

An Analysis of Injury Patterns of Blunt Abdominal Trauma in Pediatric Population

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Abstract

Original Research Article

Background: Blunt abdominal trauma is a common cause for presentation of children to the Emergency Department. Because of their peculiar body habitus and relatively immature musculoskeletal system children are more prone to sustain injuries to intra-abdominal organs after blunt abdominal trauma. This retrospective study is done to determine the epidemiological parameters of blunt trauma abdomen in pediatric population. **Methods:** The present retrospective study was carried out in 89 blunt abdominal trauma patients of both sexes aged up to 15 years, over a period of 3 years. The parameters such as age group, sex, mode of trauma, type of injury, and the overall morbidity as well as mortality were assessed. **Results:** Total 89 blunt abdominal trauma patients were enrolled in the study. The majority of the patients were aged between 6-12 years (48.31%) with male predominant (66.29%). The mean age of presentation was 6.8 years. **Conclusions:** The present study gives an idea about the epidemiology of pediatric trauma. Liver and Spleen was the most commonly injured organ. Road traffic accidents and fall from height were the most common mechanisms of injuries. The majority of pediatric injuries are preventable and pediatric epidemiological trends differ from those in adults.

Keywords: Blunt abdominal trauma, Pediatric, Epidemiology, Conservative.

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INTRODUCTION

In pediatric surgical emergency blunt injuries are very common. Worldwide pediatric trauma accounts for 1.5 million injuries [1]. Approximately one third of trauma patients have abdominal trauma [2]. As compare to adult, children's intra-abdominal organs are proportionally larger and are in relatively close proximity to each other. Children are at increased risk of sustaining injuries to intra-abdominal organs after blunt abdominal trauma. There are very few studies from developing countries discussing the epidemiology and injury pattern of blunt abdominal trauma in pediatric population [2, 3]. The present study was carried out to assess the various epidemiological parameters that influence the causation of trauma as well as injury pattern in blunt trauma abdomen in pediatric population.

MATERIALS AND METHODS

The study was conducted in the Department Surgery, Chhindwara institute of medical Sciences, Chhindwara (M.P.). The study was retrospective, based on medical records of patients over a period of three

year, from June 2018 to July 2021. All patients who were admitted with a provisional diagnosis of blunt trauma to the abdomen were included in the study. The exclusion criteria included patients with penetrating injury to abdomen, patients with added head injuries needing neurosurgical care, patients with added extremity injury needing orthopedic care. The demography of these patients were studied with respect to different parameters such as age group, sex, mode of trauma, type of injury, and the overall morbidity as well as mortality were assessed. The values obtained were analyzed and compared to available studies.

RESULTS

This retrospective study was conducted in total 89 pediatric patients of both sexes having aged between 1-15 years and who were presented with blunt abdominal trauma. The age of patients at presentation range from 3 month - 15 years. 14.6% patients presented below the age of 2 years, 23.59% patients presented between 3-5 years of age and 48.31% patients presented between 6 - 10 years. 13.48% of patients presented between 11 - 15 years (Table 2).

Table 1: Distribution of patients according to sex

	Number of patients	Percentage
Male	60	66.29%
Female	29	33.71%

Table 2: Distribution of study group according to age

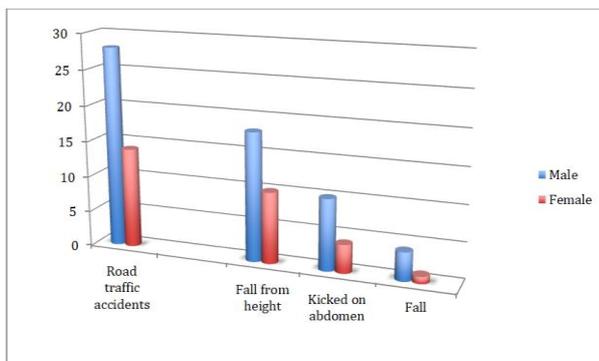
Age in Year	No. of Patients	Percentage
0-2	13	14.6%
3-5	21	23.59%
6-10	43	48.31%
11-15	12	13.48%

Patients who had sustained injury about 14% had combined injuries. Hepatic injury was the most common in 46.06% (41), followed by splenic injuries 22.5% (33) and renal injuries 17.97% (16) (Table 3).

Table 3: Distribution of the internal organs commonly injured.

Organs involved	Patients	Percentage
Liver	41	46.06%
Spleen	20	22.5%
Kidney	16	17.97%
Bowel	8	8.98%
Pancreas	4	4.49%

The mode of injuries in children is different from those in adults. Direct injuries with impact over the abdomen are less common. Road traffic accidents were noted in 42 children, with Fall from height following it (Figure 1).

**Figure 1: Mode of injury in pediatric blunt abdominal trauma**

Out of 89 cases, 74 (83.1%) were managed non-operatively and 15 (16.9%) cases were required surgery. (Table 4)

Table 4: Management protocol

Management	Patients	Percentage
Conservative	74	83.1%
Surgical	15	16.9%

Blunt injuries are a common referral to any pediatric surgical emergency. Worldwide pediatric trauma accounts for 1.5 million injuries. Almost 90 percent of all trauma impacts are blunt in nature [4, 5]. The head and extremity trauma account for majorities of all blunt injuries [4]. Abdominal blunt trauma is a special concern due to their wide-spread and variable presentation and differing outcomes. Evaluation and management protocols of blunt abdominal injuries in children have undergone drastic changes. Newer imaging modalities with better results obtained with conservative treatment have shifted the attention towards non-operative modalities [6].

Approximately, 20000 pediatric patients die every year as a result of injuries [7]. In developing nations, most injuries are observed in age groups of 13 to 18 years, particularly due to increased violence. This result is in contrast to our study where most trauma patients were less than 10 years of age [6]. Motor vehicle accidents are the leading etiological factors causing abdominal blunt injuries [8]. In the present study, significantly more males than females presented with abdominal trauma (66.29% vs 33.71%), which is consistent with Qadri AI *et al.*, [9] Liver and spleen injuries were more frequent in patients with blunt abdominal trauma. A large number of studies in children have quoted bowel injuries to be the most common injured internal organ followed by liver [10]. On contrary, hepatic (46.06%) and splenic (22.5%) injuries were the commonest organs to be injured in our study.

In our study, road traffic accident was the most common cause followed by fall from height. Others have found that the main causes of blunt abdominal trauma were fall from height, interpersonal violence, and falls [11].

In the present study, majority of patients belonged to the 6-10 years age group followed by those in 3-5 year age groups. Similar incidence of age group was observed in a study conducted by Soumyodhriti Ghosh *et al* in which majority of the patients with blunt trauma abdomen were under 10 years [6]. Males were affected more compared to females.

Majority of the patients with blunt trauma abdomen managed by conservative treatment particularly those with hemodynamic stable and without sign of generalized peritonitis. Hemodynamic instability as such is a poor indication of significant organ injury; hence it requires direct organ specific evaluation, such as ultrasonography (FAST), computed tomography or laparoscopy to identify patients who can be safely treated with surgical intervention.

CONCLUSION

DISCUSSION

Road traffic accidents are the leading cause of blunt abdominal traumas. It is important to minimize delays in diagnosis, and treatment. The majority of children with blunt trauma abdomen can be managed successfully without surgery, in a regional trauma center, if the decision is based on careful initial evaluation, aggressive resuscitation, and close observation of their hemodynamic stability. Road safety measures should be implemented to prevent accidents.

REFERENCE

1. Krug, E. G., Sharma, G. K., & Lozano, R. (2000). The global burden of injuries. *American journal of public health*, 90(4), 523-536.
2. Chirdan, L. B., Uba, A. F., Yiltok, S. J., & Ramyil, V. M. (2007). Paediatric blunt abdominal trauma: challenges of management in a developing country. *European journal of pediatric surgery*, 17(02), 90-95.
3. Adesanya, A. A., Afolabi, I. R., & da Rocha-Afodu, J. T. (1998). Civilian abdominal gunshot wounds in Lagos. *Journal of the Royal College of Surgeons of Edinburgh*, 43(4), 230-234.
4. Holmes, J. F., Sokolove, P. E., Brant, W. E., Palchak, M. J., Vance, C. W., Owings, J. T., & Kuppermann, N. (2002). Identification of children with intra-abdominal injuries after blunt trauma. *Annals of emergency medicine*, 39(5), 500-509.
5. Holmes, J. F., Gladman, A., & Chang, C. H. (2007). Performance of abdominal ultrasonography in pediatric blunt trauma patients: a meta-analysis. *Journal of pediatric surgery*, 42(9), 1588-1594.
6. Ghosh, S., Shukla, R., Mujalde, V. S., Ali, M., Mehra, S., Kumar, A., ... & Chaturvedi, V. (2017). Pediatric blunt abdominal trauma-demography in a tertiary care set up of a developing nation. *Journal of Pediatric Surgical Specialties*, 11(1), 11-14
7. Richards, J. R., Knopf, N. A., Wang, L., & McGahan, J. P. (2002). Blunt abdominal trauma in children: evaluation with emergency US. *Radiology*, 222(3), 749-754.
8. Retzlaff, T., Hirsch, W., Till, H., & Rolle, U. (2010). Is sonography reliable for the diagnosis of pediatric blunt abdominal trauma?. *Journal of pediatric surgery*, 45(5), 912-915.
9. Qadri, A. I., Ahmad, Y., Bhat, G. A., Khan, A. A., & Bashir, K. (2018). Epidemiology and injury pattern in blunt trauma abdomen in pediatric population: a two-year experience in a tertiary care institute of Kashmir, India. *International Surgery Journal*, 5(11), 3713-3718.
10. Haller Jr, J. A., Papa, P., Drugas, G., & Colombani, P. (1994). Nonoperative management of solid organ injuries in children. Is it safe?. *Annals of surgery*, 219(6), 625-631.
11. Ma, W. J., Xu, H. F., Chao, J. X., Nie, S. P., Gong, L., Lin, G. Z., & Li, J. S. (2007). Analysis on pedestrian traffic injury among aged 0-14 years children in Guangzhou, China. *Zhonghua liu xing bing xue za zhi= Zhonghua liuxingbingxue zazhi*, 28(6), 576-579.