

Retroperitoneal Organ Injuries following Blunt Trauma Abdomen

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ABSTRACT

Aim: To assess the frequency of mode and grade of retroperitoneal organs (kidney, duodenum and pancreas) injuries following blunt abdominal trauma.

Study design: Cross sectional study

Place & duration of study: Department of Surgery, B.V. Hospital from April 2012 to October 2012.

Methods: A total of 150 consecutive cases sustaining blunt trauma abdomen. Patients of both gender and age 12 to 70 years presenting with history of blunt trauma abdomen and undergoing exploratory laparotomy were included in the study. Statistical Analysis was done with SPSS Version 16.

Results: A total of 150 patients who suffered from blunt trauma abdomen were enrolled. The mean age of patients in the study was 34.11 ± 11.91 . Males were 125(83.3%), the females were 25(16.7%). A total of patients 90(60%) suffered from Road Accidents, 38(25.3%) had Fall from height and 22(14.7%) had Physical Assault. Pancreas was injured in 40(26.7%) patients, Duodenum in 39(26%) patients, Kidney in 46(30.7%) patients and 25(16.7%) had pancreatoduodenal injuries. Grade 1 injury was present in 38(25.3%) patients. Grade 2 injury was in 51(34%). Grade 3 injury in 37(24.7%). Grade 4 injury in 18(12%) and Grade 5 injury in 6(4%) patients.

Conclusion: Retroperitoneal organ injuries should be suspected in blunt abdominal trauma patients presenting with a history of Roadside accidents, falls from heights and interpersonal physical assault.

Keywords: Blunt trauma, retroperitoneal organs. road traffic accidents. laparotomy.

INTRODUCTION

Trauma is one of the leading preventable causes of death in developing countries. Sadly trauma affects the young people in general. Accidents in our country are not exceptional and there is a steady increase in accidental trauma presents rank fourth among chief causes of death. Trauma accounts for 8% of all the deaths in Pakistan. About 140,000 individuals die in accidents, and approximately double the number are disabled yearly¹.

Trauma is defined as damage to the body by exchange with environmental energy that is beyond body's resilience. Trauma deaths continue to be on higher trend. Trauma is the most common cause of death and disability in the age of 12-70 years^{2,3}. Abdomen is one among the commonly injured regions of the body due to large surface area⁴. The retroperitoneum is that portion of the abdomen which is separated from the peritoneum anteriorly by the posterior peritoneal fascia and is bounded posteriorly by the fascia transversalis. It contains portions of the colon and duodenum as well as the pancreas, kidneys, adrenal glands, abdominal aorta, and inferior vena cava (IVC). Almost 75% of abdominal trauma follows blunt injury⁵. Greatest difficulty in their management as abdominal trauma is usually

associated injuries like head injury, chest trauma and bony injury. Moreover, the decision to perform laparotomy for blunt abdominal trauma is more complex and difficult, as structural injury being less obvious.

The retroperitoneum is one of the most challenging areas of the abdomen⁶. Injuries of the retroperitoneal organs occur mainly in patients with polytrauma. Massive hemorrhage with consequent retroperitoneal hematoma is the dominant pathophysiologic event; mortality is high⁷. Retroperitoneal injuries are among the most lethal injuries sustained by trauma patients and the most common modes of injury include automobile accident, fall from height, interpersonal conflicts and animal hits⁸. Retroperitoneal organ injuries are known to occur in a significant minority of blunt abdominal trauma cases (12% of hemodynamically stable patients evaluated at one center)⁹. In our surgical unit, trauma constitutes one of the common reasons for hospital admission. A prospective study is proposed to document the pattern of retroperitoneal injuries following blunt trauma abdomen presenting at Bahawal Victoria Hospital Bahawalpur.

MATERIAL AND METHODS

This cross sectional study was conducted at Department of Surgery, Bahawal Victoria Hospital Bahawalpur April 2012 to October 2012. Total 150 consecutive cases sustaining blunt trauma abdomen were included in this study. Written informed consent

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was taken from every patient. Patients of both gender and age 12 to 70 years, presenting with history of blunt trauma abdomen and undergoing exploratory laparotomy were included in the study. The diagnosis of blunt abdominal trauma was made on the basis of presence of tenderness, rigidity, and bruise on the abdominal wall. Patients presenting within 12 hours of sustaining injury will be included in the study. Patients managed non-operatively, patients suffering any kind of penetrating abdominal injury and moribund patients of ASA-5 were excluded from the study.

Case sheets of the admitted patients were screened for various variables such as: age and sex of the patients, mode of the blunt abdominal injury and operative findings. Duration of injury will be recorded as the time taken by the patients to arrive in the Operation theatre. Intra-abdominal injuries involving the kidney, duodenum and pancreas were noted according to the operational definition on a pre-designed Proforma during the operative procedure. The scale devised by the Organ Injury Scaling Committee of the American Association for the Surgery of Trauma was used to grade injuries to various organs. Grading of injuries was verified by attending consultant. All the data were entered in SPSS version 16 and analyzed. Mean and standard deviation was calculated for numerical data. Frequencies were calculated for categorical data. Chi square test was used as a test of association. P. value 0.05 was considered as significant.

RESULTS

A total of 150 patients who suffered from blunt trauma abdomen presented to the Department of Surgery Bahawal Victoria Hospital, Bahawalpur were enrolled in the study. Mean age of the patients was 34.11±11.91. Mean duration of injury in the study group was 3.22±2.65. Study results regarding mode of injury show that a total of 90 patients (60%) suffered from Road Accidents, 38 patients (25.3%) had a history of fall from height whereas 22 patients (14.7%) had a history of physical assault (Fig. 1).

Grades of retroperitoneal organ injuries are shown in Fig. 2. Grade I injury was present in 38(25.3%) patients. Grade 2 injury was present in 51(34%) patients. Grade 3 injury was present in 37(24.7%). Grade 4 injury was present in 18(12%) patients while Grade 5 injury was present in 6(4%) patients. The frequency of Retroperitoneal organs injured was as follows: Pancreas alone was injured in 40(26.7%) patients, Duodenum alone was injured in 39(26%) patients, Kidney was damaged in 46(30.7%) patients whereas 25(16.7%) had pancreatoduodenal injuries (Fig. 3).

Stratification for gender was done for mode of injury. Among the 90(60%) patients injured with road accidents 73 (81.11%) was male and 17(18.9%) was female. Out of 38(25.33%) patients injured due to fall from height, 33 (86.85) was male and 5(13.2%) was female and patients injured with physical assault 22(14.67%), male was 19 (86.4%) and female was 3(13.6%). No association was seen between mode of injury and gender P. value 0.67 (Table 1). Stratification for age was done. Among the 90(60%) patients of road accident, 52(59.8%), 31(67.4%) and 7(41.2%) patients belonged to 12-15 years, 36-50 years and 51-70 years respectively. Out of 38(25.335) injured with fall from height, 21(24.1%) belonged to age group 12-35 years, 11(23.9%) 26-50 years and 6(35.3%) belonged to 51–70 years age group. Patients injured with physical assault was 22(14.67%), 14(16.1%) belonged to age group 12-35 years, 4(8.7%) to age group 36-50 years and 4 (23.5%) patients belonged to age group 51-70 years. No association was seen between mode injury and age group P. value 0.364 (Table 2).

Table 1: Stratification for gender

Mode of injury	Male	Female	Total
Road accidents	73(81.11)	17(18.9)	90(60)
Fall from height	33(86.8)	5(13.2)	38(25.33)
Physical assault	19(86.4)	3(13.6)	22(14.67)
Total	125(83.3)	25(16.7)	150

P value 0.67

Table 2: Stratification for Age

Mode of injury	Age group in years			Total
	12-35	36-50	51-70	
Road accident	52(59.8)	31(67.4)	7(41.2)	90(60)
Fall from height	21(24.1)	11(23.9)	6(35.3)	38(25.33)
Physical assault	14(16.1)	4(8.7)	4(23.5)	22(14.67)
Total	14(16.1)	4(8.7)	4(23.5)	22(14.67)

Fig. 1: Mode of injury

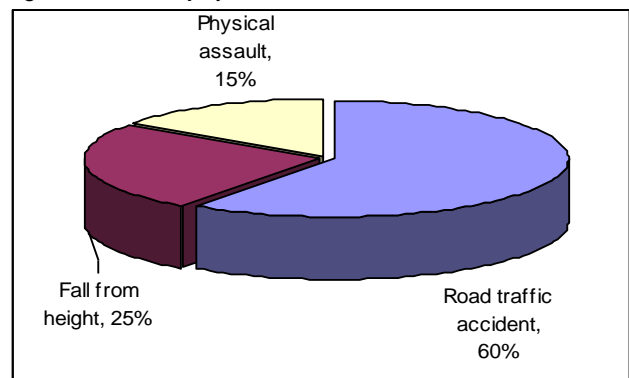


Fig. 2: Grades of injuries of retroperitoneal organ

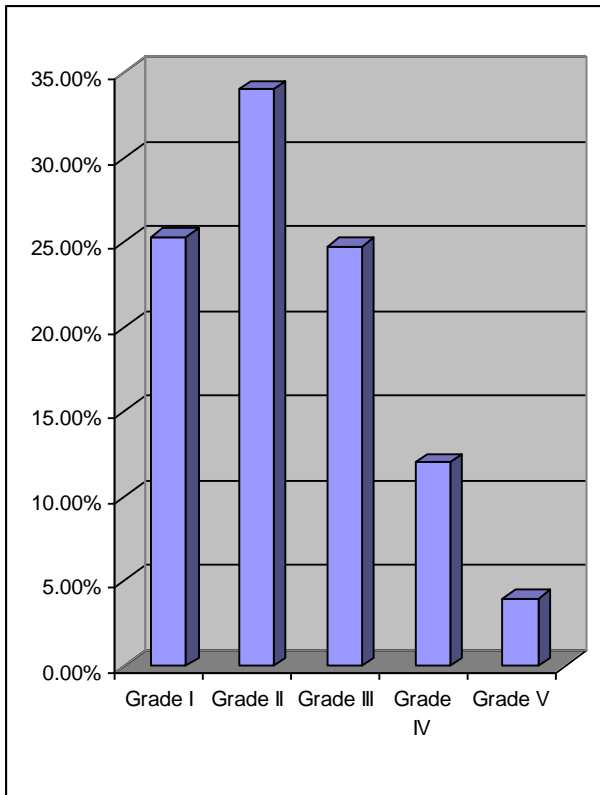
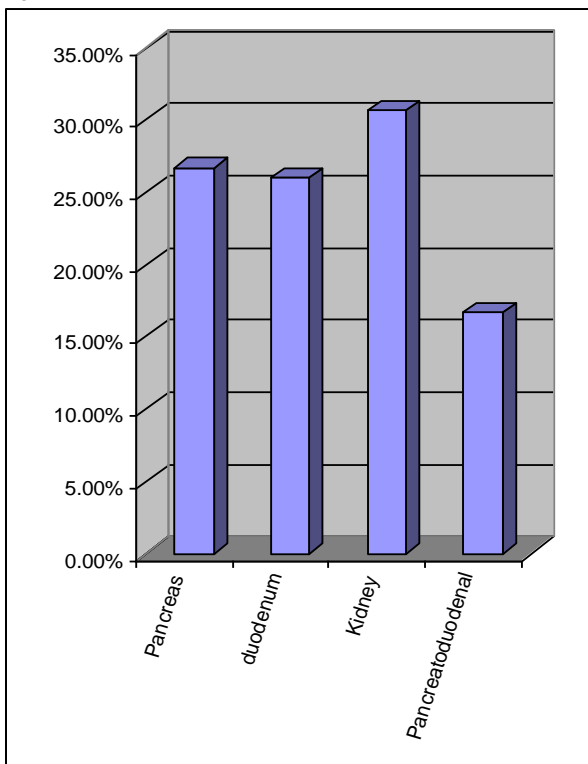


Fig. 3: Frequencies for injuries of different retroperitoneal organs



DISCUSSION

Retroperitoneal organ injuries following blunt abdominal trauma have remained a challenge to surgeons with an ever-present desire to improve the early diagnosis and the outcome of the management. Blunt abdominal trauma is a leading cause of morbidity and mortality among all age groups. The mean age of patients in my study was 34 years approximately. The minimum age of patient in the study was 15 years while the maximum was 65 years. The percentage of males was 83.3 while the females were 16.7%.

In the present study, significantly more males than females presented with abdominal trauma which is consistent with Khan et al.⁵ report of a male to female ratio of 4.4: 1 among abdominal trauma patients. Young males, most of all those aged 20 to 30 years, have been reported to be the most frequent victims. Vehicle accidents are a common cause of blunt abdominal trauma. In our study, they were the most common cause; the second most common was falling from a height and the third was interpersonal violence. The study regarding mode of injury shows that a total of 90 patients (60%) suffered from road accidents, 38 patients (25.3%) had a history of fall from height whereas 22 patients (14.7%) had a history of physical assault.

In agreement with my study others have found that the main causes of blunt abdominal trauma were road accidents, interpersonal violence and falls^{5,9,10}. A review by Ahmad et al., described trauma as the leading cause of death in those aged 1-44 years⁸. Traffic accidents, stab wounds, and falls from heights were the leading modes of injury. Blunt abdominal trauma accounted for 79% of cases. A similar paper from India¹¹ reported that blunt abdominal trauma is more frequent in males aged 21-30 years; the majority of patients were injured in automobile accidents.

In my study Duodenum was injured in 26% patients. The study by Zaydfudim et al.⁶ indicated that, of patients with vertical deceleration injuries (i.e., falls from heights), only 5.9% had blunt abdominal injuries. Consistent with these results, studies by Bhattacharjee et al and Antonacci et al, injuries to the duodenum account for approximately 3% to 5% of abdominal trauma^{11,12}. Blunt abdominal trauma as a result of direct blow to the epigastrium, mainly due to road traffic accident and sports trauma (bicycle handle injury), accounts for 25% of all duodenal injuries as shown by Chinnery et al and Girgin et al^{13,14}.

Renal injury occurs in approximately 1% to 5% of all traumas and can be classified as blunt or penetrating according to the mechanism^{15,16}. Blunt

injuries are usually secondary to high-energy collisions such as motor vehicle accidents (MVA), falls from a height, and contact sports, although significant injuries have been reported following trivial trauma in structurally abnormal kidneys^{17,18}. In the study by Wong et al¹⁹, 89 cases of Grade 2 renal injuries were recorded with blunt trauma accounting for 94.4%; 57.3% were Grade 2 injuries, 12.4% Grade 3, 25.8% Grade 4, and 4.5% Grade 5. MVAs and motorcycle accidents were the most common cause of injury, accounting for 48.3% of all renal injuries. This is comparable with my study in which Grade 1 injury was present in 25.3% patients. Grade 2 injury was present in 34.0 % patients. Grade 3 injury was present in 24.7%. Grade 4 injury was present in 12% patients while Grade 5 injury was present in 4% patients. In my study kidney was damaged in 30.7% patients.

In my study pancreas was injured in 26.7% patients, whereas 16.7% had pancreatoduodenal injuries. Traumatic injuries of the pancreas occur after blunt abdominal traumas or penetrating wounds with a ratio of 3:1.²⁰ These are characterized by high morbidity and mortality with a 45-50% combined rate as reported in the reviewed literature^{21,22}. Pancreatic injuries occur in 3-15% of all abdominal trauma. Isolated traumatic injuries of the pancreas are uncommon; in 50-98% of cases they are associated with injuries to other organs, such as spleen, liver, kidney, large/small intestine, veins or arteries. Due to the retroperitoneal location of the pancreas, isolated pancreatic injury occurs in less than 5% of cases of major blunt abdominal trauma²³.

CONCLUSION:

Retroperitoneal organ injuries should be suspected in blunt abdominal trauma patients presenting with a history of Roadside accidents, falls from height and interpersonal physical assault as the leading mode of injury. Immediate surgical intervention is an important factor to minimize post-operative complications. This study highlights the need for prioritizing a public health approach to abide by traffic laws and violence prevention in Pakistan.

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