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Research Article

**PRESENTATION OF LIVER TRAUMA AND ITS  
MANAGEMENT AT TERTIARY CARE UNIT, GUJRANWALA,  
PUNJAB, PAKISTAN****Dr Liaqat Ali Zia<sup>1</sup>, Dr Muhammad Khalid<sup>2</sup>, Dr Hafiz Muhammad Khizar Nawaz  
Cheema<sup>3</sup>, Dr Sobia Zafar<sup>4</sup>, Dr Sufyan Zia<sup>5</sup>, Dr Ahsan Iqbal<sup>6</sup>**<sup>1-6</sup> District Head Quarter Teaching Hospital Gujranwala**Abstract:**

**Objective:** To determine and document the presentation and outcome of surgical management of liver trauma.

**Methods:** This study has been performed to highlight the presentation and management of liver trauma in patients of different gender and age group presented surgical emergency in DHQ teaching hospital Gujranwala in Pakistan as a Retrospective study. This study was conducted from January 2016 to July 2019. The study included all adult patients of either gender who presented with in surgical emergency with liver trauma and underwent any management either conservative or surgical. Convenience sampling technique was employed. The data were collected through a Performa and analyzed using SPSS 16.

**Results:** Out of 23 cases of liver trauma, 22 (95.7 %) were males and 01 (5.3%) were females. Blunt Trauma abdomen was the leading cause (n=11; 47.8%) of injuries. There were 07 patients with grade I & II injury; 11 patients were with grade III injury and 05 patients with grade IV injury. 69.6 % of patients were presented with hemodynamic instability (n= 16) Perihepatic packing was the commonest operative procedure performed(n=11;47.8%). No patient was expired during hospital stay and 2 of patients were referred to specialized center for management. Complications only occurred in 8.7% (n=2) patients.

**Conclusion:** Liver trauma constitutes an important cause of emergency hospitalization, morbidity and in-hospital mortality in our population. It predominantly affects the younger males and road traffic accidents are the leading cause. Majority of the patients are successfully managed with perihepatic packing.

**Keywords:** Liver trauma, Perihepatic packing, Damage control surgery

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**INTRODUCTION:**

Trauma of liver represents an significant part and aspect of trauma, isolated or as well as part of poly-trauma carries significant morbidity and mortality.<sup>1-3</sup> It may be caused by a different types of blunt and penetrating injuries.<sup>1,4-6</sup> Over the years, the outcome and management has improved due to better ICU & critical care, damage control surgeries and strategies, good antibiotics, blood transfusions and radiological interventions.<sup>1,2,7</sup> Our present study was conducted retrospectively to determine, document and analyze the different causes, clinical presentation, outcomes, morbidity and mortality of surgically managed liver trauma with the vision of generating evidence that could prompt steps to address the issue in a more competent way.

**PATIENTS AND METHODS:**

This study has been performed to highlight the presentation and management of liver trauma in patients of different gender and age group presented surgical emergency in DHQ teaching hospital Gujranwala in Pakistan as a Retrospective study. This study was conducted from January 2016 to July 2019. The study included all adult patients of either gender who presented with in surgical emergency with liver trauma and underwent any management either conservative or surgical. Convenience sampling technique was employed. As our study was an observational study and didn't include any fresh intervention or any modification, it was carried out in accordance with the Declaration of Helsinki of 1975, as revised in 1983, and the anonymity of the participants was ensured. Initial evaluation & diagnosis was made by history, complete general and systemic examination and ancillary investigations, including radiological investigations like X-ray Abdomen, ultrasound abdomen, CT scan abdomen, and diagnostic peritoneal lavage where indicated. The Performa included variables such as socio-demographic bio data of the patient, mode of injury, hemodynamic status at time of presentation in surgical

emergency, grades of liver injury as per operative findings, and injuries other than liver. Treatment option given, post-operative complications occurred, intensive care unit (ICU), total duration of hospital stay, referral and mortality. The liver trauma was graded in accordance to the liver injury scale of the American Association for the Surgery of Trauma-Organ Injury Scale (AAST=OIS)<sup>7</sup>. Emergency exploratory laparotomy was done after intial resuscitations and arrangements to address the grade of live injury. Multiple blood transfusions of whole blood and fresh frozen plasma (FFPs) were undertaken to stabilize the condition of patients especially hemodynamic status. During exploratory laparotomy specific measures were undertaken depending upon grades of liver injuries like topical haemostatic agents i.e gelatin or oxidised cellulose, hepatorrhapy by sutures, perihepatic packing temporary or right hepatic artery ligation. The principles of damage control surgery were followed particularly in cases of moderate to high grade injuries and care was taken to ensure prevention of hypothermia, acidosis and coagulopathy. Those patients underwent perihepatic packing and temporary abdomen closure were shifted to surgical ICU for close observation, frequently monitoring, symptomatic management especially metabolic and temperature management. After 48-72 hours perihepatic packs removed and definitive treatment were performed if needed. Other injuries were treated according to standard protocols. A drain was placed around liver bed to affect any drainage or leakage and observe any bleeding/biliary leak. Patient with biliary leak and extensive liver damage were referred to specialized center. The data collected was analyzed using SPSS version 16 and different descriptive statistics were used to calculate percentages, standard deviation, means, means and frequencies. The data such as age, gender, condition at presentation, procedure underwent, complications, mode of injuries were expressed as frequencies and percentages.

Liver injury grading by the American Association for the Surgery of Trauma.<sup>7</sup>

#### Grade Injury description

I.	<b>Haematoma</b> <b>Laceration</b>	Subcapsular, non-expanding, <10% of surface area. Capsular tear, non-bleeding, with < 1 cm deep parenchymal disruption.
II.	<b>Haematoma</b> non-expanding, < 2 cm in diameter. <b>Laceration</b>	Subcapsular, non-expanding, 10-50% of surface area, intra- parenchymal, < 3 cm deep parenchymal disruption, < 10 cm in length
III.	<b>Haematoma</b> haematoma with active bleeding, intraparenchymal haematoma > 2 cm. <b>Laceration</b>	Subcapsular, >50% of surface area or expanding, ruptured Subcapsular >3 cm deep parenchymal disruption, > 10 cm in length
IV.	<b>Haematoma</b> <b>Laceration</b>	Ruptured central haematoma. Parenchymal disruption, < 75% of hepatic lobe
V.	<b>Laceration</b> <b>Vascular</b>	Parenchymal disruption, >75% of hepatic lobe Juxta-hepatic venous injuries (retro-hepatic cava/major hepatic veins)
VI.	Vascular Hepatic avulsion	

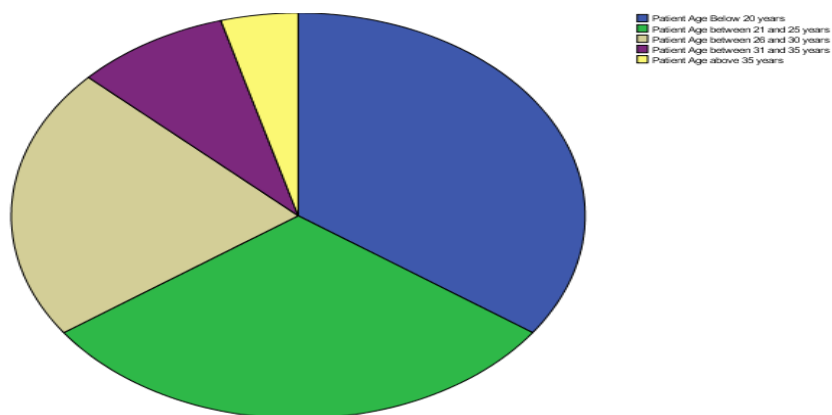
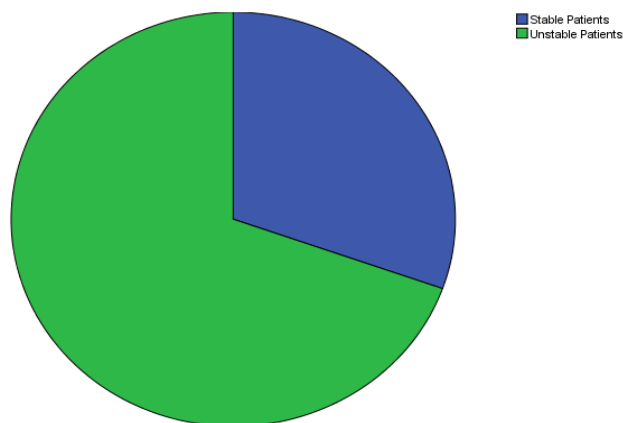
#### RESULTS:

Out of 23 cases of liver trauma, 22 (95.7 %) were males and 01 (5.3%) were females. Patients age ranges from 17 to 42 years. Eight patients (34.8%) were 20 or below 20 years, seven (30.4%) patients were in between 21 and 25 years, five (21.7%) patients were in between 26 and 30 years, between 31 and 35 there were only two (8.7%) patients and only one (4.3%) patient above 35 years of age presented with liver injury is this time period. Blunt Trauma abdomen was the leading cause (n=11; 47.8%) of injuries. Out of total 23 patients 07 (30.4%) patients were presented after firearm injury, 03 (13%) patients were presented in emergency after stab wound injury. 2 patients presented with other mode of injuries like fall from

height. Seven patients (30.4%) were hemodynamically stable while 16 patients (69.6%) were present with instability of hemodynamics at presentation in surgical emergency. There were 07 patients with grade I & II injury; 11 patients were with grade III injury and 05 patients with grade IV injury. Perihepatic packing was the commonest operative procedure performed (n=11; 47.8%). Conservative management was done in 07 patients & damage control surgery done in 03 patients. No patient was expired during hospital stay and 2 of patients were referred to specialized center for management. Complications only occurred in 8.7% (n=2) patients. The results described below in form of tables and pie charts stating percentages and frequencies.

**Age Distribution**

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Patient Age Below 20 years	8	34.8	34.8	34.8
Patient Age between 21 and 25 years	7	30.4	30.4	65.2
Patient Age between 26 and 30 years	5	21.7	21.7	87.0
Patient Age between 31 and 35 years	2	8.7	8.7	95.7
Patient Age above 35 years	1	4.3	4.3	100.0
Total	23	100.0	100.0	

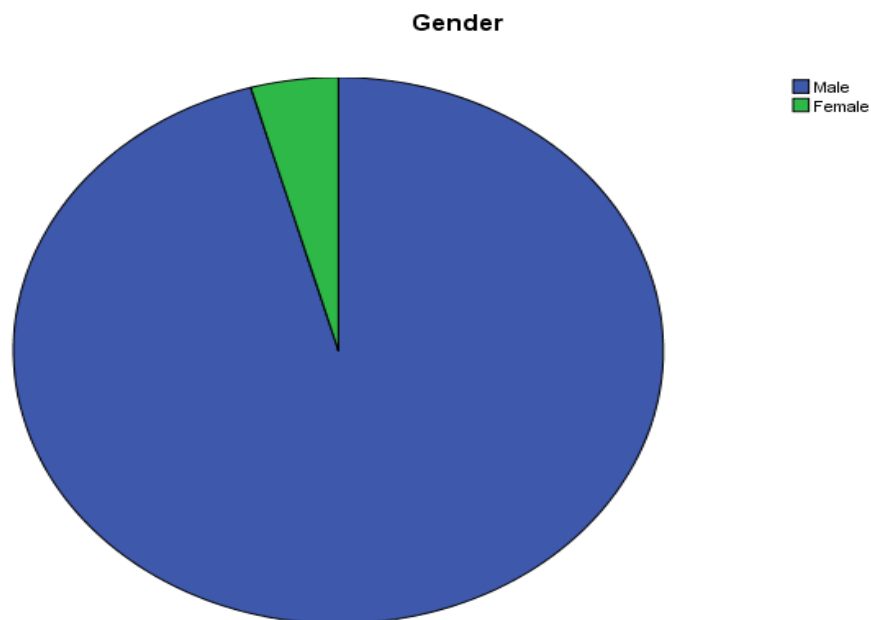
**Age Distribution****Condition of patients at presentation**

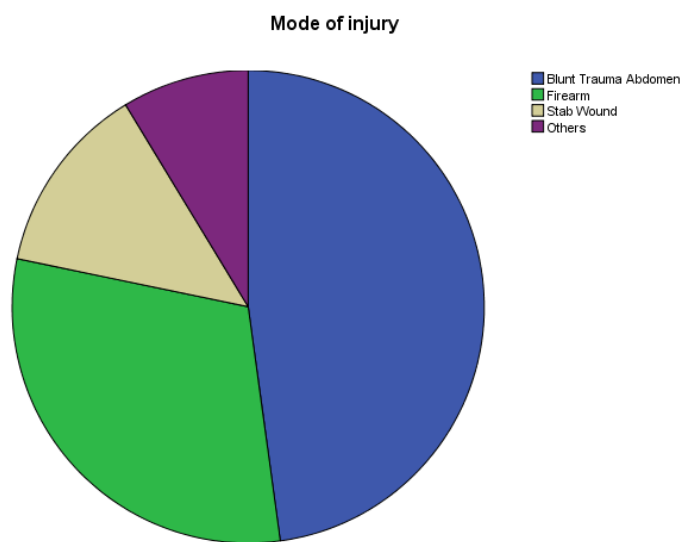
**Condition of patients at presentation**

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Stable Patients	7	30.4	30.4	30.4
Unstable Patients	16	69.6	69.6	100.0
Total	23	100.0	100.0	

**Gender**

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Male	22	95.7	95.7	95.7
Female	1	4.3	4.3	100.0
Total	23	100.0	100.0	



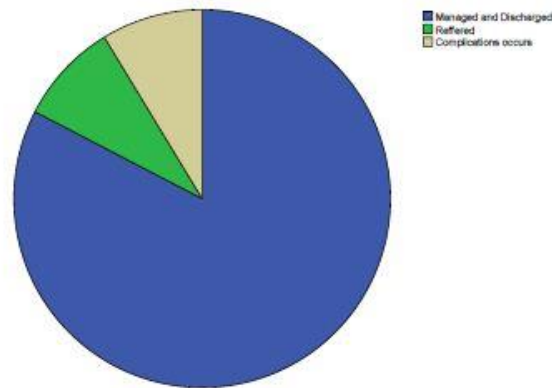
**Mode of injury**

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Blunt Trauma Abdomen	11	47.8	47.8	47.8
Firearm	7	30.4	30.4	78.3
Stab Wound	3	13.0	13.0	91.3
Others	2	8.7	8.7	100.0
Total	23	100.0	100.0	

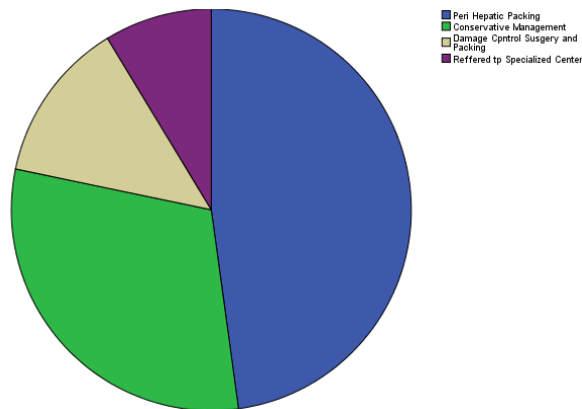
**Treatment Given**

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Peri Hepatic Packing	11	47.8	47.8	47.8
Conservative Management	7	30.4	30.4	78.3
Damage Control Surgery and Packing	3	13.0	13.0	91.3
Referred to Specialized Center	2	8.7	8.7	100.0
Total	23	100.0	100.0	

Outcome and Post Operative Complications



Treatment Given



Outcome and Post Operative Complications

	Frequency (No. of Cases)	Percent	Valid Percent	Cumulative Percent
Managed and Discharged	19	82.6	82.6	82.6
Referred	2	8.7	8.7	91.3
Complications occurs	2	8.7	8.7	100.0
Total	23	100.0	100.0	

**DISCUSSION:**

Liver is the largest solid organ in abdomen. Despite of its relatively protected anatomic location it is susceptible to injuries because of its large size when there is a abdominal insult. The exact incidence of liver injury is difficult to estimate in our country due

to poor system of trauma registry. However, it's incidence is probably high in our population as documented by our study as well as other published local studies from different parts of the country<sup>5, 8-10</sup>. In our current study, we observed there is predominance of males. In context of general and liver

trauma there is more frequent involvement of males which has been documented in published literature.<sup>9-11</sup>. As males are more frequently involved in travel, high risk activities, driving, and other outdoor activities, males are more prone to trauma. As a result of fights and brawls males are more frequent victims of assaults such as firearm injuries and stabs. Our current study demonstrates the frequent involvement of middle age group. This is in accordance with the observations of several other publications. Predominant involvement of middle age males further amplifies the socio-economic implications of such traumas. blunt in our current study blunt trauma abdomen was the leading cause of liver injury mostly after RTAs. Studies in Russia and Peshawar have reported firearm injuries as the predominant mechanism of injury [3,10]. In our study most of the patients were hemodynamically unstable at time of presentation in emergency and underwent early resuscitation and emergency exploratory laparotomy. Many of the published local articles have also documented similar views on the mode of presentation of patients with liver injuries [5,10]. In our study no patient presented with grade V or grade VI liver injury. Grade V or VI have not been reported in any other local published studies either [7,10]. This is possibly due to poor system for adequate on-scene management of road traffic accidents victims. There is a poor system of on-site medical care or transportation to tertiary care health. Due to poor system of transportation and delay in management, patients with life-threatening injuries of higher grade mostly die on the spot or en route to hospital. Most frequently perihepatic packing and suture hepatorrhaphy performed in our study. This is in accordance to other reported studies. In fact, perihepatic packing has been of proven efficacy in liver injuries, especially in patients with no tolerance for blood-loss or those requiring massive transfusion. This damage control strategy helps to prevent the lethal triad of metabolic acidosis, coagulopathy and hypothermia.

To prevent the possibility of iatrogenic abdominal compartment syndrome we followed the policy of putting no more than 06 abdominal sponges around the liver. A vast number of other haemostatic measures have been documented for liver injury by many workers with different success rates. The choice of

haemostatic measure such as hepato-omentorrhaphy (a viable omental pedicle is packed into the hepatic injury and sutured to the edges of Glisson's capsule superficially), application of topical haemostatic agents, tractotomy with finger fracture (i.e. digitoclasia), resectional debridement with selective vascular ligation, intrahepatic balloon, extensive hepatorrhaphy, angioembolisation, venovenous bypass, and hepatic transplant etc[1,214,17] instituted depends on a variety of factors such as the grade of liver injury, expertise of the surgeon, preference of individual surgeon and institutional practices. Hence, standardization as well as comparison of the surgical procedures undertaken by different researchers and outcome of patients is difficult to make. The preferred treatment option was Damage control surgery in our current study. Only fewer complications were noted. A Croatian study reported much more incidence of post-operative complications in liver traumas, which included haemorrhage and septic complications. They employed debridement of injured liver with ligation of severed bile ducts and vessels. Studies from Greece, China Thailand, and Croatia reported liver injury related mortality as 5.8%, 11.8%, 14.7% and 28.5% respectively but in our setup no patient is expired except one patient expired at specialized center after referral from our hospital. The conservative management has been time-tested for haemodynamically stable cases of blunt liver injuries, 07 patients in our study got benefit from this management. While exploratory laparotomy has remained the better option for many years in case of firearm injuries or stab wounds. Haemodynamically stable patients with penetrating injuries having no signs of peritonitis, are recommended to undergo a CT scan of the abdomen with IV contrast. Exploratory laparotomy is opted if there are radiological signs of hollow viscus perforation or peritonitis or evolving haemodynamic instability. The grades of the liver trauma itself is not considered as a contraindication for non-operative management. Given the research and evidence base, we should follow rule and regulations and special measures to prevent RTAs, so we can reduce the frequency of liver injuries. Pre hospital care and earlier transportation can help to improve & reduce morbidity and mortality as majority of our patients have haemodynamic compromise and present late.



**CONCLUSION:**

Liver trauma is an important cause of emergency hospitalization, morbidity and in hospital mortality in our country. It predominantly affects the middle age males and blunt trauma abdomen is the leading cause. Most of our patients are successfully managed with perihepatic packing.

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