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Original Article

Abdominal trauma in children: Experience from north-west region of Bangladesh

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Abstract

Background: Abdominal trauma is one of the most common causes of children's death and fatal injury. Due to advances in technology, available facilities, and improved trauma transport, the management of trauma victims becomes earlier and easier in developed countries. In underdeveloped and developing countries, it is difficult as early recognition, timely reaching to health facilities, and management initiation become delayed.

Objectives: This study was aimed at analyzing the mechanisms and causes, organ involvement, management, and outcome of childhood abdominal trauma in a tertiary centre in Bangladesh.

Methods: This was a retrospective review of children from 0 – 12 years admitted to the department of Paediatric Surgery, Rajshahi Medical College Hospital, Bangladesh, with blunt and penetrating abdominal injuries from January 2020 to December 2021. Children with blunt abdominal trauma with either solid or hollow viscus injury and penetrating trauma with peritoneal breach and/or organ injury were included. Injuries only to the abdominal wall without organ injury were excluded.

Results: 154 patients met the inclusion criteria with a 2.2:1 male-to-female ratio. The majority were 6 – 12 years of age (47.4%), most of them were presented with blunt trauma (142, 92.2%), and the leading cause of trauma was a road traffic accident (63.6%), which was followed by a fall from height (16.9%) and fall on a sharp object (6.5%). Out of 98 patients with road traffic accidents, only 16 (16.3%) were traumatized from traffic-traffic collisions, and the rest (83.7%) were injured during the crossing or running on the road. Commonly injured organ was the liver (52.6%), spleen (14.2%), and small intestine (9.7%). Most (70.1%) were treated conservatively, and 3 out of 4 died within 24 hours of admission.

Conclusion: Road traffic accident was the most common cause of abdominal trauma, and the liver was the most commonly injured organ. Most of the victims were pedestrians. The cause is a lack of awareness and attendance to children and unsafe vehicles on the road.

Keywords: Blunt trauma, Abdomen, Children, RTA, Laparotomy.

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Introduction

Abdominal trauma is a significant cause of morbidity and mortality in children worldwide. According to the World Health Organization (WHO), injuries are the leading cause of death in children aged 5 to 14 years old. Road traffic accidents are a common cause of injury in low- and middle-income countries (LMICs) [1-2]. Early recognition and timely management of trauma victims have improved due to advances in technology and facilities in developed countries [3]. However, in underdeveloped and developing countries, children with abdominal trauma may face delays in reaching health facilities and receiving appropriate care, resulting in poorer outcomes[4].

Bangladesh is one of the most densely populated countries in the world; the country faces various socio-economic challenges, including a lack of awareness

and education about road safety, inadequate traffic management, and unsafe vehicles on the road. These factors contribute to a high incidence of road traffic accidents, a leading cause of trauma in children in Bangladesh [5].

This study aimed to analyze the mechanisms and causes, organ involvement, management, and outcomes of childhood abdominal trauma in a tertiary center in the North-West region of Bangladesh. By identifying the leading causes of abdominal trauma in children, this study can provide important information for injury prevention strategies in Bangladesh. Additionally, understanding the types of organ injuries and treatment methods can help to improve the management of abdominal trauma in children and potentially reduce morbidity and mortality rates.

Materials and methods

Retrospective review of children admitted to the department of Paediatric Surgery, Rajshahi Medical College Hospital, Bangladesh, with abdominal trauma from January 2020 to December 2021. Children with blunt abdominal trauma with either solid organ or hollow viscus injury and penetrating trauma with peritoneal breach and/or organ injury were included. Children with blunt abdominal trauma with only injury to the abdominal wall without solid organ or hollow viscus injury and penetrating trauma with intact peritoneal were excluded. Data were collected from hospital record and analysis was done for age and sex distribution, cause, mechanism and type of injury, associated injuries, management and outcome.

Data analysis

The data collected from the study were processed and analyzed using appropriate statistical methods. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. Inferential statistics such as the chi-square test and t-test were used to determine the association between different variables and compare means between groups. Statistical software such as SPSS (Statistical Package for the Social Sciences) or STATA was used for data analysis. The level of significance was set at $p<0.05$. The statistical analysis results were presented in the form of tables, graphs, and charts to provide a clear understanding of the findings. The interpretation of the results was based on the research questions and objectives of the study.

Result

A total of 154 patients were admitted during the study period, with a male to female ratio of 2.20:1. Table I represents the frequency and percentage of different types of injuries observed among the study population. The most common cause of injury reported was road traffic accidents, accounting for (63.6%) of all cases recorded. Fall from height (16.9%) was the second most common cause of injury, followed by fall on sharp object (6.5%). The other couses were sports injury, fall on ground, bicycle handle bar injury etc. Among the RTA cases, only 16.3% were traffic-traffic collision. Large proportion of population was injured while crossing/running on the road was reported in (83.7%) of all RTA cases.

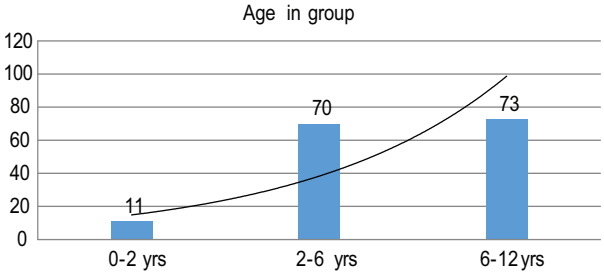

Fig.-1. *Showing the age group of the respondent*

Table-I

Information about patients with abdominal trauma

Variable	Number of patients (n=154)	Percentage (%)
Sex		
Male	101	65.6%
Female	46	29.9%
Type of injury		
Blunt trauma	142	92.2%
Penetrating injury	12	7.8%

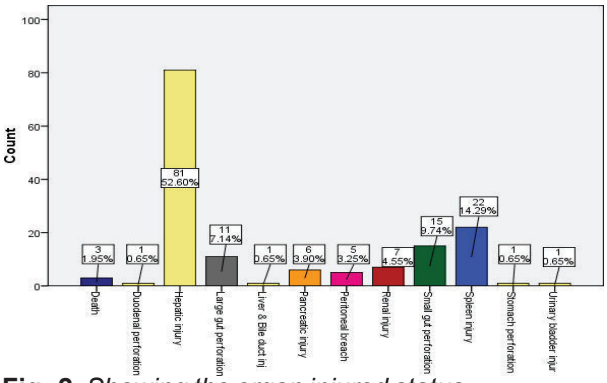

Fig.-2. *Showing the organ injured status*

Figure 2 also shows the percentage distribution of various types of organ injuries. Hepatic injury was the most commonly reported type of organ damage, accounting for (52.6%) of all cases recorded. Spleen injury was the second most common, accounting for (14.2%) of all cases, followed by renal injury, which accounted for (4.55%) of all cases. also lists several types of gastrointestinal injuries, including duodenal perforation, large gut perforation, small gut perforation, stomach perforation, large gut perforation was the most commonly reported GI injury, accounting for (7.14%) of all cases, followed by small gut perforation, which accounted for (9.74%) of all cases. Penetrating injury with only peritoneal breach was found in (3.25%) of all cases. Three (1.95%) patients died withing 24 hours of admission before identification of organ injury.

Table II

Associated Injury information of the patients.

Variable	Frequency (n=46)	Percentage (%)
Chest injury	18	39.13%
Head injury	10	21.74%
Injury to face	5	10.87%
Upper limb injury	4	8.70%
Lower limb injury	2	4.35%
Pelvis fracture	4	8.70%
Urethral injury	2	4.35%
Spine injury	1	2.17%

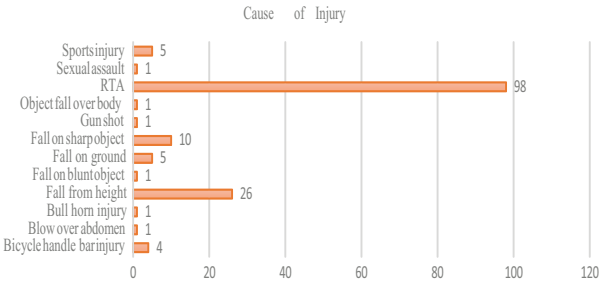

Fig.-3. *Showing the mechanism of trauma*

Overall, provides important information on the percentage distribution of different types of injuries and organ damage in a particular population. It can be useful in identifying common types of injuries and the most frequently affected organs, which can help in developing appropriate prevention and treatment strategies. The information provided may be useful for clinicians to determine the most common types of injuries observed in this population and allocate resources and treatments accordingly.

Table-III

Summarizes the surgical treatment given to the patients who suffered from abdominal trauma

Variable	Frequency (n=154)	Percentage (%)
Laparotomy and colostomy	9	5.8%
Laparotomy and ileostomy	6	3.9%
Laparotomy and peritoneal lavage	7	4.5%
Laparotomy and repair of perforation	12	7.8%
Laparotomy, repair of perforation, and Roux-en-Y Gastro-jejunostomy	1	0.6%
Suprapubic cystostomy	2	1.3%
Tube thoracostomy	5	3.2%

Table IV

Summary of treatment outcome

Variable	Frequency (n=154)	Percentage (%)
Conservative treatment	112	72.7%
Surgery	42	27.3%
Cure	150	97.4%
Death	4	3.9%

Discussion

Abdominal trauma is a common cause of morbidity and mortality in children worldwide, particularly in underdeveloped and developing countries where early recognition and management of trauma victims are delayed due to inadequate facilities, lack of awareness, and inadequate transport systems [6]. The present study aimed to analyze the causes, mechanisms, organ involvement, management, and outcome of childhood abdominal trauma in a tertiary centre in Bangladesh.

The report shows that a relatively smaller percentage (74%) of abdominal injuries in children were due to blunt abdominal trauma (BAT) as compared to North America [7] (over 95%) and parts of Europe [8]. Most patients were between the ages of 5-9 years, and like in a European report, BAT was infrequent in children below the age of 1. Additionally, the study found that the male-to-female ratio was 3.8:1. These findings suggest that cultural and environmental differences may affect the incidence and distribution of paediatric abdominal injuries across different regions worldwide.

The study found that the majority were 6-12 years old, with a male predominance. The leading cause of trauma was road traffic accidents, followed by falls from heights and falls on sharp objects. These findings are consistent with previous studies conducted in different parts of the world [9]. The study also found that most of the victims of road traffic accidents were pedestrians, and only a small proportion of them were involved in traffic-traffic collisions. This finding is consistent with other studies conducted in low- and middle-income countries, where pedestrian-vehicle collisions cause trauma [10].

The liver, Spleen, and small intestine were the most commonly injured organs. This finding is consistent with previous studies on childhood abdominal trauma [11]. Most patients were managed conservatively, and only a few required surgical interventions. However, six out of seven patients who died did so within 24 hours of admission, indicating the need for early recognition and timely intervention to improve the outcome of these patients [12].

It has been estimated that less than 10% of children with BAT and less than 15% with a hemoperitoneum will require a laparotomy, most being managed non-operatively [7]. This can only be achieved with advanced facilities such as C.T., which is useful in identifying, localizing, and quantifying intra-abdominal injuries [13-14]. This facility is not readily available or expensive in most tropical Africa. Though more widely available, the U.S. is frequently inaccessible outside of working hours and may result in a high rate of missed injuries. The result of these problems is that 51% of children with BAT are subjected unnecessarily to a laparotomy, with the attendant morbidity and long hospital stay[15].

The study highlights the importance of preventive measures to reduce the incidence of childhood abdominal trauma, particularly road traffic accidents. These measures include improving road safety, increasing public awareness and promoting the use of appropriate child restraints in vehicles. Moreover, the study also emphasizes the need for early recognition and timely intervention to improve the outcome of childhood abdominal trauma.

Conclusion

The majority of the patient with solid organ injury did not need laparotomy. Laparotomy was a lifesaving surgical intervention in managing abdominal trauma in children. However, the study noted that the delay in seeking medical attention and the lack of adequate facilities in the region were major challenges in managing abdominal trauma in children. This Study recommends the need for increased awareness and education on the importance of prompt medical attention and the development of better facilities for managing abdominal trauma in children in the region.

Conflict of interest: None

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