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Pediatric anesthesia practice in Italy: a multicenter national prospective observational study derived from the Apricot trial

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Abstract

BACKGROUND:

Pediatric anesthesia nowadays requires specific knowledge and expertise. The Anaesthesia PRactice In Children Observational Trial (APRICOT) was a European multicentre study designed for the identification of perioperative severe critical events and management. We aimed at analysing the Italian database in an attempt to determine the practice of anesthesia and the incidence of severe critical events in Italy.

METHODS:

Secondary analyses of the database consisted in extracting the raw data from the 25 Italian centres that participated to APRICOT. Descriptive statistics and comparison with the reference data were made for all the variables collected.

RESULTS:

Two thousands and eighty seven children were analysed. The Italian cohort represents 6.7% of the overall study population. Most of the children were ASA 1-2 (90.6%) and underwent a surgical procedure (62.8%). In more than 84% of the cases, anesthesia management was performed by an expert with main or frequent activity in pediatric anesthesia with on an average 15 years of experience. The overall incidence of severe critical events was 3% (95% CI 2.2-3.8). The most frequently reported severe critical incidents were of respiratory (2%; CI 1.4-2.6) and cardiovascular origin (0.7%; CI 0.3-1), while drug error, anaphylaxis and bronchial aspiration were very rare. There were no report of perioperative cardiac arrest or patients with neurological damage.

CONCLUSION:

This secondary analysis demonstrates that the incidence of severe critical incidence was lower in Italy in comparison to that reported for Europe. This low rate of critical events may be related to the high expertise and experience of the anesthesiologists in charge of the children in the Italian centres that participated to APRICOT.

Introduction

Pediatric anesthesia is a subspecialty of anesthesia that requires specific knowledge and experience. Since 1990, guidelines have been established in the USA to promote the safety and well-being of infants and children by reducing perioperative risks[1]. They stated that pediatric anesthesia should be provided or supervised by anesthesiologist with advanced training and clinical competence in pediatric anesthesia. Moreover, both the hospital and anesthesiologists are required to have a minimum annual case volume to maintain clinical competence[2]. In Europe, during the last decade, a few national guidelines and specific training programme for pediatric anesthesia management have been developed and little is known about which critical events are more frequent in the perioperative period in children and their morbidity and mortality[3]. The Anaesthesia PRactice In Children Observational Trial (APRICOT) was a European multicenter, prospective, observational audit of practice conducted in 33 European countries with the aim to identify the rate, management and outcome of perioperative complications during anesthesia and up to 60 minutes after awakening. Results from this study were published in 2015[3] and showed a high rate of severe critical events (SCEs) (5.8%) besides a large variability of practice across Europe. Recently, the UK data were published and showed a lower overall incidence of SCEs (3.3% vs 5.8%, $p < 0.001$) than in the non-UK cohort[4]. Twenty five centres participated in Italy to this large study. There are no published data on how pediatric anesthesia is conducted in Italy, neither on the incidence of severe critical events and their outcomes. We therefore decided to perform a secondary analysis of the Italian data from the APRICOT database. Primary aim of this study is to estimate the rate of severe critical events and their outcome and secondary to describe the characteristics of pediatric anesthesia management in Italy.

Materials and Methods

The APRICOT was a prospective, multicenter, observational audit of practice which collected perioperative data to describe anesthesia management on children admitted during two consecutive weeks period previously determined by each participating center. Specific of the methods were previously describe elsewhere[3]. The primary outcome was the occurrence of perioperative severe critical events during anaesthesia and up to 60 minutes after. They included episodes of: laryngospasm, bronchospasm, pulmonary aspiration, drug error, anaphylaxis, cardiovascular instability, neurological damage, perioperative cardiac arrest, and the occurrence of new onset stridor at emergence from anaesthesia or in the post-anaesthesia care unit. Each severe critical event was clearly defined and was defined as an event requiring immediate intervention that led, or could have led, to major disabilities or death. Secondary outcome measures were the potential consequences of those severe critical events (ie, no harm, minor sequelae, major sequelae, in-hospital mortality) at discharge from the hospital or at 30 days post-anaesthesia or sedation.

The Ethical Committee of each center approved the prospective European study and in some centres a parental written informed consent was needed before enrolling the children in the APRICOT trial. After publication of European data[3], we requested the steering committee of APRICOT to export the all Italian data set. All the variables were analysed (demographic, preoperative, intraoperative and postoperative), as for the APRICOT trial. Descriptive statistics was made on continuous and discrete variables. Critical events were described and their incidence was reported with 95% confidence interval (95% CI). A logistic regression was made to determine if any of the following variables was correlated to critical events: interface used (face mask vs supra glottic airway device vs endotracheal tube), type of procedure (sedation vs general anesthesia), anesthesia team experience (years), degree of urgency (elective, urgent emergency), type of induction (inhalation vs intramuscular). Due to the low number of SCEs we could test only one variable per time.

Results

The Italian cohort for the APRICOT study was represented by the 2,087 children (range of children enrolled in each hospital: 19-320), enrolled in the 25 participating centres during the 2-weeks inclusion period, with a data capture of 84%. This represents approximately 2.74% of children anesthetised over one year in Italy (n = 76,206; supplemental material APRICOT study[3]). When compared to the APRICOT cohort, the Italian database accounted for 6.7% of the overall study recruited population (n = 31,119), and 9.6% of the APRICOT centres (n = 261). Twelve children underwent two procedures, and three more than two each, for an overall number of 2,102 procedures. Among the 25 hospitals that took part in the study, 8 were pediatric hospitals while the others were general hospitals with a dedicated and structured department of pediatric surgery with daily activity.

Demographic characteristics are reported in Table I. Of note, the median age of included children was 5 years (IQR 2.3 – 9.4). The overall number of perioperative complications in Italy was 63 (3.0%; CI 2.2-3.8), 57 (3.6%; CI 38.1-65.9) under GA and 6 (1.1%; CI 1.21-10.8) under sedation (p=0.011). Two procedures had 2 SCEs and one had three. Their frequencies and characteristics are reported in Tables II and III. Respiratory events (bronchospasm, laryngospasm, pulmonary aspiration and post-anaesthesia stridor) represented the majority of all complications occurred (72.9%). The overall incidence of complications was lower in Italy when compared with the whole APRICOT database (3.0 % vs 5.3%), and respiratory and cardiovascular complications (the categories with the highest incidence of SCEs) were less frequent as well. In the Italian cohort no case of neurological damage or cardiac arrest was reported. At 30 days 1893 (90.7%) children were discharged alive from the hospital, 4 (0.2%) were transferred to another hospital, 27 (1.3%) were discharged to a convalescent home, 55 (2.6%) were still in hospital and three children (0.14%) were deceased. We compared pediatric versus general hospital but we did not find any difference in SCEs rate (p = 0.165)

The most senior anesthesiologist in charge was mainly a specialist in anesthesia with long working experience (median 15 years, IQR 8-22), and in 87.7% of cases with a frequent or mainly pediatric practice (Table IV). The medical history before the procedure is shown in Table III. Most of the children (> 90%) were investigated for the presence of possible risk factors for airway complications except familiar smoking, asked in 80.6%. The most frequent surgical procedures were urologic 31% (n=408), abdominal 18.7% (n=246), and ENT 16.3% (n=215). Among non-surgical procedures, diagnostic imaging (MRI and CT scan) (256, 36.0%), lumbar puncture (132, 19.0%) and gastrointestinal exams (125, 17.9%) were the most reported.

One-thousand-five-hundreds-eighty-one children (75.2%) underwent GA and 513 (24.4%) sedation. During GA, 1,117 (70.9%) received standard monitoring and 392 (24.9%) standard minus (one of the equipment missing), while under sedation 252 and 253 received respectively standard and standard minus monitoring (50% each).

Propofol was the most used anesthetic agent for sedation (368, 71.7%) and in 194 (37.8%) children opiates were added. Induction drugs used for GA were mainly propofol and sevoflurane and neuromuscular blockade was used in 584 children (36.9%), mainly rocuronium (402, 68.8%). Sevoflurane (n = 1285, 81.6%) and propofol (n = 244, 15.4%) were the most used hypnotic agents for GA maintenance while among opiates, administered in 909 (57.5%) children, fentanyl (n = 329, 66.6%) and remifentanil (n = 137, 27.7%) were the most commonly used. Nitrous oxide was associated with oxygen as carrier gas in 252 (16.0%) GA, while air in 1293 (82.1%). Airway was managed in 806 (51.7%) children with an endotracheal tube and in 373 (23.9%) with a supraglottic airway (SGA) device. The incidence of SCEs were significantly more frequent when using an ETT (n = 44, 5.4%) than with a SGA and face mask (n = 7, 1.8%) ($p < 0.000$, CI 0.34-0.38).

Regional anesthesia (RA) was associated to GA and to intravenous sedation in 507 (32.2%) and 122 procedures respectively. The three types of surgical procedures with the highest rate of RA were urologic (69.1%), orthopaedic (44.2%), and abdominal (43.0%). The vast majority of RA (552, 87.7%) were conducted with the landmarks technique, while only 76 (12.2%) with ultrasound use.

One hundred sixty six (26.4%) children received a central block, mainly caudal (n = 116, 69.9%), 236 (37.5%) peripheral block, mainly ileoinguinal and TAP (n = 93; 39.4%) while 176 (27.9%) received wound infiltration. One-thousand-twenty (48.5%) children were anesthetized with spontaneous breathing, 997 (47.4) were mechanically ventilated, mainly in the volume controlled (n = 598, 60.0%). Intraoperatively, 1804 (85.8%) children received IV fluids, 428 (23.7%) of them received glucose containing fluids, mainly at a concentration of 1% (n = 132) and 5% (n = 215). The median duration of anesthesia was 47 minutes (IQR 30-75). Logistic regression showed a significative higher risk of SCEs during a surgical vs non-surgical procedure (p = 0.004) and during GA vs sedation (p = 0.016).

Discussion

Mortality during modern anesthesia is a rare event[5] and has been estimated an incidence of 0.36 case per 10000 anesthetics[6]. This is mainly due to the improved safety profile of anesthetic drugs, technological advancement and implementation of guidelines and standards for minimum monitoring requirements during anesthesia and sedation[7] combined with a better knowledge and training of the anesthesiologists. Beside this catastrophic complication, there are multiple life-threatening events, which may lead to increase perioperative morbidity with bad outcomes. There are few published data showing the rate of critical events during and after anesthesia in children in Italy[8]. This secondary analysis provides an insight of pediatric anesthesia practice in the country. Two aspects might be highlighted from these data. The first is the incidence of severe critical events in the participating centres in Italy compared to other countries in Europe, and the second, is how pediatric anesthesia is conducted in those centres.

The incidence of SCEs in the Italian centres that participated to APRICOT was lower than that in the whole APRICOT cohort (3.0% *vs* 5.3%, respectively) and comparable to that reported by observed in the British cohort (3.3%)[4]. This is a reassuring result which can be used as reference for future trials or for institutional quality improvement projects. This data could be interpreted in various ways. First of all, most of the pediatric anesthesia practice in Italy is performed by experienced pediatric anesthesiologists. Looking at the data reported in the Italian cohort, pediatric anesthesia is conducted by a specialist anesthesiologist with mainly or frequent activity with children and with a long experience. The analysis performed in the APRICOT paper[3] clearly showed a significant correlation between the seniority of the team involved and less respiratory SCEs. Similarly, the frequency of pediatric anesthesiology activity plays a role in preventing critical events: the longer the time spent in pediatric anesthesia the lower the rate of adverse events[4,9]. Both the British and the Scandinavian cohort studies as well as this study demonstrate that the experience of the anesthetic team is the most relevant in reducing the incidence of severe critical events in children with preoperative medical conditions with high ASA-PS score[4,9]. One main difference

between Italy and other European countries is there are no anesthetic nurses or pediatric anesthesia technicians in Italy. Moreover, anesthesiologist in training are always supervised directly by a specialist. Indeed, only 1.1% of procedures were managed by trainees alone, while about 10% of anesthesia were managed by an anesthesiologist in training supervised by a specialist, which is clearly a small percentage when compared with the European data (19%). On the other hand, it is also possible that, due to the voluntary basis of participating centers, we collected data from those hospital with the higher expertise and larger pediatric caseload, and missed–hospitals where pediatric activity is sporadic and performed by anesthesiologists with occasional pediatric activity. Moreover, two differences in case mix of the Italian vs European cohorts should be considered. Children included in Italy underwent mainly urologic surgery, while ENT is the most represented surgery for Europe. Recently, a paper published by the APRICOT group reported a sub-analysis on the children underwent ENT surgery[10]. They demonstrated that ENT has a significantly higher incidence of respiratory SCEs than other surgeries (3.93% vs 2.61% respectively, RR 1,51). Secondly, the Italian cohort has a higher rate of sedation than the rest of the Apricot study and due to the absence of airway manipulation under sedation, the incidence of respiratory and cardiovascular critical events is less frequent under sedation[3]. Therefore, these peculiarities of the Italian cohort introduce a clear bias and provide a possible explanation of the lower incidence of respiratory SCEs which consequently affected the overall number of complications.

Respiratory and cardiovascular were the most frequent SCEs in both populations compared to neurological damage, anaphylaxis, drug errors which were reported rarely or for nothing. The low rate of drug errors reported should be considered cautiously since the study design was not focused on this specific aspect. The overall respiratory events (bronchospasm, laryngospasm, pulmonary aspiration and post-anaesthesia stridor) represented the vast majority of all complications occurred (72.9%), if compared with the cardiovascular critical events (33.5%). This data is in line with the European ones. Induction and awakening represent the two most critical periods during anesthesia. In both there is an airway manipulation either because a device is positioned or removed. This

information reinforces the need for an adequate training in airway management and treatment of respiratory events[11]. Finally, none of the children died and no major sequelae derived by the SCEs were reported which means that the events were of minor severity and or adequately managed.

About the preoperative assessment, in Italy "passive familiar smoking" is not investigated in almost one out of five children although the recent paper published by Habre et al. on risk factors for respiratory events underlined the importance of this aspect as a trigger for bronchospasm[12]. This information is missing in about one third of children in the European data, too. It is possible that this message has not been interiorized yet by the anesthesiologists and is undervalued as risk factor in the context of the whole anamnestic investigation. We suggest specific questionnaire should be implemented and used during the preoperative visit to define which aspects are important to be explored to identify children at risk of developing a critical respiratory event during perioperative period.

Two interesting data were reported in this study. One was parental presence at induction. It was allowed in almost half of the cases with the highest rate for preschool children (59% and 77.5% in GA and sedation respectively). The majority of children with no parental presence were those who received an inhalational induction inside the OR. This is probably due to the difficult logistic of introducing parents/caregivers in the OR. We believe that it is important to allow parents remaining near their children during anesthesia induction, as well as during the whole hospital stay. Of course, the environment and the logistic should always be adapted to avoid parental separation at any time of pediatric hospitalization.

Another aspect is the use of regional anesthesia in combination with GA. The rate was higher for urological surgery rather than orthopedical and the land-marks technique was still used in the majority of blocks. It seems that the use of ultrasound in pediatrics is not that diffused as it should be in Italy. A possible explanation might be related to the seniority of anesthesiologists practising (more than ten years) which could be less available to change their practice and to learn new methodologies.

Most of the descriptive data were comparable between the Italian and the Apricot cohorts, with homogenous populations in terms of ASA-PS, age, physical and medical conditions. The main difference was the rate of children with asthma which was double in the Apricot than in the Italian cohort. A possible explanation is that asthma prevalence is different among European countries and in Italy there is a low prevalence rate, less than 10%[13].

One limitation of this data report is that we cannot exclude an underreporting of SCEs and we do not have information about centres that did not participate to the study. Nevertheless, the similarities with the entire study population lead us to assume that the Italian cohort represents a real and representative sample. In Italy there is no national pediatric anesthesia-incident-reporting system like the one recently implemented in the USA[6]. We therefore cannot compare these data with other previously collected.

Conclusion

In conclusion, SCEs in pediatric anesthesia are infrequent and mostly without consequences. Respiratory events remain the most common severe critical event, which advocates for careful airway manipulation both at induction and at awakening in order to prevent bronchospasm and laryngospasm. Similarly to other countries, the results of the present secondary analysis highlight the importance of implementing a specific pediatric training pathway and good clinical procedures, while developing appropriate skills for safe management of pediatric anesthesia in children in Italy. In particular, we believe that developing a specific pediatric anesthesia curriculum with an outcome-based evaluation and appraisal should a fundamental step to define mandatory knowledge and skills across Europe. Scientific societies and regulatory bodies should endorse such initiative with the final goal to improve safety and quality of pediatric anesthesia.

Key messages

What is known:

- Pediatric anesthesia requires dedicated knowledge, skills and expertize
- Little is known about incidence of severe critical events during pediatric anesthesia in Italy

What is new:

- Severe critical events in pediatric anesthesia in Italy occur in 3% of cases
- Respiratory critical events are predominant compared with other events
- There is urgent need for a dedicated pediatric anesthesia curriculum and an outcome-based certification to improve quality and safety, especially for the most fragile pediatric populations.

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Notes

The authors declare they have no conflict of interest.

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AW and ND analysed data and wrote the first draft of the paper. ADS made the statistical analysis.

BL, MA, NZ, LP, AC, GI, AV and AC contributed for important intellectual contribution to the paper. All co-authors approved the paper in the final version.

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Table I: descriptive variables of the entire cohort (n = 2087). Data are expressed as n (%) or otherwise indicated. When available, data were compared with the Apricot trial (grey column)

Demographic		Italian cohort		Apricot trial
Gender M/F		1358/729 (65.1/34.9)		19559/12427 (61.1/38.9)
Age, years, median (IQR)		5.0 (2.3 – 9.4)		
Height, cm median (IQR) n = 794		116 (95 – 140)		
Weight, kg median (IQR) n = 2061		22 (15 – 37)		
Ethnicity, White		1843 (88.4)		
Anamnestic-physical condition		**Not asked/ not pertinent**	**Positive anamnesis**	
Medication		17 (0.8)	418 (19.9)	23.2
Snoring		60 (2.8)	277 (13.2)	14.2
Fever		16 (0.8)	62 (2.9)	2.9
Prematurity		58 (2.8)	148 (7.3)	7.6
Handicap		23 (1.1)	296 (14.3)	13.1
Environmental sensitivity				
Allergy		10 (0.5)	238 (11.3)	12.3
Atopy		39 (1.9)	136 (6.5)	7.5
Airway sensitivity				
Flu		45 (2.1)	272 (12.9)	13.5
Familiar smoking		407 (19.4)	263 (12.5)	30.9 - 10.9
Wheezing		59 (2.8)	124 (5.9)	6.3
Asthma		28 (1.3)	66 (3.2)	6.1
Anesthesia plan				
Procedure:	**Surgical**	1320 (62.8)		71.5
	Non-surgical	781 (37.2)		28.5
Elective		1859 (88.4)		81.1
Inpatient		1494 (71.1)		60.0
Opening time OR		1963 (93.4)		90.0
Consultation > 24 h		1523 (72.4)		59.5
Experience, yrs median (IQR)		15 (8 – 22)		13.85
Premedication		848 (40.3)		49.0
Anesthesia management				
Anesthesia type:	General	1581 (75.2)		93.4
	Sedation	513 (24.4)		6.6
GA drug induction:	Inhalation	875 (55.3)		48.5
	Intravenous	702 (44.4)		44.7
	Intramuscular	4 (0.2)		6.8
NMBA		584 (36.9)		26.9
Regional anesthesia		631 (30.0)		
Sedation drugs:	Propofol	368 (71.7)		
	Others	145 (28.3)		
GA Opiate		909 (57.5)		
Maintenance GA, drug:	Sevorane	1285 (81.6)		
	Propofol	244 (15.4)		
Maintenance, opiate:	Fentanyl	330 (36.3)		
	Remifentanil	137 (15.1)		
Reversal NMBA		258 (44.2)		
Airway management				
Face mask		388 (18.5)		19.1
SGAW		373 (17.7)		35.1
SGAW Removal:	Deep	273 (73.2)		42.1
	Awake	100 (26.8)		57.9
ETT		811 (38.6)		43.9
Cuffed		665 (82.0)		71.9
ETT removal:	Deep	340 (41.9)		26.1
	Awake	429 (52.9)		73.9

Legend: M = male, F = female, IQR = interquartile range GA = general anesthesia, NMBA = neuromuscular blockade agent; SGAW = supraglottic airway; ETT = endotracheal tube; OR = operating room;

Table II: rate and description of complications, n = 63

Complications **Time of occurrence**	**N (%)**	**Treatment**	**Consequences**
Bronchospasm	**24** (1.1)	17 bronchodilator 6 IV steroids 2 epinephrine 2 intubation	6 hypoxemia 1 intubation 17 uneventful
Induction	6 (25.0)		
Maintenance	4 (16.7)		
Awakening	14 (58.3)		
Hemodynamic instability	**14** (0.7)	7 hypotension 4 bradycardia 3 bleeding	All uneventful
Induction	6 (42.8)		
Maintenance	8 (57.1)		
Laryngospasm	**11** (0.5)	3 IV propofol 3 intubation 3 IV steroids 1 succinilcoline	All uneventful
Induction	9 (81.8)		
Awakening	2 (18.2)		
Stridor	**7** (0.3)	3 with CPAP 3 with oxygen 1 IV steroid	All uneventful
Awakening	6 (85.7)		
PACU	1 (14.3)		
Pulmonary aspiration	**4** (0.2)	3 with broncho tracheal suction 1 intubation 1 with bronchodilator	All uneventful
Induction	2 (50.0)		
Awakening	2 (50.0)		
Drug error	**2** (0.1)	Both wrong dosage	Both uneventful
Induction	2 (100)		
Anaphylaxis	**1** (0.05)	IV steroids	Uneventful
PACU	1 (100)		

Legend: PACU = post anesthesia care unit

Table III: incidence of critical events. Data from the Italian cohort compared with the Apricot trial (grey column).

	***N* Italy**	**Incidence (95%CI) Italy**	**Incidence (95%CI) Apricot trial**
Laryngospasm	11	0.5% (0.2-0.8)	1.2% (1.1–1.3)
Bronchospasm	24	1.1% (0.7 - 1.6)	1.2% (1.1–1.3)
Bronchial aspiration	4	0.19% (0.00-0.38)	0.1% (0.06–0.13)
Postanaesthetic Stridor	7	0.3% (0.1-0.6)	1.1% (0.9–1.3)
Anaphylaxis	1	0.05% (-0.05-0.14)	0.01% (0.002–0.025)
Cardiovascular instability	14	0.7% (0.3-1)	1.9% (1.7–2.0)
Cardiac arrest	-	-	0.03% (0.01–0.05)
Neurological damage	-	-	0.02% (0.002–0.03)
Drug error	2	0.10% (-0.04-0.23)	0.2% (0.1–0.2)
Overall (any of them)	63	3.0% (2.2-3.8)	5.3% (5.0–5.5)

Table IV: Distribution for ASA status (IVa) and anesthesia team experience (IVb). Data from the Italian cohort compared with the Apricot trial (grey column and raw). Data are expressed as n (%) or otherwise indicated

Table IVa

	Apricot trial	Age, years mean (SD); 95% CI	Team 1	Apricot trial	Team 2	Apricot trial	Team 3	Apricot trial	Team 4	Apricot trial
ASA 1 (n = 1079, 51.7%)	60.7%	6.27 (4.31); 6.0 – 6.5	704 (65.2%)	53.9%	211 (19.5%)	15.2%	148 (13.7%)	22.4%	16 (1.5%)	8.5%
ASA 2 (n = 813, 38.9%)	28.1%	5.86 (4.43); 5.6 – 6.2	611 (75.1%)	64.4%	127 (15.6%)	12.9%	68 (8.4%)	15.7%	7 (0.9%)	7.0%
ASA 3 (n = 165, 7.9%)	9.6%	5.65 (4.79); 4.9 – 6.4	137 (83.0%)	72.0%	15 (9.1%)	10.6%	13 (7.9%)	10.6%	0	6.8%
ASA 4 (n = 28, 1.3%)	1.6%	3.61 (3.88); 2.1 – 5.1	19 (67.9%)	78.9%	6 (21.4%)	9.6%	3 (10.7%)	8.8%	0	2.6%
ASA 5 (n = 2, 0.1%)	0.04%	0.03 (0.03); -0.35 to 0.4	2 (100%)	91.7%	0	8.3%	0	0.0%	0	0.0%
Overall (n = 2087)		6.0 (4.40); 5.8 – 6.2	1473 (70.6%)	59.0%	359 (17.2%)	14.0%	232 (11.1%)	19.2%	23 (1.1%)	7.8%
Apricot trial		6.3 (4.5); 6.3 – 6.4								

Legend: **team 1**: specialist anaesthesiologist with mainly (>80%) paediatric cases; **team 2**: specialist anaesthesiologist with frequent (50–80%) paediatric cases**; team 3**: specialist anaesthesiologist with occasional (<50%) paediatric cases; **team 4**: anaesthesiologist in training. **ASA** = American Society of Anesthesiology; ASA I: normal healthy patient; ASA II: mild systemic distress; ASA III: severe systemic distress; ASA IV: severe systemic distress that is a constant threat to life; ASA V: moribund patient who is not expected to survive without surgical intervention