

## Centralization of pediatric anesthesia?

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Pediatric anesthesia should be considered a sub specialty addressing a full-size pediatric population (from preterms to teenagers) and it requires peculiar anatomical, physiopathologic, pharmacologic and anesthesiologic knowledge. People providing anesthesia care for children require training and continual experience that is different from that required for adult management.

It is well known that an experienced surgical and anesthesia team can considerably decrease morbidity and mortality in young children, moreover it has been shown that the outcomes of pediatric patients are related to the experience of the clinicians involved.<sup>1</sup> Thus, surgeons and anesthesiologists "should not undertake occasional pediatric practice".<sup>2</sup>

Some 15 years ago, Cohen<sup>3</sup> and Morray<sup>4</sup> demonstrated an increased morbidity and mortality in pediatric patients compared to adults. Moreover, Keenan<sup>5</sup> showed an increased frequency of cardiac arrest in infants cared for by nonpaediatric anesthesiologists compared with children cared for by pediatric anesthesiologists. Finally, infants and neonates are exposed to a higher risk of anesthesia related-cardiac arrest.<sup>6</sup>

In 1994 the American Society of Anesthesiology (ASA) and the Anesthesiology Section of the American Academy of Pediatrics established the Pediatric Perioperative Cardiac Arrest (POCA) registry with the aim of evaluating the incidence of anesthesia-related cardiac arrest in children and to investigate the causes, the clinical risk factors and the prognosis.

Important facility-based component issues for the perioperative anesthesia environment include, but are not limited to, the training and experience of the health care team.

The American Academy of Pediatrics recommended the guidelines for the pediatric perioperative anesthesia environment.<sup>7</sup>

Specialized hospitals with an adequate environment to perform pediatric surgery (operating rooms, recovery rooms, pain services etc), special neonatal and/or pediatric care units, new devices useful in emergency management and in allowing safe transfer, are all elements able

to improve pediatric outcome and to dramatically reduce perioperative incidence of adverse accidents.<sup>8</sup>

To improve pediatric patient outcome and to reduce anesthesia related adverse events, British Anesthesiologist recommended the development of a minimum requirement for the number of pediatric cases that clinicians must perform annually and the development of a regional system for pediatric anesthesia with the transfer of pediatric patients, with more complex medical problems, to special centers for pediatric anesthesia. This recommendation is also supported by data from the United States.<sup>9</sup> There are existing guidelines in the United Kingdom,<sup>10</sup> France, Switzerland, Germany and The Netherlands,<sup>11</sup> but there are currently no agreed standards for the European Community as a whole. Accordingly, the Federation of Associations of Pediatric Anesthesia (FEAPA) put forward practicable recommendations. The aim of these recommendations is to set down desirable standards for pediatric anesthetic services throughout Europe.

In the European community, the body responsible for setting minimum standards of training and expertise for medical specialists in anesthesia is the Union Européenne des Médecins Spécialistes (UEMS) Section of Anesthesiology, Reanimation and Intensive Care. The aims of the UEMS Section are to harmonize training programs and achieve minimum standards of training and expertise among the European Union Member States and to allow the free movement of doctors and specialists.<sup>12</sup>

The current aim is to put forward recommendations for the minimum amount of training required in pediatric anesthesia throughout the European Community. It is important to appreciate that all training in anesthesia should be competency based with continuous assessment and supervision. Furthermore, it must be stressed that recommendations as to the number of cases to be under-

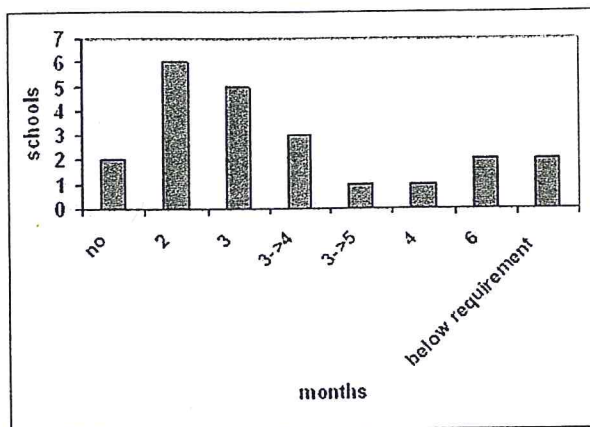


Figura 1.

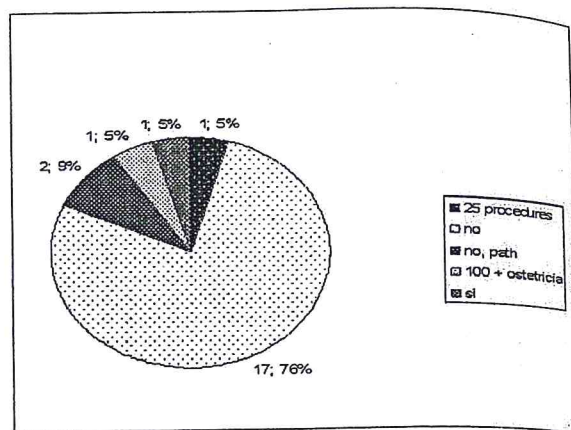


Figura 2.

taken by trainees should only be taken as a guide and not as an absolute requirement.

Referring to these considerations, we report the most important topics of the F.E.A.P.A. guidelines published in 2004.

All trainees in anesthesia should spend a minimum of 3 months of continuous training in a specialist pediatric centre in a University hospital, a large Children's Hospital or a District (non specialist) Hospital with a large pediatric department, or a combination there of, that have all the facilities required for the management of children. This training should not only include a sufficient number within the different surgical specialties but also a mixed age group of pediatric surgical patients. The recommended number of patients is:

- 10 infants less than 1 year of age (2 neonates);
- 20 children aged 1 to 3 years;
- 60 children aged 3 to 10 years.

For trainees who aspire to a post with an interest in pediatric anesthesia (less than 50% of their time or on average the equivalent of at least half a day of pediatric anesthesia per week) a further training module of at least 6 months of continuous training is recommended.

For trainees who wish to acquire a specialist post in pediatric anesthesia more than 50% of their time or on average the equivalent of at least two and a half days per week is recommended:

- A further module of continuous training for a minimum of one year in a specialized pediatric center is recommended.

Trainees in the above mentioned extended training modules should spend periods of 1 and 2 months respectively in a pediatric intensive care unit. This period of training is to familiarize the trainee with the principles of pediatric intensive care management and must not be considered as a full training in pediatric intensive care that in many countries takes an additional period of training of up to two years. In addition, the surgical case mix should be extensive and must include emergency cases.

At the completion of training the trainee should have attained competence in:

- Resuscitation, basic and advanced life support;
- Preoperative evaluation and premedication;
- Stabilization and transportation of emergency case;
- Techniques for induction and maintenance of general anesthesia;
- Airway management in all age groups;
- Monitoring;
- Circulatory support and fluid management;
- Regional anesthesia and analgesia;
- Perioperative pain assessment and management;
- Postoperative recovery room management and the initial stabilization of vital parameters of children who require intensive care management;
- Communication skills with respect to children and their parents.

Trainees in extended training are expected to have competency and experience in a wider case mix including the more specialized areas of pediatric anesthesia practice, for example in cardiac and neurological surgery.

Teaching and supervision should be adjusted to the age of the child undergoing anesthesia and other recognized risk factors.

Level 1. The trainer teaches and supervises the trainee during the whole procedure for infants aged 1 year or less.

Level 2. The trainer is present at induction and recovery for children aged 1 to 3 years.

Level 3. The trainer is immediately available in the hospital for children aged over 3 years.

F.E.A.P.A. guidelines stress the importance of identifying a specialized figure to perform anesthesia in children:

- Specialists in pediatric anesthesia are defined as anesthesiologists who have had extra training of at least one year in a specialized center and who spend at least 50% of their working week, equivalent to two and a half days, caring for children of different ages. They usually work in a specialist center. These pediatric anesthesiologists are expected to keep up to date and be competent in pediatric resuscitation, anesthesia, pain management, emergency pediatric medicine and initial stabilization of children requiring intensive care.

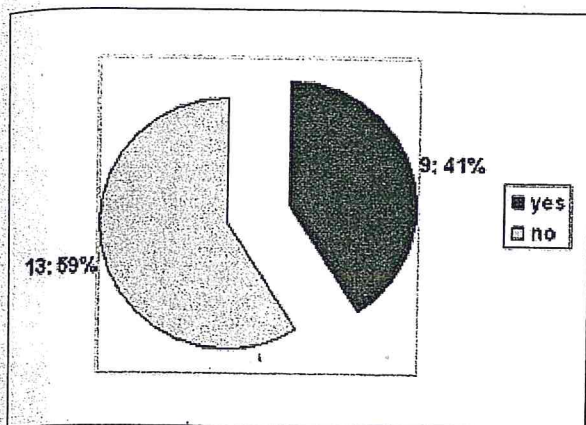


Figura 3.

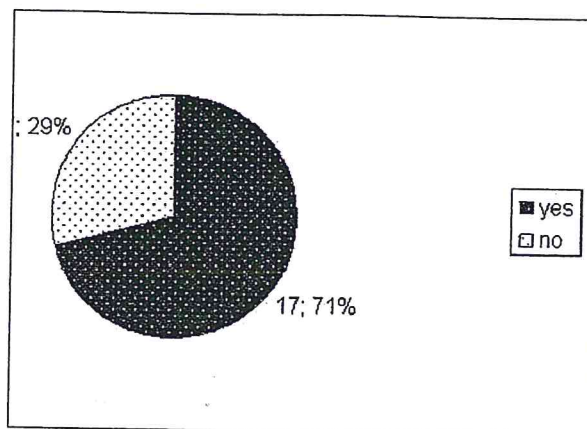


Figura 4.

Specialist Anesthesiologists with an interest in Pediatric Anesthesia usually work in a District Hospital or single specialty unit or hospital and they would be expected to undertake a minimum of the equivalent of one and a half-days of scheduled pediatric surgery per week. Continuing medical education and professional development must be undertaken to ensure that these specialists also keep up to date with the developments and advances in pediatric anesthesia. Contact should be established with a specialized pediatric surgical center to enable these anesthesiologists to update their knowledge and expertise.

All specialist anesthesiologists in general anesthesia should be capable of safely anaesthetizing children over 3 years of age for common surgical procedures of childhood. They are also required to keep up to date in pediatric resuscitation and the stabilization of infants and children prior to transfer to pediatric surgical centers.

The F.E.A.P.A. is firmly of the opinion that these recommendations are both reasonable and attainable and should be the standard for pediatric anesthesia care in all countries in the European Community.<sup>13</sup>

In accordance with this, and to clarify the state of the art, a survey has been conducted to evaluate the training system in terms of Pediatric Anesthesia in the Teaching Hospitals and Schools of Anesthesia in Italy. The survey was addressed to the Directors of the Departments of Anesthesia and Intensive Care of the Medical Schools of the Universities throughout Italy using a questionnaire.

The survey

The survey was conducted between June and July 2006 and covered 28 of the total number of 36 specialization schools.

The questionnaire was composed of four questions:

1. Does the school provide pediatric training? If yes: what is the duration?
2. Are there a minimum number of procedures to perform during the training period?
3. Does the trainee have a test at the end of the training period?
4. Does your department have a group devoted to pediatric anesthesia?

The attitude of Italian Schools of Anesthesia towards pediatric anesthesia training are variable. A specific training program exists in 22 Schools of Anesthesia and a final verification by means of a written test or an oral examination is performed in 9 Schools. In 17 Schools the training is under the supervision of a dedicated group of pediatric consultant anesthetists. Finally, a dedicated staff exists in Children's Hospitals but it is not so common in the General Hospitals, thus trainees are under the supervision of both academic figures and general physicians, with a various different distribution.

At the moment pediatric anesthesia training is not a prerequisite for the anesthesia board examination in Italy and our survey shows that there are no common specific guidelines in pediatric training. The general practice is connected with the applications of F.E.A.P.A guidelines, and S.I.A.A.R.T.I. and S.A.R.N.e.P.I. believe these F.E.A.P.A. recommendations are a useful guide for specialists in pediatric anesthesia and resuscitation. To meet these guidelines, however, every University School of Anesthesia will need to plan specific pediatric anesthesia training programs and, at the same time, Children's Hospitals and General Hospitals with large pediatric practice need to be involved in the educational demands.

## Results

The survey results are shown in the figures 1,2,3,4.

## Conclusions

It seems that we can affirm that to realize devoted pediatric structures is desirable.

To define operative guidelines, training and repetitive experience periods, the need of the minimum necessary equipment for pediatric management, seem to be indispensable elements to perform pediatric anesthesia in unspecialized structures, and to improve the quality of professional performance and the safety of pediatric patients.

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