MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/makrjms.2024.6.172.176

OPEN ACCESS

Key Words
Blunt abdominal trauma, road traffic accidents, liver injury, spleen injury, mortality

Corresponding Author
Amrut Arun Swami,
Department of Community Medicine, Dr. S. S. Tantia Medical College, Hospital and Research Centre, Sri Ganganagar, Rajasthan India

Author Designation
[1,3]Assistant Professor
[2,4]Associate Professor

Received: 2 March 2024
Accepted: 16 April 2024
Published: 19 April 2024

Citation: Ashok M. Shinde, Avishkar Barase, Rahul Kashide and Amrut Arun Swami, 2024 . Evaluation of Clinical Profile of Blunt Abdominal Trauma Cases Admitted in a Tertiary Care Hospital in Western Maharashtra. Res. J. Med. Sci., 18: 172-176, doi: 10.59218/makrjms. 2024.6.172.176

Evaluation of Clinical Profile of Blunt Abdominal Trauma Cases Admitted in a Tertiary Care Hospital in Western Maharashtra

[1]Ashok M. Shinde, [2]Avishkar Barase, [3]Rahul Kashide and [4]Amrut Arun Swami

[1]Department of General Surgery, Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital, Ahmednagar, Maharashtra, India
[2]Department of General Surgery, Symbiosis Medical College for Women, Symbiosis International University, Lavale, Pune, Maharashtra, India
[3]Department of General Surgery, MIMER Medical College Talegaon Dabhade, Pune, Maharashtra, India
[4]Department of Community Medicine, Dr. S. S. Tantia Medical College, Hospital And Research Centre, Sri Ganganagar, Rajasthan, India

ABSTRACT
This study explores the clinical characteristics of blunt abdominal trauma at a tertiary care hospital in Western Maharashtra, India. We enrolled 150 adult patients with blunt abdominal trauma. This study investigated blunt abdominal trauma cases in a hospital setting. Adults over 18 with blunt trauma were included, while those with head injuries, pre-existing abdominal conditions, penetrating trauma, or unable to consent were excluded. We obtained ethical approval and collected data through a pretested questionnaire.The majority of patients were males (74.67%) within the 31-50-year age group (49.33%). Road traffic accidents were the leading cause of injury (46.67%), followed by occupational injuries (37.33%). Associated injuries were present in 44% of cases and significantly correlated with mortality ($p<0.001$). Abdominal pain emerged as the most prevalent symptom (82.67%), followed by vomiting (49.33%) and distension (45.33%). Liver injuries were the most common (38.67%), followed by spleen injuries (20.67%). The presence of multiple organ injuries significantly decreased survival rates ($p = 0.003$). This study highlights the importance of prompt diagnosis and treatment of blunt abdominal trauma, especially for patients with multiple organ injuries. Early intervention can significantly improve patient outcomes and reduce mortality.

INTRODUCTION

Abdominal trauma refers to any injury to the organs or tissues in the abdomen. It can be caused by blunt force, such as a car accident or fall, or by penetrating trauma, such as a gunshot wound or stab wound[1,2]. Abdominal trauma can be broadly divided into two types Blunt and Penetrating[3,4]. Blunt trauma: This is the most common type of abdominal trauma and is caused by a blow to the abdomen. The most commonly injured organs in blunt trauma are the liver, spleen, and intestines[4]. Penetrating trauma: This type of trauma is caused by an object that pierces the skin and enters the abdomen. The most commonly injured organs in penetrating trauma are the intestines, liver, and blood vessels[4]. Blunt abdominal trauma can cause a range of signs and symptoms. The most common symptom is severe abdominal pain, which may be constant or worsen with movement. You might also notice swelling or bruising on your belly. Nausea and vomiting are frequent companions to abdominal pain. In some cases, blood may be present in your stool. If the trauma is significant, it can affect your breathing, making it difficult to inhale. The most concerning sign is shock, which manifests as pale skin, a rapid and weak pulse[5,6].

Diagnosis of Abdominal Trauma[7,8]: Abdominal trauma can be diagnosed by detailed patient's medical history and symptoms, a physical exam and imaging tests[9], such as:

- X-ray: Shows broken bones or air in the abdomen, which indicates a perforated intestine
- CT scan: It provides detailed images of the organs and blood vessels in the abdomen
- Ultrasound: This is used to assess for bleeding in the abdomen

Treatment for abdominal trauma depends on the severity of the injury. Some patients only require observation and pain medications, while others require emergency surgery to repair damaged organs. In some cases, blood transfusions may be necessary to replace blood loss[10,11]. Complications of abdominal trauma can be peritoneal infection, internal bleeding and organ failures. Prevention of abdominal trauma can be done by wearing a seat belt when riding in a car, using proper safety gear when participating in sports or other activities[12,13]. We conducted this study to evaluate the clinical profile of abdominal trauma cases reporting to our hospital.

MATERIALS AND METHODS

Study Participants: This study, conducted in a tertiary hospital included cases of blunt abdominal trauma reported in casualty and OPDs.

Inclusion Criteria:

- Adult patients aged 18 years and above
- Cases with history of Blunt Abdominal Trauma

Exclusion Criteria:

- Cases with head injury
- Cases with history of any major abdominal organ disease
- Penetrating Abdominal Trauma cases

Ethical Considerations:

- All participants provided written informed consent before participating
- The study employed a pre-tested, semi-structured questionnaire to gather data
- Ethical approval was obtained from the college's ethics committee

Sample Size Calculation: According to a study by J. Wang *et al*.[14], abdominal trauma cases was seen in 77% of the multiple trauma injuries cases So,

p = 77% = 0.77

q = 1-p = 1-0.77 = 0.23

Considering, absolute error of 7%, e = 7% = 0.07,

Sample size = n = 4pq/e2

n = (4 x 0.77 x 0.23) / 0.07 x 0.07

n = 144.6

So, sample size taken for our study is 144.6, rounding it up to 150.

Data was collected using a predesigned questionnaire, data was entered in Microsoft excel 2021 and was analysed using EpiInfo version 7.2.1. Detailed patients' history, blunt or penetrating abdominal trauma

RESULTS AND DISCUSSIONS

The mean age of the participants was 42.52±12.29 years. Age range was 18-75 years. There were 112 males (74.67%) and 38 females (25.33%) in our study. The most common type of injury was Road Traffic Accidents (RTA) seen in 70 cases (46.67%), followed by occupational., injuries in 56 cases (37.33%) and

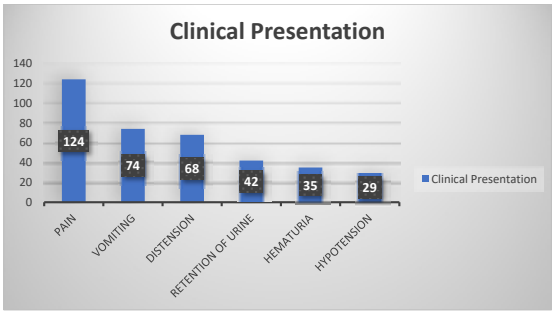

Fig 1: Clinical presentation of the cases

Table 1: Age distribution of the patients

Age group	No. of Patients	Percentage
18-30	36	24.00
31-50	74	49.33
51-70	32	21.33
>70	8	5.33
Total	150	100.00

Table 2: Type of Injury

Type of injury	No. of patients	Percentage
Road traffic accidents	70	46.67
Occupational Injuries	56	37.33
Household Accidents	14	9.33
Hit by animal	6	4.00
Assault	4	2.67
Total	150	100.00

Table 3: Associated injuries along with blunt abdominal trauma and deaths

Associated injuries	No. of patients	Percentage	Deaths	Percentage
Present	66	44.00	32	48.49
Absent	84	56.00	12	14.29
Total	150	100.0	44	29.33

P < 0.001, Significant Association

Table 4: Specific organ injuries

Organ injury	No. of patients	Percentage
Liver	58	38.67
Spleen	31	20.67
Small intestine and mesentery	24	16.00
Urinary bladder, urethra	19	12.67
Muscular hematoma	14	9.33
Kidney	5	3.33
Stomach and duodenum	2	1.33
Diaphragm	2	1.33
Colon	1	0.67
Pancreas	1	0.67
No organ injury	20	13.33

(*Multiple organ Injuries in few cases)

Table 5: Organ injuries and survival

Organ Injury	Survived	Died	Total
No Organ Injury	20	0	20
Single Organ Injury	26	08	34
Multiple Organ Injury	60	36	96

P = 0.003, Significant

household accidents in 14 cases (9.33%). (Table 2) We observed total 44 deaths out of 150 cases (29.33%). There were 66 cases with associated injuries (44%). We found a significant association between the associated injuries and deaths in our study. ($p<0.001$) Out of 66 cases with injuries, 32 had died (48.49%) followed by 84 cases without injuries with 12 deaths (14.29%). The clinical presentation data reveals a predominant occurrence of pain, reported in 124 cases, comprising a significant 82.67% of the total presentations. Following closely behind, vomiting was observed in 74 cases, representing 49.33% of the total, while distension was noted in 68 cases, accounting for 45.33%. Retention of urine was less frequent, documented in 42 cases (28.00%), alongside hematuria in 35 cases (23.33%). Hypotension, though less common, was still notable with 29 cases (19.33%). These findings emphasize the prominence of pain as a primary symptom, followed by secondary symptoms such as vomiting and distension, underscoring their significance in the clinical presentation and potential diagnosis of the condition under scrutiny. Liver injuries were the most prevalent, affecting 58 patients, constituting 38.67% of the total. Following closely, spleen injuries were observed in 31 patients, representing 20.67%. Small intestine and mesentery injuries accounted for 24 patients (16.00%), while urinary bladder and urethra injuries were noted in 19 patients (12.67%). Muscular hematoma was present in 14 patients (9.33%), whereas kidney injuries were less common, with only 5 patients affected (3.33%). Stomach and duodenum injuries and diaphragm involvement were seen in 2 patients (1.33%) each, and both colon and pancreas injuries were each observed in 1 patient (0.67%). Notably, 20 patients (13.33%) did not sustain any organ injuries. This distribution provides valuable insights into the prevalence and types of organ injuries encountered in this patient population.

The data reveals distinct patterns in patient outcomes based on the presence and severity of organ injuries. Notably, 100% of patients (20 out of 20) without any organ injury survived, demonstrating an encouraging survival rate in this subgroup. For patients with a single organ injury, the survival rate was 76.5% (26 out of 34) and the death rate was 23.5% (8 out of

34). For patients with multiple organ injuries, the survival rate was 62.5% (60 out of 96) and the death rate was 37.5% (36 out of 96). These percentages underscore the varying degrees of mortality risk associated with differing levels of organ injury severity, emphasizing the critical need for timely and targeted medical interventions to optimize patient outcomes, particularly in cases of extensive trauma involving multiple organs. There was significant association between the multiple organ injuries and deaths in our study (p = 0.003). The mean age of the participants was 42.52±12.29 years. There were 112 males (74.67%) and 38 females (25.33%) in our study[15]. Observed that the common age group was 21-30 years with male majority. They had patients younger than what we observed in our study, however the gender distribution is comparable in both these studies[17]. Observed that 41-50 years was most commonly involved age group, with male majority similar to our findings. The most common type of injury was Road Traffic Accidents (RTA) seen in 70 cases (46.67%), followed by occupational; injuries in 56 cases (37.33%) and household accidents in 14 cases (9.33%). *et al.*[15] Observed that RTA was most common mode of injury seen in 53% cases. These findings are similar to our study results[16]. Observed that Road Traffic Accidents (RTA) was most common mode of injury seen in 48% of their cases. We observed total 44 deaths out of 150 cases (29.33%). There were 66 cases with associated injuries (44%). We found a significant association between the associated injuries and deaths in our study. (p<0.001) Out of 66 cases with injuries, 32 had died (48.49%) followed by 84 cases without injuries with 12 deaths (14.29%)[17]., observed mortality of 11%, we observed a higher mortality as the patients were referred to our hospital from other primary and secondary care centres and in the transit process they lost a significant amount of important time. The clinical presentation data reveals a predominant occurrence of abdominal pain, reported in 124 cases, comprising a significant 82.67% of the total presentations. Following closely behind, vomiting was observed in 74 cases, representing 49.33% of the total, while distension was noted in 68 cases, accounting for 45.33%. Retention of urine (28.00%), alongside hematuria (23.33%), Hypotension (19.33%) were other features observed[16]. Observed that abdominal pain was seen in 90% cases followed by vomiting and abdominal distension, as seen in our study. These findings emphasize the prominence of pain as a primary symptom, followed by secondary symptoms such as vomiting and distension, underscoring their significance in the clinical presentation and potential diagnosis of the condition under scrutiny. Liver injuries were the most prevalent, constituting 38.67% of the total. Following closely, spleen injuries were observed 20.67%. Small intestine and mesentery injuries accounted for 24 patients (16.00%), while urinary bladder and urethra injuries were noted in 19 patients (12.67%). Notably, 20 patients (13.33%) did not sustain any organ injuries. This distribution provides valuable insights into the prevalence and types of organ injuries encountered in our patient population. Mehta *et al.* observed that spleen was most commonly involved (53%) followed by liver (42%)[15]. Mhaske and Deshmukh also reported that spleen was commonly involved organ followed by liver[18].

The data reveals distinct patterns in patient outcomes based on the presence and severity of organ injuries. Notably, 100% of patients (20 out of 20) without any organ injury survived. For patients with a single organ injury, the survival rate was 76.5% (26 out of 34) For patients with multiple organ injuries, the survival rate was 62.5% (60 out of 96) and the death rate was 37.5% (36 out of 96). These percentages underscore the varying degrees of mortality risk associated with differing levels of organ injury severity, emphasizing the critical need for timely and targeted medical interventions to optimize patient outcomes, particularly in cases of extensive trauma involving multiple organs. There was significant association between the multiple organ injuries and deaths in our study. (p = 0.003)[16]. Observed that the patients with multiple organ injuries had more prevalence of deaths as compared to cases with no internal organ injuries[15]. also reported similar findings. Untreated or missed abdominal injuries can be much more serious. This could lead to infections and even sepsis, secondary bleeding from the spleen or delayed splenic rupture, organ failures including cardiorespiratory failure, shock and even death of the patients.

CONCLUSION

Our study investigated the clinical profile of blunt abdominal trauma cases in a tertiary care hospital in Western Maharashtra. We found that the most common age group for abdominal trauma was 31-50 years old, with males being more affected than females. Road traffic accidents were the leading cause of blunt abdominal trauma, followed by occupational injuries and household accidents. Our analysis revealed a significant association between the presence of associated injuries and mortality. Abdominal pain was the most frequent symptom, followed by vomiting and distension. Liver and spleen injuries were the most prevalent types of organ trauma. The study also highlighted that the survival rate significantly decreased with increasing severity of organ injuries. The findings of our study emphasize the importance of prompt diagnosis and treatment of blunt abdominal trauma to improve patient outcomes. Early interventions can help prevent complications such as sepsis, delayed internal bleeding, organ failure and death.

REFERENCES

1. O'Malley, E., E. Boyle, A. O'Callaghan, J.C. Coffey and S.R. Walsh, 2012. Role of laparoscopy in penetrating abdominal trauma: A systematic review. World J. Surg., 37: 113-122.
2. Li, Y., Y. Xiang, N. Wu, L. Wu and Z. Yu *et al.,* 2015. A comparison of laparoscopy and laparotomy for the management of abdominal trauma: A systematic review and meta-analysis. World J. Surg., 39: 2862-2871.
3. Kordzadeh, A., V. Melchionda, K.M. Rhodes, E.O. Fletcher and Y.P. Panayiotopolous, 2015. Blunt abdominal trauma and mesenteric avulsion: A systematic review. Eur. J. Trauma Emerg. Surg., 42: 311-315.
4. Brooks, A. and J.A.D. Simpson, 2009. Blunt and penetrating abdominal trauma. Surg. (Oxford), 27: 266-271.
5. Shojaee, M., A. Sabzghabaei and A. Heidari, 2020. Efficacy of new scoring system for diagnosis of abdominal injury after blunt abdominal trauma in patients referred to emergency department. Chin. J. Traumatol., 23: 145-148.
6. Wadhwa, M., R. Kumar, M. Trehan, S. Singla, R. Sharma, A. Ahmed and R. Sharma, 2021. Blunt abdominal trauma with hollow viscus and mesenteric injury: A prospective study of 50 cases. Cureus, Vol. 13 .10.7759/cureus.13321.
7. Kumar, D. and K.K. Mohan, 2021. Effectiveness of clinical abdominal scoring system in the management of patients with blunt trauma abdomen. Int. Surg. J., 8: 1175-1180.
8. Nayak, S.R., M.P. Yeola, S.R. Nayak, K. Kamath and P.S. Raghuwanshi, 2021. Role of focused assessment with sonography for trauma in the assessment of blunt abdominal trauma-a review. J. Evol. Med. Dent. Sci., 10: 45-51.
9. Kharbanda, A., M. Mital, S. Saran and S. Verma, 2020. Multimodality imaging approach to blunt abdominal trauma in a tertiary care center in north India. West Afr. J. Radiol., 27: 40-45.
10. Sinha, Y., M.U. Khajanchi, R.P. Prajapati, S. Dharap and K.D. Soni *et al.*, 2020. Management of liver trauma in urban university hospitals in India: An observational multi centre cohort study. World J. Emerg. Surg., Vol. 15 .10.1186/s13017-020-00338-9.
11. Harna, B., A. Bahl and S. Arya, 2020. Epidemiology of trauma patients admitted to a trauma center in new Delhi, India. Indian J. Crit. Care Med., 24: 1193-1197.
12. Pandya, B., T. Huda, D. Gupta, B. Mehra and R. Narang, 2021. Abdominal wall hernias: An epidemiological profile and surgical experience from a rural medical college in central India. Surg. J., 7: 41-46.
13. Garg, V.K., S.K. Meena and B. Tatwal, 2020. A profile study of death due to blunt trauma to abdomen. IP Int. J. Forensic Med. Toxicol. Sci., 5: 24-26.
14. Wang, J., L. Cheng, J. Liu, B. Zhang and W. Wang *et al.,* 2022. Laparoscopy vs. laparotomy for the management of abdominal trauma: A systematic review and meta-analysis. Front. Surg., Vol. 9 .10.3389/fsurg.2022.817134.
15. Mehta, N., S. Babu and K. Venugopal, 2014. An experience with blunt abdominal trauma: Evaluation, management and outcome. Clin. Pract., Vol. 4 .10.4081/cp.2014.599.
16. Solanki, H.J. and H.R. Patel, 2018. Blunt abdomen trauma: A study of 50 cases. Int. Surg. J., 5: 1763-1769.
17. Goyal, M., L. Kumar and D. Dobhal, 2020. A clinical study of blunt trauma abdomen in a tertiary care hospital of Uttarakhand. Int. J. Scient. Study, 8: 39-43.
18. Maske, A. and S. Deshmukh, 2016. Traumatic abdominal injuries: Our experience at rural tertiary care center. Int. Surg. J., 3: 543-548.