ORIGINAL ARTICLE

Pattern of Pediatric Trauma - An Analysis of Hospital Data at Sheikh Zayed Hospital, Rahim Yar Khan

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ABSTRACT

Objective: To identify the epidemiology, site of trauma, mechanism of trauma, hospital stay and outcome of trauma patients along with the role of pediatric trauma score in children.
Setting: Department of Pediatric Surgery Sheikh Zayed Medical College, Rahim Yar Khan.
Duration with dates: Ten (10) months (January -2012 to October-2012)
Study design: Analytical type
Methods: One hundred and five patients including neonates, infants, children and young adults up to 12 years of age presenting in emergency department due to trauma and fulfilling the inclusion criteria were included in the study. A comprehensive proforma was prepared.
Results: Out of 105 patients, 77(73.3%) were male and 28(26.7%) were female. Maximum number of patients 66(62.9%) were 5-12 years of age. Five neonates suffered from birth trauma and 27(25.7%) were 1-5 years of age. Most common cause of trauma was road side accident 43(41%). Other causes of injury were falls 22(21%), fire arm injury 9(8.6%), blunt trauma abdomen 8(7.6%), dog bite 6(5.71%), beaten by stick 5(4.76%), bamboo injury 5(4.76%), burns 4(3.80%) and fight 3(2.91%). Abdominal trauma was most common site of injury 33(31.4%) and explorative laparotomy was performed in 28(26.67%) cases. Pediatric trauma score was 9-12 in 75(71.4%) cases. Major surgery was performed in 37(35.2%) cases under general anesthesia and 76(72.4%) cases were cured without any morbidity. Mortality rate was 7.62% (n=8).
Conclusion: The mechanisms and number vary with age, gender, race, parental education, social class and economic status. Awareness of these variations can assist clinicians in the management of pediatric trauma victims. Analysis of these variations can also help us to develop ways of preventing childhood injuries from occurring in the first place.
Keywords: Blunt trauma abdomen, chest intubation, perineal trauma

INTRODUCTION

Trauma is the “Greek” word meaning for wound, damage and defeat. In medicine, trauma refers to a critical bodily injury, wound or shock that overwhelms the body’s natural defenses and requires medical assistance for healing. Similarly psychological trauma is a circumstance in which an event exceeds a person’s capacity to protect his or her psychic wellbeing and integrity. One hundred years ago, infections were the great scourge to children in our society. Today the problem is trauma. Changing social conditions, better housing and nutrition, immunization and quarantine of infectious cases all helped to reduce the threat from infectious diseases. Over the same time period, new environmental factors, notably the introduction of the automobiles and motorbikes, increased the risk of injury. Injuries are the leading threat to the health and wellbeing of young people in our society[1].

The likelihood of a child being fatally injured is associated with poor family socio-economical status, single parentage, low maternal education, young maternal age at birth, poor housing, large family size and parental abuse of alcohol and other drugs. A study from Newcastle, England, of fatal head injuries revealed that children from poor neighborhoods were at greater risk than were those from more affluent areas[2].

Children are not small adults. They differ from adults in several anatomic and physiologic considerations relevant to trauma care. Differences between children and adults with respect to pattern of injury, physiologic presentation and management are important. Infants and children have relatively large surface area and are thus prone to hypothermia.[(3)] Neonatal hypothermia has been documented throughout the developing world and is an important source of neonatal morbidity[4]. That is why

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hypothermia is one of the components of "lethal triad"[17]. The child's vital signs and circulating blood volume also vary with age. They have relatively large heads and are more likely to suffer head injuries. Similarly in the abdomen, the liver, spleen and kidneys are less well protected by the ribs in the children because the ribs are more pliable and these organs are less well covered by the ribs. Pediatric surgeons who treat injured children must recognize and understand these important distinctions so that the resuscitation process addresses the special needs of the child.

The minimal score is -6 and maximum score is +12. There is linear relationship between the decrease in PTS and the mortality risk i.e. lower the PTS and higher the mortality risk. Mortality is estimated 9% with a PTS >9 and 100% with a PTS <0[15].

We reviewed our experience regarding pediatric trauma in Rahim Yar Khan and attempted to define the incidence, mechanism of injury, site of trauma, treatment required, hospital stay and outcome of treatment in a tertiary care center.

PATIENTS AND METHODS

This analytical type study was carried out in pediatric surgery department, Sheikh Zayed Medical College/ Hospital Rahim Yar Khan, which is a tertiary care hospital of southern Punjab within ten months (January 2012 to October (2012). Total 105 cases of pediatric trauma were included in the study. Non probability convenience sampling technique was used. All neonates, infants and children up to 12 years of age admitted in pediatric surgery department due to trauma, were included in the study. Children more than 12 years and patients operated elsewhere due to trauma and referred due to surgery complications were excluded from study.

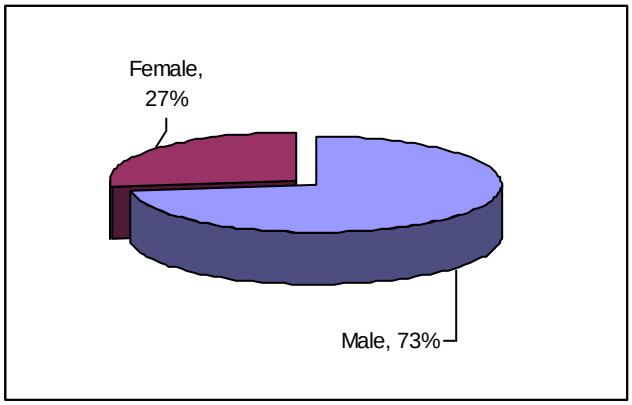
One hundred and five patients fulfilling the inclusion criteria were included in the study. A comprehensive Performa including demographics, mechanism of trauma, site of trauma, pediatric trauma score, treatment plan, duration of stay and outcome was prepared. All data was collected in this proforma and then analyzed by SPSS version 16.

Data was collected prospectively and included patient's demographics, mechanism of trauma, site of trauma, pediatric trauma score, management plan, hospital stay and outcome. Statistical analysis was carried out using SPSS version 16. Chi-square analysis was used to compare proportions between different groups. Student's t-test was used to evaluate differences between sample means. P-value of less than 0.05 was considered statistically significant.

RESULTS

The patients in the study were predominantly male. Out of 105 patients 77(73.3%) were male and 28(26.7%) were females.(Graph 1)

Graph 1: Gender distribution



Emphasizing the importance of body weight and airway diameter, pediatric trauma score (PTS) was used as shown in table below.

Component	+2	+1	-1
Weight	>20 kg	10-20 kg	<10 kg
Airway	Patent	Maintainable	Un-maintainable
Systolic BP Pulses	>90 Radial	50-90 carotid	<50 Non palpable
CNS	Awake	+LOC(responsive)	Unresponsive
Fractures	None	Closed or suspected	Multiple closed or open
wounds	None	Minor	Major, penetrating or burns> 10%

Five patients (4.8%) were neonate, seven(6.7%) were infants (one month to one year of age), twenty seven patients (25.7%) fall between 1-5 years and sixty six (62.9%)patients were between 5 to 12 years of age (Table 2) The mean age of the pediatric trauma patients was 8.6 years.

Table 2: Age of patients

Age	n=	%age
Neonates	05	4.8
1 month to 1 year	7	6.7
1 – 5 year	27	25.7
5-12 years	66	62.9

The most common cause of trauma was road side accident 43(41%), fall from height 22(21%), fire arm injury 9(8.6%) and blunt trauma abdomen 8(7.6%). Twenty three patients (21.9%) were admitted due to other etiologies like dog bite, beaten by stick, bamboo injury, burns and fight (Table 3).

Table 3: Mechanism of trauma

Etiology	n=	%age
Road side accident	43	41
Fall from height	22	21
Fire arm injury	9	8.6
Blunt trauma abdomen	8	7.6
Dog bite	6	5.71
Beaten by stick	5	4.76
Bamboo injury	5	4.76
Burns	4	3.80
Fight	3	2.91

Table 4: Site of trauma

Region involved	n=	%age
Abdominal trauma	33	31.4
Limb trauma	27	25.7
Thoracic trauma	17	16.2
Head and neck	11	10.5
Perineal trauma	10	9.5
Poly trauma	07	6.7

All patients were assessed by pediatric trauma score at the time of presentation in emergency.

Table 5: Pediatric trauma score

Pediatric Trauma Score	n=	%age
9-12	75	71.4
6-8	20	19
0-5	9	8.6
<0	1	1

All admitted patients were classified by treatment received as follows, conservative (no surgery required), minor surgery (laceration repair, chest tube placement and other procedures under local anesthesia) and major surgical procedures under general anesthesia (Table 6).

Table 6: Treatment received

Treatment	n=	%age
Conservative, no surgery	21	20
Minor surgery	47	44.8
Major surgery	37	35.2

Table 7: Hospital stay

Total stay	N=	%age
Less than three days	30	28.6
Less than 7 days	34	32.4
More than one week	24	22.9
More than two weeks	17	16.2

Table 8: Fate of patients

Fate/ outcome of patients	n=	%age
Cured without morbidity	76	72.4%
Cured after some morbidity	11	10.5
Expired	08	7.6%
Referred	04	3.8%
LAMA	04	3.8%
DOR	02	1.9%

DISCUSSION

Pediatric injuries are associated with significant morbidity and mortality in developing countries. Children have been subject to traumatic injury since the origin of man. Trauma steadfastly remains the primary cause of death in children, resulting in thousands of lost lives each year. Despite the magnitude of this burden, there is lack of data to characterize the etiology and risk factors associated with childhood injuries especially in low and middle income countries[5].

Total 481 pediatric surgical patients were seen in emergency department of Sheikh Zayed Hospital Rahim Yar Khan in first ten months of year 2012. About 105(21.83%) patients were admitted due to trauma. Out of 105 patients 77(73.3%) were male and 28(26.7%) were females.In another study conducted in Africa, incidence of trauma was more in males about 61.7%[5]. This is true in another study conducted for blunt hepatic trauma where male/female ratio was 2.5/1[6].

In our study, 66 trauma patients were between 5-12 years of age (62.9%) and 27(25.7%) were between 1-5 years of age. Trauma was relatively less common in neonates 5(4.8%) and infants 7(6.7%). The mean age of trauma was 6.5 years in our study. According to Shahrokh Chabok in 2012 mean age of trauma was 10.4 years[7].

Road side accident was the commonest cause of trauma in children 43(41%). Other causes of trauma were falls 22 (21%), fire arm injury 9 (8.6%), blunt abdominal trauma 8(7.6%), dog bite/bamboo injury 6(5.71%), burns 4(3.8%) and fight 3(2.91%). In another study conducted by Kibel, forty three percent of injuries were due to falls, bumps and blows 15%, transport 11% and burns 11%[8]. In our study relatively less number of falls is due to primary neurosurgical referral due to head trauma from main emergency department. According to Herbert HK, mechanism of injury included falls 39.8%, road traffic injuries 15.7%, burns 8.8% and assault 7.4%[5]. According to Benner A, more boys than girls presented with injury and road traffic accidents mainly occurred in children over 10 years[9].

Abdominal trauma was the most common site of injury in our study 33(31.4%).Other sites were limb trauma 27(25.7%), thoracic trauma 17(16.2%), head and neck injury 11(10.5%), perineal trauma 10(9.5%) and poly trauma 7(6.7%). The bony skeleton was the second most commonly injured organ system in our study as well as reported by Charles.[(16)] Major surgical procedures were performed mainly in abdomino-pelvic trauma while in thoracic trauma hemopneumothorax was the most common injury. Similarly in a study conducted by Chirdan LB in 2007, road traffic accidents accounted for 38(79.1%), falls

from height 9(18.75%) and abdominal trauma was seen in 63% cases[10].

Pediatric trauma score was calculated at the time of admission in order to know the severity of injury. About 75(71.4%) injured children fall between 9-12 trauma score. All admitted children were classified into three groups according to the treatment plan. 21(20%) children were managed conservatively in which no surgery was performed. 47(44.8%) injured children were managed by minor surgical procedures like laceration repair, chest tube placement under local anesthesia and incision & drainage of post traumatic abscess. Major surgeries were performed in 37(35.2%) children under general anesthesia and following major surgical procedures were performed.

Explorative laparotomy was performed due to blunt abdominal trauma, penetrating injury and fire arm injury. Total 32 injuries were noted in 26 laparotomies. Common injuries were jejunal and ileal perforations (13), ruptured spleen (3), colonic perforation(3), pancreatic injury with duodenal laceration(2), bladder injury with pelvic fracture(n=3) caecal perforation (1), grade 4 liver injury(2), renal injury associated with retroperitoneal hematoma (2), mesenteric hematoma (2) and gastric perforation with diaphragm rupture (1). Another study was conducted by Chirdan LB in 2008 in which 23 injuries were noted after 19 laparotomies and jejunoileal injuries were the most common type of injury[11]. Sites of perforation were stomach(2),jejunum(9), ileum (8), jejunum/ileum(2) and colon(2) in a study conducted by Sule AZ in 2007[12].

About 64(60.95%) patients were discharged within 7 days and 17(16.2%) were admitted for more than two weeks. Seventy six (72.4%) children were cured without morbidity, 11(10.5%) were cured after some morbidity, 8(7.61%) were expired, 4(3.8%) were referred to other hospitals, 4(3.8%) left hospital against medical advice (LAMA) and 2(1.90%) were discharged on request. Mortality was four (21.1%)[11], 8(14.5%)[13] and 5(27.8%)[14] in other studies.

These figures suggest that the primary care of injured children requires physicians with surgical expertise. Since prevention of traumatic injury is the key stone to solving the problem, increased awareness and education at all levels are essential.

CONCLUSION

Injuries are the leading risk to the lives and limbs of children from infancy through adolescence in our modern world. The mechanisms and number vary with age, gender, race, parental education, social class and economic status. Awareness of these variations can assist clinicians in the management of pediatric trauma victims. Analysis of these variations can also help us to develop ways of preventing childhood injuries from occurring in the first place. It is also hoped that advances in both prevention and treatment will reduce this toll.

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