Abdominal Solid Visceral Injuries in Blunt Abdominal Trauma. An Experience in Busy Surgical Unit of Mayo Hospital, Lahore.

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The purpose of this prospective study was to evaluate the incidence and etiology of solid organ injuries in patients with blunt abdominal trauma. This study was carried out in East Surgical Unit of Mayo Hospital Lahore from April 2000 to April 2001. Total of 63 patients were admitted through emergency during this period with the diagnosis of blunt abdominal trauma. All the patients with blunt abdominal trauma were admitted and reviewed prospectively. Out of these, 13 patients were managed conservatively and 50 were operated with 33 patients had some injury and the remaining 17 with negative findings. The mortality rate was 11%. Spleenic injury was found to be the commonest with 56% of positive laparatomies. Liver was the second most common organ involved (21%).
Key Words: blunt abdominal trauma, solid organs.

Blunt abdominal trauma is a leading cause of morbidity and mortality among all age groups[7,9]. Identification of serious intraabdominal injury often is challenging. Many injuries may not manifest during the initial assessment and treatment period[3]. Mechanisms of trauma often result in other associated injuries that may divert the physician's attention from potentially life-threatening intraabdominal pathology[3,7,10].

Injury to intraabdominal structures can be classified according to 2 primary mechanisms of injury–compression forces and deceleration forces[5,9].

Compression or concussive forces may result from direct blows or external compression against a fixed object (e.g., seat belt, spinal column)[5]. Most commonly, these crushing forces cause tears and sub capsular Hematoma to the solid viscera. These forces also may deform hollow organs and transiently increase intraluminal pressure, resulting in rupture. This transient pressure increase is a common mechanism of blunt trauma to the small gut[10].

Deceleration forces cause stretching and linear shearing between relatively fixed and free objects[5]. These longitudinal shearing forces tend to rupture supporting structures at the junction between free and fixed segments. Classic deceleration injuries include hepatic tear along the ligamentum teres[7] and intimal injuries to the renal arteries. As gut loops travel from their mesenteric attachments, thrombosis and mesenteric tears, with resultant splanchnic vessel injuries, can result[10].

The liver and spleen seem the most frequently injured organs, although reports vary. Small and large intestines and the kidneys are the next most injured organs, respectively[7,9,10,15].

Recent studies show an increased number of hepatic injuries, perhaps reflecting increased use of CT scanning and concomitant identification of more injuries 7,8. Blunt trauma resulting from road traffic accident is the predominant cause of pancreatic injury1. Renal trauma is relatively uncommon blunt injury, road traffic accidents being the most common followed by sport and home or industrial accidents[10].

Material and Methods

This study was carried out in East Surgical Unit of Mayo Hospital Lahore between 2000 to 2001. Sixty three patients were admitted through emergency during that period with the diagnosis of blunt abdominal trauma. Age, sex, mechanism of injury, preoperative diagnosis and operative findings all were noted. Immediate mortality was defined as death as a result of primary injury, whether preoperatively, and those who died as a result of complication in the same hospital admission.

Results

Over a period of one year 63 admissions were made in our department with the diagnosis of blunt abdominal trauma. Out of these 63 patients 49 were male and 14 were female (table I) with the average age of 32 (range 19-61) (table II). The commonest cause of blunt trauma was Compression or concussive forces from direct blow on abdomen either due to road traffic accidents or assault, while fall from height, either a building or tree, was more common on the extreme of age.

Table I

Male	49	68%
Female	14	22%

Table II

Age	Pts
Below 20	11
20-40	33
40-60	18
Above 60	01
Total	63

Most of the patients presented early with in 03 to 08 hrs after injury (48) rest of the patients presented late either due to delayed symptoms (07), unavailability of immediate transportation (03) or due to the far distance from the

hospital (05). All the patients under went laparatomy except 13 who were managed conservatively after doing diagnostic peritoneal lavage, which was negative. Among 50 patients who under went laparatomy, 17 were negative i-e no intra abdominal injury was found. In the rest of 33 patients solid organ injuries were noted in 31 patients and in only 02 patients injury to hollow viscous were noted (table III, IV & V).

Table III. Management planning

Management.	n=.	%age
Conservative management.	13	20.6
Exploratory laparatomy.	50	79.4

Table IV. Operative findings

Laparatomy findings	n=	% laps
Positive.	33	66
A. Solid viscous.	31	62
B. Hollow viscous.	02	04
Negative.	17	34

Table V. Injured viscera's

Organ	n=	%age
Spleen	15	23
Liver	06	09
Kidney	02	03
Pancreas	01	1.5
Mesentery	04	6.3
Gut injuries	02	03
Multiple (s+l)	03	4.6

The commonest cause of the blunt trauma in our study was road traffic accident, with 17 patients with motor vehicle accident and 09 with motorcycle/auto rickshaw accident and 04 with bicycle accidents. Another cause of blunt abdominal trauma in our set up was blunt injury to the abdomen due to the hit of the bamboo of hand cabs and tanghas (06). An assault with direct blow into the anterior abdominal wall was the other common cause of the blunt abdominal trauma (11). History of fall from height was also common especially in women (07 total with 05 women). One other unfortunate situation was the fall of roof resulting in blunt abdominal trauma to the patients (03). Industrial accidents (05) and hit by the animal over the anterior abdominal wall were other causes (01).
Mortality from the blunt trauma was 11% (07 out of 63 patients died). The commonest cause of mortality was severity of injury leading to massive hypovolumia.03 patients out of 63 died perioperatively.

Table V Etiology

Cause of injury	n=:	% Age
RTA.	36	
Motor vehicle.	17	31
Motorcycle/rickshaw.	09	22
Bicycle.	04	36
Handcabs/tangas.	06	37
Assault.	11	20
Fall form height.	07	42
Fall of roof.	03	40
Industrial accident.	05	30
Animal hit.	01	39

Discussion:
The main purpose of this study was to highlight the importance of solid organ injuries in the patients with blunt abdominal trauma. Abdomen is the one of the most commonly injured region in civilian trauma victims[5,7,15]. Abdominal injuries can be particularly dangerous because it is often difficult to assess intra abdominal pathology in multiple trauma[10]. The diagnosis of significant abdominal injury is a common problem in a multi trauma patient. Physical signs such as abdominal rigidity and Hypovolumic shock may allow the diagnosis of intra abdominal bleeding to be made easily[15]. However, these signs may not be apparent at first and signs of peritoneal irritation may be absent in about one third of the patients with significant intra abdominal pathology[5]. Furthermore, patients who sustained blunt abdominal trauma may also have multiple non-abdominal injuries[10]. These may lead to delay or missed diagnosis and give rise to problems in deciding priorities of trauma care. Prompt recognition of intra abdominal hemorrhage or perforation of a viscous is vital, and failure to do so may lead to unnecessary morbidity and mortality[15].

Blunt trauma continues to be the most common mechanism of injury to the abdomen. This is, in part, related to the consequences of road traffic accidents, assaults, falls and industrial accidents[3,5,7].
Although most of the literature shows that liver is the most commonly injured organ, with spleen being the second, in contrast[15], in our study spleen is the most commonly injured organ with liver being the second common organ. Abdominal injury requiring surgery can rarely be ruled out on a single examination. The symptoms of abdominal pain and tenderness following injury are enough to warrant a period of observation, which involves repeated examination by an experienced surgeon. Deterioration of any patient with blunt abdominal trauma and especially if supplemented by positive radiological or diagnostic peritoneal lavage findings needs immediate exploration2,3,6,8. There is no justification for a policy to postpone surgery until the appearance of generalized abdominal rigidity or symptoms of severe Hypovolumic shock. If the condition of the patient still deteriorates after initial assessment it is wiser to operate early instead for watch and see policy.

References

1. Akhrass R, Yaffe MB, Brandt CP: Pancreatic trauma: a ten-year multi-institutional experience. Am Surg 1997 Jul; 63(7): 598-604[Medline].
2. Bellows CF, Salomone JP, Nakamura SK: what's black and white and red (read) all over? the bedside interpretation of diagnostic peritoneal lavage fluid. Am Surg 1998 Feb; 64(2): 112-8[Medline].
3. Branny SW, Moore EE, Cantrill SV: ultrasound based key clinical pathway reduces the use of hospital

resources for the evaluation of blunt abdominal trauma. j trauma 1997 Jun; 42(6): 1086-90[Medline].
4. Branney SW, Moore EE, Feldhaus KM: critical analysis of two decades of experience with post injury emergency department thoracotomy in a regional trauma center. J trauma 1998 Jul; 45(1): 87-94; discussion 94-5[Medline].
5. Chandler CF, Lane IS, Waxman KS: seatbelt sign following blunt trauma is associated with increased incidence of abdominal injury. Am Surg 1997 Oct; 63(10): 885-8[Medline].
6. Chiu WR, Cushing BM, Rodriguez a: abdominal injuries without hemoperitoneum: a potential limitation of focused abdominal sonography for trauma (fast). j trauma 1997 Apr; 42(4): 617-23; discussion 623-5[Medline].
7. John TG, Greig JD, John S and Garden OJ. Liver trauma: a ten-year experience. Br J Surg, 1992: 79: 1352-6.
8. Liu M, Lee CH, Peng FK: prospective comparison of diagnostic peritoneal lavage, computed tomographic scanning, and ultrasonography for the diagnosis of blunt abdominal trauma. j trauma 1993 Surg; 35(2): 267-70[Medline].
9. Munns J, Richardson M, Hewett P: a review of intestinal injury from blunt abdominal trauma. Aust N Z J Surg 1995 Dec; 65(12): 857-60[Medline].
10. Ong CL, Png DI, Dhan ST: abdominal trauma--a review. Singapore Med J 1994 Jun; 35(3): 269-70[Medline].
11. Rozycki GS, Ochsner MG, Schmidt JA: a prospective study of surgeon-performed ultrasound as the primary adjuvant modality for injured patient assessment. J trauma 1995 sep; 39(3): 492-8; discussion 498-500[Medline].
12. Rozycki GS, Shackford ST: ultrasound, what every trauma surgeon should know. J trauma 1996 Jan; 40(1): 1-4[Medline].
13. Sahdev P, Garramone RR, Schwartz JR: evaluation of liver function tests in screening for intra-abdominal injuries. Ann Emerg med 1991 Aug; 20(8): 838-41[Medline].
14. Smith IS, Wengrovitz MA, Delong BS: prospective validation of criteria, including age, for safe, nonsurgical management of the ruptured
15. Spleen. J trauma 1992 sep; 33(3): 363-8; discussion 368-9[Medline].
16. Salomon JS, Solomon JP. Blunt abdominal trauma: J E Medicine 2001 Feb; 60(1): 773-774 [Medline]