Original Article

Penetrating abdominal injury: A tertiary care hospital experience

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Objective: To describe the pattern of visceral injuries in penetrating trauma patients, their association with entry wounds and to observe the outcome of patients after surgical intervention.

Methodology: This study included 79 patients with abdominal trauma who presented in the Accident and Emergency department of Civil Hospital, Karachi, Pakistan and underwent exploratory laparotomy from October 2011 to April 2013. A proforma was used to document patient's demography, findings and final outcome.

Results: 42.7% patients were in the age group of 21 to 30 years. 76 (96.2%) were male and 3 were female. Most entry wounds were found on ventral abdominal wall (57%), involving the left upper quadrant in 31.6% patients. Intra-abdominal injuries, included liver (n=14, 17.7%), spleen (n =12, 15.2%), kidney (n=4, 5.1%), pancreas (n=4, 5.1%), stomach (n=12, 15.2%), small bowel (n=34, 43%) and large bowel (n=35, 44.3%). 41 patients have multiple organ injury. Associated injuries were present in 50.6% cases. Postoperative complication included wound infection in 30.4%, wound dehiscence in 6.3%, abdominal sepsis in 3.8% and mortality in 8 (10.1%) patients. Average hospital stay was 8 days.

Conclusion: This study has highlighted the pattern of visceral injuries that can be predictable in firearm trauma patients even before exploration. The entry wound, clinical stability and the surface area of visceral organs are the major determinants in predicting pattern of visceral involvement. (Rawal Med J 2014;39: 68-71).

Key words: Intra abdominal injuries, abdominal sepsis, gunshot wound

INTRODUCTION

Recent surge in civilian violence, especially in densely populated and multiethnic city of Karachi is not only a source of political and social instability but also distressing and overwhelming for the trauma and surgical teams working in the tertiary care hospitals of the city.[1,2] Penetrating trauma is one of the leading cause of death and disability in the modern world.[3,4] Abdominal injury is the third common site after head and extremity, especially in young individuals.[4-6] Penetrating injury mostly results from gunshots followed by stab wounds.[7-10] Common presentations are external wounds, bleeding, peritonitis and hypovolemic shock.[11] Along with clinical examination, diagnostic procedures and imaging studies, such as CT scan, and focused abdominal sonography for trauma (FAST), aid in deciding surgical or conservative management.[11,12] Immediate exploratory laparotomy is recommended in firearm injury, hemodynamically unstable patients and in patient with signs of peritonitis.[12-14] Civil hospital receives major bulk of patients with abdominal trauma. However, local data available on patterns of these penetrating injuries, their management and outcomes is limited.[15] The aim of the study was to describe patterns of visceral injuries, their association with entry wounds and outcome after surgical intervention.

METHODOLOGY

This prospective observational study included 79 patients with penetrating abdominal trauma who presented in the Accident and Emergency department of Civil hospital Karachi from October 2011 to April 2013. Patients were resuscitated with primary survey according to ATLS protocol. Diagnostic imaging i.e. X-ray chest, abdomen, pelvis, ultrasound abdomen and local wound exploration was done in stable patients. Unstable patients were shifted immediately to the emergency operation theatre. Midline exploratory laparotomy was done in all patients. Initially, four-quadrant packing was done and after stabilization packs were removed, haemostasis was secured and appropriate procedures were performed. Trauma teams of

concerned subspecialtieswere involved for injuries to other regions. Postoperatively, patients were shifted to ICU or ward according to the patient condition and nature of injuries.

A proforma was used to record patient's demography, abdominal and associated injuries, mode of injury, investigations performed, operative findings, blood transfusion, ICU stay, postoperative complications, hospital stay, and final outcome. SPSS version 15 was used for data analysis.

RESULTS

Out of 79 patients,73 (92.4%) resulted from firearm injury and six from stab wound.76 (96.2%) patients were male and three patients were female with average age group of 21 to 30 years (Table 1).

Table 1. Age and gender distribution.

GENDER		
Male	76	96.2%
Female	3	3.8%
AGE GROUP		
12-20 years	10	12.7%
21-30 years	35	44.3%
31-40 years	19	24.1%
41-50 years	12	15.2%
51-60 years	3	3.8%

Most entry wounds were found on ventral abdominal wall (57%), involving the left upper quadrant in majority (31.6%) of patients (Table 2). Intra-abdominal injuries included liver (*n*=14, 17.7%), spleen (*n*=12, 15.2%), kidney (*n*=4, 5.1%), pancreas (*n*=4, 5.1%), stomach (*n*=12, 15.2%), small bowel (*n*=34, 43%) and large bowel (*n*=35, 44.3%).

Table 2. Distribution of external wound.

Region	Number	Percent
SIDE		
Anterior	45	57%
Posterior	7	8.9%
Both	27	34.2%
QUADRANT		
Right upper quadrant	22	27.8%
Left upper quadrant	25	31.6%
Right lower quadrant	19	24.1%
Left lower quadrant	23	29.1%

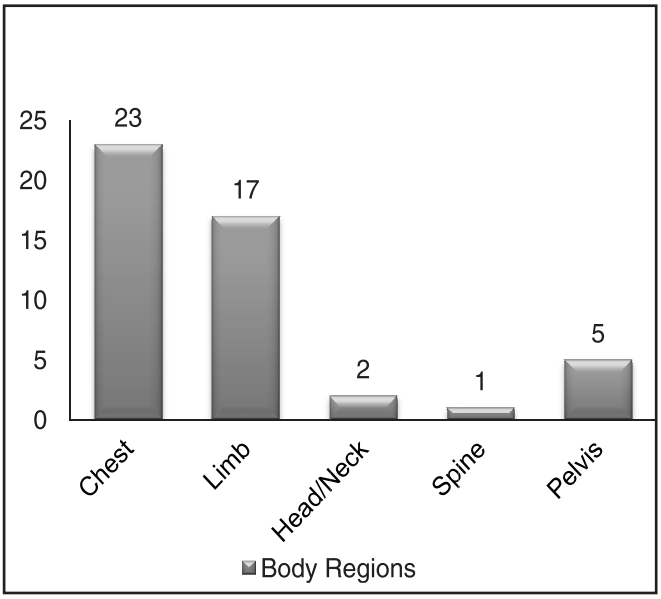
Visceral injuries in relation to entry wound in four abdominal quadrants shown in Table3. Associated injuries of other organs along with abdominal injuries were present in 50.6% (Fig 1).

Table 3. Visceral injuries.

	RUQ	LUQ	RLQ	LLQ
Liver	9	4	2	1
Gall Bladder	2	0	0	0
Pancreas	0	4	0	0
Spleen	2	11	1	0
Diaphragm	3	8	1	0
Kidney	2	2	1	0
Stomach	3	10	2	1
Small Bowel	8	7	13	14
Large Bowel	12	10	10	9
Urinary Bladder	0	0	0	2
Ureter	1	0	0	0
Major Vessel	1	2	1	0

Eight patients died on table or during postoperative period. Eighteen patients were admitted in intensive care unit.

Fig. 1. Associated injuries with abdominal injury.

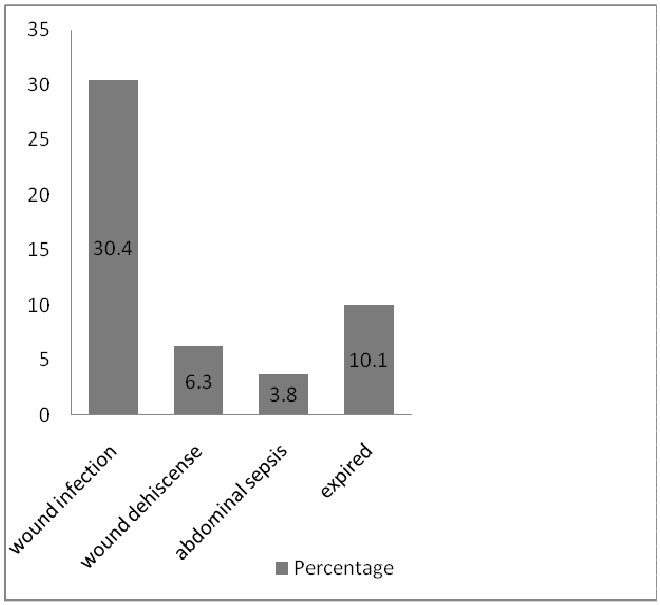


Wound infection was the commonest postoperative complications (Fig. 2).Average hospital stay was 8 days.

DISCUSSION

The recent surge in civilian violence has changed the demography of abdominal trauma. The paradigm shifted from blunt to penetrating trauma and from stab to gunshot wounds.[8-10] Similarly, in our study majority of penetrating abdominal injuries (92.4%) was due to firearm injury. However, some authors have reported stab wound and blunt trauma as leading cause of abdominal injuries.[13,14]

Fig. 2.Post operative outcome.



In this study, predominant age group was between 21 to 30 years (44.3%). In a local study from Multan, 40% of abdominal trauma patients belonged to 21 to 30 years age group.[16] A number of authors showed young age predominance in trauma patients.[12,14]Our study observed a large percentage of male (96.2%) patients. Similar pattern was reported in other studies from all over the worldsignifying the fact that females are less exposed to trauma situations.[6,7,12]

Ventral abdominal wall and upper abdomen was commonly involved region, either in isolation or combined thoraco abdominal injury in most studies.[12,17,18] In our study, similar trend was seen;91% wound occurred on ventral abdominal wall and 31% involved left upper abdomen. Often more than one region of the body were injured, out of which chest and limbs are most commonly associated with abdominal injuries.[6] In this study, associated injury to chest and limbs were observed in 25.8% and 23.6% cases, respectively.

The pattern of visceral injuries in blunt abdominal trauma is predictable, with liver and spleen being solid and fixed organs commonly involved in decelerating and compression injuries.[19] In firearm trauma the change in velocity of bullet, its recoil and the type of bullet i.e. jacketed and half jacketed make this prediction quite difficult. However, the relation with the entry wound, the surface area of visceral organ and the clinical stability of the patients may help in predicting the pattern of visceral injury before the exploration.[18]In our study, most common visceral injury found was of small bowel (41.6%) and large bowel (39.3%) followed by splenic (19.1%) and liver injury (16.9%). Study by Iqbal et al from Rawalpindi also reported increased frequency of injury to small bowel, large bowel followed by liver and spleen in penetrating abdominal trauma.[20]

Clinical stability (systolic BP > 90mmHg) is demonstrated in more than 80% of patients with small bowel (27/34) and large bowel (27/35) injuries. This is reduced to 50% (6/12) in patients with splenic injury and 0% (0/3) in major vascular injuries. With relation to entry wound, liver is predominantly involved in RUQ wounds while stomach, spleen and pancreas were involved mostly in LUQ wounds.[19] Small and large bowel due to their larger surface area are involved in all four quadrants injuries.[16,21]

Complications observed were wound infection in 30.4%, dehiscence 6.3%, abdominal sepsis 3.8%cases. This is comparable to study by Bhatti et al which reported wound infection in 24%, wound dehiscence in 10.67% and subphrenic abscess in 2.67%of cases.[17] Mortality from firearm injury to abdomen varies in different studies.[22,23] In a study from Abbotabad, 16.1% mortality was reported for patients who underwent laparotomy for penetrating firearm injuries.[24] In our study, mortality rate is10.1% and related to multiple organ injury and massive hemorrhage. When compared with other studies, this result may be attributed to early arrival, prompt initiation of treatment and sparing of vital structures.

CONCLUSION

This study strengthens the evidence that recent surge in civilian violence has changed the demography of abdominal trauma. It highlights the pattern that visceral injuries can be predictable in fire arm trauma patients even before exploration. The entry wound, clinical stability and the surface area of visceral organs are the major determinants in predicting pattern of visceral involvement. The higher wound infection rates require surveillance and prophylaxis

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