Delayed Fatal Bleeding after Non-operative Management of High Grade Liver Injury

Suresh Raghavaiah*, Hardev Ramandeep Singh Girn, Parshotam Lal Gautam and Siddarth Prakash

DMCH Liver Transplant Unit, Dayanand Medical College and Hospital, Tagore Nagar, Ludhiana, Punjab-141001, India

Abstract

Most liver injuries after blunt trauma abdomen are currently treated by non-operative management (NOPM)1-3. Delayed haemorrhage necessitating operative intervention is one of the main complication following NOPM3. We report the case of a young male who suffered delayed fatal exsanguination after NOPM of a high grade liver injury and review the available literature regarding management of high grade liver trauma.

Keywords: High grade liver Injury; Non-operative management; Bleeding

3 Key Messages: Delayed bleeding after non-operative management of liver trauma remains the main complication necessitating urgent lifesaving intervention. Follow-up imaging of the liver prior to dismissal from the hospital may help to triage patients prone to complications.

Introduction

Even high grade liver injuries in a haemodynamically stable patient are currently treated by NOPM [1-3]. With improvements in imaging techniques and the availability of angio-embolisation, surgical management of liver trauma is limited to damage control surgery and management of complications following NOPM. Delayed bleeding from the liver is one of the main complication following NOPM3 which necessitates urgent surgical intervention. If appropriate resuscitative measures and urgent intervention to control the bleeding are not carried out, the outcome is usually fatal. We report the case of a young male who suffered delayed fatal exsanguination after NOPM of a grade four liver injury.

Case History

A twenty two year old male presented to the hospital with history of motor vehicular accident. He was hemodynamically stable at initial presentation. Evaluation of injuries showed fractures of multiple long bones (Left tibia, left Femur, Clavicle and Mandible). A focused assessment with sonography for trauma scan revealed evidence of free fluid in the right upper quadrant. After initial trauma survey and resuscitation, the patient was taken up for a triphasic CT scan of the abdomen. This revealed an American Association for the Surgery of Trauma Organ Injury Severity Scoring system (Table 1) grade four liver laceration, with laceration to the caudate lobe (Figure 1).

There was no contrast blush identified although there was significant free fluid around the liver. Since the patient remained haemodynamically stable, he was elected for NOPM of the liver injury. The patient remained stable both haemodynamically (normal pulse rate and blood pressure) and by laboratory parameters (no fall in haemoglobin) throughout the stay (Table 2). He was taken up for fracture fixation on post trauma day (PTD) seven. The patient tolerated the operative procedure well. Follow up ultrasonography of the liver laceration showed a progressive decrease in the size of the liver hematoma and patient was dismissed form the hospital on PTD fifteen.

He presented for routine follow-up eight days after dismissal (PTD twenty one). On presentation, he complained of vague abdominal discomfort that started during travel to the hospital, which rapidly progressed in severity. On evaluation he was found to be in shock with a distended abdomen. Before resuscitative efforts could be initiated, he suffered asystole. Cardio-pulmonary and volume resuscitation were started and after return of pulse, he was taken up for an emergency laparotomy. Intra-operatively there was three liters of old blood and two liters of fresh clot in the inferior surface of the liver. This was evacuated and the abdomen was packed with plan of delayed reexploration. Six hours post laparotomy, the patient again had a drop in blood pressure with a concomitant drop in Haemoglobin. An emergency interventional angiogram demonstrated a right posterior sectoral arterial bleed that was coiled (Figure 2).

| Grade* | Type of Injury | Description of injury |
|--------|----------------|-----------------------|
| I      | Hematoma       | Subcapsular, <10% surface area |
|        | Laceration     | Capsular tear, <1cm parenchymal depth |
| II     | Hematoma       | Subcapsular, 10% to 50% surface area |
|        | Laceration     | Intraparenchymal <10 cm in diameter |
|         |                | Capsular tear 1-3 parenchymal depth, <10 cm in length |
| III    | Hematoma       | Subcapsular, >50% surface area or ruptured |
|        | Laceration     | Intraparenchymal hematoma >10 cm or expanding |
| IV     | Laceration     | >3 cm parenchymal depth |
| V      | Laceration     | Parenchymal disruption involving 25% to 75% of hepatic lobe or 1-3 Couinaud’s segments |
|        | Laceration     | Parenchymal disruption involving >75% of hepatic lobe or >3 Couinaud’s segments within a single lobe |
| VI     | Vascular       | Juxtahepatic venous injuries; i.e, retrohepatic vena cava or central major hepatic veins |
|        | Vascular       | Hepatic avulsion |

*Advance one grade for multiple injuries up to grade III

Table 1: The American Association for the Surgery of Trauma Organ Injury Severity Scoring scale. Liver Injury Scale (1994 Revision) [4].

*Corresponding author: Suresh Raghavaiah, DMCH Liver Transplant Unit, Dayanand Medical College and Hospital, Tagore Nagar, Ludhiana, Punjab-141001, India, E-mail: rxsuresh@gmail.com

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The patient improved hemodynamically following this and responded to resuscitation with an improved urine output. But twelve hours post embolization the patient rebled and despite ongoing resuscitative efforts and plans for repeat angi-embolisation, expired.

**Discussion**

The management of hemodynamically stable Liver trauma patient has evolved over the past two decades from aggressive surgical intervention to NOPM [5]. With improvements in imaging techniques, NOPM remains the main stay of management of a patient even with major liver trauma. The haemodynamic stability of the patient is what dictates management, rather than the grade of liver injury. NOPM involves a period of intensive monitoring with restriction of mobility of the patient. Serial monitoring of haematocrit and vital signs of the patient and on the expertise available in the hospital. Delayed bleeding remains the main complication necessitating urgent lifesaving intervention. Follow-up imaging of the liver prior to dismissal from the hospital may help to triage patients prone to complications.

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