Pediatric surgical training in India: Proposal of a new scheme

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“...We can ignore or deny that problems exist, contending that our traditional systems of training and delivery of service may need tweaking, but nothing more, in which case we will be mere observers, and remedies will be imposed on us”

- Peter Altman
33rd Presidential Address (2004) at American Pediatric Surgical Association

INTRODUCTION

Training in pediatric surgery is a constant source of concern and debate.[1-7] It is notoriously dissimilar not only between countries[3, 5, 8] but also within the same country.[1, 9, 10] The need for a better system of pediatric surgical training (PST) has been long felt in India.[1, 11, 12] The suggestions range from minor issues like staff pattern, uniformity in teaching and library facilities[1, 13, 14] to radical change in the policy of training.[11, 15]

Pediatric surgical education in India is mostly based on the western style, as the founders of this specialty tried to replicate the pattern of their training in American or Australasian countries. However, India as a developing subcontinent has its own geographic and demographic peculiarities that must be taken into account while designing the training programs. In this paper, the authors critically review the present system of PST and suggest a new scheme that, in Indian circumstances, is conceivably better than the existing one.

WHAT IS WRONG WITH THE EXISTING SYSTEM OF TRAINING IN INDIA?

Currently, there are two patterns of PST in India [Figure 1]. The first one is indirect system[14] in which a fully qualified general surgeon (M.S degree holder) undergoes a 3-year PST, culminating in the award of M.Ch degree. This “3 + 3 model” is analogous to the UEMS (European union of medical specialties) recommendations and the Rotterdam resolution.[16] These candidates, during their adult general surgery (AGS) schooling, are mainly trained to do operations such as thyroidectomy, cholecystectomy, vagotomy, prostatectomy and mastectomy. However, these operations are very seldom performed in childhood. Even the principles and techniques of repairing inguinal hernia and hydrocele are entirely different in adults and children. Therefore, spending time, efforts and money in learning some skills that they may never use in their lifetime after becoming a pediatric surgeon is a futile exercise. On the other hand, these general surgeons on entering pediatrics surgery struggle for few months to learn even venous access in infants. Calculations of drug dosages, estimation of intravenous fluid requirements and the art of diagnosis in the absence of subjective expression of symptoms have all to be learnt afresh during PST. Therefore, the skill requirements of AGS and pediatric surgery are entirely different and to link these two training programs in succession is clearly illogical. As Chatterjee[12] remarked, some general surgeons enter pediatric surgery just to collect a postdoctoral degree without assessing their psychological making or their dexterity for handling small patients. The present system does not have any ways and means to test a candidate’s aptitude for the specialty.

In the second system (direct method), a medical graduate (M.B., B.S. degree holder) directly enters a 5-year PST and receives M.Ch degree at the end. Outside India, such direct system exists only in Costa Rica.[9] The curriculum committee of IAPS found that at present no training center in India prefers or pursues this pattern except the All India Institute of Medical Sciences at New Delhi.[14] Freshly graduated students are relatively immature to choose their destination specialty. Their propensity towards pediatric surgery is comparatively more unknown than that of a general surgeon. Prolonged education for 5 years at a stretch pose hardship as regard...
to student debits.\textsuperscript{[17]} Provision to interrupt studies will enable students to repay their loans by securing a temporary job or private practice before embarking on higher education.\textsuperscript{[17]} This is important in Indian context as most of the students are from middle income families.

**CONFLICTING DEMANDS AND COMPROMISES**

Designing of PST in India should take into account the conflicting demands posed by low per capita income, inadequate transport facilities, overcrowding, illiteracy, predominance of rural population, short supply of resources, lack of supporting services such as pediatric nursing, unstructured referral practice, absence of health insurance system and sociocultural peculiarities.\textsuperscript{[13,18,19]} Unfortunately, both the existing systems of PST completely ignore these issues.

A pediatric surgeon trained in complex skills cannot practice it without sophisticated equipments such as ventilators, cystoscopes and endoscopes. Such modern gadgets are not available in villages, yet children of these hamlets require the services of a pediatric surgeon. Fraternity of this specialty is frequently advised not to concentrate in big cities and is encouraged to serve the rural India.\textsuperscript{[19]} If pediatric surgeons make up their mind to work in countryside, their training in advanced surgical techniques is going to be wasted. It is not only illogical but also a great economic loss to train someone in high-level skills and then to relegate them with only ordinary tasks.\textsuperscript{[20]}

Duration of training in the existing systems is inadequate to impart highly specialized skills such as microvascular surgery and pediatric organ transplantation. If the training period is prolonged to compensate this, it may turn away many good candidates. Already engineering and computer science have started attracting young graduates by lucrative salary and good work environment.\textsuperscript{[7]} Unacceptably long training periods, inadequate debt compensation mechanisms and only a modest career financial reward are the causes of reluctance of medical students to pursue a surgical career.\textsuperscript{[7]} Keeping the training period to the shortest minimum is essential to attract the best and brightest students to pediatric surgery.\textsuperscript{[7]}

Surgical care of children is frequently claimed to be at best in the hands of a trained pediatric surgeon.\textsuperscript{[21]} It is well established that childhood surgical deaths are more when surgeons mix-up pediatric and adult practice.\textsuperscript{[21]} Surprisingly, a sizable proportion of childhood surgeries\textsuperscript{1} in otolaryngology, orthopedics, cardiac surgery, plastic surgery and neurosurgery are relegated to the respective ‘adult-tissue-specialists’\textsuperscript{[22]} (Table 1). It is irrational for pediatric surgeons to care for certain selected surgical conditions in children while leaving others high and dry.\textsuperscript{[23]} If PST programs have to include these “lost sheep”, it is inevitable to prolong the training period.

A specialist surgeon is defined as a person who performs more than 24 operations of a particular kind in a year.\textsuperscript{[22]} We wonder if there are any Indian pediatric surgeons, other than those in apex institutions, who perform more than 24 Kasai’s procedures or cloacal exstrophy repairs in a year. It is partly because of unstructured referral pattern and partly because of surgeon’s preoccupation with multifarious diseases in many anatomical areas. If more

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
Specialty & \textbf{Proportion of surgeries (%)} & \textbf{London *1997-8} & \textbf{Rural India *2004} & \textbf{Urban India *2004} \\
\hline
Pediatric surgery & & 53.0 & 42.3 & \\
Orthopedics & 12 & 9.2 & 14.4 & \\
ENT (Otolaryngology) & 20 & 23.9 & 12.5 & \\
Plastic surgery + oral and maxillofacial surgery & 29 & 5.4 & 13.7 & \\
Neurosurgery & 14 & 0.6 & 9.7 & \\
Ophthalmology & 1 & 1.2 & 2.7 & \\
Cardiothoracic surgery & 5 & 0 & 4.7 & \\
General surgery & 1 & 6.1 & 0 & \\
Urology & 15 & 0.6 & 0 & \\
\hline
\end{tabular}
\caption{Proportion of childhood operations performed in various specialties}
\end{table}

\footnotesize
\textsuperscript{*Source: Susan Mayor. Paediatric surgery should be performed by specialist surgeons. BMJ 2000; 320: 1423. \textsuperscript{2}Source: Medical records division of Rajah Muthiah Medical College, Annamalai University, Tamilnadu, Southern India. \textsuperscript{3}Source: Maulana Azad medical college and associated hospitals, New Delhi, Northern India.}
pediatric surgeons are produced to reach the unreachable rural areas, this situation will further deteriorate. More number of equally trained pediatric surgeons will then compete for their share and ultimately none will achieve adequate expertise in complex operations. Upadhyaya’s suggestion\textsuperscript{[13]} to pool up these complex problems at one center to maximize the patient benefit and learning experience is impractical. Transferring a sick child to a regional referral center is either unrealistic due to financial constraints or hazardous due to poor transport system.

THE NEW SCHEME

From the forgoing discussions it is obvious that the problem is too complicated to find a universally satisfactory solution. Medical specialties divulged on the basis of skill requirements. However, “pediatric surgery” is used as a “generic” name that includes varying levels of expertise.\textsuperscript{[Table 2]} Pediatric surgeon who is going to practice in a small town or village need not be trained in complexities. These conflicts can be compromised if PST is stratified according to the levels of proficiency \textsuperscript{[Table 2]}.

Such a stratified pediatric surgical practice already exists in the Dutch system.\textsuperscript{[10]} In Netherlands there are two categories of pediatric surgeons: the general pediatric surgeons perform simple operations while the special pediatric surgeons perform complex operations. As early as 1986 Braasch\textsuperscript{[20]} advocated the need to separate the training programs of community and academic surgeons. Ziegler\textsuperscript{[7]} introduced the concept of “early specialization”, “academic surgery” and “surgeon scientist” with a training period of 6 years, 7-9 years and 10-11 years respectively. Applying these concepts and philosophies to Indian setup, we propose a new two tire syste of PST [Figure 2].

Level 1 training

Fresh medical graduates should first be trained in lower level skills for 3 years and a separate degree of M.S basic pediatric surgery (BPS) is to be awarded. General principles of surgery and pediatric care along with undemanding operations in various organ systems must

\textbf{Table 2: Examples of varying skill-needs grouped under ‘pediatric surgery’}

<table>
<thead>
<tr>
<th>Age group</th>
<th>Low-level skills</th>
<th>High-level skill</th>
</tr>
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<tbody>
<tr>
<td>Newborn period</td>
<td>Colostomy, Pyloromyotomy, Herniotomy, Reduction of intussusceptions, Orchidopexy, Biopsy of lymph nodes, Appendicectomy, Diagnostic laparoscopy, Excision of fibro-adenoma, Ligation of varicocele</td>
<td>Repair of tracheo-esophageal fistula, Repair of meningo-myelocele, Posterior sagittal anorectoplasty, Repair of cleft lip/palate, Hypospadiac urethroplasty, Ureteric re-implantation for reflux, Augmentation cystoplasty, Splenorrhaphy for ruptured spleen, Renal transplantation, Genitoplasty or vaginoplasty</td>
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<tr>
<td>Infancy</td>
<td></td>
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<tr>
<td>Pre-school age</td>
<td></td>
<td></td>
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<tr>
<td>School age</td>
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<tr>
<td>Adolescence</td>
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\textbf{Figure 2: New scheme of pediatric surgical training}

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be taught to these candidates. During this 3-year-period a student’s dexterity to operate upon small babies can be adequately assessed. Candidates found to have no aptitude for higher training may be encouraged to practice as basic pediatric surgeons. As they are going to practice only lower level skills, sophisticated equipments are not necessary and they will be able to do justice even in remote villages.

These basic pediatric surgeons will develop nexus with local pediatricians and family physicians on one hand and advanced pediatric surgeons on the other hand. They will treat simple problems themselves. They will also tide over emergency crisis of complex problems by temporizing measures (such as colostomy for imperforate anus) before referring to special centers. Thus specialist referrals are restricted and optimized. Economic burden of unnecessary journey to apex institutions and hazards of transporting a critically ill baby are circumvented by this model. We prefer to call this pattern of referral as “cart wheel model” [Figure 3]. Although some of these basic pediatric surgeons may trespass their limitations, it is more endurable than that of by adult surgeons.

All institutions recognized for postgraduate studies may conduct BPS courses there by producing adequate manpower. At present, pediatric surgery is not taught to medical students on the pretext of it being a “super specialty”. Demoting the lower level skills of pediatric surgery from super specialty status will necessitate it to be included in undergraduate curriculum. This not only enhances the job opportunities of pediatric surgeons in teaching institutions but also creates awareness about the surgical needs of children among the medical graduates.

Level 2 training
Outstanding basic pediatric surgeons may be chosen for further training in high-level skills [Figure 2]. This training may last for 3 years and at the completion of it, a distinct degree of M.Ch advanced pediatric surgery (APS) is to be conferred. These advanced pediatric surgeons should practice only in selected centers where there are facilities to exercise their refined talents. Competition among these advanced pediatric surgeons will lead to undesirable dilution of their skills. Therefore, contrary to BPS, annual output of APS trainees must be restricted by manpower estimations as it is done in the West.

Scientific research methodology should be an integral component of level 2 training. In the existing system, students submit dissertation during AGS training but not during PST. Research expositions presented in AGS (e.g., carcinoma breast) will be of no use once the candidate becomes a pediatric surgeon. Contrastingly, if they write thesis during APS training on any one disease, it would mean “micro specialization in mono pathology” without prolonging the training period.

Tissue specialization versus comprehensive training at level 2
There may be considerable disagreement on deciding the curriculum of level 2 PST. As tissue or organ specialization is in vogue for several centuries it seems appealing at the first look. Obviously the training period is lavishly adequate to learn a small set of complex skills in a particular organ and the surgeon’s attention is not distracted by several different pathologies in multifarious anatomical regions. However, tissue specialization is unsuitable for pediatric surgery in general and Indian setup in particular.

Tissue specialization is appropriate in adult context because, most often, only one organ system is affected at any one time by acquired disease. However, in children surgical lesions (such as congenital anomalies and polytrauma) frequently occur simultaneously in more than one organ system. For example, a child with VACTERL anomaly requires the services of thoracic, orthopedic, cardiac, plastic, urological, and colorectal surgeons. Although a team work of these various specialists is theoretically possible, it seldom works out in practice. Comprehensive care by a single person, as emphasized by Robert Gross and Denis Browne, enhances the effectiveness of planning and execution. This is exemplified in the field of polytrauma which is why it is now emerging as a new specialty even in adults. Involving many specialists is also going to increase the cost of health care which is undesirable in developing countries like India. Even Americans, being unable to contain the cost of health care, progressively emphasize on generalization. It is for this reason Rotterdam
resolution of 1973 and statement DS747 of UEMS[16] insisted that pediatric surgeons should provide total care of children irrespective of anatomical boundaries.

If tissue specialization is employed at level 2 training, then there will be at least 11 new subspecialties [Figure 2]. It is unimaginable that the Government of India, in its present economic position, will approve establishment of so many new chairs in each referral center. Some of these specialists, such as pediatric organ transplant surgeons, may not have adequate opportunities to practice their skills in the existing Indian scenario.

CONCLUSION

Although this article outlines the principles of the proposed new training system, there are several issues that need to be addressed before implementing this system. First of all a list of lower and higher level skills has to be prepared. Secondly, it is to be clarified whether orthopedic and cardiac surgeries are going to be included at level 2 training. Finally, manpower requirements of basic and advanced pediatric surgeons must be estimated. Probably a special task force of IAPS (Indian Association of Pediatric Surgeons) is the correct body to undertake resolving them.

REFERENCES

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23. McDonald P. Commentary on “Where should pediatric surgery be performed?” Arch Dis Child 1998;79:70-1.

The views expressed in this article are solely the authors’. These views have neither been endorsed nor discussed by either the Indian Association of Pediatric Surgeons or any organization/body which sanctions/monitors medical education in India. A very inadequate reference has been made to the direct M.Ch. course at AIIMS, New Delhi. This course is actually a 6 years course in which the candidate is a junior resident for 3 years (during which he/she rotates through general surgery, neurosurgery, orthopedics and emergency medicine) and a senior resident for the next 3 years (during which he/she rotates through pediatric medicine, neonatology and pediatric intensive care). It may also be noted that all the candidates who have gone through this 6 years course have proved to be competent pediatric surgeons.

- Editor