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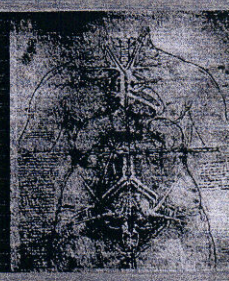

ABSTRACTS

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quality of life. The aim of the present work is to present our multicentre results with the pulmonary autograft in young patient undergoing aortic valve replacement.
Methods: Between 1992 and 2013, 1967 patients (1786 adults; 41.6 ± 15.1 years) underwent AVR with the pulmonary autograft principle in 9 centres. All patients underwent prospective clinical and echocardiographic examinations, annually. Mean follow-up was 7.7 ± 4.8 years (range 0-23) with a total cumulative follow-up of 14,571 years with 635 patients having a follow-up of at least 10 years.
Results: In-hospital mortality was 1.37% ($n = 26$). Late survival of the adult population was comparable to the age- and gender-matched general population (observed deaths: 90, expected deaths: 70; $P = 0.439$). Freedom from autograft reoperation at 5, 10 and 15 years was 97.8%, 95.9% and 89.6%, respectively, whereas freedom from homograft reoperation was 98.4%, 96.6% and 94.6%, respectively. Overall freedom from reoperation was 96.2%, 92.8% and 86.2%, respectively. Longitudinal modelling of functional valve characteristics revealed a low (<5%) probability of a patient being in higher autograft regurgitation grades throughout the first decade.
Conclusion: For the young, active patient requiring aortic valve replacement, the autograft principle results in postoperative long-term survival comparable to that of the age- and gender-matched general population and reoperation rates within the 1%/patient*year boundaries. The autograft principle for the treatment of the aortic valve disease in young, active patients who want to avoid the shortcomings of conventional prostheses should be strongly considered.

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THE ROSS PROCEDURE IN YOUNG ADULTS: OVER 20 YEARS' EXPERIENCE IN A SINGLE CENTRE
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Objectives: To analyse the long-term outcomes of the pulmonary autograft (Ross procedure) in young adults.
Methods: From 1991 to 2014, 276 consecutive adult patients underwent elective aortic valve replacement with the pulmonary autograft. The mean age of this cohort was 41.4 ± 9.7 years, the aetiology of the aortic disease was degenerative in 51%, rheumatic 5.8% and endocarditis 9.1%. The implantation techniques used were: subcoronary ($n = 5$), freestanding root ($n = 160$) and inclusion ($n = 111$; 101 into the aorta, 10 into a Valsalva graft). Median duration of follow-up was 11.3 years (IQR: 7.3-15.3).
Results: Sixty-day mortality was 1.8% ($n = 5$). Completeness of follow-up was 99%. Valve-related bleeding or thrombo-embolism events occurred in 19 patients for a linearised rate of 0.7%/year. Late valve reoperation was required in 39 patients (14.3%): 29 on the aortic valve, 3 on the pulmonary valve, 7 on both valves. Freedom from any valve reoperation was therefore 96.6 ± 1.2%, 88.4 ± 2.3% and 75.1 ± 4.2% at 5, 10 and 15 years, respectively. Overall survival was 97.1 ± 1.1%, 95.0 ± 1.5% and 89.0 ± 2.7% at 5, 10 and 15 years, respectively. Univariate Cox-regression analysis revealed that aortic insufficiency as the predominant form of valve disease at time of surgery was a significant predictor of late valve reoperation (HR: 2.18, 95% CI: 1.15-4.15).
Conclusion: The Ross operation has shown a low perioperative mortality and a low incidence of major bleeding or thrombo-embolic complications during follow-up. Despite a significant risk of valve reoperation over time, the long-term survival of these patients is excellent. An improved freedom from reoperation is expected with the implementation of the inclusion technique.

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SEVENTEEN-YEAR SINGLE-CENTRE EXPERIENCE WITH THE ROSS PROCEDURE: FULFILLING THE PROMISE OF A LONG-LASTING OPTION WITHOUT ANTICOAGULATION?
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Objectives: The performance of the Ross procedure in adult patients <60 years with aortic valve disease provides an attractive alternative to a prosthetic aortic valve. The Ross procedure is able to establish a haemodynamically ideal aortic valve replacement. A potential drawback may be long-term durability, which varies considerably between series.
Methods: Between 1996 and 2013, 206 patients (mean age 43 ± 10 years) underwent an elective Ross procedure in our department. In 78% ($n = 161$) of patients a bicuspid valve was found. Patients were examined clinically and with echocardiography during follow-up. Mean follow-up was 7.9 ± 5 years and was 98% complete.
Results: Thirty-day mortality was 2.4% ($n = 5$). The Kaplan-Meier survival rate at 10 and 15 years were 91% and 85%, respectively. In 17 patients (8.3%) the pulmonary autograft had to be reoperated: 12 of them could be reconstructed; only 5 patients underwent a prosthetic valve replacement. Freedom from reoperation for autograft failure was 93%, freedom from moderate or severe autograft regurgitation was 87% at 10 years. Thromboembolic events occurred in 9 patients (4.4%) and were mostly related to atrial fibrillation. Endocarditis involving the pulmonary autograft was observed in 6 patients (2.9%).
Conclusion: Pulmonary autograft aortic root replacement to treat patients with severe aortic valve dysfunction is a challenging procedure. Reoperation rate is higher compared to mechanical valve replacement; however, in the majority of patients with reoperation the autograft could be saved in our series. Valve-related complications are rare.

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BICUSPID AORTIC VALVE DISEASE AND ASCENDING AORTIC ANEURYSM: SHOULD THE AORTIC ROOT REPLACEMENT BE MANDATORY?
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Objectives: Bicuspid aortic valve (BAV) is associated with higher risk of adverse aortic events, but the management of moderate aortic root dilatation is controversial.
Methods: We reviewed 166 consecutive patients affected by BAV disease and ascending aorta aneurysm treated from 1994 through 2008 with the Bentall procedure (77 patients, Bentall group) and aortic valve replacement with supracoronary ascending aorta replacement (89 patients, SAAR group). Male sex ratio was similar in the 2 groups (91% vs 72%, $P < 0.01$); in the Bentall group patients were younger (55.7 ± 12 vs 60.5 ± 11 years, $P = 0.03$) and mean root diameter was larger (44 ± 6 mm vs 39 ± 5 mm, $P < 0.01$).
Results: In the Bentall group, mean CPB time (201 ± 56 vs 173 ± 57 min, $P < 0.01$) and mean cross-clamp time (155 ± 42 min and 131 ± 38 min, $P < 0.01$) were longer. In-hospital mortality (97% vs 98%), 10-year (84 ± 4% vs 81 ± 6%) and 15-year (70.1 ± 8% vs 75.4 ± 8%) survival were similar ($P = 0.61$). There was a similar rate of sudden death (12% vs 6%, $P = 0.38$). In the SAAR group, after an immediate surgical reduction of aortic root diameter there was no progressive dilatation (preoperative 39 ± 5 mm, follow-up diameter 35.9 ± 4 mm, $P < 0.01$). Neither in a subgroup of SAAR patients with preoperative aortic root >40 mm was there a progression of the dilatation at mean follow-up of 97 ± 41 months (preoperative 42.8 ± 3 mm vs follow-up diameter 39.1 ± 4 mm $P < 001$).
Conclusion: The shorter CPB and clamping time, the stability of the residual root at long-term follow-up and the low risk of adverse aortic events in the SAAR compared with Bentall groups leads us to consider the isolated aortic valve replacement associated with ascending aorta replacement as an alternative strategy, especially in high-risk and older patients.

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RED BLOOD CELL DISTRIBUTION WIDTH PREDICTS MORBIDITY AND MORTALITY AFTER AORTIC VALVE REPLACEMENT
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Objectives: Red blood cell distribution width (RDW) is a numerical measure of the variability in size of circulating erythrocytes and is emerging as a strong predictor of adverse advents for several categories of patients affected by cardiovascular disease. However, no data exist until now about the role of RDW in predicting mortality of aortic valve replacement (AVR) patients. Thus, in this pilot study we evaluated the value of RDW on early outcome following AVR.
Methods: We enrolled 75 patients, who underwent AVR with or without concomitant procedure. A high value of RDW was defined as >43 fL for women and 47 fL for men. Multivariable and univariable analysis were used in determining the association between preoperative high RDW and postoperative outcome.
Results: The prevalence of preoperative high RDW was 41% (31 patients). Univariable analysis showed that patients with high RDW were older ($P < 0.02$), with low weight ($P = 0.12$) and high level of platelets ($P = 0.005$). Patients with

high RDW were more likely to require renal replacement therapy ($P < 0.026$) and prolonged ventilation ($P < 0.01$). Following multivariable adjustment, higher preoperative RDW was a combined predictor of mortality with higher creatinine level ($P = 0.065$).
Conclusion: Increased RDW seems to be a good predictor of early outcome in patients who underwent AVR, in particular in patients with preoperative renal impairment and postoperative prolonged ventilation.

Hot strategies in complex cardiac surgery
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AORTIC WALL THICKNESS AS A PARAMETER IN PATHOGENESIS OF ACUTE AORTIC DISSECTION

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Objectives: Ascending aortic diameter and connective tissue disorders are the main criteria for ascending aortic replacement to prevent acute aortic dissection. Previously, we evaluated differences in aortic wall cohesion in aortic valve stenosis and regurgitation. The aim of the present study was to evaluate aortic wall thickness as a potential predictor for aortic wall quality.
Methods: Aortic wall cohesion of 496 patients (65.7 ± 12.0 years) was analysed using the Dissectometer device, mimicking transverse shear stress. Patients were divided into two groups according to aortic wall thickness (AWT), Group 1 (AWT ≤2 mm, 136 patients.) and Group 2 (AWT >2 mm, 360 patients). Cohesion test included three previously proven parameters (P7, P8, P9) and was correlated with the diameter of the ascending aorta and histological examination.
Results: An AWT >2 mm was associated with lower aortic cohesion (P7: 132.7 ± 84.9 vs 165.3 ± 103.3 $P = 0.001$; P8: 2.53 ± 1.14 vs 4.52 ± 2.17 $P < 0.001$; P9: 3.62 ± 1.35 vs 5.74 ± 2.37 $P < 0.001$) and media degeneration compared to AWT ≤2 mm (17.6% vs 44.7% $P < 0.001$). The diameter of the ascending aorta did not correlate with AWT (Q: 0.66, ns). Of 18 patients presenting with an acute aortic type A dissection, 12 (70.6%) had an aortic diameter of >45 mm, and except one, all showed an AWT >2 mm. In Group 2, three patients presented with postoperative bleeding due to aortic rupture and two patients developed postoperative aortic dissection.
Conclusion: Aortic wall thickness seems to correlate with aortic cohesion and histological signs of aortic wall instability. AWT >2 mm is associated with poorer aortic cohesion. AWT seems to be a good predictor for aortic dissection irrespective of aortic diameter.

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A MULTIPLE PATCH TECHNIQUE FOR THE TREATMENT OF ISCHAEMIC VENTRICULAR SEPTAL DEFECTS OR CONTAINED VENTRICULAR RUPTURE

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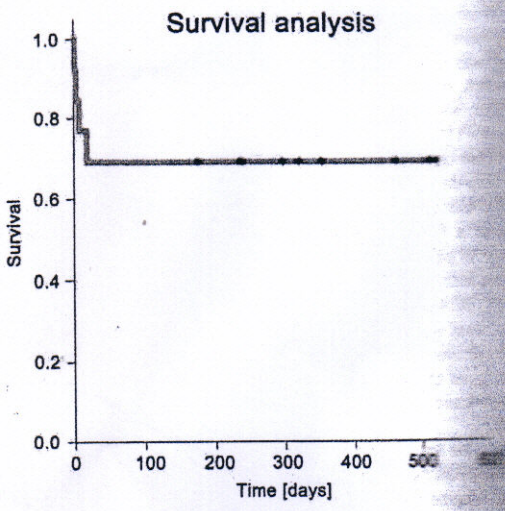
Objectives: Ischaemic ventricular septal defects (VSD) or contained ventricular ruptures (CVR) may pose a considerable surgical challenge, specifically in the acute setting. Perioperative mortality rates of >50% have been described. We describe a novel surgical approach using a multi-layered patch technique.
Methods: From November 2010 to November 2013, 13 patients (age 64 ± 15 years) presented with VSD or CVR. Eleven patients had an acute VSD. Three patients had CVR, 2 had subacute pseudoaneurysms located posterolaterally and posteriorly, respectively. One had additionally to VSD a peracute posterior LV rupture with previous coronary artery bypass graft (CABG) years earlier. The operative approach consisted of ventricular incision of the infarcted zone on the arrested (9 patients) or beating heart (4 cases). Closure of the defects was achieved by implantation of a primary Dacron patch with multiple felt-enforced U-sutures. A second Dacron patch of significantly greater dimensions was superimposed. A third big pericardial patch was used when haemostasis was not achieved by two patches. The rationale of this multi-layered patch closure is to reduce forces stepwise on the outer patch, allowing haemostasis and avoiding residual shunts.
Results: All patients left the operating room haemodynamically stable without redo for bleeding. Overall mortality was 31% ($n = 4$). Reasons for death were complete occlusion of all peripheral and abdominal arteries (possibly after severe cerebral insult, multiorgan failure or septic shock. There was no recurrence of VSD.

Demographic data

Mean age (year)	64 ± 15
Gender	4 female/9 male
EF (%)	44 ± 8
Time interval: AMI-VSD (days)	10 ± 11
Time interval: AMI-surgery (days)	21 ± 14
preop IABP support	8 (62%)
preop ECLS support	1 (8%)
VSD location (n)	5 Anteroapical 6 Inferoposterior
CVR location (n)	2 Posterolateral 1 Posterior

AMI, acute myocardial infarction; CVR, contained ventricular ruptures; ECLS, extracorporeal life support; EF, ejection fraction; IABP, intra-aortic balloon pumping; VSD, ventricular septal defect; CVR, contained ventricular rupture.

Conclusion: We suggest that placing multiple overlaying patches in ischaemic VSD or CVR is a useful treatment option in this high-risk group, especially in the acute setting.



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CARDIOMYOPATHY IN MARFAN SYNDROME

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Objectives: This report aims to evaluate the incidence of cardiomyopathy in patients with Marfan syndrome (MFS) who underwent surgical treatment for cardiovascular sequelae. We aim to determine whether cardiomyopathy in MFS is primary or secondary and whether the myocardium is susceptible to ischaemia regardless of myocardial protection used. Likewise, we aim to analyse the long-term outcome of different treatment modalities of cardiomyopathy.