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Surgery

BLUNT LIVER TRAUMA- OUTCOMES AND MANAGEMENT -A RETROSPECTIVE STUDY.

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ABSTRACT **Introduction:** Liver is the second most frequently injured organ in blunt trauma patient. Recently there is a shift from surgery to non-operative management due to the improvement of the imaging techniques and to the minimally invasive practices in the angiographic management of intra-hepatic vascular injuries. **Aim:** To evaluate the outcomes and management of blunt liver trauma. **Materials & Methods:** A retrospective study done in general surgery department from January 2021 to January 2022. A total of 52 blunt abdominal trauma cases presented to emergency department of which 24 cases were of blunt liver trauma. Including patients presenting with blunt liver trauma and excluding patients with penetrating abdominal trauma and patients who were dead on arrival. **Results:** Of total 52 cases presented to emergency with blunt abdominal trauma, 24 cases (46%) were liver injury cases. Mean age being 20±12.8 years, incidence being more among males. Of 24 patients, 18 patients had minor liver trauma and managed non operatively, and rest by operative management. One case succumbed due to multiple injuries. **Discussion:** Liver trauma is among the most common injury after blunt abdominal trauma, constituting a life threat and a reason for emergency department admission. The treatment of liver injuries is multidisciplinary. Conservative management is mainstay of treatment for patients with hemodynamically stable and surgery patients with severe hepatic trauma and hemodynamic instability.

KEYWORDS : liver trauma, non-operative management (NOM), operative management.

INTRODUCTION

The liver is more vulnerable to damage from blunt abdominal trauma because of its size and comparatively fixed location. The liver and spleen account for 75% of the abdominal blunt trauma injury (1). Liver damage, despite being the second most commonly injured organ in abdominal trauma, is the leading cause of death after abdominal injury. The treatment of liver injuries is more challenging than the treatment of spleen injuries. Previously for majority of liver injuries operative management was done. Evidence, however, demonstrates that by the time surgical exploration is completed, approximately 86% of liver injuries have stopped bleeding (2). Computerized tomographic scan (CT) has significantly improved the treatment of liver trauma patients by reducing the need for laparotomies (3,4). Due to its size, friable parenchyma, thin capsule, and relatively fixed position, the liver is susceptible to blunt injury. The right lobe is more commonly affected due to its larger size and near proximity to ribs. The preponderance of injury (>85%) to the liver occurs in segments 6, 7, and 8 when it is compressed against fixed ribs, the spine, or the posterior abdominal wall. Sites of shearing pressures during deceleration injury include the liver's ligamentous attachments to the diaphragm and the posterior abdominal wall. Additionally, the transmission of abnormally high venous pressure to remote body sites at the time of contact can cause liver damage. Deceleration injuries can result in shearing pressures that can tear hepatic lobes, and these injuries commonly involve the inferior vena cava and hepatic veins. Liver injuries may result in subcapsular/intrahepatic hematomas, lacerations, contusions, hepatic arterial injury, and bile duct injury. 90% of young children and 80% adults with blunt liver injury receive conservative care(2). Throughout conservative treatment, there needs to be continuous clinical monitoring, and if it fails, surgery is needed. Although there was no difference in the length of hospital stays for patients with liver injuries managed surgically versus non-operatively, the patients receiving conservative management required far fewer blood transfusions and experienced far fewer intraabdominal complications.

TABLE – 1 CT grading of liver injury 1994-Association of American Society for Trauma (AAST)

GRADE	TYPE OF INJURY
I	Subcapsular haematoma less than 10% surface area. Capsular laceration less than 1 cm in depth.
II	-Subcapsular haematoma 10-50%; Laceration intraparenchymal less than 10cm diameter. Capsular laceration 1-3 cm in depth; less than 10 cm length.
III	Subcapsular haematoma more than 50%; - Laceration intraparenchymal more than 10cm diameter expanding. Capsular laceration >3 cm in depth.
IV	Laceration- Parenchymal disruption 25-75% hepatic lobe; 1-3 Couinaud segments.
V	Laceration- Parenchymal disruption more than 75% or Vascular - more than 3 Couinaud segments. Major hepatic veins or retrohepatic venacaval injuries.
VI	Vascular-Hepatic avulsion.

Source: SRB's manual of surgery- 6th edition

MATERIALS AND METHODS:

A retrospective study done in general surgery department from January 2021 to January 2022. A total of 52 blunt abdominal trauma cases presented to emergency department of which 24 cases were of blunt liver trauma.

Inclusion criteria:

- Patients presenting with blunt liver trauma.

Exclusion criteria:

- Patients with penetrating abdominal trauma.
- Patients who were dead on arrival.

All data were collected regarding demographics and CT findings when available, blood transfusion used, liver injury grade, management plan (nonoperative or operative), hospital stay, ICU stay, and morbidity-mortality.

RESULTS:

Blunt liver trauma represents 46% (24 cases) of all blunt abdominal trauma cases (52 cases) in our emergency department.

Our study included 24 patients with mean age of 20 ± 12.8 years. Road traffic accidents were most common cause of trauma. Trauma more common among males (22 patients). Of 24 patients minor liver injuries- grade I-III seen in 18 patients (78%) and major liver injuries in 6 patients (22%).

Most of the liver trauma occurred in the right lobe of liver. Liver trauma associated with other injuries is seen in 8 patients (2 with chest trauma, 4 with abdominal injuries, 2 with head injury).

Conservative (non-operative) management done in 22 patients and operative management done in 6 patients. 3 patients managed with angioembolization, 1 underwent laparotomy, 1 died.

Liver enzymes were elevated in major liver trauma grade- IV-V.

In Conservative management patient recovered in 2weeks and were discharged and followed up for 6months. There were no complications.

Conservative management failure was seen in 1 case because of pseudoaneurysm formation from anterior sectoral branch of right hepatic artery with was managed with angioembolization, feeding artery blocked with 50% glue.

In Operative management, in 1 patient damage control surgery done for grade IV liver injury and packing of liver was done and shifted to ICU and patient succumbed after 4 hours due to multiple injuries.
Another laparotomy done for grade V liver trauma with vascular injury, midline laparotomy was done and right hepatic artery was ligated.

Rest patients were managed with angioembolization.

5 patients recovered well and followed for a period of 6 months. No complications.

Morbidity was higher among open surgeries when compared to minimally invasive surgeries and non-operative management.

DISCUSSION:

In terms of the incidence of solid organ trauma, the liver comes in second. Due to the location of the liver, severe bleeding is typically what results in mortality after liver trauma. Blunt injuries accounts for the majority of liver damage [18,19]. In our research, male patients sustained liver injury at a higher rate—more than 50% of them were male. Non operative management was mainstay of treatment in majority of cases.

NOM selection reduces the incidence of morbidity and mortality in addition to reducing the number of unnecessary procedures [20]. Nearly 85% of grade IV liver injury patients are mild [21]. Simple liver sutures, diathermy, or hemostatic medications—which typically halt bleeding in these patients—were previously employed to treat these patients. Therefore, NOM will be ideal for these individuals. The choice to have surgery is still difficult in the remaining 10–20% of severe liver injuries [22].

The research from Albania, which had an 83% success rate for NOM [11]. Furthermore, 192 patients in a Turkish trial with 300 patients (63% stable and 37% unstable) received NOM, compared to 108 patients who underwent surgery. 13% of patients died, which was explained by their hemodynamic instability upon admission and their severe liver damage [24].

NOM was once only used in patients with low-grade liver injury (grade III), but today, most surgeons view NOM as the preferred method of treatment in all hemodynamically stable patients, independent of the severity of the liver injury or the amount of hemoperitoneum determined by CT [27]. In our study, NOM was mostly successful in treating grade IV patients; however, in our limited experience, grade V patients all needed surgical intervention. The goal of surgical treatment, in terms of controlling bleeding and bile leaks, removing dead tissues, preventing infection, and draining the abdominal wall[28].

CONCLUSION:

When a patient's hemodynamics are steady, NOM is the preferred method of treatment; however, when a patient's hemodynamics are unstable or there are signs of peritonitis, surgery is advised. Typically, injuries that are not directly related to liver damage are what lead to NOM failure. Patients with NOM of blunt liver trauma should be admitted to institutions that are well-equipped and offered highly precise follow-up.

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