



Original Research Article

Liver Injuries and Trauma - An Autopsy Study

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ABSTRACT

Introduction: Blunt abdominal injuries are often encountered in vehicular accidents, blows or kicks on the region or following fall from heights.

Objective:

1. To study the prevalence liver injuries in relation to various factors viz., epidemiological factors, socio-economic status, penetrating/ non-penetrating injuries, time of occurrence etc.
2. To identify the risk, so as to facilitate the early diagnosis of trauma by the clinicians.
3. To study the relationship between severity of the injuries and survival period.

Materials and methods: Materials for the present study were collected from the medico legal autopsies, showing abdominal injuries, carried out at the mortuary of Adichunchanagiri Institute of Medical Sciences, Mandya during the period from 1st June 2008 to 31st May 2013. The total numbers of cases studied were 100. All the autopsies showing abdominal trauma were included in the study.

Results: Out of the 65 cases of studied, the commonest age group of the victims was 21- 30 years (36%) followed by the age group of 31-40 yrs (22%). 14 cases are brought dead . Men were more involved than women with a ratio of 1.7: 1.

Conclusion: The initial management of liver trauma generally follows the same procedures for all traumas with a focus on maintaining airway, breathing, and circulation. A physical examination is a corner stone of the assessment of which there are various non-invasive means of diagnostic tools that can be utilized.

Key words: liver, trauma, AAST liver injury scale.

INTRODUCTION

Blunt abdominal injuries are often encountered in vehicular accidents, blows or kicks on the region or following fall from heights. According to Reddy KSN, the structures most likely to be damaged in blunt abdominal trauma in order of frequency are: liver, spleen, kidney,

intestines, abdominal wall, mesentery, pancreas and diaphragm.^[1]

Abdominal wall and pelvis have the unique resilience property by virtue of which they absorb, without visible injury; impacts of such force which if delivered elsewhere might cause laceration and skeletal damage.

Blunt trauma to the abdomen and pelvis commonly involves solid viscus, viz., liver, spleen because of their large size, relatively fixed and superficially placed position in the abdominal cavity. Liver being friable is crushed between objects such as buffers etc and right lobe of the liver is frequently injured than the left lobe. At times, trauma to one area may result in contre-coup effect with injury on the opposite side of solid organ, e.g., liver.

The incidence of abdominal trauma is variable from time to time, depending on the circumstances, mode of injury, and the general background of the area of occurrence. Thus, in war time, the incidence of this trauma is much higher than that in peace time. The extent of mechanization and the overall attitude towards violence in a particular population also has a significant role to play. The three main causes are: (a) Road traffic accidents; (b) Industrial and domestic accidents, and (c) Military violence. In big cities of India, especially in Delhi, the problem is much more complex because of increase in vehicle population from just 3 lakhs in 1951 to about 3.5 crores at present, with two wheelers constituting 66.7% of total vehicle population. About 60,000 persons are killed annually in India in road accidents and 30% of the deaths in road accidents are due to untimely medical assistance.

A Forensic Expert has to take into consideration all possible information while deducing his opinion. Many a times, he has

to visit the spot in cases of traffic accidents to ascertain the nature and direction of impact on the body in vehicular accident cases.

AIMS AND OBJECTIVES

To study the pattern of liver injuries.

- To study the prevalence liver injuries in relation to various factors viz., epidemiological factors, socio-economic status, penetrating/ non-penetrating injuries, time of occurrence etc.
- To identify the risk, so as to facilitate the early diagnosis of trauma by the clinicians.
- To study the relationship between severity of the injuries and survival period.

MATERIALS AND METHODS

Materials for the present study were collected from the medico legal autopsies, showing abdominal injuries, carried out at the mortuary of Adichunchanagiri Institute of Medical Sciences, Mandya, during the period from 1st June 2008 to 31st May 2013. The total numbers of cases studied were 100. All the autopsies showing abdominal trauma were included in the study.

In 1989 the Organ Injury Scaling Committee of the American Association for the Surgery of Trauma (AAST) defined the most comprehensive hepatic injury classification to date.

Table: AAST liver injury scale (1994 revision).

I	Haematoma	Subcapsular, <10% surface
	Laceration	Capsular tear, <1 cm parenchymal depth
II	Haematoma	Subcapsular, 10–50% surface area; intra-parenchymal, <10 cm in diameter
	Laceration	1–3 cm parenchymal depth, <10 cm in length
III	Haematoma	Subcapsular, >50% surface area or expanding; ruptured subcapsular or parenchymal haematoma Intraparenchymal haematoma >10 cm or expanding
	Laceration	> 3 cm parenchymal depth
IV	Laceration	Parenchymal disruption involving 25–75% of hepatic lobe or 1–3 Couinaud's segments within a single lobe
V	Laceration	Parenchymal disruption involving >75% of hepatic lobe or >3 Couinaud's segments within a single lobe
	Vascular	Juxtavenous hepatic injuries; i.e. retrohepatic vena cava/ central major hepatic veins
VI	Vascular	Hepatic avulsion

*Advance one grade for multiple injuries, up to grade III

OBSERVATIONS AND RESULTS

TABLE 1. Distribution of cases based on age and survival period.

Age group (years)	Survival period								
	Dead on arrival	< 2 hours	2 – 6 hours	6 – 12 hours	12 – 24 hours	24 hours – 3 days	3 days- 1 week	2 – 4 weeks	> 4 weeks
<10	-	1	2	-	1	1	-	1	-
11-20	2	2	2	4	2	-	5	3	-
21-30	4	3	3	7	3	11	2	1	2
31-40	4	3	4	5	2	-	1	-	3
41-50	3	2	-	-	4	1	-	-	3
>50	1	1	-	-	1	-	-	-	-

Out of the 65 cases of studied, the commonest age group of the victims was 21-30 years (36%) followed by the age group of 31-40 yrs (22%). 14 cases are brought dead.

TABLE 2. Distribution of cases based on sex.

Sex	Cases	Percentage
Male	64	64%
Female	36	36%

Men were more involved than women with a ratio of 1.7: 1.

TABLE 3. Distribution of cases based on socio-economic status.

Socio-economic class	Cases	Percentage
Upper class	29	29%
Middle class	38	38%
Lower class	33	33%

In the present study most of the victims (38%) belong to middle class and 33% victims belong to lower class.

Table 4. Distribution of cases based on manner of trauma.

Sl. No.	Type Of Trauma	No.	%
1	Vehicular Accident	84	84%
2	Assault by Weapon	9	9%
3	Fall from Height	7	7%
4	Total	100	100

It was observed that vehicular accident was the commonest cause of blunt hepatic trauma accounting for 84% of the cases. Other causes included assault by weapon in 9 cases (9%) and fall from a height in 7 (7%) cases.

Table 5: Distribution of cases based on site of liver trauma.

SITE	No.
RT. Lobe	67
LT. lobe	42
Anterior surface	28
Posterior surface	24
Superior surface	9
Inferior surface	9

The right lobe of the liver is most commonly injured (67 cases) compared to left lobe (42 cases).

Table 6: AAST liver injury scale.

Grades of liver injury	Number of cases	%
I	34	34 %
II	27	27%
III	14	14%
IV	9	9%
V	8	8%
VI	8	8%
TOTAL	100	100%

The Grade I and grade II are the most common pattern of injuries encountered in the present study.

DISCUSSION

Out of the 65 cases of studied, the commonest age group of the victims was 21-30 years (36%) followed by the age group of 31-40 yrs (22%). 14 cases are brought dead. Men were more involved than women with a ratio of 1.7: 1.

This result was also seen by other researchers that had found highest incident in male at the age group between 20 to 40years (Abdul HM, Degiannis, Regal).^[2-4]

Male dominance in this type of injury could likely be due to the fact the males are more exposed to hazards of roads, industry, violence and sports, as they constitute working and earning member in majority of families. The incidence of blunt injuries to the abdomen has been rising world-wide because of the increasing frequency of high speed travels and social violence. This may be due to the dynamic lifestyles of these two age groups and this is consistent with studies conducted by Anjum Fazili MS and Shabana Nazir MB where the average age was 34years.^[5]

In the present study most of the victims (38%) belong to middle class and 33% victims belong to lower class. This finding tallies with other research that had found similar characteristics (Chibnall). It is very likely that this is due to the type of transportation that these groups usually took i.e. motorcycle.^[6]

It was observed that vehicular accident was the commonest cause of blunt hepatic trauma accounting for 84% of the cases. Other causes included assault by weapon in 9 cases (9%) and fall from a height in 7 (7%) cases. The right lobe of the liver is most commonly injured (67 cases) compared to left lobe (42 cases). In the study done by Abdul HM^[2] liver injuries due to blunt trauma were observed in 68.0% of cases, of which majority of cases were due to vehicular accidents. Similar findings have also been reported by Davis et al. (1996)^[7] in which majority of cases showed laceration injury including superficial and deep lacerations. Piecemeal liver was also noted in 11.4% of the cases. Penetrating trauma directed towards right, left costal, and sub costal regions by firearms or knife was found to cause injury to the liver. A total of 40.0% of liver injuries were noticed following penetrating wounds of the abdomen. This tallied well with previous report by Sharma (1989)^[8] which had

reported this type of incident to be at 44.4%. Liver was also found to be the most commonly injured organ following penetrating abdominal trauma. The majority of BAT is often attributed to car-to-car collisions, in which rapid deceleration often propels the driver forwards into the steering wheel or dash board, causing rupturing of internal organs due to the presence transiently increasing intraluminal pressure, occurring in more serious cases and contusions in less serious cases where speed or forward force is less. The abdomen is vulnerable to injury since there is minimal bony protection for underlying organs. This is similar to the results of other studies.^[9-11]

The Grade I and grade II are the most common pattern of injuries encountered in the present study. According to the the study done by Asensio JA et. al., out of 103 patients, mechanism of injury was penetrating in 80 (79%) and blunt in 23 (21%). AAST grade IV injuries occurred in 51 (47%) and grade V injuries occurred in 52 (53%). Overall survival was 43%. Results stratified to AAST-OIS injury grade were as follows: grade IV, 32 of 51 (63%); grade V, 12 of 52 (23%); grade IV versus grade V ($p < 0.001$) odds ratio, 2.06; 95% confidence interval, 2.72 (1.40-3.04).^[12]

CONCLUSION

Investigations, such as the use of ultrasound or a computed tomography scan, is the generally preferred way of diagnosis as it is more accurate and is sensitive to bleeding, however; due to logistics this is not always possible. A physical examination may be used but is typically inaccurate in blunt trauma, unlike in penetrating trauma where the trajectory the projectile took can be followed digitally.

The initial management of liver trauma generally follows the same procedures for all traumas with a focus on maintaining airway, breathing, and circulation.

A physical examination is a corner stone of the assessment of which there are various non-invasive means of diagnostic tools that can be utilized. A large majority of liver injuries are minor and require only observation. In special cases where there is a higher risk with surgery, such as in the elderly, nonoperative management would include the infusion of packed red blood cells in an intensive care unit.^[2] Typically hepatic injuries resulting from stab wounds cause little damage unless a vital part of the liver is injured such as the hepatic portal vein, with gunshot wounds, the damage is worse.

Consent: Written informed consent has been taken from the close relatives of the deceased.

Competing interest: The authors declare that they have no competing interest. Both authors have read and approved the final manuscript.

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