

Specialised training in paediatric anaesthesia: Need of the hour

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ABSTRACT

Paediatric anaesthesia is an upcoming speciality which is gaining wide interest and can be a career choice for the new trainees. The need to develop paediatric anaesthesia as a speciality was realised with the progress in the field of paediatric surgery. The profile of the 'patient' encountered by a paediatric anaesthesiologist spans from an extremely premature neonate on the fringes of survival, to a full-grown adolescent equivalent to an adult. Perioperative morbidity and mortality are 2-3 times higher in infants and neonates compared to adults particularly in middle and low-income countries. The anatomical, physiological, pharmacological variations and presence of congenital cardiac, pulmonary and metabolic diseases in young children make perioperative management challenging. Special expertise and training are required for anaesthetic management of these preverbal children. In India, 3-years DM and 1-year Fellowship courses in paediatric anaesthesia are now available for specialisation. An ideal paediatric anaesthesia training centre should have substantial paediatric and neonatal patient load with exclusive intensive care facility. Paediatric anaesthesiologists, having knowledge of several facets of paediatrics and anaesthesia are capable of coordinating with health care professionals performing procedures outside the operating room. Paediatric anaesthesia, as a career thus offers a great opportunity to enhance quality and safety of anaesthesia in this high-risk surgical population. Persistent coordinated team efforts improve patient outcomes, reduce stress at work and increase job satisfaction.

Key words: Anaesthesia, career, courses, paediatric, programme, specialisation

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INTRODUCTION

The progress of surgery as a speciality would not have been possible without the scientific advancement in the field of anaesthesia. The surgical field has improved over time primarily due to the introduction of surgical sub-specialisation. However, the introduction of specialisation in anaesthesia including paediatric anaesthesia has been slow. In fact, paediatric and neonatal surgery as a speciality has been in existence in India in tertiary training institutes for more than 50 years. Likewise, neonatology and neonatal intensive care facilities have also been established since long. Unfortunately, paediatric anaesthesia services have failed to match up to the demand and it is only recently that training programs in paediatric and neonatal anaesthesia have commenced at some centres in India. In their editorial, Rao *et al.* stressed

the urgent need to develop paediatric anaesthesia in India and recommended availability of specialist anaesthesiologists to safely administer anaesthesia to neonates, infants and children.^[1]

Need for specialisation in paediatric anaesthesia

During the postgraduate course, the trainees are broadly trained for providing anaesthesia to all types of patients by rotating them in all branches of surgical

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speciality including specialised branches. However, this is a short-term posting and just gives an overview of the specialised branches. Because of this, any practical hands on training for paediatric anaesthesia is limited.

The consequence is that the 'qualified' anaesthetist might find himself/herself inadequate in application of knowledge, skills and use of latest technology when it comes to administering anaesthesia safely to the paediatric population.

Specialisation in paediatric and neonatal anaesthesia is the need of the hour because of many reasons. First, paediatric anaesthesia represents only 12% of the total anaesthesia caseload. In most hospitals, infants represent 1%, and neonates or preterm babies requiring anaesthesia are few.^[2] Therefore, the individual experience of an anaesthesiologist in the paediatric, especially neonatal population is maybe limited for both the teachers and the postgraduates. Second, it has been seen that the perioperative mortality, cardiac arrest and anaesthetic-related serious adverse events are 2-3 times higher in small children compared to adults particularly in middle- and low-income countries.^[3,4] A contributing factor to this, amongst many, is the non-availability of trained and specialist anaesthesiologists. In addition, the incidence of severe complications, e.g., bradycardia, cardiac arrest, laryngospasm or adverse respiratory events in general is highly dependent on the experience of the anaesthesiologist handling children and the risk is higher when the care is by an anaesthesiologist who manages children infrequently.^[5-7]

Thirdly the anaesthetic management of children is very different from that of adults due to the anatomical, physiological, pharmacological and psychological differences between the two. The presence of cardiac, pulmonary and metabolic diseases and newborns and infants with congenital conditions translates into an anaesthetic technique which requires special expertise and training as well as individualised treatment. The profile of the 'patient' encountered by a paediatric anaesthesiologist spans from an extremely premature neonate on the fringes of survival, to a full-grown adolescent equivalent to an adult. The psychological considerations vary with age and development; with issues such as separation anxiety and emergence delirium being unique to this patient group. Assessment and management of pain can be challenging. Risk factors which have been cited for

anaesthesiologists and their patients are incorrect drug dosages and dilutions, inadequate oxygenation, lack of knowledge of congenital anomalies and syndromes, as well as insufficient teaching and training.^[8] It is estimated that in most developing countries including India, nearly half of the population is below 18 years of age and almost 85% will manifest with a need for a surgical procedure before their 15th birthday.^[9]

Courses in paediatric anaesthesia

In the Western world there is 1-year specialisation for paediatric anaesthesia after post-graduation. In India there is a 3-year DM degree as well as 1-year Fellowship course in paediatric anaesthesia. The American College of Surgeons (ACS) guidelines recommend that for optimum care of paediatric surgical patients, paediatric anaesthesiologists shall directly care for patients at advanced and comprehensive paediatric surgical centres.^[10] However, in India no such recommendation has been proposed by surgical bodies or the Medical Council of India (now the National Medical Commission). In our opinion, Fellowship courses are excellent for anaesthesiologists who want to gain experience in anaesthetising children. The DM course is demanding and gruelling and helps a candidate in pursuing a career in teaching hospitals with opportunities in research and as a specialist paediatric anaesthesiologist in stand-alone 'Children's Hospitals'.

Both government and private hospitals in India provide exclusive courses (DM and Fellowship) in paediatric anaesthesia [Tables 1 and 2]. The details of the various courses are available from individual websites of the institutes and from Indian Association of Paediatric Anaesthesiologists (IAPA) website (for fellowship accredited by IAPA). The ideal institute for training of a paediatric anaesthesiologist should be the one with a substantial patient load including neonates, which has a neonatal and paediatric intensive care facility as well as provides facility of Non-Operating Room Anaesthesia (NORA). It should have experience in conduct of complex surgical procedures including foetal surgery and EXIT surgery. This essentially provides extensive experience for managing all children including neonates and those with complex diseases.

MD (Anaesthesiology) curriculum is inadequate to prepare a postgraduate to confidently practise paediatric anaesthesia. A 1-year fellowship can bridge this gap and make a fellow proficient in the practice of

Table 1: Paediatric Anaesthesia DM Courses in India (Duration: Three Years Post MD)

Name of the program	Institution/University	Location
DM (Paediatric Anaesthesia and Intensive Care)	Postgraduate Institute of Medical Education and Research	Chandigarh (UT)
DM (Paediatric and Neonatal Anaesthesia)	King Edward Memorial (KEM) Hospital Seth GS Medical College	Mumbai (Maharashtra)

Table 2: Fellowship in Paediatric Anaesthesia (1 year)

Name of Program	Institution/ University	Location
Accredited by IAPA (Indian Association of Paediatric Anaesthesiologists) http://www.iapaindia.com/accredited-institutions.html [Duration 1-year Post MD, 2-years Post DA]	AIMS (Amrita Institute of Medical Sciences) CNBC (Chacha Nehru Bal Chikitsalaya) GKNM (G Kuppuswamy Naidu Memorial) Hospital KMC (Kasturba Medical College) K.G. Patel Children Hospital NH SRCC Children's Hospital Rainbow Hospitals Rainbow Hospitals, Marathahalli Sri Ramachandra Institute of Higher Education and Research Super specialty Paediatric hospital and Postgraduate Teaching Institute	Kochi, Kerala New Delhi. Coimbatore, Tamil Nadu Manipal, Karnataka Vadodara, Gujarat Mumbai, Maharashtra Hyderabad, Telangana Bangaluru, Karnataka Chennai, Tamil Nadu Noida, Uttar Pradesh
Affiliation: Rajeev Gandhi University of Health Sciences, Karnataka [Duration 1 Year]	Bangalore Medical College and Research institute Indira Gandhi Institute of Child Health Bapuji Medical College	Bengaluru, Karnataka Bengaluru, Karnataka Davanagere, Karnataka
ICA accredited Fellowship Paediatric CVS Anaesthesia [Duration 18 months]	Narayana Hrudayalaya, Bangalore	Bengaluru, Karnataka
Fellowship in Paediatric Anaesthesia [Duration 1-Year]	All India Institute of Medical Sciences (AIIMS) Jodhpur	Jodhpur, Rajasthan
MUHS (Maharashtra University of Health Sciences) accredited paediatric anaesthesia fellowships [Duration 1 year]	J J Hospital (Grant Medical College and Sir Jamshedjee Jejeebhoy Hospital) King Edward Memorial (KEM) Hospital and Seth GS Medical College Lokmanya Tilak Municipal General Hospital (LTMGH) and Medical College, Sion Wadia Children's Hospitals	Mumbai, Maharashtra
Fellowship in Paediatric Cardiac Anaesthesia (Duration 1-Year) Paediatric Cardiac Critical Care Fellowship (Post DM) Duration 1-Year	All India Institute of Medical Sciences (AIIMS) Delhi Post Graduate Institute of Medical Education & Research (PGIMER)	New Delhi Chandigarh, Union Territory
WFSA (World Federation of Societies of Anaesthesiologists) Paediatric Anaesthesia fellowship [Duration 6 months]	Children Anaesthesia services www.suryahospitals.com Christian Medical College	Mumbai, Maharashtra Vellore, Tamil Nadu
Fellowship in Paediatric Anaesthesia [duration 1 year]	Sir Ganga Ram Hospital	New Delhi

paediatric anaesthesia, so that he/she can confidently manage paediatric cases. However, to gain mastery over a subject is a long, and intense process. The 3-year rigorous DM (Paediatric Anaesthesia) program provides the postgraduate student the opportunity and the time to master the various nuances of neonatal and paediatric anaesthesia, similar to the MCh courses in surgical branches.

Teaching and training for specialisation in paediatric anaesthesia

Teaching and training is an essential component of any educational course. It requires hands on practical training as well as teaching of theoretical aspects of the

speciality. Paediatric anaesthesiologists need to balance high clinical workload with academic development. They are expected to develop good communication skills to interact with the families and understand a child's behaviour. Besides this, a rapport needs to be maintained amongst colleagues and other staff members to provide satisfactory services. This is important because they will be dealing with patients of varied age groups (neonates to teenagers). They have to master various skills, be prepared for the adverse events and perform effective resuscitation if required. Persistent coordinated efforts improve patient outcomes, reduce stress at work, and increase career satisfaction.

Importance during the pandemic

The pandemic of coronavirus disease (COVID)-19 has further stressed the importance of specialisation in the field of paediatric anaesthesia. In the present COVID times, modification of anaesthesia technique is desirable to avoid and contain transmission of the infection by aerosolisation. Anaesthesiologists need to be aware of children specific problems and their management e.g., avoiding nasal premedication since it can cause aerosolisation.^[11] In addition, anaesthesia management by a paediatric anaesthesiologist will enable safe and quick performance of routine tasks like intubation as well as complex tasks like placement of invasive lines and nerve blocks. A generalist is more likely to struggle and take extra time for performance of these practical tasks thereby increasing the possibility of aerosol generation.

Merits of paediatric anaesthesia specialisation

Paediatric anaesthesia is a relatively new speciality; the limited number of trained and qualified paediatric anaesthesiologists, and a largely young population translates into a huge demand.^[12] Increased clinical expertise can lead to higher job satisfaction, better recognition from paediatric surgical colleagues and higher remuneration if working in private hospitals. There is a growing awareness amongst the lay public about the problems of anaesthesia especially in children; and informed parents are now seeking trained anaesthesiologists for their child's perioperative care.

Awareness about paediatric anaesthesia, and its risks (especially in high risk groups e.g., neonates, children with significant comorbidities, major surgical procedures) is increasing. Surgeons, hospital administrators, and even parents have begun to specifically ask for anaesthesiologists with paediatric anaesthesia experience. In such a situation, a qualified paediatric anaesthesiologist is in a position to quote his price. There is a trend for children's hospitals to employ only anaesthesiologists with specific training in paediatric anaesthesia.

Recognition in the medical fraternity

Paediatric anaesthesiologists, having knowledge of several facets of paediatrics and anaesthesia are uniquely positioned to coordinate and cooperate with health care workers from related specialities especially those managing procedures outside the OR, diagnostic imaging, cardiac catheterisation laboratory, gastroenterology suites, dental sedation, radiotherapy, etc. Active interactions with consultants from other

specialities like oncology, neurosurgery, dental and oral surgery, ophthalmology will help in providing high quality anaesthesia, comfort and pain control during various procedures. Being highly skilled and qualified professionals, paediatric anaesthesiologists are in a position to communicate authoritatively with colleagues from other specialities managing children.

Global appeal as a permanent career

In the past, the most appealing specialisation courses have been in cardiac anaesthesia, critical care and chronic pain. Recently, the focus has shifted from these courses to paediatric, obstetric and trauma anaesthesia because of their interesting, appealing and rewarding qualities. Also, at the moment there is manpower saturation in these previous courses. The authors feel that paediatric anaesthesia provides a degree of stability and a reasonable family time compared to other specialities.

Encouraging the youngsters to adopt this super speciality

Faculty working as paediatric anaesthesiologists can work as role models to influence many young minds to opt for paediatric anaesthesia as a career choice. The job of mentors would be to lead by example, conduct educational sessions during conferences, award prizes for presentations by trainees (Kop's award), dissertation topics for PG students related to children and thus inspire young anaesthetists to embrace this speciality and help carry forwards the legacy of paediatric anaesthesia.^[13]

During their specialisation training, the trainees develop an in-depth understanding of the subject thereby making them expert in practical skills. They can thus manage safe anaesthesia on a full spectrum of young sick patients exposed to newer surgical techniques like laparoscopy, robotics, organ transplant etc.^[14] A calm and cool person who is conscientious, meticulous and passionate to care for small sick babies and empathise with the families would be a suitable choice.

To be trained and accredited as a specialist by a recognised institution that would provide fellowship or DM degree with an ever-increasing global demand will definitely be the choice of young aspiring anaesthesiologists. More and more paediatric anaesthesiologists trained this way will get the opportunity to settle in institutions or corporate hospitals worldwide to work in this demanding speciality.

Growth avenues

Specialisation and the associated training programs are avenues with great potential for clinical advancement and research. Tertiary training institutes with large patient loads, conducting training programs for the DM and Fellowship courses in paediatric anaesthesia offer opportunities for enhancing knowledge and skills, and also the opportunity to conduct scientific research. Specialist societies, such as IAPA conduct regular focused meetings and workshops, and are also instrumental in framing policies and guidelines for safe conduct of anaesthesia. Young, budding paediatric anaesthesiologists would do well to be members of such societies to further their own growth as well as improve the standards of paediatric anaesthesia in India.

The qualified paediatric anaesthesiologists can be a part of anaesthesia departments in hospitals leading teaching and training or find job opportunities in corporate hospitals or freelance practice at stand-alone nursing homes dealing exclusively with children. Paediatric anaesthesia as a career choice thus offers a great opportunity to enhance quality and safety of anaesthesia in this high-risk surgical population.

Ethical aspects

Paediatric anaesthesiologists often face dilemmas between the law, ethical issues and good clinical practice.^[15] Children being minor are not eligible to give written informed consent.^[16] All the complex decisions regarding blood transfusion, challenging surgical procedures with long-term implications and participation in a research project are taken by care-providers. One must ensure that they understand the ethical and legal implications before giving consent. This requires coordination of patient care utilising conflict management and negotiation skills that are not formally taught in anaesthesia residency or medical training.

Legal aspects

In India, recommending that only a paediatric anaesthesiologist will provide anaesthesia to children is not feasible at the moment. In case of such a recommendation, if a paediatric anaesthesiologist is not available it would have legal implications and it becomes mandatory to inform the parents about it.

However, defining an age group below which only a paediatric anaesthesiologist should provide anaesthesia services is possible. Neonates as well as children below the age of 2 years should be

exclusively provided anaesthesia by experts.^[17] This is because the perioperative morbidity and mortality is particularly higher in infants and neonates based on closed claims analysis and the Perioperative Cardiac Arrest (POCA) registry.^[3,18] A non-paediatric anaesthesiologist (generalist) should be competent to provide perioperative care for common elective and emergency procedures in children aged 2 years and older.

Limitations of specialisation

If specialisation becomes the norm, non-availability of the paediatric anaesthesiologist may lead to delays in treatment. Medico legal implications may arise, where the 'generalist', not the disease process, may even be blamed for a poor outcome rather than the responsible disease process. Specialisation may lead to attrition of other skills e.g., the paediatric anaesthesiologist may not feel confident administering anaesthesia to an adult with comorbidities or an obstetric patient.

CONCLUSION

Paediatric anaesthesia is a high-pressure and time-sensitive speciality where outcome depends on communication, teamwork, in addition to individual skill and performance. A trained paediatric anaesthesiologist can enhance safety and quality of perioperative care thus improving surgical outcomes in neonates, infants and children. Specialisation in paediatric anaesthesia will enable the anaesthesiologist in achieving these goals.

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Conflicts of interest

There are no conflicts of interest.

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