

## An Interesting Case of Deceleration Injury to Liver Requiring Hepatectomy

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### Abstract

Blunt injury to the liver due to high velocity deceleration injuries can cause transection of liver parenchyma at the ligaments attaching the liver to the abdominal wall and cause devitalization of the transected segments. Though these injuries might require hepatectomy eventually, it is better to wait expectantly to allow a line of demarcation to develop if these patients are hemodynamically stable. This allows for a limited resection than an anatomical resection to occur reducing morbidity and mortality. We are describing such an interesting case of deceleration injury in a young man which was managed successfully by expectant observation followed by limited segmentectomy inferring that timely intervention is the key to management.

**Keywords:** Deceleration injury; Liver; Hepatectomy

### Introduction

Blunt trauma of the liver is an important cause of morbidity and mortality in the trauma setting. In today's trauma setting, most cases can be managed by conservative non-operative management. However, some cases might require formal surgical resection.

Blunt trauma to the liver is a cause of morbidity and mortality in the trauma setting. There are two main modes of blunt injury to the liver [1,2]. The deceleration injury, which is most frequent during motor vehicle accidents occurs when the liver is violently fractured at the insertion of the restraining right triangular ligament leading to a separation of the right posterior segment and devitalisation. This region of the liver is difficult to visualize and is associated with increased bleeding causing further difficulty in diagnosis and treatment. Frontal crush injury is the other type, which occurs when a direct blow occurs to the anterior surface of the liver and results in damage to the central segments 4, 5 and 8 [1,2].

### Classification of Liver Injuries

Liver injuries were classified by the most commonly accepted Moore score [3], which is based on the Organ Injury Scale (OIS) of the American Association for Surgery of Trauma (AAST), published in 1989 [4] and revised in 1995. The Mirvis score [5] is based on CT grades and traumatic liver injuries with higher grades more often than not requiring surgery. Though these scoring systems are highly validated and prognosticate injury severity, localization of lobe of the liver with respect to impact was not considered important enough for inclusion. It is to be noted that liver injuries due to blunt force trauma are mainly associated with the right lobe (67.6%) [6] which is better tolerated than the left lobe which allows for the selection of a conservative non-operative treatment approach in these patients. Slotta [7] developed a classification, based on the localization of liver injury and the mechanism of the underlying blunt liver trauma, into two types: Type A, involving the left liver lobe mostly along the falciform and Type B injury, which though considered more complex injuries than Type A, are localised to the right lobe but are associated with no increase in mortality than type A injuries.

In transection deceleration injuries, as in our case, involvement of the hepatic vasculature is rare [2]. For the devitalised liver tissue

in hemodynamically stable patients, it is better to wait for a formal line of demarcation to develop before going for surgery so that the bare minimum of devitalised liver tissue can be resected without affecting outcomes [8]. Due to high success rates in the management of patients by non-operative protocols in liver trauma, these patients can be followed and surgery be offered only in cases of hemodynamic instability. This shift in techniques in the trauma setting, from radical surgeries like major hepatectomy to more conservative techniques (segmentectomy) has improved outcomes.

### Case Report

Twenty nine year old mechanic presented with history of blunt injury to the right side of abdomen when he was hit on the side of the abdomen by the bus which unfortunately hit him when he was backing the bus into the bus depot. Clinical Examination revealed a Soft abdomen with mild tenderness over right hypochondrium. Vitals were normal and lab investigations including the Hb was normal. (hb-14 g%). CECT abdomen done showed massive contusion in the 7,8 and 5,6 segments with hemoperitoneum with fracture 12 th rib. As the patient was hemodynamically stable, patient was followed by Non operative management (NOM). The next day (18 hours later), as the patient had hemodynamic instability with fall in Blood Pressure and raise in pulse rate, patient was taken for emergency laprotomy. Intraoperatively, laceration seen between the right posterior and right anterior segments causing devitalisation of the right posterior segments (segments 6/7 and partial segment 5) with line of demarcation present. Devitalization of remaining tissues parenchymal dissection done with crush clamp technique right hepatic vein identified and ligated. Hemostasis was secured and surgical applied over the raw area. Post-operatively; patient developed a small bile leak (4 × 4 cm) which was managed by percutaneous drainage (Figures 1, 2 and 3).

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**Received** September 10, 2018; **Accepted** September 22, 2018; **Published** September 29, 2018

**Citation:** Amarjothi JMV, Prabhakaran R, Jeyasudhahar J, Babu OLN (2018) An Interesting Case of Deceleration Injury to Liver Requiring Hepatectomy. Emergency Med 8: 378. doi:10.4172/2165-7548.1000378

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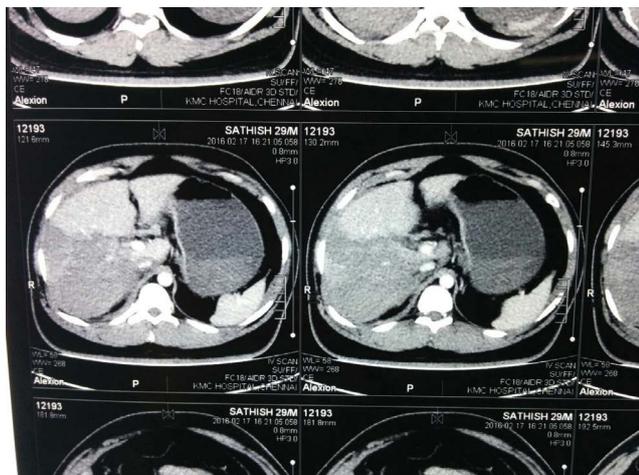


Figure 1: CECT showing devitalised right lobe of liver.



Figure 2: Intraoperative picture of devitalised liver.



Figure 3: Post-operative picture of right lateral sectionectomy.

## Discussion

However, segmentectomies are also not common place due to the expertise required as it is usually done in specialised settings and technology needed (intraoperative ultrasound, transection instruments etc.) [9]. It is to be noted that recovery of the remaining liver is fast following removal of the infected necrotic tissue with compensatory hypertrophy of the surviving liver [2].

## Conclusion

Patients with high deceleration injuries classically present with such fracture at sites of restraint or injury of the organs to the abdominal wall. Though these injuries appear severe on imaging, they can be managed conservatively in hemodynamically stable patients. If patient is hemodynamically unstable, even substantial parenchymal devitalisation can be treated with limited resection and debridement. This is associated with decreased morbidity and mortality than formal anatomical live figurer resection.

## Conflicts of Interest

The authors have no conflicts of interest.

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