CASE SERIES

Blunt abdominal trauma patients presenting to a tertiary care facility of Pakistan: A three years' experience

Bushra Kiran Naeem, Mazhar Iqbal, Sughra Perveen, Urooj Ahmed Abbasi, Mir Arsalan Ali, Tanveer Ahmed

Abstract

Blunt abdominal trauma (BAT) refers to injuries without wounds entering the peritoneal cavity due to road traffic accidents (RTA) and falls, as a result of collision or counter collision. The objective of the present study was to determine the frequency of patients with visceral injuries in blunt abdominal trauma. This study was carried out in the Department of Surgery, including ward-3 of Jinnah Post Graduate Medical Centre, Karachi, from November 2017 till November 2020. The study design was descriptive case series. During the study period, the data of 112 patients was collected, which comprised of 102 males and 10 females. All the patients between 12 to 65 years of age (mean age:31.84±13.14 years) presenting to the emergency with < 24 hours of abdominal trauma, were included in the study. Organs involved during blunt abdominal trauma were observed and frequency was recorded. Liver injuries were found in 48(42.28%) patients, intestinal injuries in 40(35.7%), splenic injuries in 32(28.5%), kidney injuries in 24(21.4%), pancreatic injuries in 8(7.1%) and stomach injuries in 4(3.5%) patients. Grade 4 liver injury was found in 80(71%) patients, Grade 2 and 3 splenic injuries in 56(50%) patients whereas 47(42%) patients had grade 1 kidney injury. Liver was found to be the most frequent organ involved, followed by intestine and spleen.

Keywords: Blunt Trauma, Pakistan, Abdominal Viscera.

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Introduction

The Trauma transcends all national boundaries. Many underdeveloped countries, like Pakistan, share a significant portion of road traffic accidents and industrialised trauma particularly in the juvenile population. Mortality and morbidity linked to trauma can be decreased by early and successful medical and surgical intrusion.[1]

Karachi, the largest city of Pakistan, is an industrial cosmopolitan centre where the heavy traffic and the rising numbers of population and motor vehicles form the high risk factor for RTA.

Trauma is harmful to the body due to an exchange with environmental energy.[2] Civilian trauma remains the primary reason of death universally and is rising progressively. Currently Trauma surgeons have put into practice conservative treatment in large figures due to recent technological advances in diagnostic measures. Blunt abdominal trauma (BAT) refers to injuries due to road traffic accidents (RTA), as well as falls secondary to collision or counter collision without wounds entering the peritoneal cavity. The main organs involved in blunt abdominal injuries are solid and the treatment is conservative.[2] Injury to hollow visceral organs are difficult to diagnose. There is an important diagnostic challenge for the most experienced trauma surgeon for evaluating the patients who have BAT.[2] Blunt trauma can cause from a trivial, single-system injury to overwhelming damage to multiple systems. Trauma surgeons should have the capability of identifying the intra-abdominal injuries through the whole spectrum. The most vital process to determine the requirement for an exploratory laparotomy is a detail physical examination. Spleen is the second most common organ and liver is the most frequent organ to be involved in BAT.[3]

The outcome of altered level of consciousness due to alcohol, any drugs, or neurologic injury is a key factor in managing BAT. Trauma surgeons must rely on a number of diagnostic adjuncts as there is inadequacies of physical examination. Generally used modalities are Focused Abdominal Sonography for Trauma (FAST), Diagnostic Peritoneal Lavage (DPL), and Computed Tomography (CT) scanning.[4]

However, FAST is not commonly accessible, but recently it has been included in the investigative armamentarium. Diagnostic algorithms to utilize these modalities independently have been recognized.[5]

There are a number of factors which control the assortment of all diagnostic testing which includes hospital type i.e., non-trauma centre vs. trauma centre, the capabilities of the surgeon which also affect the hospital stay, access to an exact technology to the

Department of Surgery, Jinnah Postgraduate Medical Centre, Karachi, Pakistan.

Correspondence: Bushra Kiran Naeem. Email: bushrak.naeem@hotmail.com

particular trauma surgeon; and the surgeon's personal skill and practice.[5]

The rationale of the study was to collect the data from the Jinnah Postgraduate Medical Centre, Karachi, from all surgical departments. Due to lack of evidence in literature on the hospital figures of blunt abdominal trauma secondary to vehicles and falls, this study was undertaken to collect these figures in a local hospital.

This study paved the way to measure the burden of these injuries in our area and help to develop policies on this aspect.

Case Series

The study was performed after taking approval from head of the department of Surgical Unit 3 of the Jinnah Postgraduate Medical Centre. The data was collected from all the patients with established abdominal trauma presenting to the emergency department of the hospital. Oral and written consent was obtained from the participants/guardian and the purpose, procedure, hazards, and advantages of the study were explained and confidentiality was maintained. The basic demographic data like age, gender, and trauma duration was collected and recorded.

BAT is defined as when the patient has an abdominal pain visual analogue score (VAS) > 5. He/she reported to casualty as a result of road traffic accident (RTA) or fall from a height and on abdominal examination, tenderness is present. Injuries to abdominal viscera is explained in terms of injuries to liver, spleen, intestine, kidney, stomach, and pancreas.

This was a descriptive case series which included patients from all surgical departments along with ward-3 of JPMC, Karachi. The study was conducted from November 2017 till November 2020. The sample size was 112. The sampling technique was non-probability consecutive sampling.

Patients older than 12 years age, of both genders and with blunt trauma, were included in the study. Poly-trauma patients with neurological, limb and thoracic injury and those with penetrating injury like gun shot and stab wounds were excluded.

As per protocol, the patients were sent for assessment of injuries to viscera to the radiology department immediately after first aid and treatment. The injury was assessed by Chest X-ray, erect PA view, abdominal X-ray erect and supine, FAST and CT scan. The methods of assessment of injuries in stable patients were CT scans and FAST, whereas unstable patients with clinical signs and symptoms of peritonitis were subjected to immediate laparotomy. Stable patient's injuries were assessed clinically as well as radiologically and unstable patient's injuries were assessed per operatively during laparotomy.

Exploratory laparotomy was performed in blunt abdominal trauma patients when clinically there were signs of peritonitis, with tenderness, and patient was haemodynamically unstable and FAST showed free fluid. Patients with signs of peritonitis as tense, tender, rigid, absent gut sounds and free gas under right dome of diaphragm for intestinal perforations. CT scan was done in stable patients with blunt trauma.

Data regarding abdominal visceral injuries like, spleen, liver, intestine, kidney, pancreas, and stomach according to the definition was collected and documented on a especially designed Performa. The Organ Injury Scaling (O.I.S.) of the American Association for the Surgery of Trauma (A.A.S.T) was used.[1] Data was analysed with statistical analysis programme (IBM-SPSS.V.24). Frequency and percentage was computed for qualitative variables like gender, type of abdominal trauma and abdominal visceral injuries to liver, spleen, intestine, stomach, kidney, and pancreas. Quantitative variables included age and duration of trauma as the mean value. Stratification was done for effect modifiers as age, gender and duration of trauma to see their influence on abdominal visceral injuries.

There were 102 (91.07%) males and 10 (08.92%) females. The mean age of the patients was 31.84 ±13.14 years. Duration of hospital stay was less than 10 days in 30(27.14%) and more than 10 days in 24(21.43%) for blunt abdominal trauma patients. Mean duration of trauma was 3.63 ±0.22 hours.

Majority 60(53.57%) of the patients were ≤30 years of age. There were 45(40%) of the patients who were unstable and 67(60%) were stable. The stable patients were subjected to a CT scan to determine the type of the injury acquired, which provided an accurate diagnosis for all. Organs involved in BAT were liver, intestine, spleen, stomach, kidney, and pancreas as shown in the Figure.

Table: Grades of Solid Organ Injury in Blunt Abdominal Trauma (n=112).

	Liver Injury	Spleen Injury	Kidney Injury	Pancreas Injury
Grade 1	4 (08%)	0	10 (42%)	0
Grade 2	10 (21%)	16 (50%)	6 (25%)	0
Grade 3	0	16 (50%)	8 (33%)	4 (50%)
Grade 4	34 (71%)	0	0	4 (50%)
Grade 5	0	0	0	0
Total Number	48	32	24	8

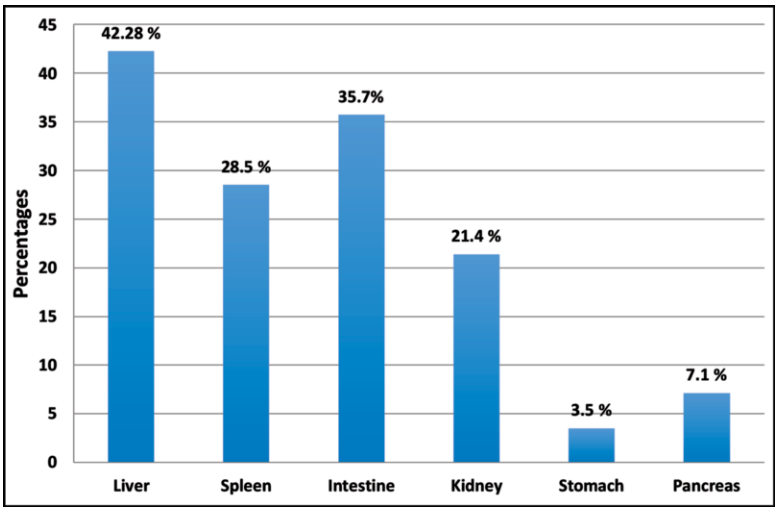

Figure: Percentages of visceral injuries in blunt abdominal trauma.

Grade 1 and 2 were mostly involved in blunt trauma of liver, spleen, kidney, and pancreas. Grading of solid organ injury of involved organs can be seen in the Table.

Discussion

The abdomen is commonly injured in multiple trauma victims. Blunt abdominal trauma does not occur in segregation and is related with noteworthy extra abdominal injuries that decide overall prognosis of the patient.[6] Early recognition of abdominal injuries is important due to its tremendous life-threatening potential for saving the life.[6] In our study, liver was the first organ involved followed by intestinal injury being the second, and spleen is the third. This is contrary to other studies, where the most commonly injured organ is spleen 71% followed by the liver 41.5% and kidneys 13.8%.[7] In another study, Sara Leite and her associates found the frequency of abdominal visceral injuries as spleen 33.2% and kidney 25.5%.[1] This study reflects that the increasing number of motor vehicles, the condition of the roads and the lack of interest of the common man in obeying traffic rules in our country is the stigmata of the outcomes of injuries.

The present study revealed that the modes of injury causing blunt trauma were assaults 11(10%), fall from height 36(32%) and the most common aetiology was RTA 65(58%) cases. This is similar to the results in the literature.[1] Another study showed results of Road Traffic accident (RTA) being the most common cause (75%) and 10% cases were secondary to a fall.[8] Leite el al also observed in their study that 2/3rd of trauma cases was due to RTA.[1]

The mean age of abdominal trauma in the current study was 31.84 ±13.14 years whereas in the literature mean age is 42.6 years,[2] with a male predominance 74.2%.[2] The highest frequency was seen in ages between 14 and 69 years which shows that in our study blunt trauma is more widespread in juvenile age group. Males were predominantly involved as compared to females. Ratio of both the genders in this study is 9:1 which is similar to literature.[2]

FAST and CT scan was performed in 60% of the stable patients with blunt abdominal trauma. Free fluid is an indication for surgery depending on the stability of the patient. CT is the preferred investigation in stable patients to exclude organ injury. Fast and CT scan is the diagnostic test for blunt abdominal trauma with Fast having a very high negative predictive value reaching almost 100%.[9]

The hospital stay in our study is consistent with the literature[2] depending upon the number of injuries and the gravity of trauma to the organs, associated co-morbidities and post-operative complications. Liver is the most frequent organ involved in blunt trauma followed by intestine and spleen as depicted in literature.[4] Another study found the spleen to be the most common organ involved in blunt trauma followed by the liver and kidney.[10] Our study observed the spleen to be the third common organ to be injured.

The average hospital stay in the present study was 10 days. Our study showed that stable patients with blunt abdominal trauma can be managed conservatively (60%) in solid visceral injury specially grade 1 to 4 liver and grade 1 to 3 splenic injury. The patients were under strict observation in intensive care units and if serial abdominal examination showed any signs of peritonitis or there was deterioration in clinical condition then immediate surgery was the optimal choice. Investigations, like CT scans, can minimize the missing injuries and a high index of suspicion should be present even in mild abdominal trauma.

The grading of solid organ injury showed in this study that grade 4 liver trauma was most common, this is due to vigorous low speed injuries having an impact on organs fixed to the mesentery and ligaments in BAT. Splenic grades were 3 & 4 in blunt trauma in majority of the trauma victims. Pancreatic injury was itself rare, so grades are rare with an incidence of 3 and 4. Kidney injuries in majority of the cases were grade 1 and 2 managed conservatively while grade 4 and 5 requires partial nephrectomy or nephrectomy, grade 3 is equivocal. This type of trauma was dealt by the urology team.

Majority of the patients (60%) were stable when

presenting to the emergency department. The unstable patients (40%) with blunt abdominal trauma, were subjected to surgery immediately. This is consistent with the management published in literature which shows that 75% of patients had blunt trauma and from these, 48% required conservative treatment and 27% had to be operated.[1,4] Some trivial trauma patients were discharged from the emergency department who refused investigations as CT scan.

The limitations of the study were exclusion of the patient due to reluctance of being subjected to investigations like CT scan. The other limitation was the non-availability of ventilators in the hospital due to a large number of patients and few ventilators. These patients had to be referred to other tertiary care hospitals where ventilators were available.

Conclusion

The results of our study concluded that liver was the most common organ involved in blunt abdominal trauma, followed by intestine, spleen, and kidney. The least involved organs were stomach and pancreas in our local population.

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