

Management and Outcome of Bowel Injuries Following Blunt Abdominal Trauma

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ABSTRACT

Background: Bowel injuries resulting from blunt abdominal trauma represent a significant medical challenge, requiring prompt and comprehensive management to ensure favorable outcomes for affected patients. Timely identification of bowel injury is of paramount importance and is a difficult task. **Objective:** To determine the frequency and management outcome of bowel injury among cases having blunt abdominal trauma presenting to a tertiary care hospital at Jamshoro Hyderabad. **Study Design:** Descriptive cross-sectional study. **Settings:** Department of surgery, Liaquat University of medical and health sciences, Jamshoro Hyderabad Pakistan. **Duration:** From December 2021 to November 2022. **Methods:** All patients aged 18 years to 70 years of either gender with blunt abdominal trauma presented within 48 hours of injury were consecutively enrolled. Based on peritonism symptoms, the patient's hemodynamic condition, and radiological evidence, the diagnosis of bowel and mesentery damage was determined. Standard of care was provided to all patients and managed in consultation with the experienced Surgeons. Post procedure patients were followed till discharged and outcome in terms of discharged or mortality was noted. **Results:** The average age of the participants was 43.64 years. Males were higher as compared to females, i.e., 37 (52.9%) and 33 (47.1%) respectively. The leading reason for injuries was road traffic accidents in 40 (57.1%) patients. 26 (37.1%) cases underwent surgical management. Bowel injury was observed in 12 (17.1%) patients and out of this mortality rate was 5 (41.7%). Higher mortality was observed among patients under 45 years old and those who underwent surgical treatment ($p < 0.05$). However, no significant no notable disparity in mortality was observed in relation to gender ($p = 0.408$). **Conclusion:** Among individuals with blunt abdominal trauma, the incidence of bowel injury was approximately 17.1%, coinciding with a heightened mortality rate in this group.

Keywords: Bowel injury, Blunt abdominal trauma, Mortality.

INTRODUCTION

In the Accident and Emergency department, blunt abdominal trauma stands out as a prominent contributor to abdominal injuries, contributing significantly to both morbidity and mortality rates.¹ The altered mental status due to head injury and its severity make it difficult to diagnose and manage such cases. Patients with blunt abdominal trauma sustained both kind of injuries abdominal and extra abdominal which further complicates the cases. The magnitude of intra-abdominal injuries secondary to blunt abdominal trauma reported to emergency department is 13%.¹ Among the solid organ spleen and liver are the commonest injured organs whereas bowel, mesentery, pancreas, diaphragm,

bladder as well as kidney and abdominal aorta are less like to be injured.²⁻³ To assess the degree and extent of injuries secondary to blunt abdominal trauma the commonly used modalities include physical examinations, X-rays, ultrasound, diagnostic peritoneal lavage, CT scan, and diagnostic laparoscopy.⁴⁻⁶ In a hemodynamically stable patient, currently, computed tomography is the modality of choice for the diagnosis of injury to hollow viscera in addition to abdominal solid organ injury of suspected trauma.⁴⁻⁷ Presence of free intra-peritoneal fluid or gas, enhanced intestinal-wall thickening, mesenteric fat stranding, and extraluminal gas are the commonest findings detected on X rays in diagnosis of small bowel injury.⁸⁻⁹ The accuracy of computed tomography in the diagnosis of intestinal

damage, which necessitates surgical intervention and might even result in severe morbidity and death, is questionable. For colonic perforations, the course of treatment included laparotomy, subsequently anastomosis, resection repair, simple closure of perforation and protective colostomy.¹⁰ The rationale of the study is that timely identification of bowel injury is of paramount importance and is a difficult task. An unnoticed bowel lesion is very lethal because of its remarkable infectious potential. Therefore, the present study is designed to assess the magnitude and management outcome of bowel injury secondary to blunt abdominal trauma.

METHODS

A descriptive cross-sectional study was conducted at the Department of surgery, Liaquat University of medical and health sciences, Jamshoro Hyderabad Pakistan.

The duration of the study was one year from December 2021 to November 2022. The sample size was determined using the sample size calculator provided by the WHO on the basis of following prerequisites: Prevalence of bowel injury in blunt abdominal trauma: 12.63%¹¹ Confidence level: 95%, absolute precision: 8%. Sample came: 67 cases rounded to 70 cases of blunt abdominal trauma

Patients with blunt abdominal trauma, patients presenting within 48 hours of injury, patients of aged 18 years to 70 years and patient of either gender were included in the study.

Individuals with penetrating wounds, individuals presented with chronic renal impairment and chronic liver disease, history of abdominal tuberculosis and non-consenting patients were excluded from the study.

The institutional ethical review committee's clearance was acquired before the study was conducted. Patients coming to emergency department or outpatient department satisfying the inclusion criteria was included in the research. Prior to enrollment, the study's procedures, risks, and benefits were described, confidentiality was upheld, and informed permission was obtained. The chief investigator recorded the incident's full history and timing. Physical testing was done, and pertinent research was requested. Based on the patient's hemodynamic condition, radiographic findings, and symptoms of peritonism, the diagnosis of bowel and mesentery damage was determined. X-rays of the chest, abdominal ultrasonography, and contrast-enhanced computed tomography of the abdomen are among the radiological examinations performed to assess patients who have suffered blunt trauma. Free fluid was thought to be predictive of hollow viscus and/or mesenteric damage when present without solid organ injury. On computed tomography, the presence of contrast

extravasation and/or extraluminal air was seen as diagnostic for intestinal damage. Small intestinal thickening and dilatation together with the presence of free fluid without solid organ injury was also thought to be symptomatic of bowel injury. All patients received the same level of care and were treated under the supervision of a skilled surgeon. Following the surgery, patients were monitored until they were released, at which point the outcome—discharge or mortality was documented. In the questionnaire that is annexed, information such as age, gender, bowel injury, source of damage, place of injury, procedure done, and result in terms of discharge or mortality was recorded. The data was inputted and examined using IBM's SPSS, version 26.

RESULTS

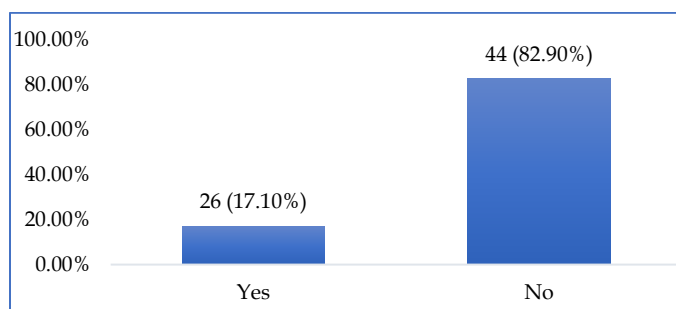
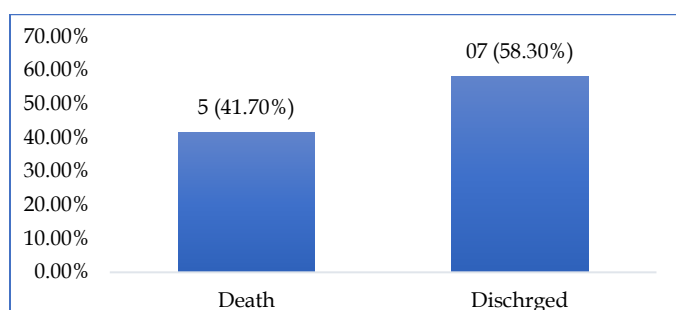
The mean age was 43.64 with the standard deviation of 9.74 years. Males were higher as compared to females, i.e., 37 (52.9%) and 33 (47.1%) respectively. The mean duration of blunt abdominal trauma was 58.10 with the standard deviation of 8.71 minutes. The leading reason for injuries was road traffic accidents observed in 40(57.1%) patients followed by fall in 21 (30%) and assault in 9 (12.9%) patients. Surgical management was done in 26 (37.1%) and non-surgical in 44 (62.9%) patients. (Table 1)

Table 1: Descriptive statistics of demographic characteristics (n=70)

Variables		Statistics	
Age of patients	(mean ± SD)	43.64 ± 9.74 years	
Duration of trauma	(mean ± SD)	58.10 ± 15.71 minutes	
Gender	Male	37	52.9%
	Female	33	47.1%
Cause of the injury	RTA	40	57.1%
	Fall	21	30.0%
	Assault	09	12.9%
Types of management	Surgical	26	37.1%
	Non- surgical	44	62.9%

Out of all, 12(17.10%) cases observed with bowel injury, while remaining had no bowel injuries. Furthermore, out of these 12 cases 5(41.7%) were died and remaining 7(58.3%) were discharged. (Figure 1 & 2)

Among 12 cases of bowel injuries, mortality was significantly high in <45 years of the cases and those who were undergone surgical treatment ($p < 0.05$), while the mortality rate was statistically insignificant according to gender ($p = 0.408$). (Table 2)

Figure 1: Frequency of bowel injury (n=70)**Figure 2: Management of outcome in bowel injury patients with blunt abdominal n=12****Table 2: Management outcomes of bowel injury with age of the patients (n=12)**

Variables		Outcome		p-value
		Death (n=5)	Discharge (n=7)	
Age groups	≤45	4 (33.3%)	1 (8.3%)	0.023
	>45	1 (8.3%)	6 (50.0%)	
Gender	Male	4 (33.3%)	4 (33.3%)	0.408
	Female	1 (8.3%)	3 (25.0%)	
Cause of injury	RTA	5 (41.7)	7 (58.3)	--
	Fall	--	--	
	Assault	--	--	
Management Type	Surgical	5 (41.7)	3 (25.0%)	0.038
	Non-Surgical	0 (0)	4 (33.3%)	

DISCUSSION

Bowel injuries resulting from blunt abdominal trauma represent a complex medical scenario that demands prompt recognition, effective management, and comprehensive care to optimize patient outcomes. The present study has been done to evaluate the occurrence of bowel injury in patients with blunt abdominal trauma and its management outcomes. In this study among the 70 patients with blunt abdominal trauma, the average age was 43.64 years with a standard deviation of 9.74 years, males comprised a larger proportion at 52.9%, while females constituted 47.1% of the cases. These findings were supported by the Agbroko S et al¹¹ as total of 76 individuals in their study, with 66 being males and 10 being females. Their ages spanned from 15 to 66 years,

with an average age of 32.9 ± 10 years. Similarly, in the study by AZIM Kh et al¹² also reported that in their study among the 113 patients, 102 (90.3%) were male, while 11 patients (9.7%) were female, with an overall average age of 37.1 ± 3.5 years. Although Shojae M et al¹³ also found almost similar findings regarding age as 35.79 ± 13.09 years of the patients with abdominal trauma. Blunt abdominal trauma is observed to be more prevalent among young adults and males due to several factors, because they often engage in higher-risk activities, including sports, recreational pursuits, and driving, which can increase their susceptibility to accidents causing blunt abdominal trauma.

In this study road traffic accidents emerged as the primary source of injuries in 57.1% patients followed by fall in 30% and assault in 12.9% patients. Several studies have reported around 75 percent of blunt abdominal trauma cases are due to motor vehicle accident or motor vehicle to pedestrian accidents followed by abdominal blow 15% and fall 6-9%.^{14,15} According to the current study the frequency of bowel injury was observed in seventeen percent. In a study, bowel injuries occurred in almost thirteen percent of the study subjects having blunt abdominal trauma.¹⁶ On the other hand Polat AV et al¹⁷ reported that, out of the twenty-seven cases evaluated with Blunt Bowel and Mesenteric Injury (BBMI), 20 individuals (74%) exhibited bowel injury, while 3 patients (11%) experienced mesenteric injury, and 4 patients (15%) had both bowel and mesenteric injuries. In the line of this series Fraga GP et al¹⁸ reported that, out of the total patient population, sixty-two individuals (68.9%) sustained exclusive injuries to the small bowel, while twenty-eight patients (31.1%) experienced injuries to the small bowel along with other intra-abdominal injuries.

One of the primary challenges in managing bowel injuries following blunt abdominal trauma is timely diagnosis. The symptoms of bowel injuries can often overlap with those of other traumatic injuries, making accurate identification complex. This underscores the importance of a high index of suspicion and the utilization of advanced imaging techniques, such as CT scans with contrast enhancement, to accurately diagnose such injuries. The earlier the diagnosis, the more effectively interventions can be initiated, preventing potential complications and improving patient outcomes. The choice between surgical and non-surgical management depends on various factors, including the severity of the injury, the patient's overall condition, and the expertise of the medical team. Surgical intervention remains the cornerstone for managing many bowel injuries, involving techniques ranging from primary repair to resection and ostomy creation. The decision-making process should carefully weigh the risks and benefits, taking into consideration the potential complications associated with

surgery. The ultimate outcomes of bowel injuries following blunt abdominal trauma can be influenced by multiple factors, as well as the age of the cases, general health status, the extent of the injury, and the effectiveness of the chosen treatment strategy. Patients who had acute abdominal damage as a result of an automobile accident should have their bowels thoroughly examined. It is advised that comparable study be conducted in the future on a bigger sample of participants, taking into account broader demographical features and taking into account additional potential correlations, in order to further the field's analysis.

CONCLUSION

As per the study conclusion, the identification of an occurrence rate of around 17.1% highlights the substantial occurrence of bowel injuries within cases of blunt abdominal trauma. Moreover, the concerning revelation of a heightened mortality rate among these patients underscores the critical nature of this medical condition. The study's findings emphasize the pressing need for improved strategies in the management of bowel injuries arising from blunt abdominal trauma. Prompt diagnosis, effective treatment, and comprehensive post-operative care are crucial elements in mitigating the mortality risks associated with these injuries.

LIMITATIONS

One significant constraint is the relatively small sample size employed in the research. With a limited number of participants, the study's results may not be fully representative of the broader population of patients with blunt abdominal trauma. This could potentially impact the generalizability of the reported incidence of bowel injuries and the associated mortality rate.

SUGGESTIONS / RECOMMENDATIONS

To strengthen the understanding of bowel injury prevalence in cases of blunt abdominal trauma and its associated mortality, it is recommended that further large-scale studies be conducted. These studies should encompass diverse patient populations and multiple healthcare centers to enhance the reliability and generalizability of the findings.

CONFLICT OF INTEREST / DISCLOSURE

None.

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