Traumatic injury to extrahepatic bile duct system is a rare entity. Associated injuries are usually the indication of surgical exploration, and most of the common bile duct (CBD) injuries are diagnosed intraoperatively. Here, we present a case of a 23-year-old boy with a history of road traffic accident. Intraoperatively there was moderate hemoperitoneum with Grade 3 liver laceration, Grade 1 splenic laceration, laceration of anterior wall of stomach, common hepatic artery tear, and complete transaction of CBD. The principle of damage control surgery followed. Stomach laceration repaired and common hepatic artery ligated. Infant feeding tube placed in a proximal portion of transected CBD and distal portion ligated. The patient was discharged on the 45th day with infant feeding tube draining bile. In follow-up OPD tube cholangiogram followed by magnetic resonance cholangiopancreatography done which showed the formation of a choledochoduodenal fistula. Infant feeding tube removed. The patient did well for next 6 months but after that he presented with jaundice which on evaluation found to be due to stricture of choledochoduodenal fistula. The patient underwent elective cholecystojejunostomy. Miraculous spontaneous formation of choledochoduodenal fistula in traumatic CBD injury and management by cholecystojejunostomy is very less reported in the literature.

Keywords: Cholecystojejunostomy, Choledochoduodenal fistula, Traumatic common bile duct injury

INTRODUCTION

Common bile duct (CBD) injuries from blunt abdominal trauma are rare. Extrahepatic biliary tract injuries occur in 3-5% of all abdominal trauma cases. Penetrating wounds lead to 85% cases of extrahepatic biliary tract injuries and 15% results from blunt trauma. In 85% of these cases, the gallbladder alone is involved.1 The first report of bile duct rupture was in 1799 by Wainwright.2 Bourque et al.,3 in his review of the literature in 1989, found only 125 cases reported since 1806, one-third of which were in the pediatric population. Dawson et al.4 reported 1 case of bile duct injury in 10,500 consecutive trauma patients. Here, we present a case of traumatic complete CBD injury in a polytrauma patient. Initial damage control surgery done by ligating distal CBD and putting infant feeding tube in proximal CBD. Latter on patient develops spontaneous choledochoduodenal fistula between proximal CBD and duodenum, which was managed by cholecystojejunostomy.

CASE REPORT

A 23-year-old male brought to the emergency department with a history of road traffic accident. He was evaluated as per Advanced Trauma Life Support protocol. He was found to be a non-responder hence immediately shifted to OR for emergency laparotomy. Intraoperatively there was moderate hemoperitoneum with Grade 3 liver laceration, Grade 1 splenic laceration and 12 cm laceration on the anterior wall of the stomach. There was a tear of the common hepatic artery with active bleeding. CBD was found to be transected in the lower part. A small pancreatic and mesenteric hematoma was also present. Stomach was repaired with 3-0 polydioxanone suture (PDS). Common hepatic artery ligated. Infant feeding tube placed in the proximal portion of transected CBD and distal portion ligated. Liver packed with mopping sponge. Suction drain placed in the pancreatic bed. Soft abdominal drain placed in the subhepatic and pelvic region. Post-operatively patient was...
resuscitated in intensive care unit (ICU). After 48 h, relook surgery was done, and liver pack removed. The patient was kept on laparostomy with one abdominal drain and an infant feeding tube in the proximal end of CBD. The patient recovered well and came out of ICU on the 24th day. Bilious drainage output gradually came down. Laparostomy wound was healthy and hence split-thickness skin graft done on the day 30. The patient discharged on the 45th day with infant feeding tube in the proximal CBD draining bile and with a plan to do choledochojunostomy after 3 months. In follow-up, the patient came with nil output through infant feeding tube on the day 60. The patient was symptom-free with no icterus and with normal color stool. A tube cholangiogram (Figure 1) followed by magnetic resonance cholangiopancreatography (MRCP) (Figure 2) was done which showed the spontaneous development of the choledochoduodenal fistula between proximal CBD and duodenum. Infant feeding tube removed. The patient did well for next 6 months but after that he presented with a complaint of jaundice. Ultrasound (USG) showed dilated intrahepatic biliary radicles. Percutaneous transhepatic cholangiogram (Figure 3) and MRCP (Figure 4) done thereafter showed a stricture of choledochoduodenal fistula. The patient planned for choledochojunostomy. Intraoperatively there were dense adhesions at porta hepatis, and there was a chance of loss of vascularity of CBD after dissection of adhesions; hence, cholecystojunostomy was done in view of protecting remaining part of CBD. The patient recovered well in the post-operative period and doing fine after 1 year of regular follow-up.

**DISCUSSION**

Injury of the extrahepatic biliary system after blunt trauma is a relatively rare and complete CBD injury is particularly very rare. Post-traumatic CBD injury occurs commonly at areas where the biliary tract is relatively more fixed: (a) the origin of the left hepatic duct, (b) the bifurcation of the hepatic ducts, and (c) the pancreaticoduodenal junction. Different mechanisms leading to rupture of the CBD are:
(i) compression of the ductal system against the vertebral column, (ii) sudden increase of intraluminal pressure in the gallbladder with a short and permeable cystic duct, and (iii) a “shearing force” producing avulsion of the CBD at its fixed part at the junction with the pancreas.7

The diagnostic modalities to be used depend greatly on the stability of the patient, risk or suspicion of associated injuries, and other indications that may necessitate operative exploration. Diagnosis may be done immediately in patients undergoing laparotomy for associated injuries. It is done lately in stable patients with scant symptoms (>50% of cases), and because of complications due to missed injuries at the time of the trauma.8 Bile staining in the hepatoduodenal ligament area during laparotomy requires exploration of the area and may lead to a diagnosis of CBD injury. The diagnosis is more difficult with incomplete injuries that result in a delayed presentation. These cases may present days to months post-injury, with nausea, vomiting, jaundice, and abdominal pain.9 Such symptoms are caused by a stricture or bile leak from a direct injury or ischemic insult from injury resulting in devascularization of the extrahepatic biliary tree.

In polytrauma patient diagnosis of a bile duct injury is often difficult and demands a high index of suspicion. Worsening abdominal discomfort, distension, nausea, vomiting, persistent ileus, hyperbilirubinemia, and low-grade fever commonly is associated with bile duct injury. The first diagnostic test should be an abdominal USG or computed tomography (CT) scan to confirm free fluid, but a concomitant liver injury with hemoperitoneum often is present. A diagnostic peritoneal lavage with testing for bilirubin is sensitive but not specific. Endoscopic retrograde cholangiopancreatography or MRCP defines the area of injury more precisely. The diagnostic challenges in the CBD injuries are suboptimal imaging modalities, the presence of confounding injuries, and the rare incidence of blunt traumatic CBD injuries. In patients with blunt injuries to the ductal system, diagnostic delays may occur.10 These delays probably include two different conditions: Real diagnostic delay because of the difficulty of diagnosis and delayed onset of biliary duct trouble.11 Late recognition and inappropriate management of these injuries result in severe, often fatal consequences.1 Thus, any patient sustaining blunt abdominal trauma whose workup suggests possible pancreatic, liver, or duodenal injury requires a thorough evaluation.

The approach to the management of these patients depends primarily on the patient’s hemodynamic stability: Unstable patients are requires immediate exploratory laparotomy. In the stable patient, controversy exists regarding the decision to go for exploratory laparotomy based on equivocal contrast-enhanced CT findings. However, a frequent incidence of significant visceral injury has been reported with the CT finding of free abdominal fluid without evidence of solid-organ injury.12 Patients who have persistent or worsening abdominal pain, or a persistent base deficit despite adequate resuscitative efforts, probably will often need a laparotomy. The principles of operative management in the unstable patient follow the guidelines of damage control laparotomy. These include control of hemorrhage, prevention of contamination, and avoidance of intraoperative metabolic failure. The rule is to move these patients to the ICU rapidly to stabilize their physiology before subsequent definitive repair.13 In the stable patient, the initial laparotomy is the best opportunity for the diagnosis and definitive repair of CBD injuries. Within 24 h of gross contamination, inflammatory changes develop, and it limits surgical options and also predispose to the development of further complications.14

The treatment options for extrahepatic biliary injuries have broadened. Until recently, such injuries are usually managed with surgical repair utilizing debridement and closure with or without T-tube; patch closure using gallbladder, cystic duct, vein, serosa, or jejunum; biliary-enteric anastomosis using duodenum or jejunum; or ligation and drainage with plans for subsequent enteric diversion as done in our case.15 When the only relative indication for surgery is the bile leak, non-operative management is possible. Currently, Roux-en-Y hepaticojejunostomy (HJ) is the most frequently performed surgical reconstruction. In this surgical technique, a proximal common hepatic duct is identified and prepared, and the distal CBD is ligated. End-to-side or end-to-end HJ is performed in a single layer using interrupted absorbable PDS (4-0 or 5-0).16 In our case, we did cholecystojejunostomy. Points in favor of our technique are: (a) preservation of remaining part of CBD for further backup if required in future; (b) undilated normal caliber CBD in healthy trauma patient which make HJ technically difficult, (c) wider and technically easy anastomosis during cholecystojejunostomy with less chance of stricture in future, and (d) fibrosis around CBD as we are doing diversion late in course of treatment and compromised blood supply of CBD due to injury to hepatic artery in our case. Spontaneous development of choledocoduodenal fistula is a very rare entity. A study of 81 patients over a 50-year period had attempted to list the incidences of several types of spontaneous bilioenteric fistula and reported incidence of choledochoduodenal fistula up to 8.6%.17

CONCLUSIONS

CBD injury is often discovered immediately during laparotomy. The diagnosis of a bile duct injury is often difficult in the patient with multiple injuries. In unstable patients,
the principle of damage control surgery is followed. In such patients, it is better to do ligation and external drainage with a plan to subsequent enteric diversion. The spontaneous formation of choledochoduodenal fistula is rare as happened in our case, and cholecystojejunostomy is a better alternative in comparison to HJ during definitive surgery.

REFERENCES


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