

Case Report

Unusual Right Hepatic Bile Duct Injury Following Blunt Abdominal Trauma

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INTRODUCTION

Injury of the right hepatic bile duct following blunt abdominal trauma is rare. Only a few reports of injury of the extrahepatic bile duct after blunt abdominal trauma have appeared in the English medical literature. The following case report illustrates an unusual site of injury of the biliary tree, a delay in diagnosis, and a rational plan for management.

CASE REPORT

A 35-year-old male presented to the surgical casualty at Al Jahra Hospital following a motor vehicle accident. Apparently, he had sustained a blunt trauma to his right lower chest and upper abdomen due to the steering wheel. His initial pulse rate was 120/min and his blood pressure was 64/38 mmHg. Clinically, he had a flail right chest, with diminished air entry on the right side, tenderness of the upper abdomen. The initial laboratory findings showed a hemoglobin of 13.3 g/dl, total Bilirubin of 15.1 mmol/l, direct bilirubin of 6.4 mmol/l, ALT 762 IU/l, AST 1293 IU/l, ALP 44 IU/l, white cell count of 16.3×10^9 . Chest radiograph showed multiple right segmental ribs fracture with hemopneumothorax. A right intercostal tube was inserted. Abdominal ultrasonography revealed moderate amount of free intra-peritoneal fluid. The patient was simultaneously actively resuscitated with intravenous fluids and blood transfusion.

The patient's condition remained unstable despite vigorous resuscitation and, therefore, it was decided to proceed to a laparotomy. Approximately 1500 cc of blood was evacuated from the abdominal cavity. The liver seemed to be the only organ injured, with grade IV multiple liver lacerations, one of which was near the porta hepatis on the right side. Bile was not seen at the time of the exploration. Surgical gauze swabs kept near the porta hepatis did not show any bile staining. No

dissection was attempted in the region of the porta hepatis. The lacerations around the accessible part of the liver were approximated after securing the bleeding vessels in the depth using chromic catgut sutures. Abdomen was closed with a haemovac drain placed in the hepatorenal pouch.

The initial post-operative period was unremarkable. On the tenth post-operative day, he developed abdominal distension with tenderness and guarding diffusely. He had low-grade fever of 37.5 °C and the sclera was found to be icteric. There was bile stained fluid around and from the drain, approximately 250 cc. The total bilirubin was 60 mmol/l and the direct fraction was 32 mmol/l. The liver enzymes were normal. Ultrasonography of the abdomen revealed fluid collection of 4.4 cm X 4.1 cm, communicating with the intrahepatic biliary radicle and a normal sized common bile duct. Tc99 IDA Liver scan revealed bile leakage from the upper part of the extrahepatic duct. Endoscopic retrograde cholangio-pancreatography [ERCP] (Fig 1) was done and this revealed incomplete right main hepatic duct injury with bile leakage. Papillotomy was done at the same time.

The collection in the subhepatic area was drained under computerized tomographic [CT] guidance, using a No. 12 Fr catheter. The fluid was sent for Amylase, which was normal and the culture and sensitivity grew no microbes.

There was a gradual reduction in the amount of drainage from the catheter, which corresponded with the improvement in the general condition of the patient and confirmed with ultrasonographic examinations and monitoring of the liver function tests.

The patient was discharged on the 65th day, after removal of the catheter. He has been since followed up in the surgical outpatient, where he was found to be in good health with return to normal activity.

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DISCUSSION

Since the initial case report of bile duct rupture secondary to blunt trauma^[1] in 1799, there have been only about 30 reports in the English language literature from 1929 to 1995 involving injuries to the right and left hepatic ducts, either independently or at their bifurcation^[2, 3]. In a review^[2] of 34 cases of blunt traumatic bile duct injuries, 65% occurred in males. In another review^[4] of 36 cases, it was noted that those who survived had an average delay in the diagnosis of nine days, while those who died had a delay of 40 days. Nearly one third of these injuries occurred in children^[5].

The mechanism of injury to the proximal bile duct are numerous and largely speculative^[2, 6, 7] and includes shearing forces applied to a distended bile duct at the area of maximum fixation, i.e. where the bile duct enters the pancreas of liver. Displacement of the liver during blunt impact leads to traction or shear injury to the bile duct. The other mechanism may be due to compression against the vertebrae causing ischemic necrosis to the bile ducts due to major hepatic fracture through porta hepatis. The fact that our patient had delayed bile leak suggests that all the previous factors together with the associated liver injury, gives a plausible explanation for the right bile duct injury. As in our case, up to 20% of the bile duct injuries may go undetected at initial celiotomy^[2]. The clinical course of these injuries is insidious and often delayed, with an average time of 18 days, until the development of obvious abdominal signs and symptoms. Accumulation of free fluid in the abdominal cavity with subsequent diagnostic puncture or an abdominal drain draining bile stained fluid, may draw attention to a possible injury of the biliary system^[8].

Pre-operative diagnosis of biliary tree injuries is difficult. Computerized tomography [CT] and ultrasonography are useful for revealing peritoneal fluid collection or biliary dilatation^[8]. HIDA scanning is the preferred screening tool for suspected bile duct injury. Delayed images should always be obtained if bile leakage is suspected, even if the study is normal at one hour. HIDA scanning can also be used for following up the patient post-operatively^[5]. Endoscopic retrograde cholangio pancreatography [ERCP] has been used to detect extravasation of contrast medium from the injured site in selected patients with biliary injury^[9]. Most of the bile leaks resolve spontaneously within two weeks^[10].

In the era of advanced interventional radiological and endoscopic gastroenterology, conservative management of proximal hepatic duct injury for selected patients with partial injury has



Fig. 1: Endoscopic retrograde cholangio-pancreatogram demonstrates contrast extravasation just above the confluence. Arrow denotes the extraluminal leak.

been advised^[11]. The stenting technique for a patient with right anterior hepatic duct injury was first introduced in 1972^[12].

CT guided percutaneous intraperitoneal puncture, together with ERCP and insertion of nasobiliary drain has been described in recent years with good results in adults as well as in infants^[13]. Endoscopic sphincterotomy alone with closed percutaneous drainage of the bile duct injury may result in the closure of the injury in some patients^[14]. Endoscopic sphincterotomy causes diminution of the pressure gradient between the biliary system and the duodenum. Masanori, et al.,^[15] succeeded in treating biliary leakage from a second order or more peripheral branches of the intrahepatic bile duct in five cases by using ERCP and placement of a stent, without undue complications. All these patients had remained asymptomatic for a mean of 2.6 years since the removal of the stent. Some authors^[16] have described late stenosis after stent removal.

Operative management of biliary injuries is based on well-established principles and depends on the patient's stability, associated injuries, location and extent of the biliary injury, the size of the bile duct and the state of its blood supply. Simple drainage^[17], ligation of the common bile duct with cholecysto-jejunostomy^[18] and T-tube placement^[3] have been described. Primary suture for an injury involving less than 50% of the circumference of the hepatic duct has been

reported with a 67% success^[12]. Primary repair is not recommended for complex bile duct injuries, including those with segmental tissue loss or injuries of greater than 50% of the circumference. There is a reported 55% stricture rate for end-to-end anastomosis of bile duct transection^[19]. A success rate of 67% using Roux-en-Y hepatoportal jejunostomy has been reported by some authors^[20]. There have been reports^[21] of using two separate right and left Roux-en-Y hepatico-jejunostomy to treat complete disruption of the right and left hepatic ducts within a centimetre of the liver edge.

CONCLUSION

This paper documents a right hepatic bile duct injury following blunt abdominal trauma, with delay in diagnosis due to the rarity of the condition, thereby being overlooked at the time of laparotomy. It also documents the use of endoscopic retrograde cholangio-pancreaticography in the diagnosis with a successful outcome of the conservative management by the use of percutaneous guided drainage. Operative cholangiography should be considered during exploration for suspected extra-hepatic bile duct injury.

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