

The Role of Endoscopic Retrograde Cholangiopancreatography in the Management of High-Output Bile Leak Post-Blunt Hepatic Trauma

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ABSTRACT

Background: Major bile leaks from blunt liver injuries is uncommon but difficult. Management generally involves endoscopic retrograde cholangiopancreatography (ERCP). This case study aims to verify the importance of ERCP after blunt hepatic trauma.

Case presentation: A 20-year-old patient with a history of blunt abdominal trauma presented one month later with abdominal distension, imaging showing hepatic injury with ascites, and the role of early ERCP efficacy in management.

Conclusion: High-grade, central liver damage following acute liver trauma. ERCP should be scheduled early if the patient has risk factors and a plasma bilirubin level over 2.5 mg/dL at admission.

Keywords: ERCP; blunt liver injury; Bile leak; Jaundice.

Introduction

The Blunt liver trauma (BLT) can be fatal and severe. As a result of the development of trauma treatment and interventional radiology, the standard of care for BLT is now non-operative management (NOM) if the haemodynamics are stable. The NOM has an efficacy rate of 85-95% [1, 2]. This outcome has resulted in the emergence of a variety of late complications, including infection, haemorrhage, and biliary complications. Those are particularly prevalent in hepatic trauma sustained at a level exceeding grade

III [3, 4]. The recovery of patients is frequently significantly impeded by these late complications.

Despite the minimal incidence of major bile leaks following BLT [1], it is essential for the patient's recovery. Bile duct injuries with bile leaks following BLT are significantly more intricate and subtle than iatrogenic bile duct injuries. Initially, the presentations are often vague, making it difficult to achieve an accurate diagnosis in the early stages. Nevertheless, a significant bile leak following BLT is associated with a high risk of infection and can substantially extend the hospital stay [5-7]. Consequently, it is imperative to promptly identify and address biliary leaks to facilitate patient recovery following BLT. This necessitates the appropriate utilisation of image studies and a high level of clinical suspicion [8, 9].

A follow-up imaging examination after stable BLT is not routine. Endoscopic retrograde cholangiopancreatography (ERCP), which may evaluate iatrogenic bile duct damage, is seldom recommended following BLT. ERCP is the recommended method for bile duct assessment following liver trauma; nonetheless, it is predominantly utilised in cases of evident jaundice. This patient with jaundice frequently undergoes ERCP following BLT, resulting in an extended hospital stay and heightened infection risk. Currently, there remains an absence of a reliable approach to identify individuals at risk of significant bile leaks following BLT for timely ERCP intervention.

Case Presentation

About 20 years male patient with history of blunt abdominal trauma admitted to nearby hospital treated conservatively imaging at that time normal including native CT abdomen. one day later patient developed jaundice consulted general practitioner advise him to do liver function test which revealed

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S.bilirubin 13mg /dl Liver enzyme threefold than normal S.ALP mildly elevated without any imaging at that time he kept on conservative management including liver function test decreasing gradually to mild elevation. Two weeks later, the patient was presented to the gastroenterology clinic with abdominal pain and distension.

- On examination, the patient's vital signs were typical.
- Jaundice.
- Abdominal examination revealed ascites.

send for investigations:

- Renal function tests and complete blood count were normal
- The liver function test:
- S.bilirubin 2.5 mg /dl; Liver enzymes two-fold elevated than normal
- S.ALP normal.
- U/S revealed liver injury in the Centre of the liver with ascitic fluid biliary content?
- CT scan showed liver injury in seg five extending to seg 6 and 7 with a bile-filled peritoneal cavity (fig.1&2).



Figure (1): Central liver injury.

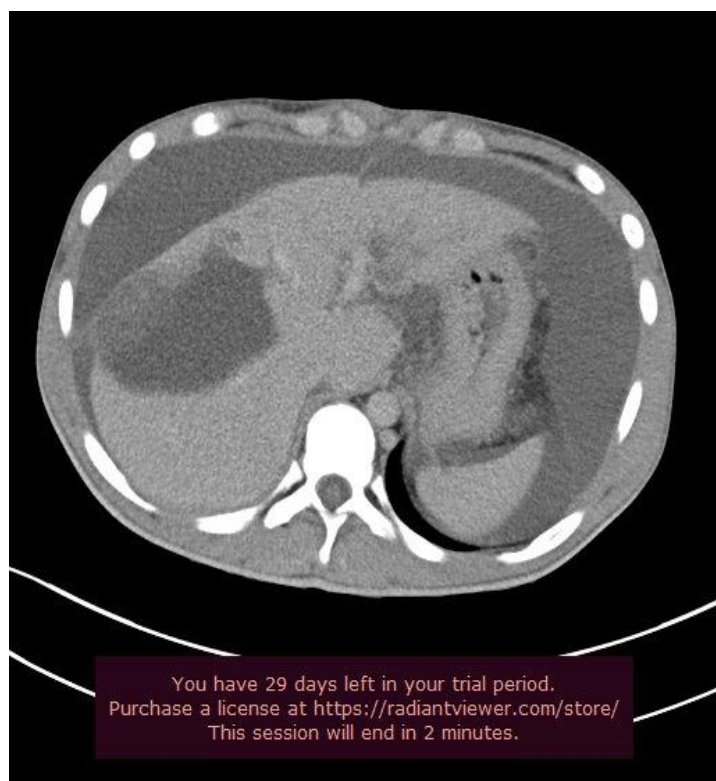


Figure (2): injury extending to the periphery of the liver with ascitic fluid

Peritoneal dialysing catheter inserted under U/S guidance revealed three liters of bile evacuated, later 300 cc of bile discharged per day for about 5 days without any improvement, so a gastroenterologist consultation regarding history, imaging and peritoneal catheter discharge (biliary content and amount) was performed, resulting in a decision to perform ERCP for both diagnostic and therapeutic purposes. Biliary leak after biliary cannulation has been shown. (Fig. 3)



Figure (3): Bile leak after biliary cannulation

After biliary cannulation with identification of bile leak, a biliary stent was inserted successfully with the absence of leak. (Fig. 4) Post ERCP, the Peritoneal dialysis catheter was removed.



Figure (4): biliary stent with no bile leak

After 3 months, an ultrasound of the abdomen showed no intraperitoneal collection, so the stent was removed successfully.

Discussion

A significant bile leak was characterized by the clear presence of contrast emanating from the bile duct during ERCP. If bile duct damage is confirmed via ERCP, stenting or nasobiliary drainage will be employed for bile flow diversion.

Successful bile duct damage therapy includes symptom remission and removal of the bile diverting device and percutaneous drainage catheter. The follow-up ERCP also fixed the bile leak.

The reported incidence of bile leak is between 0.5 and 21%, and it is one of the most significant complications following any form of hepatic trauma [1,2]. Nevertheless, the safety and efficacy of non-operative management for blunt liver trauma are not compromised by the potential presence of a bile duct in the jury [11]. Many bile escapes that occur because of blunt liver trauma are minor and respond favorably to conservative treatment [12]. However, major bile leaks can significantly impede patient recovery and are a developing concern in the treatment of blunt hepatic trauma [3,4,9,13]. Timely diagnosis and effective intervention are crucial for treating significant bile leaks.

Timely intervention through bile flow diversion can avert the onset of additional complications, including biloma infection or intra-abdominal sepsis. Consequently, it is advantageous to identify people at elevated risk for significant bile leaks to facilitate early therapy.

The site and severity of injury following blunt liver trauma are regarded as critical determinants for subsequent substantial bile leakage.

Wahl *et al.* examined bile duct injuries following blunt liver trauma and determined that patients with high injury grades (> grade IV) were more prone to bile leakage [2].

Centrally located liver injuries exhibited a higher likelihood of developing significant bile leaks compared to those located peripherally. The location of the injury was deemed a pertinent and vital risk factor. The intrahepatic bile ducts exhibit a confluent distribution, while the main bile ducts are situated more centrally. The likelihood of injury to the central bile duct increases when blunt liver trauma affects the central regions. Injuries to the main bile duct present greater challenges for recovery compared to those involving the smaller, peripheral bile ducts, resulting in a higher likelihood of significant bile leakage.

Various modalities have been proposed for the evaluation of bile flow or bile duct integrity, including radionuclide scans, magnetic resonance imaging (MRI), sonography, and CT scans. The evaluation of the bile duct via ERCP demonstrates high accuracy; however, its invasive nature precludes its use as a routine evaluation method. In this study, sonography or CT scan served as the primary examination method. Intraperitoneal or intrahepatic fluid accumulation is frequently the predominant finding in these patients; however, further intervention is not always required [17].

Jaundice following trauma is a recognized indication for ERCP in cases of blunt hepatic trauma. Jaundice following liver trauma is a complex condition with multiple causes. This encompasses the resolution of hematoma following trauma, transfusion-related hyperbilirubinemia, progression of infection, hepatic dysfunction post-injury, and bile duct injury [18]. Most cases of jaundice following blunt liver trauma require only conservative treatment, except for jaundice associated with bile duct injury. Currently, there is an absence of a reference level for plasma bilirubin that can effectively distinguish between patients requiring only conservative treatment and those at a higher risk for significant bile leaks. Watchful waiting is a prevalent approach, as most cases of jaundice tend to resolve following conservative treatment. This practice frequently leads to delayed management and extended hospitalisation.

Due to the invasiveness of ERCP and the patient's unstable condition, it is not standard practice to schedule this procedure for all blunt liver trauma patients.

Patients exhibiting no abdominal symptoms following blunt liver trauma do not require additional imaging studies. Patients presenting with non-specific abdominal complaints following BLT should undergo additional investigations, including CT scans or sonography, along with laboratory follow-up. Detection of abnormal intraabdominal fluid accumulation necessitates the assessment of plasma bilirubin levels. When bilirubin levels are below 2.5 mg/dL, conservative treatment is recommended. In cases where the bilirubin level exceeds 2.5 mg/dL or the patient presents with risk factors such as high-grade liver injury or centrally located injury, it is imperative to arrange percutaneous drainage in conjunction with ERCP without delay. A bile diversion method is indicated if ERCP confirms a major bile leak.

Conclusion

In conclusion, significant bile leakage following blunt liver trauma is rare, with a frequency of less than 5%. Centrally located liver injuries, in conjunction with a severe grade injury, present substantial risk factors for serious bile duct injury. In blunt liver trauma patients exhibiting aberrant fluid collections and non-specific symptoms, together with a bilirubin level exceeding 2.5 mg/dL or the presence of any identified risk factors, ERCP should be deemed appropriate.

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