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Original article

Are falls more common than road traffic accidents in pediatric trauma? Experience from a Level 1 trauma centre in New Delhi, India

Annu Babu, Amulya Rattan, Piyush Ranjan, Maneesh Singhal, Amit Gupta, Subodh Kumar, Biplab Mishra, Sushma Sagar*

JPN Apex Trauma Centre, New Delhi 110029, India

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ABSTRACT

Purpose: The epidemiology of pediatric trauma is different in different parts of the world. Some researchers suggest falls as the most common mechanism, whereas others report road traffic accidents (RTAs) as the most common cause. The aim of this study is to find out the leading cause of pediatric admissions in Trauma Surgery in New Delhi, India.

Methods: Inpatient data from January 2012 to September 2014 was searched retrospectively in Jai Prakash Narayan Apex Trauma Centre Trauma Registry. All patients aged 18 years or less on index presentation admitted to surgical ward/ICU or later taken transfer by the Department of Trauma Surgery were included. Data were retrieved in predesigned proformas. Information thus compiled was coded in unique alphanumeric codes for each variable and subjected to statistical analysis using SPSS version 21.

Results: We had 300 patients over a 33 month period. Among them, 236 (78.6%) were males and 64 (21.3%) females. Overall the predominant cause was RTAs in 132 (43%) patients. On subgroup analysis of up to 12 years age group ($n = 147$), the most common cause was found to be RTAs again. However, falls showed an incremental upward trend (36.05% in up to 12 age group versus 27% overall), catching up with RTAs (44.89%). Pediatric Trauma Score (PTS) ranged from 0 to 12 with a mean of 8.12 ± 2.022. 223 (74.33%) patients experienced trauma limited to one anatomic region only, whereas 77 (25.66%) patients suffered polytrauma. 288 patients were discharged to home care. Overall, 12 patients expired in the cohort. Median hospital stay was 6 days (range 1–182).

Conclusion: Pediatric trauma is becoming a cause of increasing concern, especially in the developing countries. The leading cause of admissions in Trauma Surgery is RTAs (43%) as compared to falls from height (27%); however, falls from height are showing an increasing trend as we move to younger age groups. Enhancing road safety alone may not be a lasting solution for prevention of pediatric trauma and local injury patterns must be taken into account when formulating policies to address this unique challenge.

Introduction

Though the principles of pediatric trauma management are similar to adults, anatomical peculiarities and differences in physiological reserve confer additional responsibilities on the treating doctor for an optimal outcome.[1,2] Pediatric survival is also one of the health performance indicators for a nation.[3] The problem of pediatric trauma has been studied in different parts of the world, and it is clear that epidemiology and hence effective prevention strategies differ geographically.[1,2,4–6] Therefore, it is very important to delineate a problem statement for our own region when gearing up to tackle this menace. Whereas some researchers suggest falls as the most common mechanism, others report road traffic accidents (RTAs) as the most common cause. The aim of this study is to find out the leading cause of pediatric admissions in Trauma Surgery in New Delhi, India.

Materials and methods

JPN Apex Trauma Centre is the premier Level 1 trauma centre in the Indian subcontinent. Each year, more than 60,000 patients are

* Corresponding author. Tel.: +91 98 91510122.
E-mail address: sagar.sushma@gmail.com (S. Sagar).

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evaluated catering to a population of around 10 million of New Delhi. All index admission records, investigations and follow-up records are traceable from a single Unique Identification Number, greatly facilitating research activities on a large prospectively maintained database.

We searched inpatient data from January 2012 to September 2014 retrospectively in our Trauma Registry. All patients aged 18 years or less on index presentation, admitted to surgical ward/ICU or later taken transfer by Department of Trauma Surgery were included. Patients who primarily received neurosurgical or orthopedic care and remained admitted in respective wards were not included. Pediatric trauma patients found stable on workup yet requiring admission for observation/treatment appropriate for a Level 2 trauma centre or Community Hospital, were transferred in accordance with pre-existing agreements in case of paucity of beds, and were not included in this study.

Applying above criteria, we had 300 patients over 33 months. Data were then retrieved from an electronic database into predesigned proformas with emphasis on epidemiology (age, gender, mechanism of trauma), primary survey and abnormalities and pattern of injury-isolated or polytrauma. Each patient record was individually reviewed. Data obtained were coded with ICD codes of trauma. Follow-up information of patients was as much retrieved as available in records. Patients lost to follow-up were not contacted by telephone/by post due to logistic reasons. Information thus compiled was coded in unique alphanumeric codes for each variable and subjected to statistical analysis using SPSS version 21.

Results

We had 300 pediatric patients admitted in Trauma Surgery during January 2012 to September 2014. Of these, 236 (78.6%) were males and 64 (21.3%) females. Almost half (147; 49%) of the patients were up to 12 years age and rest (153; 51%) were in >12–18 years age group. We had no infant pediatric trauma patient admission in trauma surgery in the aforementioned period. In adolescent age group, the mean age was (16.27 ± 1.74) years.

Mechanism of trauma

Overall the predominant cause was RTAs in 132 (43%) patients; falls accounted for 81 (27%) patients (Table 1). On subgroup analysis of up to 12 years age group ($n = 147$), the most common cause was found to be RTAs again. However, falls showed an incremental trend (36.05% in up to 12 age group versus 27% overall), catching up with RTAs (44.89%, Table 2).

Pediatric trauma score

Pediatric trauma score ranged from 0 to 12 with a mean of 8.12 ± 2.022.

Pattern of injury

A total of 223 (74.33%) patients experienced trauma limited to one system only, whereas 77 (25.66%) patients suffered polytrauma, i.e. more than one anatomical region affected.

Hospital stay

The median hospital stay was 6 days (range 1–182 days).

Table 1
Mechanism of trauma ($n = 300$).

Mechanism	*n* (%)
RTA	132 (43)
Railway track injury	6 (2)
Fall from height	81 (27)
Fall of object	6 (2)
Blunt assault	20 (6.66)
Gunshot	4 (1.33)
Stab injury	14 (4.66)
Self inflicted	8 (2.66)
Accidental/sports	7 (2.33)
Animal injury	3 (1)
Foreign body ingestion	2 (0.66)
Machine injury	14 (4.66)
Blast injury	2 (0.66)
Electrocution	1 (0.33)

Table 2
Mechanism of trauma in >12 yrs age group ($n = 147$).

Mechanism	*n* (%)
RTA	66 (44.89)
Railway track injury	2 (1.36)
Fall from height	53 (36.05)
Fall of object	3 (2.04)
Blunt assault	6 (4.08)
Gunshot	1 (0.68)
Accidental/sports	7 (4.76)
Foreign body ingestion	1 (0.68)
Machine injury	6 (4.08)
Blast injury	1 (0.68)
Electrocution	1 (0.68)

Outcome

In this series, 288 patients were discharged to home care finally. Twelve patients expired in the cohort, in whom, 4 patients died from hemorrhagic shock, 4 from sepsis, 3 from multi organ dysfunction and 1 patient of electrocution died from arrhythmia.

Discussion

In contrast to the reductions in childhood mortality from trauma by up to 50% in high-income countries (HICs) between 1970 and 1995, the burden and pattern of childhood injuries are just now being studied in low and middle income countries (LMICs).[4] Though malnutrition and infections are still the leading causes of mortality in LMICs,[7,8] traumatic deaths are also five times higher than industrial nations.[7] There are many studies reporting epidemiology of pediatric trauma in nations with dedicated trauma registries.[9,10] However, countries with trauma systems in infancy of development are still not able to report and analyze pediatric trauma data in appropriate number.[11] Our study, involved trauma surgery data over 33 months from a Level 1 Trauma Center, hence, would help in addressing the mode of injury of pediatric trauma in the region.

Male to female ratio was 3.6:1 in our study. Almost half of the patients were up to 12 years age and the rest belonged to 12–18 years age group. No infant was seen in our study. A previous study from same institute addressing the issue of pediatric extremity vascular trauma has found the M/F of 1 in 0–5 years age group.[12] Infant proportion of just 2% has been reported in a large multinational study of 1600 pediatric trauma patients, supporting lack of any infant in our cohort of 300 patients.[8]

Prevalence of trauma in childhood admissions has been reported from 5.5% to 19.23%,[13] in Indian studies[14] as well as LMICs abroad.[15–17] All reports confirm a majority affliction of boys than girls, M/F ratio of 1.5–3,[18] the most common age group being 6–12