

EDITORIAL VIEW

Establishing a congenital cardiac anesthesia service: challenges in a developing country

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ABSTRACT

Congenital heart disease is the commonest congenital birth defect seen in low and middle income countries and definitive care requires highly sophisticated equipment, drugs, and above all a specially trained professional teams. Financially viable and sustainable congenital heart programs are a big challenge in these countries although examples of creative solutions do exist.

Major challenges in establishing services are training, team building and staff retention. There is a lack of recognized fellowship programs as well as centers for training. Investment in a structured program is a cost effective solution for capacity building. One solution is to locate congenital cardiac service in a few strategic centers, with facilities of transport and accommodation which can then serve as recognized training centers. And which may cater to a number of peripheral referring centers.

Cost containment strategies such as clinical protocols and checklists, economical alternatives for expensive drugs, minimization of blood and blood product transfusion, prevention of infection, efficient turnover time, and fast track extubation to reduce ICU and hospital length of stay are important for cost effective care.

Key words: Congenital cardiac anesthesia; Education; Education, Professional; Training programs; Financial Management, Hospital; Financial Management; Program Sustainability

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Congenital heart disease is the most common congenital birth defect and the burden of disease is significant at a global scale. In a review of 35 publications, Bernier et al reported an incidence of 1.2 to 17 per 1,000 births, which is approximately one million patients annually.¹ A large part of this patient population remains underserved in low and middle income countries. The main reason being inability of the large majority of the population to afford healthcare in the private sector; public sector hospitals being underfunded for a material and manpower intensive infrastructure necessary for care of this unique subset of patients.^{2,3}

'Congenital Cardiac Anesthesia Service' is

necessarily a collaborative and integrated part of a multidisciplinary service structure in physical proximity, consisting of cardiology, cardiac surgery, operating rooms, cardiac intensive care unit, catheterization laboratory, magnetic resonance imaging suites and perioperative echocardiography services. Additional essential support services required are easily accessible pathological laboratory, radiology, blood bank, and ECMO service. Anesthesia service needs to be supported by adequate staffing, space, monitoring and equipment for appropriate cost effective post procedure care, which might range from same day discharge to highly sophisticated intensive care of

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variable duration.

Technological advancement in anesthesia care has progressed from administration of cyclopropane through a face mask held by a nurse for simple ligation of an uncomplicated patent ductus arteriosus in 1938. Present day perioperative care is highly sophisticated and caters for complex, staged intracardiac repairs on cardiopulmonary bypass, procedures requiring deep hypothermic circulatory arrest as well as heart transplants, in a diverse age group ranging from preterm babies to surviving adults. Versatile anesthesia techniques have to be tailored for these high risk patients for diagnostic imaging and interventional procedures in the cardiac catheterization laboratory and MRI suite.

Age appropriate anesthesia equipment, drugs and essential monitors in operating room (OR) and outside OR for congenital cardiac anesthesia are a costly affair. Creative solutions for long term financial support for the congenital heart program are the highest priority in developing countries because of limited government support. Healthcare in India, Guatemala, Nicaragua, China, Vietnam and Brazil are some of the examples of innovative financial models to supplement government resources.^{3,4} These models have to be improvised in the social, cultural and political context of each country. Some examples are funds from endowments by local and overseas philanthropists, CSR sector of industry, social security schemes, innovative health insurance schemes, donations from affording patients, payments scaled to the ability to pay from less affording patients, NGOs, and in our own context annual zakat funds. An effective marketing strategy is the key to sustain the flow of these resources.

In addition to advanced training in cognitive and psychomotor skills, developing shared mental models and strong nontechnical skills for effective communication and teamwork is pivotal to deliver comprehensive anesthesia care for patients with congenital heart disease.^{5,6}

It follows that team consistency is also an important requirement for this subspecialty. One of the major challenges in low income countries, including Pakistan, is shortage of highly trained subspecialists; staff retention is a problem for multiple reasons, primarily related to financial and social security, and availability of more thriving areas of anesthesia practice.⁴ This is a factor disrupting team building and needs to be addressed actively.

Professional growth incentives for retaining adequately trained anesthesiology teams and attracting high caliber trainees are important to provide an adequately staffed service. It is important to create awareness through seminars and dedicated sessions in anesthesia conferences, as the need for a dedicated subspecialty training in congenital cardiac anesthesia is as yet under recognized all over the world, especially in developing countries.

There are currently no formal training guidelines or certification processes. Unstructured training by the apprenticeship model occurs with exposure to congenital cardiac patients during training for either adult cardiothoracic anesthesia or pediatric anesthesia.

The Congenital Cardiac Anesthesia Society set up a task force in 2008 to address the need for dedicated anesthesia training similar to training in other subspecialties of Congenital Heart Disease. The recommendations of this task force were published in 2010.⁷ This training guideline recommends basic training in anesthesia supplemented by a one or two years fellowship in pediatric anesthesia or adult cardiac anesthesia, followed by an elective time of one year in a recognized high volume congenital cardiac center with a structured program of didactic teaching and rotations in all departments.

Training abroad is expensive for candidates of developing countries. Investment in local structured and standardized training programs can ensure availability of high quality anesthesiology teams to meet the demands of a growing service.⁸

One of the skills receiving emphasis in the anesthesiologists' armamentarium is perioperative echocardiography because of their continued availability and presence in OR.⁷ It removes dependence on cardiologists and sonographers to assess adequacy of repair and improves OR time utilization. Availability of equipment and training opportunities need to be addressed locally to save cost and build professional expertise.

To maximize resource allocation, manpower, training programs, continuing professional development and staff retention the professional societies of leading countries recommend care of congenital heart disease patients to be concentrated in few strategically placed centers catering to a number of referring centers with facilities of transport and accommodation.^{8,9} There is increasing recognition of volume outcome relationship in congenital cardiac surgery and minimum numbers of procedures per center to minimize mortality

and morbidity.⁶ Such centers can be accredited by professional societies for recognized training in anesthesia.

Cost containment strategies are important for efficient utilization of limited manpower and consumables. Implementation of clinical protocols and checklists, economical alternatives for expensive drugs, minimization of blood and product transfusion, prevention of infection, efficient turnover time, and fast track extubation to reduce ICU and hospital length of stay are essential quality assurance tools for cost effective care.³⁻⁵ These need to be addressed by professional societies at the national level.

To summarize, the challenges in establishing

congenital cardiac anesthesia services in developing countries are primarily related to service infrastructure, long term sustainable financial support for maintenance of a standardized integrated service, focus on cost containment strategies, availability of adequately trained professionals, structured training programs, and development of regional high volume centers with a referral network, team building and staff retention.

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