Setting Up of Pediatric Trauma Care in India

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ABSTRACT

Pediatric trauma is a significant cause of mortality and disability, being responsible for more deaths than all diseases combined. The burden of child injuries in India is not clearly known. Timely recognition and intervention starting from the scene of injury and continuing during transport to care to pediatric trauma centre has decreased mortality rate by 25%. Over the years, the number of trauma Centres have increased with adequately equipped units but still care remains inadequate at multiple levels.

The essential components for improving pediatric trauma care system in India are – (1) Setting up protocols for triage, quality transfer of pediatric trauma patients, ensuring adequate supply of equipment, appropriate utilization of available resources, implementation of basic quality improvement programmes like medical audit and continuous evaluation of quality of care by trauma system administration. (2) Effective linkage of major trauma centers in cities to each other and to liaison strong referral system between these tertiary level urban set-ups with rural territories where even basic trauma care is lacking (3) Encouraging staff with more experience in trauma care to work in such hospitals and continuing educational courses on trauma care for medical and paramedical personnel. Pediatric trauma is by and large a preventable condition. Therefore, injury prevention should be a priority.

Keywords: Pediatric Trauma, Trauma burden in India, Pediatric trauma care center

Introduction

Trauma is emerging as an epidemic and has become a leading cause of morbidity and mortality in India.¹ In India, up to one-fourth of hospital admissions and approximately 15% of deaths in children are reported to be due to injury.² As per National Crime Record Bureau report of 2006 there were 22,766 deaths (<14yrs of age) due to injuries among children.³ According to the World Report on Child Injury Prevention in 2008 published by the WHO and UNICEF, injury and death in a child is a major public health problem requiring urgent attention. The report projects it to be the number one disease by 2020.⁴

The WHO estimates injuries as a cause of death in one million children per year.⁵ In India, for every death, 30–40 children are hospitalized and discharged with varying level of disability. Road traffic incidents (RTI) are the leading cause of death and hospitalization, with a higher level in male children (79%) in the 14 to 18-year age group (33%) and domestic falls being the second leading cause for injury and hospitalization among children.⁶ The burden of child injuries in India still remains unclear, as there is a lack of proper trauma database in India and even in Indian studies the population covered are mostly from metro city based.

Need For a Pediatric Trauma Center

Care at trauma center lowers risk of death by 25 percent compared to that in non-trauma centres.¹ Children cared at Pediatric trauma center (PTC) have a lower mortality and shorter lengths of stay in hospital compared to children cared for at adult trauma centres. It has been shown that younger and those who are seriously injured have better outcomes at a trauma center within a children's hospital or at a trauma center that integrates pediatric and adult trauma services (ATC).⁸ The first PTCs appeared soon after adult centers, in the 1970s and 1980s. Today, trauma centers and integrated trauma systems are in place in many areas of the world; however, there are still too few PTCs to manage all major pediatric trauma cases. A PTC must meet all the essential criteria of an adult center, and it must also have the following:² (fig1)

- A pediatric trauma service directed by a Pediatric Emergency physician
- Trauma surgeons credentialed for pediatric trauma care.

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Pediatric specialists in general surgery, emergency medicine, orthopaedics, neurosurgery, physical medicine & rehabilitation, anaesthesia, and critical care.

- A separate pediatric emergency room and intensive care unit.
- Pediatric resuscitation equipment in all patient-care areas.
- Laboratory, blood bank and imaging facilities
- Pediatric specific quality assurance and performance improvement.

Pediatric trauma care is a fairly complex area, not just at a clinical level where doses and equipment sizes need to be accurately calibrated for weight and age of the child, but also the practical aspects of dealing a pediatric patient on the field and in the hospital.

Clinical care of pediatric patients is a logistic challenge as it involves duplication of equipment, separate pieces of pediatric sizes, charts indicating pediatric dosages of emergency drugs etc. Immobilization and transport of the conscious pediatric patient is also often very difficult to manage and they on most occasions need parent or a care-taker to be beside them. Children are also prone to more severe injuries than adults, not only because they are often passive and helpless recipients of trauma especially during accidents, but also because their delicate bodies and experimental approach towards their surroundings can turn the most routine objects into potential causes of injury. However, unfortunately most of the children worldwide are not treated at PTC or ATC with added qualification due to limited availability of such centers. These limitations create persistent disparities in outcomes of injured children depending on where they are treated. There is, hence, overall a much greater need to develop specific set of protocols for pediatric trauma care, which will come under the purview of pediatric emergency care.

Status in Developing Countries

It is not as if the development of trauma care centers in India has significantly lagged compared to global standards. Over the years, the number of trauma Centers has increased with adequately equipped units distributed in different corners of the country based in and around major cities. There are two major weak links in the trauma-care setup in the country: First, the absence of effective linkage of these major trauma centers in cities to each other and to similarly competent prehospital trauma stabilization networks and second, the total disconnect of these tertiary level urban set-ups from rural territories where even basic trauma care is lacking. Most hospitals in the rural areas get a huge number of casualties, yet these areas are often staffed with doctors and nurses with no specific training in trauma care. Inexpensive but effective solutions to such problems include country-wide plans to encourage those staff with more experience in trauma care to work in such hospitals and provision of continuing education courses on trauma care for such medical personnel in high-volume trauma hospitals. Thus, India especially faces major challenges in injury prevention, prehospital care, and rehabilitation of residual disabilities within the demographic segment.

Essential Elements in Setting up Of a Pediatric
Symposium

Trauma Care Center in India

The concept of a dedicated Children's Hospitals is just taking shape in India. Most hospitals have only a department of pediatrics, and many hospitals have graduated to having pediatric intensive care units. However, immense work needs to be done in order to improve the pediatric emergency care services. In India, the development of pediatric emergency will involve a change in attitudes, sensitivity and preparedness to deal with pediatric emergencies. It is not so difficult, as Pediatricians have already made headway into pediatric critical care and neonatology, so the super specialty in pediatric EM is a possibility in the near future. As a part of Postgraduate training both pediatric and emergency PG students get experience in taking care of pediatric emergency patients but as a discipline, pediatric EM is a separate super-specialty field across the world.

The Pediatric Emergency department in itself akin to a miniature hospital dealing with acute pediatric emergencies round-the-clock. The workings, and thus the quality of care delivered in the emergency department largely determine the outcome of these patients. Hence, It is crucial to set up standard operating protocols wherever possible and develop an individualized accreditation program and board for the ED that would lay down standards and performance evaluation for quality.

In India, conventionally, injury victims are given a choice after initial stabilization to transfer to government hospitals, private hospitals, and institutions. In government sector hospital the quality of services is not homogeneous, so the ultimate outcome of the patient is vulnerable. Private sector hospitals are equipped with modern devices but the cost of the services sometimes hinders people from getting care. Tertiary care teaching hospitals provide a reasonable level of emergency care. The concept of public–private partnership (PPP) blends best of both worlds, where government and private enterprises successfully work together for primary health care delivery in India. Emergency Management and Research Institute (EMRI), a PPP model, provides prehospital emergency care free of cost with the creation of a single emergency toll free number, '108' with a network of hospitals that are cooperating to stabilize the patient free of charge.

Improvement in the outcome of trauma patients will come from improvements in the organization of trauma care services in the form of developing trauma systems in given geographical areas. The organisation of trauma system has four impact pillars: organization of pre-hospital care facilities, hospital networking, communication systems, and organization of inpatient-hospital care (acute care and definitive care). Proper organization of these systems reduces the time between injury and the definitive treatment and hence reduce morbidity and mortality. In India, such a trauma system is almost non-existent and even if present in some urban areas, lacks the cohesive effort required.

Developing a Trauma care center as a part of trauma system

Well-organized trauma systems have decreased mortality among treated trauma patients by 15%–20% and decreased medically preventable deaths by 50% in High Income countries (HIC). Trauma care in Low and Middle Income countries (LMICs) like India have not been well established and according to an estimate nearly 2 million lives could be saved each year if these countries were to have the same level of trauma care as the developed world.

Every trauma care center at the level of community health centers or district hospitals may not have resources to care for all injured children at any given time, so they should identify a closest tertiary referral center where severely injured children may be effectively transported. The referral center should have physical infrastructure in terms of emergency room, inpatient wards, operation theatres, intensive care unit and blood bank facilities. A designated pediatric trauma team and specialty services for managing polytrauma are essential. Neurosurgeons and rehabilitative nursing staff are important and a radiographer should be available on a 24/7 basis. Data reveals that availability of beds in PICU within a region may improve survival in pediatric trauma. A well-equipped and staffed pediatric intensive care unit (PICU) is an essential component of a pediatric trauma center. Pediatric critical care specialists, surgeons, and anaesthesiologists who work together and are trained in the care of the injured child are needed for optimal care of severely injured and unstable patients.
The nationwide ability to provide around-the-clock trauma care may be in peril because of shortage of physician workforce. The critical needs of the victim requires well-trained clinical and para-clinical staff at all facets of the Emergency department. We must focus to have these skill-based training programs at repeated interval for doctors as well as paramedics, to ensure continuous improvement of skillset and maintain consistency of performance. ITLS (International trauma life support) is available for paramedic 2 days recognised by American college of emergency physicians and ATLS (Advanced trauma life support) is for doctors- physicians, surgeons and orthopedicians. It is imperative that such efforts are conducted in the spirit of multi-disciplinary collaborative framework, with the best-trained physicians in their respective specialties, starting with the EM experts, and culminating with rehabilitation medicine specialist.

Most of the physical resources for in-hospital care in terms of infrastructure and equipment are already available at secondary and tertiary care hospitals and needs to be upgraded. Equipment and supplies should be available to all who need them, without considering their ability to pay, especially in life-threatening emergencies. It also implies not only having them physically present in the facility but having them readily available on an ongoing basis. In addition to assuring adequate supplies, improved administration could also assist in appropriate utilization. Implementation of basic quality improvement programmes (medical audit) can be a possible way of addressing problems in trauma care.

The quality of care that is provided within the system should be continuously evaluated by the trauma system administration through performance-
improvement processes. Outcomes for pediatric trauma patients should be compared with available benchmarks, and information should be shared with specific providers so that an optimal environment for quality improvement in pediatric trauma care is promoted. Trauma care review is facilitated by a comprehensive trauma registry and this is tied with national databases so that outcomes can be benchmarked for improved quality of care21. Pediatric trauma center personnel should be aware of need for reporting child abuse and neglect. For management of such cases, cooperation and collaboration with hospital-based child protection teams are essential22.

Conclusion
In summary, this article focusses on magnitude of the problem and the role of a pediatric trauma care centre in improving patient outcome. The development of the advanced specialty of Pediatric Emergency Medicine and creation of specialty pediatric emergency trauma centers should be done on a war footing. Care of children is a specialized field and its needs special attention as children are not small adults and physiology and pathology varies. Furthermore, trauma in children dramatically affects the economy because of expenses for medical care and rehabilitation and costs related to the inability of the children to function independently in society. Holistic trauma care that reduces morbidity, mortality and disability are essential. To begin with the emphasis should be on up gradation of the existing infrastructure and mechanisms for knowledge and skill retention and continuous evaluation of performance are crucial. Timely referral to the network of hospitals providing optimum trauma services with legislative backup will be the building blocks of an essential trauma care system. The Indian government has to recognize traumatic injury as an important health and development issue and intensify support for both prevention and system-wide response.

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