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Original Article

Pattern of Visceral and Peritoneal Injuries in Fatal Blunt Abdominal Trauma at a Tertiary Care Teaching Hospital in South India

Ramu Yangala[1], Suraj Sundaragiri[2], Vijaya Durga Koppada[3]

[1]Assistant Professor, Department of Forensic Medicine and Toxicology, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana, India,[2]Senior Resident, Forensic Medicine and Toxicology, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry, India, [3]Assistant Professor, Department of Forensic Medicine and Toxicology, Apollo Institute of Medical Sciences and Research Centre, Chittor, Andhra Pradesh, India

Abstract

The present prospective study aims to establish the pattern of visceral and peritoneal injuries in cases with blunt abdominal trauma subjected to post-mortem examination in a tertiary care teaching hospital in Hyderabad, Telangana for two years period between June 2010 and May 2012. Details pertaining to Cause of injury, pattern of injuries and cause of death were obtained from post mortem examination reports. The study revealed that among 150 cases in the study period, existence of both liver and spleen injuries (n=35; 23.33%) was most common followed by liver injury (n=23; 15.33%). The most frequent visceral and peritoneal injury reported was liver in 72 cases (48%), followed by mesentery in 54 cases (36%), spleen in 52 (34.67%) and intestine in 47 cases (31.33%). Abdominal injury was found associated with other injuries like head, chest, limb injuries in 36% cases.

Keywords: *Blunt trauma, Abdominal injury, Fatal, Pattern of injury, Autopsy cases*

Introduction

Abdominal viscera and peritoneum are quite vulnerable to trauma, unlike thoracic and cranial cavities which is well protected by rib cage and skull, there is no protection of abdomen by any bony cage.[1] According to World Health Organization (WHO), trauma kill more than five million worldwide annually, accounting for 9% of global mortality.[2] The recognized aetiology of blunt abdominal injury involves road traffic accidents, fall from height, assault, industrial accidents, animal hits etc.[3] Traumas involve a wide spectrum ranging from a mild to severe injuries of several organs. The underlying mechanisms for blunt abdominal trauma is either or both tensile and shear strain. Tensile injuries indicate direct compression or stretching of tissue, as seen usually in liver, spleen, and pancreas from frontal impact, and the kidney from impact to the flank. It results from direct blow, such as a punch or kick, or compression against a rigid object such as steering wheel. When the blunt force surpasses the elasticity and tensile strength of an internal organ, laceration may occur in the absence of any surface tear. Associated pelvic fractures or diaphragmatic rupture or hollow organ rupture may also result from increase of intra-abdominal pressure subsequent to direct abdominal compression. During abrupt acceleration or deceleration, shear injuries occur at a point of attachment of an organ. For instance, during rapid deceleration, the liver may continue to traverse relative to ligamentum

Corresponding Author:
Dr. Suraj Sundaragiri,
Senior Resident, Forensic Medicine and Toxicology, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry, India. 605006
Email: drsurajfm@gmail.com
Contact No.: 091-9908267327

teres resulting in liver laceration from shear forces acting around point of the attachment. Similarly, the organs like spleen, kidneys, and intestines are also all susceptible to injuries.[4,5,6] Here, we determine the pattern of visceral and peritoneal injuries, its frequencies and associations in fatal blunt abdominal trauma.

Materials and Method

This prospective study involves cases of blunt injury abdomen subjected for post mortem examination at Gandhi hospital Mortuary, Secunderabad, Telangana during June 2010 to May 2012. The study constituted 150 cases of fatal abdominal trauma. Preliminary details and history of the cases and cause of injury was gathered from the inquest report. Pattern of injuries and cause of death were obtained from post mortem examination reports. All data was collected on a proforma, and data prepared was analysed under discussed objectives.

Observation

The study shown that among autopsies conducted on deceased with blunt abdominal trauma for a period of two years from June 2010 and May 2012, the causes of injury were road traffic accident, accidental fall from height like fall from trees, roof tops, and during walking, industrial accidents, homicide, and fall from bullock carts and being run over by the bullock cartwheel. In the study population of 150 cases of fatal blunt abdominal trauma, the most common injury observed was combination of both liver and spleen (n=35; 23.33%), followed by liver alone (n=23; 15.33%), spleen alone (n=12; 8%), and combination of intestine and mesentery (n=12; 8%). (Table 1) Based on the frequency of individual visceral (solid or hollow organ) injury or peritoneal injury in cases of fatal blunt abdominal trauma, it was noticed that liver injury was most common (n=71; 48%), followed by mesentery (n=54; 36%), spleen (n=52; 34.67%) and intestine (n=47; 31.33%). (Table 2) In the present study, association of blunt abdominal trauma with trauma in other regions like head, chest, extremities was also considered. It was detected that only 36% cases had shown association, and 111 cases (72%) had shown no association i.e. abdominal trauma alone. The associations in the study population were seen with chest injury (n=9; 6%) and limb injury with fractures (n=9; 6%), head injury (n=6; 4%), and multiple injuries with association of more than one region (n=15; 10%).

Table 1: Distribution of study population based on viscera and peritoneum injured.

Viscera and peritoneum injured	No. of cases (n=150)
Liver	23 (15.33%)
Spleen	12 (8%)
Mesentery	9 (6%)
Intestine	6 (4%)
Kidneys	6 (4%)
Stomach	3 (2%)
Liver & Spleen	35 (23.33%)
Intestine & Mesentery	12 (8%)
Liver, Intestine & Mesentery	10 (6.67%)
Bladder, Intestine & Mesentery	6 (4%)
Kidney & Retroperitoneum	6 (4%)
Spleen, Stomach & Omentum	5 (3.33%)
Intestine, Mesentery, Stomach & Omentum	5 (3.33%)
Bladder, Intestine, Mesentery, Kidney & Retroperitoneum	4 (2.67%)
Intestine, Mesentery & Retroperitoneum	4 (2.67%)
Liver, Mesentery, Kidney & Retroperitoneum	4 (2.67%)

Table 2: Frequency of viscera and peritoneum injury in the study population.

Viscera and peritoneum injured	Frequency
Liver	72 (48%)
Mesentery	54 (36%)
Spleen	52 (34.67%)
Intestine	47 (31.33%)
Kidneys	20 (13.33%)
Retroperitoneum	18 (12%)
Bladder	10 (6.67%)
Stomach	13 (8.67%)
Omentum	10 (6.67%)

Table 3: Frequency of visceral and peritoneal injury in the study population.

Study	L	M	S	K	R	B	St	I
Present (n=150)	48%	36%	34.67%	13.33%	12%	6.67%	8.67%	31.33%
Singh M et al[7] (n=55)	67.27%	-	30.91%	10.91%	-	-	9.09%	18.18%
Panchal HA et al[9] (n=37)	35.13%	-	40.54%	13.51%	29.72%	2.7%	-	24.32%
Singh SP et al[10] (n=100)	18%	4%	28%	-	2%	2%	4%	20%
Sah D et al[11] (n=61%)	34.4%	52.4%	46%	11.4%	-	-		70.5%
Gushinge M et al[12] (n=114)	58.77%	10.52%	36.84%	35.08%	-	-	9.64%	13.15%
Kannan RR et al[13] (n=26)	26.9%	34.61%	34.6%	-	57.6%	-	-	57.69%

L=Liver; M=Mesentery; S=Spleen, K=Kidney; R=Retroperitoneum; B=Bladder; St=Stomach; I=Intestine

Discussion

Among 150 cases of fatal blunt abdominal trauma, the most common injury observed was combination of liver and spleen (23.33%), followed by liver (15.33%), spleen (12; 8%), and combination of intestine and mesentery (n=12; 8%). In study conducted by Singh M et al, the most common visceral injury noted was liver alone (40%); and spleen injury alone was observed in 12.73% cases and combination of liver and spleen was seen in 5.45% cases.[7] More studies demonstrating the existence of either single or combination of visceral injuries in cases of blunt abdominal trauma could not be traced.

Based on the frequency of individual (visceral) or peritoneal injury in the cases of fatal blunt abdominal trauma, it was noticed that liver injury was most frequent (48%), followed by mesentery (36%), spleen (34.67%) and intestine (31.33%). Santhosh CS study reported hollow viscous and mesenteric injury was most common (81.81%) followed by liver (63.63%) and splenic injury (9.09%).[8] We could not any study which presented the frequency of omentum injury. Studies of Singh M et al,[7] Panchal HA et al,[9] Singh SP et al,[10] Sah D et al,[11] Gushinge M et al[12] and Kannan RR et al[13] which presented the individual frequency of solid visceral or hollow visceral or peritoneal injury have been described in Table 3. The findings in the present study was supported by Singh M et al[7] and Gushinge M et al[12] with liver injury is more common. In Sah D et al[11] and Kannan RR et al[13] studies, mesentery injury was most commonly noted. In other studies, spleen injury was more frequent.[9,10]

In the present study, it was detected that only 36% cases had shown association, and no association i.e. abdominal trauma alone was seen in 111 cases (72%). The associations in the study population were chest injury (6%) and limb injury with fractures (6%), head injury (4%), and multiple injuries with association of more than one region (10%). Shubhendu K et al study negate with findings in present study, by showing 8.78% cases of abdominal injury alone, i.e. without an associations. Association of abdominal injury was seen with head (160/296; 54.05%), chest (198/296; 66.89%), and limbs (107/296; 36.15%).[14] Similarly, the study of Ravikanth J et al showed association seen in 46% cases. Commonly associated extra-abdominal injuries were chest (28%), head injury (15%), and limb bone fractures (20%).[15] Naik BV et al study revealed no association in 47% cases and association with head (7%), chest (17%), limb (11%) and multiple injuries (18%).[16]

Conclusion

The study revealed that among 150 cases of fatal blunt abdominal trauma, combination of liver and spleen injuries (23.33%) was common observation, followed by liver injury (15.33%). The visceral and peritoneal injury frequently perceived was liver in 72 cases (48%), followed by mesentery in 54 cases (36%), spleen in 52 (34.67%) and intestine in 47 cases (31.33%). Abdominal injury was associated with other injuries like head, chest and limb injuries in 36% cases.

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