



STUDY OF THE PATTERN OF LIVER INJURIES IN FATAL BLUNT TRAUMA ABDOMEN

General Surgery

Dr. Maryam Afifa* Resident, Department of Neurosurgery, Osmania General Hospital, Hyderabad
*Corresponding Author

Dr. Bushra Nishat Senior Resident, Department of General Surgery, Osmania General Hospital, Hyderabad

Dr. K Vijay Kumar Professor, Department of General Surgery, Government Medical College, Nizamabad.

ABSTRACT

Liver is the most commonly injured organ in blunt trauma abdomen due to its large size, location, fixed position, and friable consistency. It remains a significant cause of mortality in the young population of developing nations. A prospective study was conducted, analyzing the pattern of liver injuries in 59 cases of fatal blunt trauma abdomen by postmortem examination in a tertiary care hospital for a duration of 2 years. 81% (n=48) affected were male, with the 21-30 years age group affected the most. 66% (n=39) deaths occurred within 6 hours of trauma. 59% (n=35) cases had external injuries to the abdomen, 72.8% (n=43) had associated chest injury. Right lobe was injured in 66% (n=39) and the anterior surface of the liver in 51.7% (n=30). Liver laceration was the most commonly encountered injury i.e. 61% (n=36). Most fatal liver injuries affect young males due to RTA and maximum fatality is seen during the initial few hours after trauma. Chest injuries are commonly associated and over half cases show external abdominal signs.

KEYWORDS

Liver Injury, Blunt Trauma Abdomen (BTA), Fatal Trauma

INTRODUCTION

Accident and Trauma aka “Modern Day Epidemic” are counterproducts of modernisation. It is one of the leading causes of morbidity and mortality among young people, especially in developing countries, adding to the financial and social burden and loss of productive years of life.

Abdominal cavity is one of the most vulnerable regions. Unlike cranial and thoracic cavities it is not protected by a hard bony cage all around. The liver being the largest organ in the body and because of its large size, central, fixed location and friable consistency is wounded more frequently than any other organ in the abdomen due to blunt trauma of abdomen. which can range from minor laceration to rupture of liver with torrential hemorrhage and death. Mortality from liver trauma has significantly reduced over the years due to better understanding of the pathophysiology, diagnostic techniques, new technologies and better surgical management.

Yet there remains a significant number of patients still dying due to liver injury, further studies directed to understanding of these injuries and its mechanisms, presentation, severity and associated injuries is needed. This study aims to analyze the age group vulnerable to liver injury, correlation of external injuries & internal organ damage, the associated organs injured, the pattern, types & severity of liver injury in fatal blunt trauma abdomen.

METHODOLOGY:

A prospective observational study was conducted in Osmania General Hospital, Hyderabad for 2 years duration from October 2017 to October 2019. wherein all the cases of trauma getting admitted or brought dead to our hospital were followed, death following alleged history of trauma were closely observed and those cases where death was concluded as due to blunt trauma abdomen and having liver injury were selected and studied in detail. Cases with penetrating abdominal injuries were excluded.



59 cases were studied. Details such as mode of trauma, time and date of trauma, treatment received, time and date of death were collected from family members, Police, Inquest report and PME report. Whole body injuries were recorded, paying more attention to the external injuries of the abdomen and chest. All the abdominal visceral injuries were noted with focused examination of liver. Liver was examined in situ and

detailed examination was done after evisceration. The collected data was analyzed with respect to the age, sex, mode of injury, duration of survival, cause of death, associated injuries, and liver surfaces and types of injuries such as laceration, contusion or avulsion.

RESULTS:

Of the 59 cases studied, 48 (81.4%) were male, 11 (18.6%) were female and 21-30 years was the most common age group i.e. 15 (25.4%) cases. Road traffic accidents were responsible for 39 (66%) cases, homicides for 7 (11.9%) cases, Railway accidents and fall from height for 4 (6.8%) cases each and bull gore injuries for 2 (3.4%) cases.

Table 1: Age and Sex distribution of cases

AGE (YEARS)	MALE N (%)	FEMALE N (%)	TOTAL N (%)
0 - 10	2 (4.2)	1 (9.1)	3 (5%)
11 - 20	8 (16.7)	1 (9.1)	9 (15%)
21 - 30	12 (25)	3 (27.3)	15 (25.4%)
31 - 40	8 (16.7)	2 (18.2)	10 (16.9%)
41 - 50	8 (16.7)	1 (9.1)	9 (15%)
51 - 60	6 (12)	1 (9.1)	7 (11.8%)
> 60	4 (8.3)	2 (18.2)	6 (10%)
TOTAL	48 (81.4)	11 (18.6)	59 (100)

22 (37.3%) deaths occurred within the first hour of trauma, 17 (28.8%) cases died during 1 to 6 hours duration, 5 cases (8.4%) died during 6 to 12 hours, 4 (6.7%) cases died during 12 to 24 hours after trauma, 6 (10%) cases died during 1 day to 1 week period and 5 (8.4%) deaths occurred after 1 week post trauma.

PERIOD OF SURVIVAL

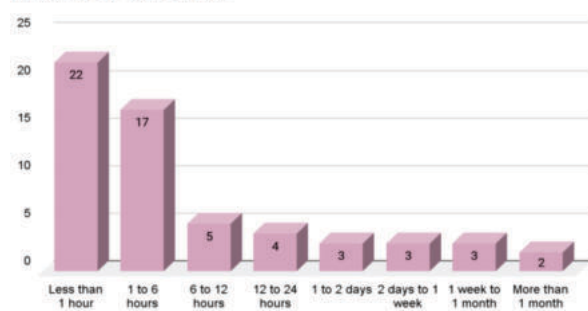


Figure 1: Period of survival following fatal blunt trauma abdomen

Overall external injuries to the abdomen were seen in 35 (59%) cases, 100% (n=2) with bull gore injury, 75% (n=3) with railway injuries, 71.4% (n=5) homicidal and 56% (n=22) with RTA. Associated chest injuries were found in 43 (72.8%), head injuries in 22 (37.2%) cases, limbs were injured in 12 (20.4%) cases, spine injuries were seen in 8

(13.6%) cases and pelvic injuries in 5 (8.5%) cases. Multiple body parts were injured in about 25 (42.4%).

Most frequently associated organ injury was splenic, seen in 24 (40.6%) cases, followed by intestines, kidney and mesentery with 10 (17%) cases each. diaphragm injury was seen in 7 (11.8%) cases, pancreas and gallbladder were injured in 2 (3.4%) cases each. injury to aorta was noted in 1 (1.7%) case.

VISCERAL ORGAN INJURED

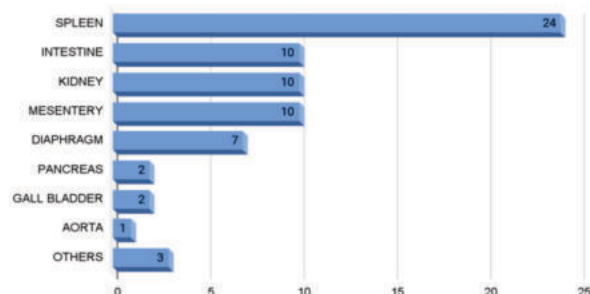


Figure 2 : Frequency of other intra abdominal organs injury

Right lobe of the liver was most commonly injured, seen in 39 (66.1%) cases, left lobe injuries were seen in 9 (15.3%) cases and both lobes injuries in 11 (18.6%) cases. Anterior surface of the liver was noted to be the most frequently affected surface with 30 (51.7%) cases, followed by multiple surfaces involved in 9 (15.5%) cases, superior surface in 8 (13.8%) cases, right lateral surface in 7 (12.1%) cases and inferior surface in 4 (6.9%) cases. Most common injury type was laceration seen in 36 (61%) cases. 9 (15.2%) cases had both lacerations and contusions, 8 (13.6%) cases were with shattered liver lobes, isolated contusions were seen in 6 (10.2%) cases.

SURFACE OF LIVER INJURED

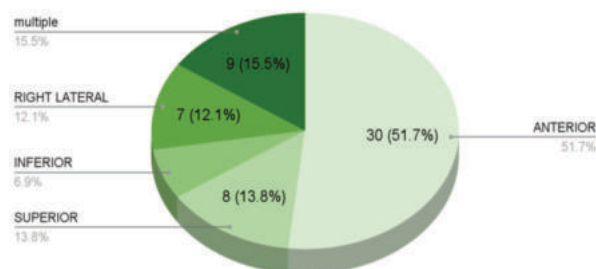


Figure 3 : Frequency of liver surfaces injured

Table 2: Pattern of liver injuries in association with mode of trauma

Mechanism Of Trauma	Rta	Homici dal	Railway Injuries	Fall From Height	Bull Gore Injury	Others	Total
External Abdominal Injuries							
Present	22 (56.4)	5 (71.4)	3 (75)	2(50)	2(100)	1 (33.3)	35 (59.3)
Absent	17 (43.6)	2 (28.6)	1 (25)	2(50)	-	2 (66.6)	24 (40.7)
Other Associated Injuries							
Chest	31 (79.5)	5 (71.4)	3 (75)	1 (25)	2 (100)	1 (33.3)	43 (72.8)
Head	13 (33.3)	3 (42.8)	3 (75)	2 (50)	-	1 (33.3)	22 (37.2)
Pelvis	3 (7.7)	-	-	1 (25)	1 (50)	-	5 (8.5)
Spine	3 (7.7)	-	2 (50)	3 (75)	-	-	8 (13.6)
Limbs	5 (12.8)	2 (28.6)	3 (75)	2 (50)	1 (50)	1 (33.3)	12 (20.4)
Multiple	13 (33.3)	4 (57)	3 (75)	3 (75)	1 (50)	1 (33.3)	25 (42.4)
Liver Lobe Injured							
Both	5 (12.8)	1 (14.4)	4 (100)	1 (25)	-	-	11 (18.6)

Right	28 (71.8)	3 (42.8)	-	3 (75)	2 (100)	3 (100)	39 (66.1)
Left	6 (15.4)	3 (42.8)	-	-	-	-	9 (15.3)
Liver Injury Pattern							
Laceration & Contusion	6 (15.4)	1 (14.3)	1 (25)	1 (25)	-	-	9 (15.2)
Contusion	4 (10.3)	1 (14.3)	-	-	-	1 (33.3)	6 (10.2)
Laceration	25 (64)	4 (57.1)	1 (25)	3 (75)	1 (50)	2 (66.6)	36 (61)
Shattered Lobe/Liver	4 (10.3)	1 (14.3)	2 (50)	-	1 (50)	-	8 (13.6)
Total	39 (66)	7 (11.9)	4 (6.8)	4 (6.8)	2 (3.4)	3 (5)	-

DISCUSSION

In the present study, the most common mode of injury was road traffic accidents (66%), similar findings were observed in other studies^{2,3,5,6,9}. Males were affected 4 times more than females, with the 21-30 years age group being most frequently injured followed by the 31-40 years group which was comparable to other studies^{2,3,5,6,7}. Most cases died during the first few hours of trauma with more than one third within the first hour of blunt abdominal trauma and two thirds (66%) during the first six hours of blunt abdominal trauma similar outcome was seen in other studies^{4,9}.

External injuries to the abdomen were present in 59% and associated chest injury was seen in 73% cases in the present study compared to 50% and 72% cases respectively in the study done by Sreedevi et al². Spleen was the most commonly injured intra abdominal organ i.e. 41% cases, followed by intestines, mesentery and kidney each seen in 17% cases, as was the case in other studies^{2,3,6,7,9,10}.

Right lobe of the liver was most commonly injured i.e. (66.1%) in two thirds of cases. Anterior surface was involved in more than half (51.7%) of the cases, followed by multiple surface, superior, right lateral and inferior surfaces in that order. Liver laceration was the most common type of injury seen (61%), followed by combined laceration & contusion, shattered liver lobes, and contusions, as was the case with study done by Subedi et al⁵.

CONCLUSIONS

Young males were four times more affected than females for fatal blunt trauma abdomen with liver injuries. Road traffic accidents were responsible for two thirds of the cases. Most deaths were seen in the first few hours after trauma, signifying the importance of early and effective treatment of liver injuries. Over half the cases of fatal blunt trauma abdomen were with signs of external injuries to the abdomen, having differing frequency according to mode of trauma. Chest injuries were frequently associated with abdominal injuries. Spleen was the most frequently associated injured organ. Right lobe and anterior surface of the liver were most vulnerable to blunt forces. Blunt injury causes liver laceration the most, but shattered liver lobes with severe mode of trauma are seen too.

REFERENCES:

- David RJ, Franklin GA, Lukan JK, Carrillo EH, Spain DA, Miller FB, et al. Evolution in the management of hepatic trauma: a 25-year perspective. *Ann Surg* 2000;232:324/30.
- Sreedevi CS, Sreelekshmi J. *Liver trauma with associated external injuries and other internal vital organ injuries – An autopsy based study*. *J. Evolution Med. Dent. Sci.* 2016;5(98):7196-7199.
- Arumugam S, Al-Hassani A, El-Menyar A, Abdelrahman H, Parchani A, Peralta R, Zarour A, Al-Thani H. Frequency, causes and pattern of abdominal trauma: A 4-year descriptive analysis. *J Emerg Trauma Shock* [serial online] 2015 [cited 2017 Nov 12];8:193-8.
- Analysis of Blunt Abdominal Trauma with Respect to Associated Injuries, Period of Survival And Mechanism of Death Among Autopsies Conducted in Dept. of FMT, RIMS, Ranchi. Kumar Shubhendu1, Ajay Bhengra2, Tulsi Mahto3, A. K. Chaudhary4 *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 15, Issue 10 Ver. IV (October. 2016), PP 74-78
- An Autopsy Study of Liver Injuries in a Tertiary Referral Centre of Eastern Nepal Nuwaddatta Subedi1, b.N. Yadav2, ShiveNdra Jha3, SharMila GuruNG4, aMShu PradhaN5 *Journal of Clinical and Diagnostic Research.* 2013 Aug. Vol-7(8): 1686-1688
- Abdominal Organ Involvement in Blunt Injuries Mousami Singh, Amit Kumar, Anoop Kumar Verma, Sanjeet Kumar, Abbas Kumar Singh, *J Indian Acad Forensic Med.* Jan-March 2012, Vol.34, No.1
- The study of abdominal trauma: patterns of injury, clinical presentation, organ involvement and associated injury Hemang A. Panchal1*, Avadhesh M. Ramanuj2 *International Surgery Journal Panchal HA et al. Int Surg J.* 2016 Aug;3(3): 1392 - 1398
- Chakraborty Prabir, Das Somnath, Pandey Surendra Kumar. Comparative Study of Hepatic Injury and its Different aspects in Medicolegal Autopsies. *J Indian Acad Forensic Med.* 2011;33(3):203-6.
- Blunt Injuries of Abdomen in Warangal Area An Analytical Study *B. Vasanth Naik, **Surender Jakkam, *J Indian Acad Forensic Med.* October-December 2013, Vol. 35, No. 4

10. Hanumantha A, et al. An epidemiological study on pattern of thoraco-abdominal injuries sustained in fatal road traffic accidents of Bangalore: Autopsy Based Study; Narayana Med J, Oct 2012;1(2) Published online