



A PROSPECTIVE STUDY OF BLUNT ABDOMINAL TRAUMA: OUTCOMES AND MANAGEMENT

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ABSTRACT

Background- Blunt abdominal trauma is one of the commonest injuries responsible for considerable mortality and morbidity. Hence this study was planned with the objectives to assess the cause, the pattern of injury, and management in patients of blunt abdominal trauma. **Methods-** This was a prospective study in 50 patients of blunt abdominal trauma who presented to trauma ward in the study duration of January 2021 to October 2023. **Results-** In this study, vehicular accident was the most common mode of injury. As spleen was the most common abdominal organ injured, certainly, the most common surgical intervention performed was splenectomy. Chest injury combined with other injuries was appraised as the commonest associated injury. Mortality rate was 8%. Majority of patients were pertaining to 21-30 years of age group interval with male predominance. Male to female ratio was 11:1. **Conclusion-** Timely diagnosis, surgical expertise, and skilled management for operative interventions can enhance survival in these patients

KEYWORDS : Abdominal Trauma, Blunt Trauma, Spleen Injury, Vehicular Accident

INTRODUCTION

Traumatic injuries occupy the foremost place in causes of mortality and morbidity under 45 years of age in developing countries. Globally, it is the 7th cause of mortality with abdominal injuries as the third commonest injured organ, out of which 25% mandates surgical intervention. 85% of abdominal trauma worldwide are blunt injuries.(1) The abdomen is vulnerable to injury since there is minimal bony protection for underlying organs. Abdominal structures can occur due to compression or deceleration forces.(2) Compression forces consequences from tears of solid viscera or rupture of hollow organs due to direct blows or external compression on fixed object. Later causes stretching and linear shearing between relatively fixed and free objects.(3) Motor vehicle collision, civilian violence, pedestrian accidents and falls are paramount causes of such traumas.(4) Specifically, spleen, liver, kidney, pancreas, are the most vulnerable solid organs, while the hollow viscera like stomach, intestines and bladder are implausible to be involved. Solid organs blunt traumas are characterised by haemorrhage and shock, while in hollow visceral injury results in peritonitis.(1) Abdominal blunt trauma poses diagnostic difficulties to surgeons.(5) It is recommended to look for clinically detectable signs of abdominal injury, do initial resuscitation, focused assessment with sonography in trauma (FAST) and computed tomography (CT) abdomen as diagnostic protocol.(3,6) Notwithstanding of advances in diagnostic techniques, the morbidity and mortality of blunt abdominal traumas are still on rise. Reason for the former may be the time borrowed between trauma and hospitalization, delayed diagnosis, meagre surgical treatment as well as intensive care unit care, and postoperative complications.(7)

Non-operative management (NOM) of blunt trauma amounts to 80% of total hemodynamically stable cases but the failure rates comprises to 2-3%. However, in resource-limited countries like India, modern diagnostic facilities are lacking making non-operative treatment a major challenge. The suspected or confirmed hollow organs injury mandates laparotomy.(8) Hence we focused, to assess the cause, the pattern of injury, and management in patients of blunt abdominal trauma.

Methods

This was a prospective cohort study conducted in 50 patients admitted in trauma ward in the Department of surgery, tertiary care teaching institute after obtaining approval of institutional ethics committee. Total duration of study was from

January 2021 to October 2023. Patients satisfying the following inclusion and exclusion criteria and willing to participate in this study were enrolled in the study.

Inclusion Criteria

All patients of blunt abdominal trauma admitted in trauma ward

Exclusion Criteria

Patients of polytrauma with severe bony and penetrating abdominal injury

After initial resuscitation of patient, demographics were noted, clinical examination was done followed by various laboratory tests. All patients underwent FAST and CT scan to arrive at diagnosis. Patients were then categorized into unstable or stable ones. A 4 quadrant abdominal tap was done to look for haemoperitoneum or fecal contamination in cases of suspected blunt trauma to the abdomen. It was also done in all unconscious patients and where exact nature of accident could not be ascertained, especially in patients presenting with signs of shock. The patients were closely monitored in an intensive care unit. Patients not responding to conservative management underwent immediate laparotomy. Complications, if any were recorded and dealt with accordingly. Post operatively, patients were managed on IV fluids, blood transfusions, broad spectrum antibiotics and analgesics as per the requirement of the individual cases. Data was entered and analyzed in Microsoft Excel. Relevant statistical analysis was done using SPSS v.16

OBSERVATIONS AND RESULTS

Table 1. Baseline Characteristics (n= 50)

Characteristics	No. of patients	Percentage (%)
Age group (years)		
0-20	13	26
21-30	26	52
31-40	5	10
41-50	6	12
51-above	0	0
Sex distribution		
Female	4	8
Male	46	92

In our study, blunt abdominal trauma (BAT) was seen at all ages, predominantly in the prime of life between 21-30 years(52%). The sex distribution had male preponderance and male:female ratio is 11:1 (Table 1)

Table 2. Clinical Profile (n= 50)

Parameters	No. of patients	Percentage (%)
Mode of injury		
Vehicular accidents	24	48
Railway accidents	3	6
Falls	18	36
Assaults	5	10
Associated injuries		
Present	18	36
Absent	32	64
Organ Injured		
Liver	18	36
Spleen	21	42
Kidney	2	4
Stomach & duodenum	0	0
Intestine & mesentry	4	8
Bladder	2	4
Diaphragm	0	0
Pancreas	3	6
Gall bladder	0	0
Vascular	0	0
Abdominal tap		
Positive	35	70
Negative	7	14
USG guided positive	8	16
Associated injuries		
	No of patients	No of deaths
Head injury	2	0
Chest injury	5	0
Other injury	4	0
Head + Chest Injuries	1	0
Chest + other Injuries	5	3
Head + other Injuries	1	0

In our study, as expected vehicular accidents have been the major cause of trauma. They contributed 48% followed by falls 36%. Of them, 36% had associated injuries. 75% who died had associated injuries. Chest injuries associated with major long bone injury leading to hypotension and shock was seen in 2 of them. 3 patients ceased in patients with combined chest and other injuries. Spleen was the commonest organ injured in 42% and the mortality being 5%. Liver was the next common organ injured being found in 36% of patients with mortality of 17%. Abdominal tap was employed in all patients with suspected abdominal trauma. 70% had positive abdominal tap and 14% had negative abdominal tap while 16% were detected on USG guided abdominal tap (Table 2)

Table 3. Treatment Profile (n= 50)

Parameters	Percentage (%)
Treatment	
Liver tear suturing	0
Liver packing	1
Splenectomy	9
Nephrectomy	0
Bladder suturing	0
Suturing of gastric or duodenal tears	0
Suturing of intestinal perforation, mesenteric tears & resection and Anastomosis	4
Repair of diaphragmatic tear	0
Cholecystectomy & liver tear suturing	0
Complications	
	Mortality (%)
Chest infection	50
Septicaemia / ARDS shock	50
Reactionary haemorrhage	0
Wound infection	0
Burst abdomen	0
Neurological deterioration due to head Injury	0
Peritonitis	0

Outcome	Percentage (%)
Survived	92
Expired	8

In our study, splenectomy was the commonest operation performed in 9 patients. A combination of procedures were required in patients with multiple injuries. Chest infection was seen among 24% of cases, Septicemia/ARDS shock was present in 8%, wound infection is seen in 4%, burst abdomen in 4%, and Neurological deterioration due to head injury was seen in 2% of cases. Mortality was seen in 50% of septicemia/ARDS shock patients and rest 50% succumbed to chest infection and shock due to multiple organ failure. The overall mortality in this study was 8% (Table 3)

Table 4. Relation Between Mode Of Injury And Organ (n= 50)

Organ	Vehicular	Fail	Assault	Railway	Total
Liver	11	6	0	1	18
Spleen	10	7	2	2	21
Kidney	1	1	0	0	2
Duodenum, Stomach	0	0	0	0	0
Small intestine, mesentry	1	1	2	0	4
Colon	0	0	0	0	0
Gall bladder	0	0	0	0	0
Pancreas	1	1	1	0	3
Bladder	2	0	0	0	2
Vascular injury	0	0	0	0	0

In our study, spleen was most commonly injured (21) followed by liver (18) and vehicular accidents being commonest mode of injury (26). (table 4)

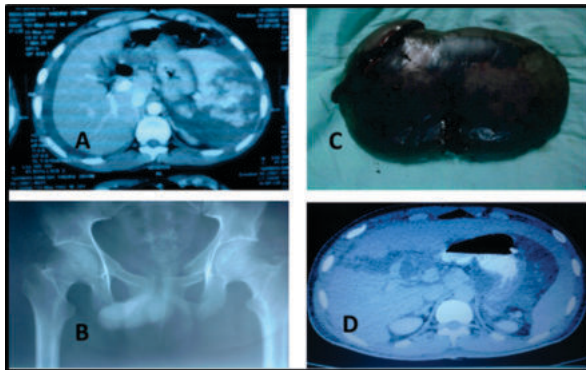


Figure 1. Blunt Abdominal Trauma Images

A) CT Abdomen showing shattered spleen in blunt abdominal trauma. B) Pelvis fracture in case of blunt abdominal trauma. C) Splenic laceration in case of blunt abdominal trauma. D) Liver laceration in case of blunt abdominal trauma. (Figure 1)

DISCUSSION

The principal finding of the present study suggested that vehicular accidents have been the major cause of trauma comprising of 48% followed by falls contributing 36% of aetiologies. Of them, 36% had associated injuries and 75% of them succumbed. Wadhwa et al., also had similar findings with majority of there patients having roadside accidents (72%). They also evaluated other causes like our study including falls from height, machine injury, animal injury, and cycle bar injury.(4) Srivastava et al., also had findings in consensus with our data, as they appraised road traffic accident as commonest etiology (55%). But, they found assault as second commonest, which was different from our results.(33%)(2) Road traffic accidents remain a leading cause of trauma and admissions to emergency departments of most hospitals in India and contributing profoundly to high morbidity and mortality. Findings from this study calls for urgent need for targeting at reducing the prevalence of road traffic accidents and subsequently reduce the incidence of

these injuries.

In our study, chest injuries associated with major long bone injury leading to hypotension and shock was seen in 2 of them. 3 patients ceased in patients with combined chest and other injuries. Spleen was the commonest organ injured in 42% and the mortality being 5%. Liver was the the next common organ injured being found in 36% of patients with mortality of 17%. Abdominal injuries are frequently associated with other injuries and complicate management, affecting the outcome. 60% patients had associated intra-abdominal and extra-abdominal injuries, which was in contradiction to our data. They found skeletal injury (22%) as commonest associated injury followed by blunt chest trauma.(4) This was also in alignment with Ayoade et al., which showed skeletal injuries to be the most common associated extra-abdominal injury and pelvic fractures to be the most common among skeletal injuries.(9) Manohar et al., appraised that the head/neck and musculoskeletal were the most frequently injured regions.(10) Early diagnosis and treatment of associated injuries is utmost to reduce mortality and morbidity associated with abdominal injuries.

As reported by other studies by Nyongole et al., and Musau et al., the spleen was the most commonly injured organ, supporting our data. Despite being protected under the bony ribcage, the spleen remains amongst the most vulnerable organs sustaining injury from amongst the abdominal trauma cases.(10-12) Contradictory results were also revealed by Srivastava et al., where small bowel was commonest injured organ.(2) Sisodiya et al., focused on liver as commonest injured organ as it is more anteriorly placed, making it susceptible to injury.(1)

In our study, splenectomy was the commonest operation performed in 9 patients. A combination of procedures was required in patients with multiple injuries. The findings in this study conform to previous study elsewhere that confirmed splenectomy being commonest means of treatment interventions by Chalya et al.(13) Asuquo et al., managed 36% cases in the NOM group. This translated to reduced hospitalization, lower cost of treatment, and avoidance of added morbidity attributable to laparotomy and the hazards of blood transfusion.(14) The tendency of treating splenic injuries by splenectomy can be attributed to limited access to CT scan expertise as well as lack of treatment guidelines in imaging such injuries.(2)

In our study, chest infection was seen among 24% of cases, Septicemia/ARDS shock was present in 8%, wound infection is seen in 4%, burst abdomen in 4%, and Neurological deterioration due to head injury was seen in 2% of cases. Mortality was seen in 50% of septicemia/ARDS shock patients and rest 50% succumbed to chest infection and shock due to multiple organ failure. The overall mortality in this study was 8%. Wadhwa et al., found surgical site infection in 26% patients, as it could be due to contamination of peritoneal cavity by bowel contents. They managed it by aseptic dressings and intravenous antibiotics as per culture and sensitivity reports. Furthermore, wound dehiscence was one complications, which led to an increased hospital stay in their study in 20% patients managed by secondary suturing and daily dressings.(4) Sisodiya et al., wound complications as commonest post operative complication followed by wound dehiscence in one case. The overall mortality rate in this study was 5.5% which correlated with many other studies, in consensus with our study data.(15,16) Reports have shown that mortality increases with the number of associated injuries and co-morbid medical conditions, which adversely affect the management outcome.(17)

In our study, BAT was seen at all ages, predominantly in age interval of 21-30 years (52%). The sex distribution had male sex predominance with 92% males. Wadhwa et al., also

supported our study data with highest incidence among patients in the age group of 21-40 years.(4) Ayoade et al. also found 68.90% in similar age interval. Author explains the reason as this age group has major segment of the workforce.(9) 61% patients were vulnerable in study by Sisodiya et al., belonging to 14-30 years with male predominance of 82.2% males and with male to female ratio of 4.6:1.(1) Author explains the reason as adult males are the earning active member of family and more involved in activities like fast driving vehicles, mechanics, automobile drivers, recreational activities, aggressive behaviour and may be under influence of alcohol in contrast to females.(1,18)

CONCLUSION

From this study, it can be concluded that blunt abdominal trauma is one of the commonest causes of mortality in our setting with vehicular accidents being the most common cause. Associated injuries play a noteworthy and remarkable role in the survival. It is perceptible from our study that early diagnosis and prompt management certainly reduces the mortality in blunt abdominal trauma patients. We recommend, large scale research with big patient population to validate our findings. However, surgical expertise integrated by early management will greatly ameliorate survival of such patients

REFERENCES

- Sisodiya S, Malpani PA retrospective study of blunt trauma abdomen in a tertiary center in central India: evaluation, management and outcome. *Int Surg* 2020;7:2696-701.
- Srivastava SK, Jaiswal K, Kumar D. Prospective study of management and outcome of blunt abdominal trauma (solid organs and hollow viscus injuries). *Int Surg J* 2017;4:3262-71.
- Shah Y, Singh A, Bansod PY, Akhtar M. A prospective evaluation of blunt trauma abdomen in rural setup. *Int J Med Res Rev*. 2017;5:691-701.
- Wadhwa M, Kumar R, Trehan M, Singla S, Sharma R, Ahmed A, Sharma R. Blunt Abdominal Trauma With Hollow Viscus and Mesenteric Injury: A Prospective Study of 50 Cases. *Cureus*. 2021 Feb 12;13(2):e13321.
- Rodrigues J, Gawas S, Kumar S, Talaulikar SS. A clinical study on penetrating abdominal trauma and its outcome at a tertiary care Institute in Goa. *Indian Journal of Basic & Applied Medical Research*. 2023 Mar 1;12(2).
- Carr BM, Bellolio F. Blunt Abdominal Trauma. Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules. 2023 Apr 14:121-7.
- Kiran S. Prospective study of blunt abdomen injury. *International Journal of Surgery Science* 2021;5(4):308-315
- Agarwal S. A Prospective Study of Blunt Abdominal Trauma in a Tertiary Care Center of Northern India. *Journal of cardiovascular research*. 2023;14(6):23-39
- Ayoade BA, Salami BA, Tade AO, Musa AA, Olowoye OA. Abdominal injuries in Olabisi Onabanjo University teaching hospital Sagamu, Nigeria: pattern and outcome. *Niger J Orthop Trauma*. 2006 Dec;5(2):45-9.
- Manohar D. Abdominal Trauma in adults - its outcome - a prospective study in a tertiary health care centre in Andhra Pradesh. *Indian journal of applied research*. 2015;5(11):33-41
- Musau P, Jani PG, Owillah FA. Pattern and outcome of abdominal injuries at Kenyatta National Hospital, Nairobi. *East Afr Med J*. 2006 Jan;83(1):37-43.
- Nyongole. The Pattern of Abdominal Trauma as Seen at Muhimbili National Hospital Dar es Salaam, Tanzania. *East and Central African Journal of Surgery*. 2013;18:41-48.
- Chalya, P.L., Mabula, J.B. Motorcycle injuries as an emerging public health problem in Mwanza City, north-western Tanzania. *Tanzania Journal of Health Research*. 2010;12:214-221
- Asuquo, M. A Prospective Study of Blunt Abdominal Trauma at the University of Calabar Teaching Hospital, Nigeria. *European Journal of Trauma and Emergency Surgery*. 2009;36(2):164-168.
- Nikhil M, Sudarshan B, Kumar V. An experience with blunt abdominal trauma: evaluation, management and outcome. *Clin Practice*. 2014;4:59
- Fazili A, Nazir S. Clinical profile and operative management of blunt abdominal trauma: a retrospective one year experience at SMHS hospital, Kashmir, India. *JK Practit*. 2001;8:219-21.
- Watts DD, Fakhry SM, EAST Multi-Institutional HVI Research Group. Incidence of hollow viscus injury in blunt trauma: an analysis from 275,557 trauma admissions from the East multi-institutional trial. *Journal of Trauma and Acute Care Surgery*. 2003 Feb 1;54(2):289-94.
- Sule AZ, Kidmas AT, Awani K, Uba F, Misauno M. Gastrointestinal perforation following blunt abdominal trauma. *East Afr Med J*. 2007;84:429-33.