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# Challenges in management of an isolated intrapancreatic Common Bile Duct injury in an abdominal trauma

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## ABSTRACT

**INTRODUCTION:** Biliary tract injuries are rare following abdominal trauma. If detected late, outcome is less favourable. It adds to morbidity if there is involvement of head of pancreas or duodenal wall.

**CASE REPORT:** We present a case of an adult male with sharp and blunt trauma over the right side of the abdomen with omentum protruding out. Exploratory laparotomy revealed non expanding paraduodenal hematoma without evidence of solid or hollow viscous injury. Post-operative day 2 drain showed bilious content. Contrast Enhanced CT scan ruled out the solid or hollow viscous injury. Magnetic Resonance cholangiopancreatography (MRCP) done on day 4 was suggestive of isolated intrapancreatic common bile duct injury of American Association of Surgery for Trauma (AAST) grade V. Endoscopic Retrograde cholangiopancreatography (ERCP) with stenting was done. Stent removal was done after 12 weeks. The patient is asymptomatic at 1 year follow up.

**DISCUSSION:** Due to limitations of the conventional post trauma investigations like FAST and CECT abdomen, it is likely to miss the CBD injury in the early course. MRCP is a good noninvasive investigation to diagnose the biliary injury. ERCP is considered as the most appropriate tool for the diagnosis as well as therapeutic stenting.

**CONCLUSION:** High degree of suspicion is most important in diagnosis of the distal common bile duct trauma as imaging studies like FAST and CT scan can miss the same. MRCP is good noninvasive imaging tool to diagnose the biliary trauma, while ERCP is the best diagnostic and therapeutic tool with minimal post-operative morbidity.

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## 1. Introduction

Isolated injury to the common bile duct is uncommon, in a trauma to abdomen. It represents about 0.5% of all the patients undergoing laparotomy for acute trauma. Intrapancreatic rupture or avulsion of the common bile duct is an even less common occurrence that presents unique challenges. The rarity of this entity can be judged by the paucity the number of case reports published. Only 34 case reports were published related to intrapancreatic CBD injury [1].

The difficulty in making a diagnosis underscores the importance of maintaining a high degree of suspicion for ductal injury in abdominal trauma, especially when there is a notion of pancreatic head trauma.

**Abbreviations:** CT, computed tomography; MRCP, magnetic resonance cholangio-pancreatography; ERCP, endoscopic retrograde cholangio-pancreatography; CBD, common bile duct; AAST, American Association for the Surgery of Trauma; FAST, focused assessment with sonography in trauma; IV, intravenous; Grade V, grade five; POD, post operative day.

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This report is reported in line with SCARE 2018 criteria [2].

## 2. Case report

24 year old male presented in the emergency department of our hospital with a history of assault with a sharp and blunt object. Omentum was protruding out of the stab wound.

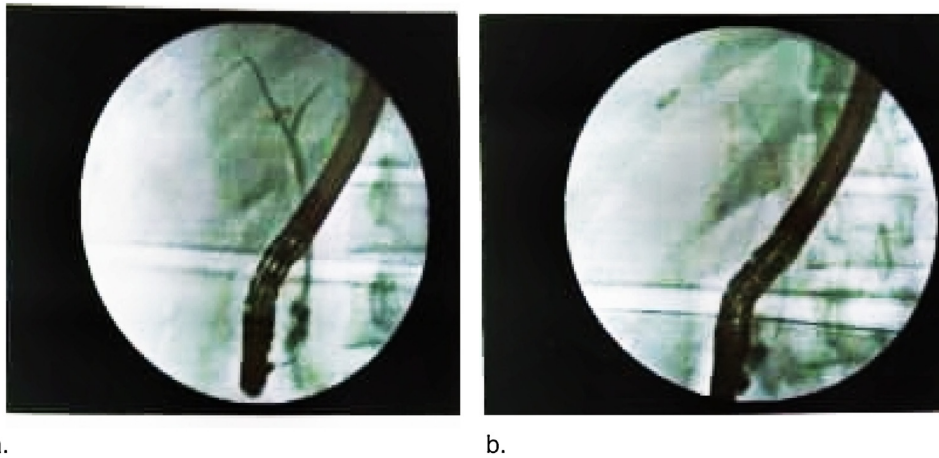
On examination, the patient was vitally stable. There was tenderness in the upper abdomen with 5×3×2 cm stab wound, 1.5 cm to the right side of the umbilicus with breach in the parietal peritoneum.

All preoperative investigation including serum amylase were within normal limits

Exploratory laparotomy revealed non expanding para duodenal hematoma. On exploration of that hematoma, there was no evidence of injury to duodenum or any evidence of bile leak. A 32 F tube drain was kept in Morrison pouch. From POD 2, there was bilious drain output of around 250 cc on 2 consecutive days. Serum amylase and drain amylase were mildly elevated. The contrast enhanced CT ruled out the presence of solid or hollow viscous trauma. However the biliary injury was not detected. MRCP diagnosed the intrapancreatic common bile duct injury, showing AAST Grade V intra pancreatic CBD injury. ERCP with stenting was done

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**Fig. 1.** Endoscopic Retrograde Cholangiopancreatography showing extravasation of the contrast from intrapancreatic common bile duct a. Pre-stenting b. Post-stenting.

(Fig. 1). Post stenting, the Morrison drain output reduced over the period of 3 days and it was removed after 5th day post stenting. The patient had uneventful course and the stent was removed after 12 weeks, after ruling out the stricture or contrast leak.

Patient is asymptomatic at 1 year follow up.

**3. Discussion**

Among all patients undergoing exploratory laparotomy for acute abdominal trauma, less than 0.5% had isolated common bile duct injury [3]. It is a rare event. The cause of the rupture of the bile duct is nearly always a crushing trauma to the right hypochondriac region and especially to the costal margins. This phenomenon was first explained by Mason et al [4]. The mechanism of the injury is based upon Pascal law, which that, outside pressure applied over fluid medium gets transmitted in every direction. So, according to this theory, the pressure would remain the same inside as well as outside the common bile duct, and there would be no rupture unless the resultant organ is flattened against some object, here, in this case, traumatic blow anteriorly and vertebral bodies posteriorly [5].

Diagnosis of the common bile duct injury in a patient with abdominal trauma can be established at three different points of time depending upon the situation. In unstable patients who undergo exploratory laparotomy and have active leak at the time of surgery, it is diagnosed intraoperatively. In stable patients at the time of admission, there is slow deterioration and the diagnosis is usually delayed on radiological investigation. Some patients have missed common bile duct injury at the time of initial laparotomy, and it is presented as bilious drain, signs of sepsis, worsening of abdominal signs etc [1].

Clinical signs directing towards the Extrahepatic biliary trauma in cases of abdominal trauma can be

- Increasing abdominal pain & tenderness
- Persistent emesis or inability to tolerate oral diet
- Unexplained hypotension
- Increasing leukocytosis
- Increasing amylase
- Proximal small bowel obstruction
- Abdominal sepsis

During abdominal trauma, with only extra hepatic biliary injury, CT scan findings are usually non-specific and diagnostic dilemma arises [6,7]. MRCP can diagnose the biliary injury. Endoscopic retrograde choledocopancreatography is the IOC investigation for

**Table 1**  
AAST Extrahepatic biliary ductal trauma.

| GRADE | FINDING   |
|-------|---|
| I     | Gall bladder contusion or hematoma, Portal triad contusion  |
| II    | Partial gall bladder avulsion from liver bed with cystic duct intact                                |
| III   | Complete gall bladder avulsion from liver bed, Cystic duct avulsion                                 |
| IV    | Partial or complete right hepatic duct laceration, Partial or complete left hepatic duct laceration |
| V     | Partial common hepatic duct laceration (<50%)   |
|       | Partial common bile duct laceration (<50%)  |
|       | More than 50% transection of common hepatic duct  |
|       | More than 50% transection of common bile duct   |
|       | Combined right and left hepatic duct injury   |
|       | Intraduodenal or intrapancreatic bile duct injury   |

the diagnosis of the extra hepatic and pancreatic ductal injury with therapeutic intervention [8,9].

Exploratory laparotomy can reveal only duodenal and proximal biliary injury, however, intrapancreatic CBD injury can be missed.

American Association for Surgery of Trauma (AAST) classified extrahepatic biliary injury as given in Table 1. Management is as per the grade of an injury. Traditionally it was treated with exploratory laparotomy with T tube insertion or bilio-enteric anastomosis. However, recent studies have shown that the minimally invasive approach of ERCP guided stenting shows good efficacy and safety without a major post-operative morbidity. A variety of endoscopic techniques have been used to manage bile leaks. These include biliary Sphincterotomy alone, biliary stenting with or without sphincterotomy, and nasobiliary Drainage with or without sphincterotomy. These methods share the common goal of decreasing or eliminating the pressure gradient between the bile duct and duodenum, allowing preferential flow of bile from the duct into the duodenum instead of bile exiting the leak site. The absence of ongoing bile flow through the leak site allows the defect to heal [10].

In our case, the patient came with a stab and fist blow trauma to abdomen, with omental protrusion through the stab wound. Exploratory laparotomy revealed a non-expanding para duodenal hematoma. Further exploration revealed no solid or hollow viscous injury. A tube drain placed in hepatorenal recess revealed bilious drainage from 2nd post-operative day. Contrast enhanced CT did not reveal any significant finding. Thus the suspected extra hepatic biliary trauma was confirmed with MRCP, which revealed intrapancreatic CBD injury (AAST grade V). ERCP with stenting was done. Post stenting follow up was uneventful. So, a second operative intervention and related morbidity was avoided.

#### 4. Conclusion

As CT scan is not specific to diagnose the extrahepatic biliary trauma, a high degree of suspicion is necessary to assess the clinical progression of the patient for early management before development of any complication. During exploratory laparotomy, duodenal and proximal CBD injury can be visualized, however, intrapancreatic CBD injury can be missed.

In treatment of such patients, when suspected post operatively, semi interventional procedure like ERCP should be preferred in appropriate cases. AAST Grade V CBD injury can be managed with ERCP and stenting.

#### Declaration of Competing Interest

The authors have no conflicts of interests.

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#### Ethical approval

Being a retrospective study, the investigation is exempted from approval by Ethics Committee.

#### Consent

Written informed consent was obtained from the patients for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

#### Author contribution

**Akshay Deshpande:** Design of the work, Acquisition of data, Analysis of data, Drafting the work, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Jaini Modi:** Design of the work, Analysis of data, drafting the work, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Jayashri Pandya:** Conception of the work, Analysis of data, Interpretation of data, revising the work critically for important intellectual content, final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions [4] related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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#### Guarantor

Jayashri Pandya.

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