

## Comparative Assessment of the Effectiveness of Both Non-Operative Management as Well as Operative Management of Liver Injury Patients

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### Abstract

**Objective:** To analyze the effectiveness and morbidity and mortality of both non-operative management as well as operative management of liver injury patients admitted to our hospital.

**Methods:** A retrospective study of the patients admitted with the diagnosis of isolated liver injury due to blunt abdominal trauma over the two years of time period. Data collected of 80 patients of isolated liver injury who either treated conservative management of operative management.

**Results:** A total of 80 patients were analyzed of isolated liver injury due to blunt abdominal trauma, 75 patient sustained minor liver injury (grade I, II and III), whereas 5 patients had major liver injury (grade IV, V and VI). Majority of the patients presented with abdominal pain (100%) and abdominal tenderness (100%). Associated extra-abdominal injuries were found in 21 cases. A total of 77 (96.2%) patient discharge and 3 (3.75%) patient expired in our study.

**Conclusions:** Isolated liver injury is common in the blunt abdominal trauma patient. Most of the patients with the liver injury with hemodynamically stable treated conservatively. Only a few of them require surgical management if they are hemodynamically unstable.

**Keywords:** Blunt abdominal trauma, Conservative management, isolated liver injury.

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### Introduction

Injuries account for 4.8 million lives globally, and deaths due to road traffic injuries alone are among the top 10 causes of mortality. [1, 2] Seven to ten percent of all injuries that occur involve the abdominal region, making it the third most

common region injured following traumatic brain injury (TBI) and extremity injury. [3, 4] Liver and spleen injuries are the commonest damages in blunt abdominal trauma. [5]

There is a paradigm shift in the management of liver trauma due to advancements of diagnostic and therapeutic modalities. About a century ago, Pringle conducted an animal experiment, occluding the porta hepatis in liver trauma while repairing the injuries.[6] However, application of the same principle in trauma victims led to high mortality.[7] Since 1965, the introduction of diagnostic peritoneal lavage (DPL) has led to many nontherapeutic laparotomies in previously unsuspected low-grade injuries.[7] Operative intervention in high-grade injuries may result in high mortality as well.[7, 9]

Liver trauma can occur as a result of falls from a height, assault and sports injuries.[7] Blunt liver injury is usually not evident and is often missed. Rapid resuscitation is necessary to save the unstable but salvageable patient with liver trauma. During the last decades, there has been a change in treatment protocols for isolated liver injury and many studies published.[7, 10, 11]

In 2013, a four-university hospital registry study, called Towards Improved Trauma Care Outcomes in India (TITCO), was initiated to observe the demography, injury etiology, management and outcomes of injured patients in urban India [13, 14].

Initially skeptical but now NOM is standard of care with aim of obtaining a reduction in morbidity and mortality.[12] Surgery is also limited to limited debridement, selective vascular ligation and perihepatic packing.[15, 16]

The objective of the study was to analyze the effectiveness and morbidity and mortality of both non-operative management as well as operative management of liver injury patients admitted to our hospital.

### **Materials and Methods:**

A retrospective study of 80 patients of isolated liver injury due to blunt abdominal injury conducted at the Department of Surgery Nalanda Medical College and Hospital, Patna, Bihar, India for two years. The medical record of the patients with isolated liver injury was extracted.

Isolated liver trauma was defined as a liver injury with no other intra or extra-abdominal involvement. [15]

### **Inclusion criteria:**

Patients aged between 18-60 years of both sex with isolated liver injury due to blunt abdominal trauma with or without associated injury.

### **Exclusion criteria:**

Those patients who had associated intra-abdominal injuries, penetrating injuries and head injury patient with GCS <13 were excluded in this study.

### **Method of collection of data:**

Data were collected from the medical record section and entered into the proforma.

All the patients were with isolated liver injury due to blunt abdominal injury included in the study all the relevant information extracted from the case paper noted in proforma. This includes demographic data, mechanism of injury, clinical examination and investigation laboratory as well radiological recorded. Postoperative follow up was done to not for complication.

All 80 patients were first attended by the emergency trauma center of our hospital, where vitals were recorded. Followed by the patient were resuscitated according to ATLS guidelines, following which the patients were subjected to radiological investigation with focused assessment sonography for trauma (FAST) in hemodynamically unstable patients and contrast-enhanced computed tomography

(CECT) abdomen in hemodynamically stable patients. All injuries were classified

according to the American Association for the Surgery of Trauma (AAST).

### Results:

**Table 1: Age incidence**

Age group (in years)	No of patients	%
1-10	7	8.75
11-20	12	15
21-30	39	48.75
31-40	14	17.5
41-50	3	3.75
>50	5	6.25

In this series, the majority of the patients (48.75%) belonged to 21-30 years age group, followed by 11-20 and 31-40 years

age group (15%) Thus majority of the patients were of a young age group (Table 1).

**Table 2: Sex ratio**

Gender	No of patients	%
Male	72	90
Female	8	10

In this series, the majority of patients were male 90% whereas female patients were

only 10% (Table 2).

**Table 3: Mechanism of injury**

Mechanism of injury	No. of patients	%
MVA	70	87.5
Falls from a height	10	12.5

MVA was responsible for 70% of blunt abdominal trauma cases, while fall from

height accounted for 12.5% of cases (Table 3).

**Table 4: Symptoms and signs**

Symptoms and sign	No. of patients	%
Abdominal pain	80	100
Abdominal tenderness	80	100
Abdominal guarding	13	16.25
Abdominal rigidity	0	0
Abdominal distension	19	23.75
Tachycardia (pulse >100/min)	24	30
Hypotension (SBP <90 mm of Hg)	8	10

Majority of the patients presented with abdominal pain (100%) and abdominal

tenderness (100%) (Table 4).

**Table 5: Associated injuries**

Associated injuries	No. of patients	%
Head injury	6	7.5
Chest injury	8	10
Extremity or pelvic injury	7	8.75
No associate injury	38	47.5

Associated extra-abdominal injuries were found in 21 cases. There were 8 cases of chest injury. 7 cases of fracture of

extremities were managed by the orthopedic surgery department. (Table 5).

**Table 6: Assessment of grade of liver injury**

Grade of liver injury	No. of patients	%
Minor injury (grade I, II and III)	75	93.75
Major injury (grade IV, V and VI)	5	6.25

In present series, most of the liver injuries due to blunt trauma abdomen were minor type (grade I, II and III), they are (93.75%) of the total blunt liver injuries, major

injuries (grade IV, V and VI were seen in (6.25%) cases of blunt liver trauma (Table 6).

**Table 7: Liver injury scale and its relation with management modalities**

Liver injury scale	Conservative management		Operative management	
	No. of patients	%	No. of patients	%
I	14	17.5	0	0
II	34	42.5	0	0
III	8	10	0	0
IV	3	3.75	0	0
V	0	0	2	2.5
VI	0	0	0	0

The majority of the blunt liver injuries were grade II (42.5%), grade I (17.5%) injuries followed by grade III (10%) and

IV injury (3.75%) have the lowest incidence. Incidence of grade V & VI were not found in the present study. (Table 7).

**Table 8: Outcome.**

Outcome	No. of patients	%
Discharge	77	96.25
Expired	3	3.75

In the present study, 77 (96.2%) patient discharge and 3 (3.75%) patient expired (Table 8).

### Discussion:

In our study, a third of all the abdominal trauma patients had liver injury. Studies

from India which reported 23-35% of all the abdominal injuries [17-19]. However, this is lower than the proportion of 42-52% reported from studies from Africa and Italy [7, 20]. In India, blunt abdominal trauma due to RTI is the commonest mechanism of injury except in the state of

Jammu and Kashmir (a conflict zone) which has a higher proportion of penetrating abdominal trauma [18]. In countries where assault is common, penetrating injuries are the most common cause of abdominal injury thence liver injuries [21–23].

The surgical options for the management of blunt liver injuries depend on the type of injury to the subscapular, intrahepatic parenchymal injuries. Surgery includes a wide range of temporary and definitive surgical procedure. Direct suture ligation of the parenchymal bleeding vessel, perihepatic packing, hepatorrhaphy repair of venous injury under vascular isolation. The present study shows that conservative management is feasible even for higher grade blunt liver injuries.

Progress in the management of liver trauma towards the end of the twentieth century has reduced the mortality [24]. Serial imaging, advancements in critical care and adjunctive therapies like angiography, percutaneous drainage and endoscopy/ endoscopic retrograde cholangiopancreatography management of hepatic injuries have resulted in improved outcomes [25].

In the present study, conservative management was successful in all grade I, II, III liver injuries. One patient with grade V injury required operative management.

Hemorrhage can result in the lethal triad of hypothermia coagulopathy and acidosis, each exacerbates the others.[26] Mortality rapidly increase if patient core temperature less than 34°C so warm blankets and intravenous fluids were given to the patient to avoid hypothermia.[27]

### Conclusion:

Management of liver injury has evolved over the last two decades. Hemodynamic status, not the grade of the injury, should dictate the management. A majority of all the patients with minor and major liver

injuries can be managed conservatively and surgical exploration is required only in hemodynamically unstable patients with severe associated injuries.

### References:

1. Haagsma JA, Graetz N, Bolliger I, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the global burden of disease study 2013. *Inj Prev*. 2016;22:3–18.
2. (2017) WHO | Top 10 causes of death. WHO.
3. Ferrah N, Cameron P, Gabbe B, Fitzgerald M, Martin K, Beck B. Trends in the nature and management of serious abdominal trauma. *World J Surg*. 2019; 43:1216–25.
4. Costa G, Tierno SM, Tomassini F, Venturini L, Frezza B, Cancrini G, Stella F. The epidemiology and clinical evaluation of abdominal trauma. An analysis of a multidisciplinary trauma registry. *Ann Ital Chir*. 2010;81:95–102.
5. Badger SA, Barclay R, Campbell P, Mole DJ, Diamond T. Management of liver trauma. *World J Surg*. 2009;33:2522–37.
6. Jarnagin WR, Allen PJ, Chapman WC, D'Angelica MI, DeMatteo RP, Do RKG, et al. Blumgart, Blumgart's Surgery of the Liver, Biliary Tract, And Pancreas 6th Edition. Chapter 115. Elsevier Publication; 2017: 1889-1897.
7. 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(3):324-30.
8. Pachter HL, Hofstetter SR. The current status of nonoperative management of adult blunt hepatic injuries. *Am J Surg*. 1995;169(4):442-54.
9. Carrillo EH, Richardson JD. The current management of hepatic trauma. *Adv Surg*. 2001;35:39-59.

10. Carrillo EH, Richardson JD. The current management of hepatic trauma. *Adv Surg.* 2001;35:39-59.
11. Brammer RD, Bramhall SR, Mirza DF, Mayer AD, Mc-Master P, Buckels JA. A 10-year experience of complex liver trauma. *Br J Surg.* 2002;89(12):1532-7.
12. Roy N, Gerdin M, Ghosh S, Gupta A, Kumar V, Khajanchi M, Schneider EB, Gruen R, Tomson G, von Schreeb J. 30-day in-hospital trauma mortality in four urban university hospitals using an Indian trauma registry. *World J Surg.* 2016.
13. Jacobs IA, Kelly K, Valenziano C, Pawar J, Jones C Nonoperative management of Blunt splenic and hepatic trauma in the pediatric population: significant differences between adult and pediatric surgeons? *Am Surg.* 2001;67(2):149-54.
14. Bernardo CG, Fuster J, Bombuy E, Sanchez S, Ferrer J, Loera MA. Treatment of Liver Trauma: operative or Conservative Management. *Gastroenterol Res.* 2010;3(1):9-18.
15. Parks RW, Chryso E, Diamond T. Management of Liver Trauma. *Br J Surg.* 1999;86(9):1121-35.
16. David RJ, Franklin GA, Luken JK, Carrillo EH, Spain DA, Miller FB, et al. Evolution in the management of adult blunt hepatic injuries. *Am J Surg.* 2000;232(3):324-30.
17. Umare GM, Sherkar N, Motewar A (2018) Study of clinical profile and management of blunt abdominal trauma.
18. Lone GN, Peer GQ, Wani KA, Bhat AM, Wani NA, Bhat A. An experience with abdominal trauma in adults in Kashmir. *JK Pract.* 2001;8:225-30.
19. Mehta N, Babu S, Venugopal K. An experience with blunt abdominal trauma: evaluation, management and outcome. *Clin Pract.* 2014.
20. Osuh, J., Sunmola, A. M. ., Balogun, S. K. ., & Ishola, A. A. . (2021). Evaluation of Blood Lead Levels (Bll) of Albino Rat Offspring (Weanlings) Prenatally Exposed to Lead and Moringa Oleifera. *Journal of Medical Research and Health Sciences*, 4(12), 1610-1628. <https://doi.org/10.52845/JMRHS/2021-4-12-3>
21. Ntundu SH, Herman AM, Kische A, Babu H, Jahanpour OF, Msuya D, Chugulu SG, Chilonga K Patterns and outcomes of patients with abdominal trauma on operative management from northern Tanzania: a prospective single centre observational study.
22. Kalil M, Amaral IMA. Epidemiological evaluation of hepatic trauma victims undergoing surgery. *Rev Col Bras Cir.* 2016;43:22-7.
23. Bilgiç I, Gelecek S, Akgün AE, Özmen MM. Evaluation of liver injury in a tertiary hospital: a retrospective study. *Ulus Travma ve Acil Cerrahi Derg.* 2014;20:359-65.
24. Zago TM, Pereira BM, Nascimento B, Alves MSC, Calderan TRA, Fraga GP. Hepatic trauma: a 21-year experience. *Rev Col Bras Cir.* 2013;40:318-22.
25. Richardson JD, Franklin GA, Lukan JK, Carrillo EH, Spain DA, Miller FB, Wilson MA, Polk HC, Flint LM. Evolution in the management of hepatic trauma: a 25-year perspective. *Ann Surg.* 2000;232:324-30.
26. Coccolini F, Montori G, Catena F, et al. Liver trauma: WSES position paper. *World J Emerg Surg.* 2015;10:39.
27. Jurkovich GJ, Greiser WB, Luterman A, Curreri PW. Hypothermia in trauma victims: an ominous predictor of survival. *J Trauma.* 1987;27:1019-24.