with cavoportal hemitransposition was performed. Four patients underwent splenectomy.

RESULTS: Follow-up after LTx ranges from 53 to 249 months (mean 107 months). Liver function is good in all 9 children. In 1 patient two portosystemic shunts thrombosed (one with native vein and one with Goretex graft), and we still observe episodes of anemization.

CONCLUSION: Portal vein thrombosis may be the source of chronic problems in children after liver transplantation. Treatment of portal hypertension is challenging in these patients, but liver function is well preserved.

Abstract# 393

SIROLIMUS AS RENAL AND IMMUNOLOGICAL RESCUE AGENT IN PEDIATRIC LIVER TRANSPLANT RECIPIENTS. Maria-Sole Basso,[1] Pushpa Subramaniam,[1] Mike Tredger,[2] Anita Verma,[1] Nigel Heaton,[1] Giorgina Mieli-Vergani,[1] Anil Dhawan.[1] *[1]Paediatric Liver, GI and Nutrition Centre, King's College Hospital, London, United Kingdom; [2]Institute of Liver Studies, King's College Hospital, London, United Kingdom.*

PURPOSE: Calcineurin inhibitors (CNI) have improved the outcome of liver transplantation (LT) in children. However their inherent potential towards nephrotoxicity and sometimes-inadequate immunosuppressive effect have lead to the use of new drugs like Sirolimus (SRL). This drug has been investigated in adults but the data in pediatric liver transplantation is limited. The aim of this study was to review children who received SRL as rescue for allograft rejection or as CNI sparing agent for nephrotoxicity.

METHOD: Thirty-seven (20 female) children post LT, median age 13.8 years (3.6-23.8) with a minimum follow up of 6 months comprised the study group.

RESULTS: The etiologies of liver disease leading to LT were biliary atresia in 13, PFIC in 8, acute liver failure in 7, GSD in 2, and others in 7. Indications for SRL were biopsy proven resistant acute allograft rejection (n =12), chronic rejection (n =12) and CNI induced nephropathy with Mycophenolate Mofetil (MMF) intolerance (n =11). In two patients the indication was the recurrence of BSEP (bile salt export pump) disease in the allograft. SRL was used in combination with Tacrolimus in 16 patients, with MMF in 9, with cyclosporine in 4 and on its own in 10. Median follow-up was 2.4 (0.6-6.4) years. In patients with acute rejection, aspartate aminotransferase (AST) normalized in 10/12 patients after a median time of 3 (2-11) months. In patients with chronic rejection, AST normalized in 6/12 patients after a median time of 5 (2-10) months. Those with renal impairment showed improvement in their creatinine levels from a mean baseline of 99 to 56.7 µmol/L (p =0.03) and their mean Cystatin C was 1.02 (range 0.89-1.15) after SRL. Side effects leading to discontinuation of SRL were seen in 3 patients: oral ulcers in 1, hyperlipidaemia in 1 and recurrent infection in 1.

CONCLUSION: SRL was effective in rescuing patients with acute and chronic allograft rejection and improving renal function in CNI induced nephropathy group.

Abstract# 394

FOLLOW UP OF RENAL HYPERFILTRATION IN CHILDREN WITH BILIARY ATRESIA ONE YEAR AFTER LIVER TRANSPLANTATION. Tonya Kara,[1] Helen M. Evans.[2] *[1]Paediatric Nephrology, Starship Hospital, Auckland, New Zealand; [2]Paediatric Gastroenterology, Starship Hospital, Auckland, New Zealand.*

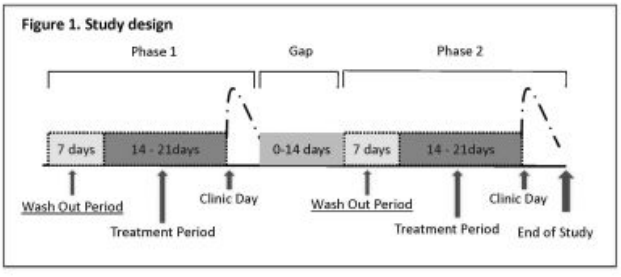
PURPOSE: Chronic kidney disease (CKD) is recognised as a long term complication of liver transplantation (LT). We have previously described renal hyperfiltration (enlarged kidneys, proteinuria, hypertension) in a cohort of children awaiting LT for biliary atresia (BA) (Kara, IPTA 2009). The current study presents follow-up data from the same cohort one year following LT undertaken between 2005-2010.

METHOD: Retrospective review of the following renal parameters in 23 children with BA (9M, 14F; median age at LT 15 mo (range 5 – 112 mo) at assessment for and at a median of 13 mo after LT: blood pressure & centile, creatinine, cystatin C where available & estimated (e)GFR, renal lengths & centiles on ultrasound & proteinuria (raised protein:creatinine ratio).
RESULTS: Median creatinine at 1 yr was 29mmol/L (range 20-61) compared to 22 (range <20-46) at assessment. Median eGFR by cystatin C in 22/23 and CrEDTA in 17/23 was 82 (range 49-106) and 95 (range 56-134) mls/min/1.73m2 compared to 93 (range 74-114) pre LT. Median systolic BP at 1 yr was unchanged at the 90th centile, range 50-99th centile adjusted for height, sex, and age. Post LT proteinuria had improved with only 3/20 children having a mildly raised prot:creat ratio compared to 14/19 at assessment. Median renal lengths had slightly reduced from 95th centile for both right & left kidneys pre LT to 90th and 85th for the left & right kidneys respectively at follow-up, the children who waited the longest for LT having the largest kidneys at 1 yr.
CONCLUSION: At 1 yr post LT children with BA had preserved GFR despite an apparent rise in creatinine. Proteinuria had largely resolved. There was still evidence of renal hypertrophy and hypertension. The latter may be related to immunosuppression with tacrolimus. Continuing renal hypertrophy was more prevalent in those who waited the longest for LT but this was not the case for proteinuria. Thus, at 1 yr, the hyperfiltration had largely resolved but longer-term studies will determine whether these changes are sustained.

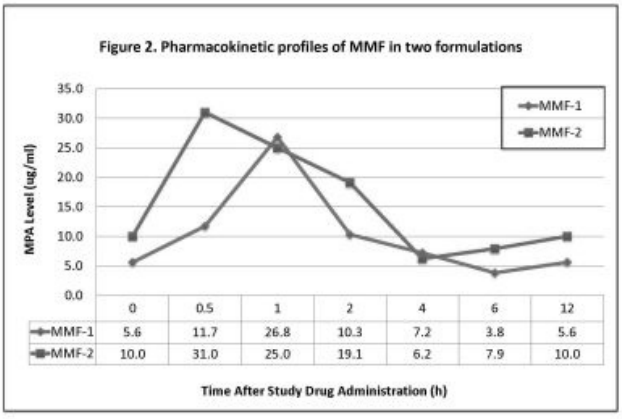
Late Breaking Abstracts

Abstract# LB4

BIOEQUIVALENCE OF CELLCEPT® AND GENERIC MYCOPHENOLATE MOFETIL: A RANDOMIZED, PHARMACOKINETIC, TWO-PERIOD, CROSS-OVER STUDY IN PEDIATRIC RENAL TRANSPLANT PATIENTS. Nianzhou Xiao, Frank Ayestaran, Kristin Fleming, Beatriz Teppa, Cris Hogue, Samhar Al-Akash. *Renal Transplant Program, Driscoll Dhildren's Hospital, Corpus Christi, TX, USA.*
PURPOSE: The primary purpose is to assess the bioequivalence (BE) of a generic mycophenolate mofetil (MMF) and Cellcept®in pediatric renal transplant (Ped RTx) recipients.
METHOD: This is a prospective study with two randomized cross-over treatment (Rx) periods.



During Rx period, subjects take either Cellcept® or MMF (300-450 mg/m^2/dose) every 12 hours for 14-21 days. Blood is collected at 0 time, 0.50, 1, 2, 4, and 6 hours after the final AM dose of MMF. The BE parameters of interest are the C-0, C-max, area under the concentration curve (AUC) calculated to AUC_{0-12}, all at steady-state serum levels. The study is designed with an N of 16, a power of 80% at α (two-tailed) = 0.05. $P < 0.05$ is considered significant.
RESULTS: Figure 2 shows the PK profiles on one patient after completing both randomization periods. Calculated AUC_{0-12} is 35% higher for MMF-2 than for MMF-1.



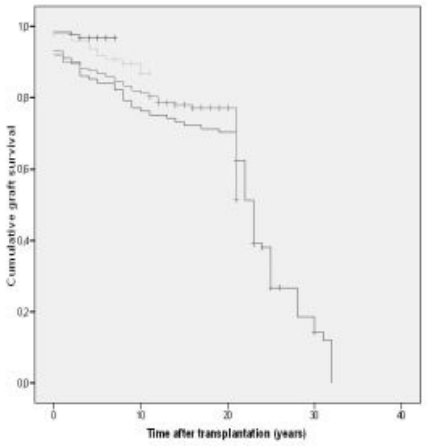
Six patients are projected to complete the study by May 2011, at which time we will decode the randomization, analyze and present the data.
CONCLUSION: FDA accepts BE difference as much as 45% (80-125%) in healthy adults to approve generic MMF formulations. Drug metabolism may be different in the Ped RTx population resulting in unpredictable efficacy and potentially clinical risks. To our knowledge, this is the first study to address the BE of Cellcept® and generic MMF in Ped RTx patients.

Abstract# LB5

T CELL DEPLETION INDUCES ENDURING HOMEOSTATIC EXPANSION OF CD8+, VDELTA1 AND CD25+CD127lo CD4+ REGULATORY T CELLS IN LIVER TRANSPLANT. Frances R Malone,[1,3] Jonathan E Karedemos,[2] David Burzo,[3] Andrew Burzo,[3] Andre A Dick,[1,3] Patrick J Healey,[1,3] Simon P Horslen,[1,3] Wei Li,[4] Jorge D Reyes,[1,3] Stephen DeRosa.[2,3] *[1]Seattle Children's Hospital, Seattle, WA, USA; [2]Fred Hutchinson Cancer Research Center, Seattle, WA, USA; [3]University of Washington, Seattle, WA, USA; [4]The Third Hospital (China-Japan Union Hospital) of Jilin University, Changchun, China.*
PURPOSE: To demonstrates the differences in the peripheral lymphocyte subsets between induction regimens in liver transplantation.
METHOD: Changes in lymphocyte subsets over 5 time points (Pre-txp, 1, 4, 12, and 24 weeks post-txp). Advanced multicolor flow cytometry was utilized to examine the cellular phenotype. Wilcoxon analyses were used to compare post-txp time points to pre-txp values.
RESULTS: 30 recipients of liver txp received either depleting (rabbit anti-thymocyte globulin) or non-depleting (basliximab, anti-CD25 monoclonal antibody) induction and tacrolimus maintenance samples were analyzed using multi-parameter flow cytometry. CD4+ T cells, as a percent of live lymphocytes were significantly decreased for the depletion group at 1 ($p<0.0001$), 4 ($p<0.0001$), 12 ($p=0.004$) and 24 ($p<0.0001$) weeks. However, in this group cytotoxic CD8+ lymphocytes were elevated at 1 ($p=0.07$), 12 ($p=0.08$) and 24 ($p=0.02$) weeks post-txp comprising a larger portion of PBMC. Vdelta1 gamma delta T cells were expanded at 24 ($p=0.007$) weeks in the depletion group while the Vdelta2 subset decreased significantly at 1 ($p=0.012$) week then recovered to pre-txp levels. CD4+ regulatory T cells, defined as CD25+CD127lo, as a proportion of total CD4+ T cells tended to be higher at 1 ($p=0.03$), 4 ($p=0.02$), 12 (0.02) and 24 ($p=0.07$) weeks following depletion.
CONCLUSION: Although CD4+ T cells remain decreased through 24 weeks, CD8+ cytotoxic T cells and Vdelta 1 T cells appear to proliferate in response to depletion. Regulatory T cells are either relatively resistant to depletion or are preferentially reconstituted after induction with depleting regimens. Depleting and non-depleting induction regimens have effects on lymphocyte subset composition and the induction of tolerance that are as yet unexplored.

Abstract# LB6

TRANSITION OF ADOLESCENT RENAL TRANSPLANT RECIPIENTS TO ADULT NEPHROLOGY UNITS. Toledo K Perdomo, S Bradley, S Doyle, R Jonhson, S Marks. *PEDIATRIC NEPHROLOGY, Great Ormond Street Hospital for Children, London, United Kingdom.*
PURPOSE: The literature states that 30% of renal allografts are lost when patients are transferred to adult nephrology units.
To report the patients and renal allograft survival in paediatric renal transplant recipients when they are transferred into the care adult nephrology units.
METHOD: Retrospective review of the patient and renal allograft survival and influencing factors in the 496 children transplanted between 1973 and 2008 and the 159 transferred into adults at Great Ormond Street and Royal Free Hospitals, with a minimum of one year follow-up.
RESULTS: 496 children had received a total of 579 transplants; 172 were living-related donations. The median age at transplantation was 12.34 (range 2-17) years. 63 children required a second and 10 a third transplant before transfer to an adult unit. 101 transplant patients are currently under paediatric follow-up.
159 patients have been transferred to adult nephrology units. The median age when they were transferred was 17.43 (range 16-19) years. 64.2 percent had congenital structural abnormalities of the urinary tract.
The outcome for successful transplantation is improving in the last decade as shown in Figurre 1.



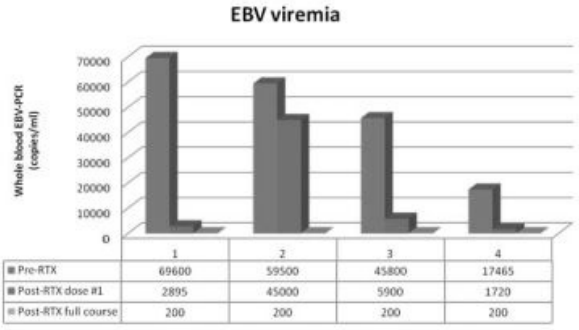
The overall patient and renal allograft were 97.5 % and 86.5 % at follow up of 5-266 (medium 84.34±53.87) months after transfer to adult nephrology unit.
CONCLUSION: The outcome for successful transplantation is improving in the last decade.
We note that 13.5% (21.4) renal allografts were lost and the overall patient and renal allograft were 97.5 % and 86.5 % after transferred to adult nephrology unit.

Abstract# LB7

ALTERED IL-7 SIGNALING IN T-CELLS FROM PATIENTS WITH PTLD AFTER ALLOGENEIC HSCT. Åsa Gustafsson Jernberg, Hamdy Omar, Raija Ahmed, Per Ljungman, Mark Maurer. *Department of Pediatrics #, Karolinska Institutet, Stockholm, Sweden; Department of Hematology Medicine Huddinge ¤, Karolinska Institutet, Stockholm, Sweden; The Swedish Institute for Infectious Disease Control (SMI), Stockholm, Sweden; Department of Microbiology Tumor and Cell Biology (MTC)&, Karolinska Institutet, Stockholm, Sweden.*
PURPOSE: Post transplant lymphoproliferative disease (PTLD) is a major cause of morbidity and mortality after transplantation.
IL-7, a non-redundant cytokine for B- and T- cells, plays a central role in cell survival and immune memory formation.
METHOD: PBMCs from 7 patients after hematopoietic stem cell transplantation (HSCT) diagnosed with PTLD and from 10 EBV PCR-positive HSCT patients (controls) were evaluated for IL-7- and IL-2 induced Stat5 phosphorylation in CD4+ and CD8+ T-cells.
RESULTS: PBMCs from PTLD + and control patients exhibited detectable EBV specific CD8+ T-cells defined by tetramer analysis. CD4+ and CD8+ T-cells from patients with PTLD showed statistically significant reduction in responsiveness to IL-7 as compared to PBMCs obtained from controls defined by Stat5 phosphorylation. CD20+ B-cells from patients with PTLD and from some EBV+ PCR control individuals exhibited IL-7R expression.
CONCLUSION: Dysregulated immune surveillance, reflected by deficient Stat5 phosphorylation, may facilitate PTLD development despite the presence of EBV-reactive CD8 + T-cells. Reduced IL-7 responsiveness will aid to monitor patients after HSCT for increased risk to develop EBV-associated PTLD.

Abstract# LB8

RITUXIMAB IS SAFE AND EFFECTIVE FOR TREATMENT OF PROGRESSIVE EBV VIREMIA IN HIGH-RISK PEDIATRIC RENAL TRANSPLANT RECIPIENTS. Sonia Mathew, Samhar Al-Akash. *Driscoll Children's Kidney Center, Driscoll Children's Hospital, Corpus Christi, TX, USA.*
PURPOSE: EBV-ve Renal Tx recipients from EBV+ve donors are at high risk of developing PTLD. The purpose of this study is to assess the efficacy and safety of Rituximab (RTX) in high-risk pediatric renal Tx pts with progressive EBV viremia
METHOD: Whole blood EBV-PCR is used to routinely monitor viremia in our pts. 4 pts with progressive EBV viremia received RTX. Donor status was +ve in 3, unknown in 1, and all 4 pts were EBV-ve at time of Tx. Mean age at Tx was 1.8 (1.5-3.5 years). All received monoclonal antibody induction, and a 4-day steroid taper post Tx. Maintenance immunosuppression consisted of tacrolimus (TAC) + mycophenolate mofetil (MMF) or Azathioprine (AZA). Once EBV viremia was detected in a rising trend, MMF or AZA was discontinued. If viremia continued or increased then TAC dose was reduced. RTX was given for pts with rising EBV viremia after TAC dose reduction. RTX was given weekly for 4 doses in all pts except 1 who received 3 doses.
RESULTS: Mean follow up was 27.4 (8.4-46.2) months (mon) post Tx, with a mean of 12.5 (1.1-20) mon after RTX therapy. EBV viremia was detected at a mean of 6.2 (1.7-13.4) mon, and peaked at a mean of 14.8 (5.4-29.7) mon post Tx. Mean RTX dose was 331 (289-416) mg/m^2/dose. EBV became undetectable in all pts (< 200 copies/ml) at a mean of 31 (23-67) days of the first RTX dose ($p < 0.001$). No pt developed clinical EBV disease or PTLD. Asymptomatic EBV viremia recurred in 3 pts at a mean of 222 (33-476) days, but did not reach pre-RTX levels in any pt**.** All pts tolerated RTX well. 2 pts developed hypogammaglobulinemia and 1 pt developed low-level BK viriuria. Graft function remained stable in all pts with no acute rejection or allograft dysfunction.



CONCLUSION: RTX is safe and effective in treatment of EBV viremia in high risk ped renal Tx pts.

Early Investigator Award Abstracts

Abstract# 395

ATTENTION AND EXECUTIVE FUNCTIONING DEFICITS IN LIVER-TRANSPLANTED CHILDREN. Tanja Kaller,[1] Nadine Langguth,[1] Ganschow Rainer,[2] Nashan Björn,[3] Karl-Heinz Schulz.[1,3] *[1]Medical Psychology, University Hospital Hamburg, Hamburg, Germany; [2]Childrens Hospital, University Hospital Hamburg, Hamburg, Germany; [3]Transplantation Center, University Hospital Hamburg, Hamburg, Germany.*
PURPOSE: Liver-transplanted children have an increased risk for serious developmental problems. We examined attention and executive functioning and their relation to intelligence and several disease-related variables after transplantation (Ltx).
METHOD: This is a monocentric, cross-sectional study. Children's mean age at Ltx was 3.4+/-3.8 years (n=137, age 10.2+/-3.8 years). Assessment included attention and executive functioning (Test of Attentional Performance [TAP]/Test of Attentional Performance [children's version] [KITAP]) and intelligence (Wechsler Intelligence Scale for Children/Kaufman Assessment Battery for Children).
RESULTS: In most TAP and KITAP Subscales, children scored in the lower normal range, but reaction times, errors, and omissions were significantly below the population mean. Most notable deficits became manifest in the subscales Sustained Attention and Working Memory where 47% respectively 38% of the present sample scored below the normal range. Most TAP and KITAP Subscales, particularly Alertness and Go/NoGo, were highly correlated with Wechsler Intelligence Scale for Children, and Kaufman Assessment Battery for Children Subscales indicating that liver-transplanted children with longer reaction times display lower intelligence scores. Regression analysis revealed that decelerated reaction times in the subscales TAP-Go/NoGo, Divided Attention (KITAP and TAP), and KITAP-Sustained Attention were associated with type of donation, duration of disease, age at Ltx, and sex (R^2=0.14 to R^2=0.25).
CONCLUSION: Results provide evidence suggesting that liver-transplanted children are at risk of developmental deficits regarding attention and executive functioning. Especially intrinsic alertness and working memory performance seem to be insufficient. This might result in deficient initiating, sustaining, and controlling of action. In summary, results demonstrate the need for an early and comprehensive developmental screening after pediatric liver transplantation.

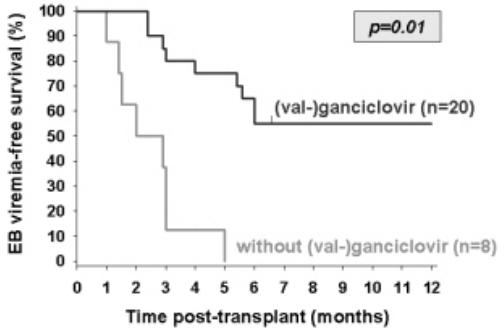
Abstract# 396

ANTIVIRAL PROPHYLAXIS WITH (VAL-)GANCICLOVIR REDUCES THE INCIDENCE OF EBV PRIMARY INFECTION AFTER PEDIATRIC RENAL TRANSPLANTATION (RTx). B. Höcker,[1] S. Böhm,[2] M. Pohl,[3] U. John,[4] M. Kemper,[5] H. Fehrenbach,[6] M. Wigger,[7] B. Tönshoff.[1] *[1]Univ. Hospital, Heidelberg, Germany; [2]Hygiene Institute, Heidelberg, Germany; [3]Univ. Hospital, Freiburg, Germany; [4]Univ. Hospital, Jena, Germany; [5]Univ. Hospital, Hamburg, Germany; [6]Children's Hospital, Memmingen, Germany; [7]Univ. Hospital, Rostock, Germany.*
PURPOSE: Data on the effect of (val-)ganciclovir prophylaxis (P-Gan) on the incidence of EBV primary infection post-transplant are lacking.
METHOD: Within a prospective, multicenter trial in 114 pediatric RTx patients, we performed a subgroup analysis of the effects of P-Gan with or without CMV

hyperimmunoglobuline (IgG) on the incidence of EB viremia during the 1st year post-transplant. 28 of 80 pat. (35%) with known donor (D)/recipient (R) EBV serostatus were at high risk (D+/R-) for EBV primary infection.
RESULTS: 17/28 (61%) high-risk pat. developed EBV primary infection, 10/17 (59%) exhibited clinical symptoms (n=6 flu-like, n=2 mononucleosis, n=2 PTLD). 4/17 (24%) pat. with high, persistent EB viremia (6.5 ± 4.9 x 104 genomes/ml) were nevertheless asymptomatic; 3/17 (18%) were asymptomatic with low-level EB viremia. P-Gan led to a significant reduction of EBV primary infection incidence in D+/R- pat. (9/20 on vs. 8/8 without P-Gan, p=0.01). 12 mo. after RTx, 55% of pat. after P-Gan were EB viremia-free vs. 0% without P-Gan (Fig. 1).

Fig. 1

Effect of antiviral prophylaxis with (val-)ganciclovir on EB viremia
in high-risk patients (D+/R-) during the 1st post-transplant year



An additive effect of CMV-IgG could not be shown (p=0.64). Type and intensity of immunosuppression, quantified according to the Vasudev score, neither had an effect on the incidence of EBV primary infection nor on the level/persistence of EB viral load or clinical symptoms.
CONCLUSION: Prophylaxis with (val-)ganciclovir significantly reduces the incidence of EBV primary infection in high-risk RTx patients, potentially lowering the risk of EBV-associated PTLD.

Abstract# 397

DONOR CHARACTERISTICS & IMPACT ON OUTCOMES IN PEDIATRIC HEART TRANSPLANT RECIPIENTS. J. Conway,[1] C. Chin,[2] M. Kemma,[3] M. Burch,[6] A. Barnes,[4] M. Tresler,[7] J. Scheel,[8] D. Naftel,[7] K. Beddows,[5] T. Allain-Rooney,[1] A. Dipchand.[1] *[1]University of Toronto, Toronto, Canada; [2]Stanford University, Palo Alto, USA; [3]Seattle Children's Hospital, Seattle, USA; [4]Children's Medical Center Dallas, Dallas, USA; [5]Children's Hospital of New York Presbyterian, New York, USA; [6]Great Ormond Street Hospital for Children, London, United Kingdom; [7]University of Alabama at Birmingham, Birmingham, USA; [8]Johns Hopkins Hospital, Baltimore, USA.*
PURPOSE: Organ availability & acceptability limit pediatric heart transplantation (HTx). It is unclear what defines a marginal pediatric donor. The purpose of this study was to desribe pediatric donors & determine donor risk factors that affect recipient survival.
METHOD: Data from a multicentre (35) prospective database was used to examine the impact of donor factors on the outcomes of HTx patients ⟨18 yrs old (1993-2009).
RESULTS: Donor data was available for 3122/3132 HTx. Median donor age was 4.2 y. Donors were male (57%), white race (68.4%) & blood group O (59%). Head trauma (55%) & anoxia (30%) were the main causes of death. Mean ischemic time (IT) was 222 mins, & longer IT impacted survival (p=0.03). Cause of death & need for inotropes or CPR did not effect outcomes (p=0.05). Combination of any of the latter 4 factors did not impact survival (p=0.7). Univariate analysis risk factors (early death) post HTx were younger age (Tx <6m of age;p=0.008), older age (Tx >10y,p=0.0003), BSA (p<0.0001) & IT (p<0.0001). Multivariate analysis risk factors (early death): younger donor age (p=0.03), inotropic support (p=0.03) & longer IT (p=0.04).When stratified by recipient age at HTx, the only significant risk factors identified in those <6 m were a non-normal donor echo (p=0.03) and younger donor age (p=0.02). No donor risk factors for early death were identified by multivariate analysis in those Tx >10 y of age.
CONCLUSION: This analysis of the largest cohort of pediatric donors ever reported, shows that factors that we traditionally use to consider a donor as high risk may be age dependant and may not adequately define a marginal pediatric donor.

Abstract# 398

SUCCESSFUL TREATMENT OF CHRONIC ANTIBODY-MEDIATED REJECTION IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS WITH IVIG AND RITUXIMAB: A PROSPECTIVE STUDY. Heiko Billing,[1] Caner Suesal,[2] Joerg Ovens,[2] Ruediger Waldherr,[3] Gerhard Opelz,[2] Burkhard Toenshoff.[1] *[1]University Children's Hospital, University Hospital, Heidelberg, Germany; [2]Department of Transplantation Immunology, University Hospital, Heidelberg, Germany; [3]Institute for Clinical Pathology, Heidelberg, Germany.*
PURPOSE: Resent studies have shown that chronic antibody-mediated rejection (CAMR) is the major cause of late renal allograft loss (El-Zoghby et al., AJT 2009). Until now, there is no treatment protocol for this condition. We therefore undertook a pilot trial on treatment of CAMR with an antihumoral regimen consisting of high-dose IVIG and rituximab (Billing et al, Transplantation 86, 2008). We report the extended data of 21 patients with CAMR on the same treatment protocol.
METHOD: 21 p, aged 14 ± 6.4 years, with CAMR at 5.8 (1.2-13.8) years after RTx were treated with IVIG (4 doses of 1 g/kg KG per week) and rituximab (1 dose of 375 mg/m^2); the mean follow-up was 18 (6 to 36) months. Response to therapy was defined as a ≥ 50% reduction of the loss of GFR in the period of 6 mo after antihumoral therapy *vs.* 6 mo prior to therapy. Renal allograft biopsies were evaluated using the Banff '09 classification. Donor-specific HLA antibodies (DSA) were detected by solid phase ELISA assays and the Luminex assay.
RESULTS: The median loss of GFR 6 mo prior to therapy was 9.8 ml/min/1,73m^2 (25th-75th percentile, 12.7-4.5) and was stabilized to 2.9 ml/min/1.73m^2 [9.2 to -4.6) 6 mo after antihumoral therapy (P=0.0013); 16 of 21 patients (76%) responded. Non-responder (n=5) showed more frequently (5/ 5 (100%), P=0.012) transplant glomerulopathy than responder (5/16 (31%). At baseline, 16 of 21 patients had *de novo* DSA, which were no longer detectable in 5 of 16 patients (31%) 6 mo after antihumural therapy. Response to therapy was not associated with the decline of DSA. As a major side effect, one episode of PCP occurred.
CONCLUSION: This prospective study demonstrates that the loss of transplant function can be stabilized or improved in the majority (76%) of patients with CAMR by IVIG and rituximab. A negative predictor of response is the presence of transplant glomerulopathy.

Abstract# 399

CXCL12 COATING CAUSES EFFECTOR T CELL CHEMOREPULSION FROM AND T REGULATORY CELL CHEMOATTRACTION TO ALLO-ISLET GRAFTS AND SIGNIFICANTLY DELAYS THEIR REJECTION. Tao Chen,[1] James Markmann,[2] David Sachs,[3] Mark Poznansky.[1] *[1]Vaccine and Immunotherapy Center (VIC), Massachusetts General Hospital, Charlestown, USA; [2]Transplant Surgery, MGH, Charlestown, USA; [3]TBRC, MGH, Charlestown, USA; [4]VIC, MGH, Charlestown, MA, USA.*
PURPOSE: Long-term survival of allo-islet grafts is dependent on the abrogation of immune rejection. Recipient cytotoxic and regulatory T-cells play a major role in allo-islet rejection. CXCL12 at high concentration (1ug/ml) has been shown to repel effector T cells in vitro and in vivo. We proposed that coating islets with CXCL12 would delay rejection by inducing a state of immune isolation by restricting the entry of recipient effector T cells.
METHOD: CXCL12 coated BALB/C islets were transplanted under the renal capsule of STZ-treated diabetic C57BL/6 mice without the use of systemic immune suppression and islet function/survival measured. Cell mediated and humoral allo-responses were quantified as well as T cell infiltration into islet grafts.
RESULTS: Mice receiving donor islets coated with CXCL12 (1ug/ml) showed prolonged survival in a nondiabetic state compared with PBS exposed controls or islets coated with lower concentrations of CXCL12 (median survival: control = 8.3 days vs CXCL12 (1ug/ml)= 18.2 days)(P=0.048). Mice receiving CXCL12 coated islets rejected allogeneic co-transplanted skin from BALB/C mice. Islets coated with 1ug/ml CXCL12, demonstrated reduced CD3+T cell infiltration at day 14 post transplant compared to controls(P=0.001). Surprisingly, FoxP3+ T cell infiltration into the graft was increased as compared to controls (P=0.0016). In vitro, CXCL12 at 1ug/ml caused chemorepulsion (fugetaxis) of CD4 and CD8 T cells in Boyden chambers while this concentration of CXCL12 resulted in T reg chemoattraction. This difference in migratory behaviors of cell subpopulations to CXCL12 was associated with differential CXCR4 expression on effector T cells versus T regs.
CONCLUSION: Pretransplant CXCL12 coating of islets may represent a novel and simple clinically relevant approach that may allow dose reduction of systemic immune suppression during the first few weeks post transplantation.