

Clinical Profile and Management Spectrum of Blunt Trauma Abdomen Cases At A Tertiary Care Center; A Prospective Observational Study

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Abstract

Trauma is one the leading causes of morbidity and mortality in modern times more so in young population and abdominal trauma is occurs in 1% of trauma cases but it contributes to 10% of the mortality, this is mainly due to complexities involved in management of blunt trauma abdomen. Management of trauma patients is field active research and protocols are evolving. This is an observational study in a tertiary care hospital involving 50 cases of blunt trauma abdomen on their clinical profile. Blunt trauma abdomen was most common in age group of 21-40 years, it was seven times more common in men than women. Road traffic accident was most common cause of injury followed by assault. Liver was the most common abdominal organ injured followed by spleen and intestine. 56% cases were managed nonoperatively and 44% required surgery.

Key Words: Blunt trauma abdomen, road traffic accident, operative management, nonoperative management.

Date of Submission: 14-12-2021

Date of Acceptance: 28-12-2021

I. Introduction

Trauma or injury has been defined as damage to the body caused by an exchange with environmental energy that is beyond the body's resilience. (1) Trauma is the most common cause of death in the age group of 1 to 44 years and is the third most common cause of death regardless of age. (2) Blunt abdominal trauma is more common in men than women. (3,4) According to WHO by the year 2020, trauma will become the first or second leading cause of "loss of productive years of life" for both developed and developing countries. (5)

Abdominal injuries occur around 1% of all trauma patients. Usually, abdominal organ injuries alone are responsible for 10% of total trauma caused mortality. (6,7) Blunt trauma abdomen (BTA) is a common surgical emergency which may present as an isolated problem or as a part of poly trauma. Road traffic (automobile) accident is the most common cause of blunt trauma abdomen. (8,9).

Blunt trauma abdomen occurs due to deceleration, crushing or external compression mechanism (10). Abdomen is considered as a diagnostic magic box by the surgeons. Physical examination of abdomen alone is unreliable for decision making in blunt trauma abdomen. (11,12)

Few main reasons being the presence of distracting injuries, an altered mental state, and co-existing drug and alcohol intoxication in patients. (13) Mortality rates are higher in patients with blunt abdominal trauma than in those with penetrating wounds, because of the lack of early diagnostic facilities and optimal management. (14)

Generally, different diagnostic modalities in abdominal injuries include diagnostic peritoneal lavage (DPL), focused abdominal sonography for trauma (FAST), and computerized tomographic (CT) scan (15) facilities are unavailable or unaffordable as in developing countries, it is better to open and see the abdomen than to wait. (16).

The initial hours of blunt trauma abdomen are extremely crucial for the patient. Introduction of ambulance services 108 (Toll free number) has given very positive result by early transportation of injured patient. (17)

Haemorrhage is the second most common cause of death after blunt trauma abdomen, and missed abdominal injuries are a frequent cause of morbidity and late mortality in patients who survive the early period after injury. (18)

Close supervision and early institution of proper management results in decreased morbidity and mortality. (10).

The most important step in management of trauma patients is ABC [airway, breathing, circulation according to Advanced Trauma Life Support (ATLS) guideline or Primary Trauma Care (PTC) guideline]; most of the trauma patients respond to initial fluid treatment and will not need surgery, and all emergency physicians must have continuous education about trauma guidelines. (19-21)

RTA is the most common cause of admissions in poly trauma ward. Among these, blunt trauma abdomen cases are quite frequently encountered. In the management of blunt trauma abdomen, the decision to go for emergency exploratory laparotomy and conservative management is very crucial. Hence, this study was undertaken.

II. Methods

This study was conducted on 50 patients of blunt abdominal trauma admitted surgical ward in a tertiary care centre.

Inclusion criteria

- All patients with blunt abdominal trauma.
- Patients of all age groups.

Exclusion criteria.

- All deaths on arrival.
- Pregnant females.

Selection of cases was done as above, and study was conducted based on the following points:

Detailed clinical history was recorded including age, sex, symptoms, mode of injury, associated injuries, external bleeding and mental status.

Thorough physical examination was carried out to assess hemodynamic stability, vitals, systemic examination, severity of injury and other associated injuries. Detailed examination of the abdomen along with the neurological status also, was done.

Investigations

Baseline investigations like blood investigations, chest x-ray, x-ray abdomen was carried out.

Special investigations like Ultra sonography (USG), Computed Tomography, Intravenous Pyelography, Retrograde Urethrography Imaging were done as per the hemodynamic stability of the patient and according to the suspicion of the organ/viscera/vessels involved.

Management of patients

Patients were assessed and resuscitated to achieve and maintain hemodynamic stability according to Advanced Trauma Life Support (ATLS) guidelines.

IV fluids, blood transfusions were given based on monitoring of urine output and blood pressure. Patient's vitals, urine output, abdominal girth was also measured and monitored. Patients were prepared for emergency exploratory laparotomy as per their hemodynamic stability, nature of injury and findings of USG and other investigations.

The surgical procedures were performed according to the intra-operative findings. Total amount of blood in peritoneal cavity, presence of faecal matter and biliary contamination of peritoneal cavity were looked for and recorded. Injury to any organ, extent of injury and status of other viscera was recorded.

Post operatively patients managed were with IV antibiotics, IV fluids, vaccines (in splenectomy), analgesics and blood transfusion as per requirement. Complications, if any were recorded and dealt with accordingly.

Discharge was given on complete recovery and follow up was advised in outpatient department

III. Results

In this study of 50 cases of blunt abdominal trauma, following observations were recorded.

Maximum incidence was noted in age group of 21- 40years and 41 to 60 years which was 48% and 28%. these age group people are more active in their life activity (table no. 1). Commonest type of injury was BTA which was 84% in comparison to 16% of penetrating injury (table no.2)

Table no.1 age wise distribution

Age in years	No. of patients	Percentage
1-20	10	20
21-40	24	48
41-60	14	28
>60	2	4

Table 2 incidence between BTA and Penetrating injury

Type of injury	No. of Patients	Percentage
Blunt trauma abdomen	42	84
Penetrating injury	8	16

The sex distribution has male predominance as shown in the above table. In present study Male: Female ratio was around 7:1 (table no.3).

Table 3 sex wise distribution

Sex	No of Patients	Percentage
Male	44	88
Female	6	12

In present study, commonest cause of blunt abdominal trauma was road traffic accidents (72%). Next common cause was assault (16%) (Table no. 4).

Table 4 Mode of injury

	No of Patients	Percentage
RTA	36	72
Assault	8	16
Fall from height	4	8
Bull horn injury	2	4

Mortality rate observed was highest in road traffic accidents. Mortality was 4 out of 36 patients (11%). Higher mortality in road traffic accidents is related to the intensity and severity of trauma as well as associated other injuries.

In our study we observed, that liver was the most common (28%) organ injured in cases of blunt abdominal trauma. The next most common organ injured was spleen (24%), followed by small intestine and mesenteric injuries, which were 16% (Table no. 5).

Table 5 Specific organ injury.

Organ involved	No of Patients	Percentage
Liver	14	28
Spleen	12	24
Stomach & Duodenum	4	8
Small intestine	8	16
Large Gut	4	8
No organ involved	8	16

Patient having liver, kidney and splenic injuries and hemodynamically stable were treated conservatively. Patients with gut and splenic injury with hemodynamically unstable were managed with primary repair of gut injury, stoma formation and splenectomy as required (table no. 6).

Table 6 Way of management and operative procedure

	No of Patients	Percentage
Primary repair of gut injury	10	20
Stoma formation	6	12
Splenectomy	1	2
Other operative	5	10
conservative	28	56

IV. Discussion

Due to rapid development of cities and development and construction of new factories, the incidence of cases of blunt abdominal trauma has increased (22). If patient is taken to hospital as early as possible (within golden hours) after trauma, it can decrease patient's morbidity and mortality (23). Injuries in blunt abdominal trauma have a wide variety of spectrum. It can range from no any organ injury to multi organ injury. In some cases, there may be associated head or chest or any other injuries, in such circumstances it is difficult to perform abdominal examination (24). So, each polytrauma patient has to be thoroughly investigated in addition to clinical examination (25).

Age incidence

Table 1 describe that Out of 50 cases in present study 48% of patients were in 11-40 years of age group. This is similar with studies of Musau p et al. (61%) and Mehta N (46%) (26-27). This age group is involved in most

active lifestyle activities and suffer in road traffic accidents this is also according to Singh R P and Dhaded RB et al. (28,29)

Causes of blunt trauma abdomen

In our study the chief cause of blunt trauma abdomen was road traffic accidents (RTA) which is 72%, almost similar to the study by Dhaded and Malra where the most common cause was road traffic accidents accounting (66.6%) (29). It is also similar to Kumawat JL (68%) and Aziz A et al. (58%) were blunt traumas by RTA. (30,31)

In our study second common cause was assault which were 16% but in most of other studies second common cause was fall from height. According to Singh S (8) 25% blunt trauma by fall from Height and Pancchal HA et al (32) 16%, assault was 9% which was third common cause. It may be because of easy availability of vehicles, daily migration to urban area for livelihood, unaccustomed to traffic, traffic sense and ignorance of safety measure (Mohan). (33)

Frequency of organ involved

The large size of the liver, its friable parenchyma, its thin capsule and its relatively fixed position in relation to the spine make the liver particularly prone to blunt injury. The right lobe is injured more commonly than the left because of result of its larger size and proximity to the ribs. commonest intra-abdominal injury was liver injury in 28% followed by splenic injury (24%) which were similar to Aziz A (28%) (31) and according to Smith J 17.50% liver injury and 15.93% splenic injury. Commonest hollow organ injury was small bowel perforation. Most common bowel injured was ileum (Smith J) (34) .

Management of blunt trauma abdomen

Out of 50 cases 22(44%) cases underwent laparotomy (operative) and 28 (56%) cases were managed non-operatively.

Operative management (OM)

Hollow viscous perforation closure (20%) was the most common procedure performed in patients with early presentation, healthy gut. stoma formation in unhealthy gut (12%) was the second most common procedure done. Small bowel was the third most common organ injured (16%). A study conducted by Dhaded and Malra also had similar findings, in which third common organ injured was small bowel (30%). (29)

Non operative management (NOM)

Those patients who were hemodynamically stable at the time of presentation at emergency department with stable blood pressure, adequate urine output, maintained abdominal girth and insignificant changes in laboratory finding were managed conservatively. Rahman S et al. (19) Later on these patients were undergone CT scan of abdomen.

Solid organ injured in 26 patients, out of whom liver was injured in 14 patients, spleen was injured in 12 patients. In this study, 50% of patient having solid organ injured was managed conservatively (nonoperative management) where hepatic injuries were 28% and splenic injuries were 24%.

In the non-operative managed group hepatic injury was the commonest injury, 28% cases were managed by non-operative management. A study by Bee et al concluded approximately 60–80% of patients presenting with blunt splenic injury can be managed nonoperatively (35)

The early presentation of our patients helped us to start appropriate resuscitation at time and save their lives. So, patients of blunt abdominal trauma presenting to hospital should be resuscitated with the help of IV fluids, blood transfusions (36).

V. Conclusion

Now trauma is the most common cause of mortality in the younger age group, also causing loss of productive days even more than other notorious diseases like cardiovascular diseases and malignancies. The incidence of blunt injuries to the abdomen is now at its peak since the whole period of mankind. No abdominal organ is safe from injury with injuries of solid organs being more in blunt abdominal trauma. Prompt primary resuscitation and timely definitive treatment are the goals of the surgeon for treating blunt abdominal trauma victims with important being the initiation of management within the golden hour. CT scan along with assessment of hemodynamic stability is required to decide surgical intervention or non-operative management. A combined evaluation comprising of physical examination, imaging techniques, hemodynamic assessment and monitoring the patients have decreased the number of non-therapeutic laparotomies and have increased the non-operative management of solid organ injuries.

In short, morbidity and mortality can be prevented by timely initial resuscitation and correct diagnosis as well as management (operative or non-operative) which depend on patient's hemodynamic stability and findings of imaging studies.

Reference

- [1]. Schwartz's principles of surgery, 9th edition, chapter 9th, Schwartz, Seymour I, Brunicaardi, F Charles. New York: McGraw-Hill Medical Pub. Division, c201;1928:135-196.
- [2]. Sabiston's textbook of surgery, 18th edition, section II, chapter 20. 2007;477-520.
- [3]. Currie RA, Watne AL, Heiskell EF, Jr., Gerwig WH, Jr. Blunt abdominal trauma. *The American Journal of Surgery* 107: 321-8. DOI: 10.1016/0002-9610(64)90275-2
- [4]. Lankarani KB, Heydari ST, Aghabeigi MR, Moafian G, Hoseinzadeh A, Vossoughi M. The impact of environmental factors on traffic accidents in Iran. *J Inj Violence Res* 2014; 6(2): 64-71. DOI: 10.5249/jivr.v6i2.318 .
- [5]. Mock CN, Jurkovich GJ, Nii-Amon-Kotei D, Arreola- Risa C, Maier RV. Trauma mortality patterns in three nations at different economic levels: implications for global trauma system development. *J Trauma*. 1998;44:804-14.
- [6]. Rutledge R, Hunt JP, Lentz CW, et al. A statewide, population-based time-series analysis of the increasing frequency of nonoperative management of abdominal solid organ injury. In: *Annals of Surgery*. 1995;222:311-26.
- [7]. McKenney KL, Nuñez DB, McKenney MG, Asher J, Zelnick K, Shipshak D. Sonography as the primary screening technique for blunt abdominal trauma: Experience with 899 patients. *Am J Roentgenol*. 1998;170(4):979-85.
- [8]. Gupta S, Talwar S, Sharma RK, Gupta P, Goyal A, Prasad P. Blunt trauma abdomen: a study of 63 cases. *Indian J Med Sci*. 1996;50(8):272-6.
- [9]. Singh S, Gupta V, Singh S. Pattern of injury of blunt trauma abdomen in rural population. *Int Surg J*. 2016;497-500.
- [10]. Britt LD, Maxwell RA. Management of abdominal trauma. In: Zinner MJ, Ashley SW, eds. *Maingot's Abdominal Operations*. 12th ed. The McGraw-Hill Companies, Inc.; 2013:247-259.
- [11]. Singh M, Kumar A, Verma AK, Kumar S, Singh AK. Abdominal organ involvement in blunt injuries. *J Indian Acad Forensic Med*. 2012;34(1):24-6.
- [12]. Burch J, Franciose R, Moore E. Trauma. In: Brunicaardi FC, ed. *Schwartz's Principles of Surgery*. 8th ed. USA: McGraw Hill; 2005:129-187.
- [13]. NHTSA. Effectiveness of occupant protection systems and their use: third report to Congress. *Natl Highw Traffic Saf Adm (NHTSA)*, Washingt DC, US Dep Transp. January 1996:1-49.
- [14]. Shires GT, Thal ER, Jones RC, Shires GT III, Trauma PM. *Principles of surgery*. (6thedn), New York: McGraw Hill;1994:175-224
- [15]. Where, these Rahman S et al. *Int Surg J*. 2018 Jul;5(7):2582-2587 *International Surgery Journal | July 2018 | Vol 5 | Issue 7 Page 2583*
- [16]. Dongo AE, Kesieme EB, Irabor DO, Ladipo JK. A Review of Posttraumatic Bowel Injuries in Ibadan. *ISRN Surg*. 2011;2011:1-4.
- [17]. JLK, PNM, Mathur K, FSM. A retrospective study of blunt trauma abdomen. *J Evol Med Dent Sci*. 2015;4(59):10263-9.
- [18]. Jansen JO, Yule SR, Loudon MA. Investigation of blunt abdominal trauma. *BMJ (Clinical Res ed)*. 2008;336(7650):938-42
- [19]. Gezen FC, Cincin TG, Oncel M, Vural S, Erdemir A, Dalkilic G, et al. Noninvasive management strategy in hemodynamically unstable patients with blunt trauma. *Ulus Travma Acil Cerrahi Derg* 2006; 12(1): 43-50.
- [20]. Amiri H, Gholipour C, Mokhtarpour M, Shams Vahdati S, Hashemi AY, Bakhshayeshi M. Two-day primary trauma care workshop: early and late evaluation of knowledge and practice. *Eur J Emerg Med* 2013; 20(2): 130-2.
- [21]. Amiri H, Shams Vahdati S. Two-day primary trauma care workshop - is it beneficial? *Turk J Emerg Med* 2009; 9(1):
- [22]. Hill Ac scheter Wp, Trinkey DD: Abdominal trauma and indication for laparotomy. *Trauma Norwalk CT scan*, Appleton and lange P. 1988:401.
- [23]. Goyal S, Sancheti KH, Shete KM. Poly Trauma in Rural India- Changing Trends. *Indian J Orthopaed*. 2006 Oct 1;40(4):259.
- [24]. Dave PK. Organisation of an accident Service, Delhi; Jaypee Brothers;1995:62-65.
- [25]. Hassan R, Aziz AA. Computerized tomography (CT scan) imaging of injuries of blunt abdominal trauma: a picture assay. *Malays J Med Sci*. 2010;17:29-39.
- [26]. Musau P, Jani PG, Owillah FA. Pattern and outcome of abdominal injuries at Kenyatta National Hospital, Nairobi. *East Afr Med J*. 2006;83(1):378-43.
- [27]. Mehta N, Babu S, Venugopal K. An experience with blunt abdominal trauma: evaluation, management and outcome. *Clinics Practice*. 2014 Jun 18;4(2).
- [28]. Singh RP, Garg N, Nar AS. Role of amylase and lipase levels in diagnosis of blunt trauma abdomen. *J Clin Diagn Res*. 2016;10(2):PC20-3.
- [29]. Dhaded RB, Malra S. Clinical Study, Evaluation and Management of Blunt Abdominal Trauma- Hollow Viscus and Solid Organ Injuries at Basaweshwar Teaching & General Hospital Attached to Mahadevappa Rampure Medical College , Gulbarga. *SAS J Surg*. 2016;1(1):53-9.
- [30]. Kumawat JL, Mathur PN, Mathur K, Mehta FS. A retrospective study of blunt trauma abdomen. *J Evol Med Dent Sci*. 2015 Jul 23;4(59):10263-9.
- [31]. Aziz A, Bota R, Ahmed M. Frequency and Pattern of Intra-abdominal Injuries in Patients with Blunt Abdominal Trauma. *J Trauma Treat*. 2014;3:196.
- [32]. Panchal HA, Ramanuj AM. The study of abdominal trauma. *Int Surg J*. 2016;3:1395.
- [33]. Mohan D. Injuries in India, a Survey. ICSSR research abstract. *IIT Bull IIT Delhi*. 1992;21(3):8-10.
- [34]. Smith J, Caldwell E, D'Amours S, Jalaludin B, Sugrue M. Aabdominal trauma: a disease in evolution. *ANZ J Surg*. 2005;75:790-4.
- [35]. Bee TK, Croce MA, Miller PR, Pritchard FE, Fabian TC. Failures of splenic nonoperative management: is the glass half empty or half full? *J Trauma*. 2001;50(2):230-6.
- [36]. Majid S, Gholamreza F, Mahmoud YM. New scoring system for intra-abdominal injury diagnosis after blunt trauma. *Chin J Traumatol*. 2014;17:19-24

Dr. Dinesh Chandra Sharma, et. al. "Clinical Profile and Management Spectrum of Blunt Trauma Abdomen Cases At A Tertiary Care Center; A Prospective Observational Study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(12), 2021, pp. 54-58.