

Prevalence, distribution and pattern of childhood soft tissue and visceral trauma in a tertiary care hospital: A record-based cross-sectional study

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ABSTRACT

Background: Trauma is one of the major cause of morbidity and mortality in children. Incidence of injuries in below 14 year age group is on the rise and needs urgent application of preventive policies to ensure safer childhood.

Objective: To analyze retrospectively the distribution and pattern of childhood trauma cases in hospital setting.

Methods: All trauma cases below 12 years, referred to pediatric surgery unit of a referral centre in south India were retrospectively studied. Study period was of 26 months, from October 2011 to November 2013. Parameters assessed were age, sex, mode of trauma, type of injury, and place of injury, time interval between injury and presentation, overall morbidity and the mortality. Out of total 2949 cases seen, 218 children had history of trauma. 194 cases were studied and 24 cases were excluded due to unavailability of all details in record. Injuries were grouped as trivial and major.

Results: Prevalence of injury was 6.57%. Male to female ratio was 2.3:1. Out of 194 children, school age group (5-12 years) was most commonly affected 84 (43.29%). Home (35.05%), school (28.35%) and roads (36.59%) were places for injury incident. Mean time of presentation to hospital was 7.55 hours (1-168 hours). Trivial injuries were 144 (74.22%) and major injuries were 50 (25.77%). 14 patients of major injuries underwent operative interventions. There was no mortality.

Conclusion: This study has revealed that home, roads and schools are all equally unsafe for children, so there is urgent need for application of preventive strategies and improvement of referrals to a specialized centre to avoid delay in management of major cases.

Key words: Trauma, childhood injury, traumatic diaphragmatic hernia, duodenal perforation, epidemiology

Introduction

In this era of rapid growth and urbanization, child safety at home and on the roads is getting jeopardized. Under 14 year population in India constitutes a major portion of 35.3% of total population. [1] National Crime Records Bureau (NCRB) in 2013 report mentioned that 6.1 % of

total accidental deaths were among children below 14 years. [2] Though exact burden of childhood injuries in India is not known, possibly due to incomplete reporting, a national review on burden of childhood injuries in India from ministry of health and family welfare in 2005 reported 8% deaths and 20-25% hospitalization due to injuries in children. [3] Incidence of injuries in below 14 year age group is on the rise and needs urgent application of preventive policies to ensure safer childhood. It is unfortunate that those efforts put to reduce under five year mortality and neonatal mortality from infection and malnourishments are getting jeopardized, as children saved from these problems are probably becoming victims of injuries. Our study is a retrospective analysis of

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distribution and pattern of childhood trauma cases in pediatric surgery unit of a referral institute.

Methods

The study design is retrospective record based. Out of 2949 children referred to pediatric surgery unit below 12 year age, seen in outdoor, inpatient and emergency department, 218 children had history of trauma. Study duration was of 26 months from October 2011 to November 2013. 194 cases were studied. 24 cases were excluded due to incomplete details. Parameters assessed were age, sex, mode of trauma, type of injury, place of injury, time interval between injury and presentation, overall morbidity and the mortality. Burns, isolated head injury, ophthalmic injuries, and isolated orthopedic injuries were not included as they were referred to respective departments. Injuries were grouped as trivial and major. Trivial injuries were those managed on outpatient basis in emergency department and not required any major surgical intervention. Major injuries were those requiring admission and surgical intervention or observation in intensive unit.

Results

Prevalence of injury noted was 6.57%. Male to female ratio was 2.3:1. Out of 194 cases, school age group (5-12 years) was most commonly affected group 84 (43.29%). Home 68 (35.05%) school 55 (28.35%) and roads 77 (36.59%) were places of injury. Mean time of presentation after injury was 7.55 hours (1-168 hours). Some major injuries like traumatic rupture of right diaphragm and pancreatic injury were referred as late as seven days. (Figure 1B, 2A, 2B, 2D) One case who had isolated duodenal injury following blunt trauma reported after 24 hours. (Figure 1A, 2C) Trivial injuries were 144 (74.22%) and major injuries were 50 (25.77%). 74 (51.38%) of trivial injuries were received while playing, 44 (30.55%) were fall from height and 26 (18.05%) were due to road traffic accidents. Among 50 children who received major injuries, 24 (48%) were due to road traffic accidents, 15 (30%) due to fall from height, 9 (18%) sustained injuries while playing and one patient each had pig bite and bull gore injury. 36 (72%) major injury cases were managed conservatively. 14 (28%) of major injury group required operative interventions. There was no mortality in the series. (Table 1)

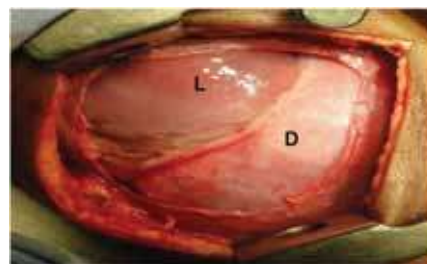


Fig. 1: Operative photograph showing traumatic rupture of the right hemi-diaphragm (D) with liver herniation (L).

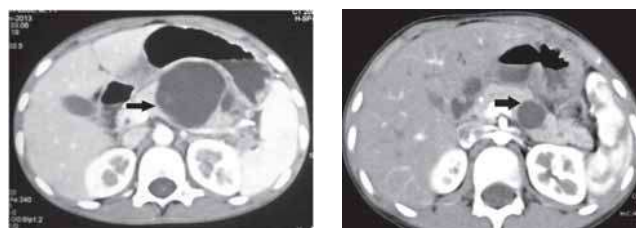


Fig. 2: Computed tomogram (axial section) of a 7-year-old boy who presented 7 days after handlebar injury to the abdomen. (A) On admission it showed a large (6×6 cm) acute fluid collection around the body of pancreas (arrow). (B) After 6 weeks of non-operative treatment considerable resolution occurred (arrow).

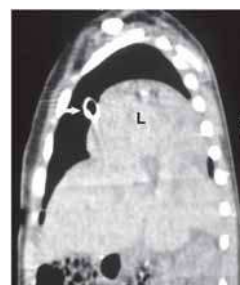


Figure 3: Contrast enhanced computed tomography (sagittal section) of thorax after insertion of intercostal tube (arrow) for mistaken pleural collection in plain radiograph. Radio-opacity seen in x-ray was in fact due to herniated liver (L) following diaphragmatic tear. The child was referred 7 days after the injury.

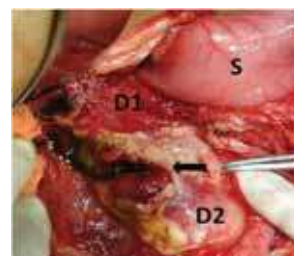


Figure 4: Operative image showing isolated perforation (arrow) of the second part of duodenum (D2). S-stomach; D1- first part of the duodenum



Figure 5: Contrast enhanced computed tomography (axial section) of the abdomen showing discontinuity of the lateral wall of duodenum (arrow), extravasation of contrast and few air pockets (bracket).

Table 1:**Demography of pediatric soft-tissue and visceral injuries**

Parameters	n	(%)
Age Distribution		
Neonates (0-30 days)	1	0.5
Infants (up t 1 year)	18	9.3
Toddlers (1-3 years)	57	29.4
Preschool (3-5 years)	34	17.5
School age (5-12 Years)	84	43.3
Place of injury		
Home	68	35.1
School	55	28.4
Road	71	36.6
Severity of injury		
Minor	144	74.2
Major	50	25.8
Mode of injury in minor cases (n=144)		
Playground	74	51.4
Fall from height	44	30.5
Road traffic accidents	26	18.1
Mode of injury in Major cases (n=50)		
Road traffic	24	48.0
Fall from height	15	30.0
Playground	09	18.0
Bull gore	01	2.0
Pig bite	01	2.0
Management of major cases		
Operative	14	28.0
Conservative	36	72.0
Mean delay in reaching tertiary-care hospital (hours)	7.55 hr (Range 1 - 168)	

Discussion

In our study prevalence of childhood trauma is 6.57 % . This prevalence however may not reflect true community prevalence as many patients either report to local clinics or may not even reach tertiary hospital due to lack of transportation or because of poor awareness for specialist child surgical services. On the spot death also may not be reflected in departmental records. Singhi et al reported prevalence of 5.5% which is comparable with this series. [4] Some series from developing countries have reported much higher prevalence of 12.96%, 15.1% and 19.2%. [5-7] This may be attributed to inclusion of orthopedic, burns, ophthalmic and head injuries which was not included in our series.

The male to female distribution in our study was 2.3:1. Studies in last two decades from Singapore and different major Indian cities have also shown that injuries are more common in boys. [5-8] Mean age in our study was 5.2 years. School going age group of 5-12 years was most commonly affected. Some population based studies have also reported similar high incidence in school going age group. [9] Verma et al in a prospective study of 225 children reported school age of 6-12 years as most common group affected with mean age of 6.14 years. [10] High incidences at this age may be attributed to their attitude of impulsiveness along with increase in outdoor activities.

In our study, incidence of injuries was almost equal at home, roads and while playing in school. Most common mode of trivial injuries was while playing at home. But home related injuries were also serious like one child who was reportedly crushed after fall from stairs by the person who carried him. Most common mode of major injury in our study was road traffic accident. Cases of injuries while reversing a vehicle at home were also recorded. In schools, injury received while playing on slides and swings were most common. These may be attributed to improper execution of standard safety protocols like lack of proper space, inadequate supervision, and poor maintenance of equipment. One child with scrotal hematoma was actually beaten with wooden stick by teacher Sharma M et al and Sharma AK et al have reported home as the most common place of injury. [5-9] Injuries received as road traffic accidents were second in order. [9-10] In our study all three places are almost equally unsafe.

Children with major injury requiring admission and intensive unit care underwent either surgical intervention or required skillful suturing. Interventions required in major group included exploratory laparotomy with splenectomy, nephrectomy, duodenal perforation repair, liver tear repair, traumatic diaphragmatic hernia repair (28.57%), thoracotomy (7%), scrotal exploration (7%), intercostal drainage (7%) and major suturing (42.85%). Majority of injuries in this study were trivial in nature. These included lacerations, friction abrasion over extremities and face, blunt injury to abdomen or chest with no internal organ involvement. Also, most of major injuries in our study were managed expectantly.

There was no mortality related to trauma in our series. This is possibly due to a relatively smaller sample size and more number of trivial cases in our study. Delmira et al in a prospective study of 335 cases also reported zero mortality in their series. [11] Studies have shown that head injuries and burns are the leading causes of death due to injury in developing countries.¹² These two

diagnosis, however were excluded from our study. One prospective study of 1281 cases from Tehran reported mortality of 2.26% with road traffic accidents as major cause. [6]

This study however has limitations. It is a hospital data based study, thus it may not reflect exact incidence pattern of trauma in community for which a prospective population based study with larger sample size shall be more accurate. Also since we have excluded burns, head injury and isolated orthopedic injuries, the exact burden of trauma in hospital setting may not be reflected.

We suggest that referral pattern needs to be streamlined by education at primary and district level hospitals to reduce the delay in reaching a tertiary care center. School management should also be regularly updated by medical fraternity about application of standard safety measures. Majority of the pediatric trauma at home, school or on roads are possibly preventable. Preventive strategies are needed along with their practical execution to provide safety to children at home and on roads. Supervision by adults at home and on roads seems lacking and houses are not protected to prevent falls. We therefore recommend that adults need to supervise the children at home and in playgrounds. Parents especially on two wheelers should drive responsibly on roads when child is on board. They should also ensure that adequate child safety measures like metal grills in balcony, doors at staircase are in place. Children should be discouraged to fly kites from roof top.

We emphasize on the fact that development and urbanization should always be accompanied with increased knowledge and practice of safety for all individuals including children. We also suggest better coordinated political and social efforts to make our roads and home safe.

Conclusion

This study has revealed that home, roads and schools are all equally unsafe for children, so there is urgent need for application of preventive strategies and improvement of referrals to a specialized centre to avoid delay in management of major cases.

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