

Pattern and outcome of abdominal injuries at Trauma Centre Postgraduate Medical Institute, Quetta

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Abstract

Objective: To evaluate the pattern, causes and clinical outcomes of abdominal injuries in patients presenting at a trauma centre.

Method: The hospital-based, cross-sectional study was conducted at the Trauma Centre, Postgraduate Medical Institute, Quetta, Pakistan, from July 20, 2024 to January 20, 2025, and comprised patients with abdominal injuries. Demographic and clinical variables were noted. Data was analysed using SPSS 25.

Results: Of the 310 patients, 266(85.80%) were male and 44(14.2%) were female. There were 32(10.3%) patients aged 6-15 years, 43(13.9%) aged 16-30 years, 204(65.8%) aged 31-45 years, and 31 (10%) aged 46-60 years. Liver and gut injuries were associated with higher mortality, while cases of gut injury and multi-organ involvement had more frequent complications ($p < 0.05$).

Conclusion: Abdominal trauma was found to mainly affect males of bread-winning age, with penetrating injuries being the most common.

Keywords: Abdominal trauma, Abdominal injuries, Outcome, Blunt, Penetrating. (JPMA 76: 1645; 2026)

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Introduction

Abdominal injuries represent a significant cause of morbidity and mortality among trauma patients, especially in settings with high incidences of road traffic accidents (RTAs), interpersonal violence and industrial hazards.¹ The abdomen, being a relatively insecure area of the body, is prone to a wide range of injuries, which can be classified broadly into blunt and penetrating trauma. These injuries can involve various organs, such as the liver, spleen, intestines and major blood vessels, making the management of abdominal trauma a critical component of emergency and trauma care.^{2,3} Globally, abdominal trauma accounts for a considerable proportion of emergency trauma admissions, with rates varying depending on the region, demographics and social factors.⁴ In low- and middle-income countries (LMICs), such as Pakistan, abdominal injuries frequently result from RTAs, domestic violence and occupational hazards.⁵ In contrast, high-income countries (HICs) report more cases related to gunshot wounds and stab injuries, reflecting differences in social environments and risk factors. Regardless of the mechanism of injury, abdominal trauma remains a significant public health concern, often leading to long-term disability, economic loss and burden on healthcare

systems.^{6,7} Blunt abdominal trauma (BAT) is the more common form, and often results from RTAs, falls from height or physical assaults. This type of injury is typically characterised by compression, deceleration or shear forces that damage internal organs without penetrating the skin.⁸ Penetrating abdominal trauma (PAT), on the other hand, includes injuries caused by objects such as knives, bullets or other sharp instruments that directly violate the peritoneal cavity.⁹ Both types of traumas can be life-threatening, and often require immediate diagnosis and intervention. Abdominal trauma presents a unique challenge to trauma surgeons due to the complexity of injuries and the variability in clinical presentation.^{10,11} The delay in diagnosis and management can significantly increase the risk of complications, such as internal haemorrhage, infection and multi-organ failure.¹² Blunt abdominal injuries, in particular, can be deceptive as they may not show visible signs of trauma externally.¹³ Thus, reliance on diagnostic imaging, such as ultrasound and computed tomography (CT) scans, is crucial in assessing the severity of the injury.¹⁴ For penetrating injuries, early surgical exploration is often the preferred course of action, especially when vital structures are involved.¹⁵ Advances in trauma care, including improvements in diagnostic imaging, damage control surgery and resuscitation techniques, have led to better outcomes for patients with abdominal injuries.¹⁶ However, the prognosis remains highly dependent on the severity of the injury, the time to intervention, and the availability of specialised trauma care. Despite the advancements in trauma care, the pattern and

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outcome of abdominal injuries in many regions remain poorly documented.¹⁷ In countries like Pakistan, where trauma centres are often overwhelmed with cases, there is limited research that systematically evaluates the spectrum of abdominal injuries and their outcomes. Given the high incidence of RTAs and violence in this region, it is crucial to understand the epidemiology and clinical management of these injuries to improve outcomes.

The current study was planned to fill the gap in literature by evaluating the pattern and outcome of abdominal trauma cases presented at a trauma centre in an urban setting.

Patients and Methods

The prospective, hospital-based, cross-sectional study was conducted at the Trauma Centre, Postgraduate Medical Institute (PGMI), Quetta, Pakistan, from July 20, 2024 to January 20, 2025. After approval from the institutional ethics review board, the sample size was calculated using the formula: $n = z^2 p (1-p) / d^2$ ¹⁸ where confidence level (z) was 1.96, prevalence was 17.75% = 0.1775¹⁹ and absolute precision d was 5% = 0.05. The sample was raised using non-probability consecutive sampling technique. Those included were patients with abdominal injuries who presented to the trauma centre during the defined period. Participants of all age groups and genders were included to ensure a comprehensive patient population analysis. Those excluded were cases with incomplete medical records and those involving non-abdominal injuries.

Data was collected after taking informed written consent from each participant once they were in a stable condition post-injury. Significant associations among demographic, clinical and treatment variables were explored.

Data was analysed using SPSS 25. Descriptive statistics were presented as frequencies and percentages. For comparative statistics, Fisher's exact tests were used to assess associations and differences across the groups. $P < 0.05$ was considered significant.

Results

Of the 310 patients, 266(85.80%) were male and 44(14.2%) were female. There were 32(10.3%) patients aged 6-15 years, 43(13.9%) aged 16-30 years, 204(65.8%) aged 31-45 years, and 31 (10%) aged 46-60 years. Overall, 97(31.3%) patients had stab wounds, 105(33.9%) had blunt trauma injuries and 108(34.8%) had gunshot wounds. Further, 274(88.4%) patients sustained injuries for <6 hours, and 12(3.8%) reported injuries lasting >24 hours. Most patients 253(81.6%) were stable and 57(18.4%) were hypotensive at the time of assessment. Also, 253(81.6%) patients achieved full recovery, and 27(8.7%) patients succumbed to their

conditions. Complications noted in 3(0.95%) patients was acute respiratory distress syndrome (ARDS), while another 3(0.95%) patients experienced abdominal collection while renal failure and faecal fistula were observed in 12(3.8%) patients each.

Most patients 165(53.2%) required surgical intervention, while 118(38.1%) Patients were managed conservatively, and a smaller group of 27(8.7%) patients transitioned from conservative to surgical management. In terms of hospital stay, the majority of patients 263(84.8%) were discharged within 7 days, while 21(6.8%) patients stayed between 7 and 14 days, 21(6.8%) stayed 15-21 days, and 5(1.6%) patients had prolonged stay of >22 days. Laparotomy findings detected injuries to the spleen and gut each in 71(22.9%) patients, followed by multi-organ injuries in 86(27.7%), liver injuries in 41(13.2%), stomach injuries in 38(12.3%), and renal injuries in 3(1%) (Table 1).

Among those with liver injuries, 29 patients recovered, 9 died, and 3 developed renal failure. Among those with spleen injuries, 62 patients recovered, 3 died and 6 developed renal failure. Among those with stomach injuries, all 38(100%) patients recovered. Among those with gut injuries, 9 died, 3 developed ARDS, 3 had abdominal collections, and there were 9 cases of faecal fistula. All the 3(100%) renal injury cases resulted in death. Among those with multi-organ involvement, 77 patients recovered, 3 died, 3 developed faecal fistula and 3 developed renal failure. Injuries involving multiple organs were associated with significant mortality and more frequent complications ($p < 0.05$). Liver injuries were linked to high mortality rates, but less complications, while gut injuries were associated with both high mortality and high complication rates (Table 2).

Table-1: Patient characteristics based on management approach, hospital stay and laparotomy outcomes.

		n (%)
Mode of management	Conservative	118 (38.1)
	Surgical intervention	165 (53.2)
	Conservative then turned to surgical	27 (8.7)
	Total	310 (100)
Duration of Stay	< 7 days	263 (84.8)
	7 to 14 days	21 (6.8)
	15 to 21 days	21 (6.8)
	> 22 days	5 (1.6)
	Total	310 (100)
Findings on Laparotomy	Liver Injury	41 (13.2)
	Spleen Injury	71 (22.9)
	Stomach Injury	38 (12.3)
	Gut injury	71 (22.9)
	Renal Injury	3 (1)
	Multi organ involved	86 (27.7)
	Total	310 (100)

Table-2: Cross-tabulation of laparotomy findings and treatment outcome.

		Outcome of Treatment					Total	Fisher test	p-value
		Recovered	Died	Developed ARDS	Developed Renal failure	Developed abdominal Collection			
Findings on Laparotomy	Liver Injury	29	9	0	3	0	41	31.714	0.001
	Spleen Injury	62	3	0	6	0	71		
	Stomach Injury	38	0	0	0	0	38		
	Gut injury	47	9	3	0	3	71		
	Renal Injury	0	3	0	0	0	3		
	Multi-organ involved	77	3	0	3	0	86		
Total		253	27	3	12	3	310		

ARDS: Acute Respiratory Distress Syndrome.

Discussion

The current study revealed a predominantly male demographic (85.8%), and a significant proportion of those aged 30–45 years (65.8%). These findings align with previous research.^{20,21} A possible explanation for this trend lies in the cultural and tribal context of Balochistan, where young males often bear the responsibility of being primary breadwinners. Consequently, their injuries result in substantial loss of productive hours, ultimately impacting not only their family's economic wellbeing, but also the broader national economy.

A notable trend was noted in this study, with penetrating injuries, specifically gunshot wounds and stab wounds, being the predominant type of abdominal trauma. Among the 310 cases analysed, penetrating injuries accounted for approximately 66.1% cases, whereas blunt trauma injuries comprised 33.9%. This finding is consistent with global trends.^{20,22} This prevalence of penetrating injuries may be attributed to the widespread availability of firearms and heightened insecurity in the region. Interestingly, a shift in the pattern of abdominal injuries has been observed over the past two decades. Previously, blunt trauma was the leading cause of abdominal injuries,^{23,24} but recent reports, including the current study, indicate a reversal of this trend, with penetrating injuries now being the predominant type of abdominal trauma.^{20,22}

The current study observed that 88.4% patients presented within six hours of injury, with the majority (84.8%) being haemodynamically stable. These findings are consistent with literature.²³ Several factors may contribute to this trend. Firstly, the general public tends to perceive abdominal injuries as severe and life-threatening, prompting immediate medical attention.²³ Secondly, the provincial government's establishment of a network of Medical Emergency Response Centres (MERCs), including those in Quetta, provides an effective and timely response to emergency calls. This network is staffed with well-trained paramedics who deliver standard pre-hospital care. Lastly,

the presence of a sophisticated trauma centre in the city, offering 24/7 emergency services with readily available equipment, staff and consultants, likely contribute to reduced mortality and morbidity among trauma patients.

The current study also revealed a complication rate of 9.6% and a mortality rate of 8.7%, which is comparable to rates reported in countries like the Netherlands and England.²⁴ The study also observed that the total length of hospital stay for 84.8% of patients was <7 days. This finding is consistent with a previous study which reported an average hospital stay of 6.5 days.²³ This improved outcome can also be attributed to the introduction of a well-equipped MERC team and a state-of-the-art trauma centre.

The current study has limitations, like geographical bias, as the data was collected from a single trauma centre in a single city, which may not be representative of peripheral areas of the largest province in Pakistan. Additionally, limited follow-up may not fully capture the long-term complications of abdominal injuries.

Despite the limitations, however, the current study provides valuable local data that can serve as a guide for healthcare providers and policymakers to identify challenges faced by patients with abdominal trauma. It is recommended that the network of trauma centres be expanded beyond Quetta to the peripheral areas of the province along with upgradation of existing trauma centres to further enhance the quality of care for trauma patients.

Conclusion

Abdominal trauma predominantly affected males of breadwinning age. Penetrating abdominal injuries were the most common type. Early presentation to medical facilities, facilitated by sufficient ambulance services and adequate pre-hospital management, significantly improved outcomes.

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Author Contribution:

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MM: Result writing and presentation.

NN: Discussion writing and references collection.