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Case Report

# Blunt Trauma Abdomen-Fatal and Non-fatal Liver Injury

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**Abstract**

Blunt abdominal trauma is a common feature in modern day-to-day activities including RTA, falling from the height. Liver is the second most frequently injured organ and most common cause of death after abdominal trauma. Management modalities include operative and non-operative measures depending on the state of the patient, pattern of injury, and availability of surgical experts.

Here we present 3 cases of blunt abdominal trauma which includes fatal and non-fatal liver injury. One of the patients managed non-operatively and two of them managed with operative techniques. Out of two patients, one died in the second post-operative day. Another patient survived and maintained healthy life after successful management. The non-operative techniques include assessment of patients, vital signs, and radiographic evaluation, volume replacement, blood transfusion, antibiotics, and analgesics. Haemodynamically stable patients are kept in this category.

Operative techniques include perihepatic packing, omental packing, hepatorraphy absorbable mesh, and gel foam application.

**Key words:** Blunt injury liver; Surgical procedure; Non-operative.

## INTRODUCTION

The liver is the largest solid abdominal organ. Damage to the liver is the most common cause of death due to its fixed position which makes it vulnerable for injury. Liver injury causes significant morbidity and mortality. Most common cause of liver injuries are penetrating and traumatic injury. The management of liver injury varies from conservative to operative treatment and depends on the condition of the patient. Most of the liver injury causes torrential bleeding which may stop spontaneously in 50%–80% patient. But rest of the patients requires operative treatment. Due to the advancement of radiological modalities, preoperatively situation of the patient can be determined. Hemodynamic status of the patient is the most vital predictor for modality of treatment. Though non-operative management causes less morbidity and mortality, sometimes operative management is required to reduce the mortality.

## CASE REPORTS

### Case-1

A 47-year-old male was brought to emergency room with history of fall from height. On examination he was conscious, oriented, tachypnoeic, with pulse

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105/m, BP 110/70 mm of Hg. Examination of abdomen revealed diffuse tenderness. Neurological examination was normal. Ultrasonography (USG) exam of abdomen shows free fluid in the abdomen and solid viscera were normal but Right side of liver was lacerated. Adequate resuscitation includes crystalloids and whole blood; antibiotics and analgesics were administered.

Vital parameters were followed up. Within the first 24 hrs patient was stable haemodynamically. We kept the patient under continuous surveillance with nasogatic suction, catheterization, and nil orally. A serial USG scan was done. Patient's haemodynamic status was not detoriated.

After 3 days he was allowed to have food. Patient improved dramatically. After 7 days, patient discharged. A follow-up visit was done after 15 days, patient was normal.

## Case-2

A 34-year-old man was brought to a private hospital with history of RTA. On examination he was conscious, oriented, tachypnoeic with pulse rate-115/m, and blood pressure of 80/60 mm of Hg. Patient was sweating profusely. Examination of abdomen revealed diffuse tenderness. Guarding was present in entire abdomen. Neurological exam was normal. X-ray chest demonstrates rib fracture 8$^{th}$, 9$^{th}$ on the right side. USG of abdomen shows huge free fluid in the abdomen, liver was ruptured and the architecture was lost.

CT scan of abdomen showed multiple lacerations in liver with huge amount of fluid in the whole abdomen. Patient was shifted to intensive care unit. Patient was resuscitated with crystalloid, whole blood transfusion, analgesic, central venous line, etc.

Despite all measure, the patient's haemodynamic state was not stable. Then emergency laparotomy was done. The laceration was on the anterolateral and posterior inferior surface. Pack was done with gelfoam, greater omentum. Haemeostasis up to the mark could not be carried out. One drain kept in the Rt subhepatic space. After 1 hour about 300 ml of blood came through the drain. Despite adequate resuscitation, with whole blood, FFP patient did not improve.

Patient was re-explored after about 12 hours. Liver laceration in posterior surface was found actively bleeding. A perihepatic pack was kept. Pt was on ventillatory support. Pt developed coagulation abnormalities with pneumonia and multi organ failure, ultimately patient died on the second post-operative day.

## Case-3

A 25-year-old man was brought to emergency room with history of fall from height. Patient was an electric worker. He was doing electric job in a fourth storied building and suddenly fell on the sand damp. On examination he was conscious, oriented, pulse 110/m, BP 90/60mm of Hg. Examination of abdomen revealed diffuse tenderness all over the abdomen, guarding was present. USG of abdomen (Fig. 1) revealed moderate to huge amount of free fluid in the abdomen. Liver was lacerated. All other organ was normal. With adequate resuscitation, the condition of the patient did not improve. Resuscitation includes crystalloids, whole blood and FFP transfusion, central venous line. Patient was treated in intensive care unit.

Despite all measures, the general condition of the patient deteriorated, then laparotomy was done. Liver lacerated on the anterolateral surface about 5 × 3 × 2 cm with active hemorrhage. Hepatic packing, hepatorrhaphy with omental pack was done to achieve haemostasis. Patient was in hospital for 2 weeks. He was stated oral feeding on the 4$^{th}$ POD


**Figure 1:** Ultrasonogram showing free fluid collection

**Figure 2:** Case 3 on 10th postoperative day

suture removed on 10th POD. Patient was discharged on 14th POD; patient did well.

## DISCUSSION

The relatively fixed position of the liver and its large size makes it more prone for injury in blunt trauma of the abdomen. Liver and spleen together, account for 75% of injuries in blunt abdominal trauma.[1] Though liver is the second most commonly injured organ in abdominal trauma, it is the most common cause of death following abdominal injury. Compared to splenic injuries, management of liver trauma still remains a challenge in the best of trauma centers.

Predominant cause of blunt hepatic trauma is by road traffic accidents. A patient with a history of blunt trauma to abdomen should arise suspicion of liver injury especially if is in the right lower chest wall or right upper abdomen. Signs and symptoms of liver injury depend on the level of blood loss, peritoneal irritation, and presence of associated injuries. Right upper quadrant tenderness, guarding, and rebound abdominal tenderness is common, but non-specific signs may dominate. Peritonism may be severe in case of bile leaks. Elevation of serum liver enzymes in blunt trauma abdomen suggest liver injury although pre-existing causes like fatty liver may also be responsible.[2] Following blunt trauma of the abdomen, a conscious patient who is hemodynamically unstable and has generalized peritonitis should undergo immediate laparotomy.

Overall success of non-operative treatment in appropriately selected patients exceeds 95%[3]. If conservatively managed, it should be borne in mind that risk of hollow organ injury, though small, is increased. There is a significant risk of increase in delayed hemorrhage. Patients who fail with an initial conservative approach despite close supervision should be detected and treated accordingly.[4]

The weakness of non-operative management of blunt hepatic injuries is the possibility of missing an associated intra abdominal injury. The rate of missed injuries in published literature is about 3% mainly being small bowel injury and diaphragmatic tear.[5] The risk of missed injuries should not influence the decision to undertake non-operative management in suitable candidates. Less common complications such as bilomas and perihepatic abscesses can almost always be treated by percutaneous drainage.[6]

Laparotomy for liver injuries is no different from any other trauma laparotomy. Liver hemorrhage can usually be initially controlled by direct pressure using packs. Additional techniques include the Pringle maneuver, bimanual compression of liver or manual compression of aorta above the coeliac trunk. Intravascular volume replenishment and coagulopathy correction with packed cells, platelets, fresh frozen plasma, and cryoprecipitate is crucial. After adequate resuscitation and adequate mobilization of liver a useful assessment of the injury if necessary after a Pringle manoeuvre by applying a vascular clamp should be done.[7] Depending on the injury and experience of surgeon various methods may be used.

Surgical literature confirms that as many as 86% of liver injuries have stopped bleeding by the time surgical exploration is performed, and 67% of operations performed for blunt abdominal trauma are non-therapeutic. Imaging techniques, particularly CT scanning, have made a great impact

on the treatment of patients with liver trauma, and use of these techniques has resulted in marked reduction in the number of patients requiring surgery and non-therapeutic operations.[8] Non-operative procedure management can safely be applied to hemodynamically stable patients with blunt hepatic injury. Although urgent surgery continues to be the standard for hemodynamically compromised patients with blunt hepatic trauma, there has been a paradigm shift in the management of hemodynamically stable patients. Approximately 85% of all patients with blunt hepatic trauma are stable.[9]

## CONCLUSION

Non-operative and operative management of blunt abdominal trauma depends on the haemodynamic state of the patient. Though non-operative management of blunt liver injury is safe and effective, operative management is life saving in unstable patients.

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