



Case Report

A Rare Double Hepatobiliary Fistula Following Gunshot Injury Treated by Roux-en-Y Double Hepatic Parenchyma Fistulo-Jejunostomy: Case Report

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Abstract

We report a case of a 27-year-old patient with double biliary fistula affecting both the right lobe and the left lobe of the liver following a gunshot wound. Two years before, during a military battle in Libya, the patient received a gunshot wounding to the left lobe of the liver. The primary treatment consisted in a biliary prosthesis placement. The procedure was complicated by the common bile duct perforation and by a biliary fistula between the common bile duct and the duodenum with consequent chronic cholangitis which caused a progressive serrated stenosis of the main bile duct and further the appearance of a biliary cutaneous fistula which had been active for over a year. Due to a progressive obstructive jaundice and to the clinical status deterioration, the patient underwent ERCP with removal of the biliary prosthesis. Cholangiography showed an intra-extra-hepatic bile ducts complete obstruction, therefore, the patient underwent emergency surgery consisting in an external derivation by enlarging one of the biliary fistulas and placement of a sub-hepatic drainage. Two months after he underwent a second surgery consisting in a double Roux-en-Y hepatic parenchyma fistulo-jejunosomy between the fistulous tracts of both lobes and the jejunum, followed by an uneventful post-operative course and a full recovery.

The surgery was performed in the city of Tripoli, Libya, by a Libyan-Italian surgical team organized by the Libyan Emergency Medicine and Support Center (EMSC), the Italian hospital Policlinic “Luigi Di Liegro” in Rome and the Consulate of Libya in Milan (Italy).

Keywords: Biliary fistula, CBD stenosis, Fistulojejunostomy, Liver injury; Liver trauma

Introduction

Hepatic parenchymal fistula associated with bilio-cutaneous fistula is a rare pathology which may occur after liver trauma, stenosis of intra hepatic and extra hepatic duct in chronic inflammatory and neoplastic diseases or after liver resection. The percentage after liver trauma can vary between 2% and 28% [1]. In case of complex hepatic trauma multi-disciplinary approach is needed involving radiologists, gastroenterologists and surgeons who have a pivot role [2,3]. In these cases, first- choice treatment is biliary prosthesis, or PTC, as alternative procedure when a dilatation of the biliary tract is present. Surgical treatment is indicated when non-invasive procedures are unsuccessful or unavailable and consists in an anastomosis between the wall of biliary fistula or fistulas and jejunal loop (Roux-en-Y). In the literature (Pub med - Scopus) only 18 publications are reported [4-8]. The reported case consists of a double post traumatic biliary fistula affecting both lobes of the liver treated by a Roux-en-Y double Hepatic parenchyma fistula-jejunostomy.

Case Presentation

In 2021, a 27-year-old Libyan patient, received an abdominal gunshot wound with injury to the left lobe of the liver. He underwent emergency laparotomy in the battlefield followed by a biliary stent placement for a biliary leak. Because of an international cooperation program between Libya and Italy, in December 2022, the patient was referred to the Gout El Sahaal Hospital in Tripoli, for a cutaneous fistula dated a few months before with a bile outflow of about 40 ml/24 hours. In a few days, during the hospital stay, the patient developed a progressive jaundice. A MRI cholangiography (Figure 1) showed a complete obstruction of the common hepatic duct and of the hepatic bifurcation with modest dilatation of the hepatic ducts, the presence of a biliary stent and the presence of an intra hepatic arteriovenous fistula. The general condition of the patient was severely compromised by hepatic failure (ALP/AST > 500 U/l, gamma GT >2500 U/l, alkaline phosphatase > 1000 U/L, bilirubin > 17 mg/dl). An Endoscopic Retrograde Cholangiopancreatography (ERCP) was carried out showing the occlusion of the biliary tract and the obstruction of the biliary prosthesis located in a fistulous connection between the Common Bile Duct (CBD) and the duodenum. The prosthesis was then removed. The lack of dilatation of the biliary tract due to chronic cholangitis did not permit a percutaneous transhepatic approach neither with ERCP. Due to a further worsening of the clinical condition the patient underwent surgery. At median laparotomy, the liver presented as dark green colour with a congestive oedematous appearance due to biliary stasis; a fistula,

identified between the CBD and the duodenum, was detached and sutured. A double hepatic fistula was observed, one near to the round ligament in the superior portion of segment III and the other in the inferior portion of segment IV, about two centimetres from the right hepatic duct. Choledochotomy was performed and an unsuccessful attempt to overcome the biliary stricture by a guidewire was carried out. In consideration of the congestive state of the liver, of the high level of bilirubin in the tissues and of the precarious general conditions of the patient, a T tube was inserted in the choledochal bile duct, the right biliary fistula was enlarged with a parenchymal incision for about two centimetres and a 28 fr. subhepatic drainage was positioned. Another drainage was placed close to the fistula of the left lobe of the liver. The subhepatic drainage was maintained under continuous double tube aspiration according to Sump and, in the following days, it presented a 400 ml/24 hours bile collection, associated to a progressive drop in bilirubin level up to 2 mg/dl reached 10 days after surgery. In the meantime, the T tube drained gastro-enteric fluid rather than bile. Few days after surgery, a bile leak was observed from the upper tract of the abdominal wound which became dehiscent for about 4 cm. A negative pressure dressing (V.A.C.[®]Therapy System) was placed in the wound and the treatment was continued for about 15 days by aspirating a little amount of bile daily. Two months after the first operation, the patient presented in good general conditions with improved liver function, subhepatic tube draining 400 ml/day of bile and a bilio-cutaneous fistula with modest bile leakage. A CT scan was carried out with the injection of contrast medium through the subhepatic drainage showing a biliary fistula from the right lobe of the liver (Figure 2). A further laparotomy was performed, the T tube was removed and the two parenchymal fistulas were confirmed in the right and left lobes with good trophism of the liver parenchyma and the presence of perihepatic fibrotic tissue in correspondence with the fistulous tracts. It was observed that the fistula of the right lobe was near the site of insertion of the T tube on the CBD and that it was not suturable due to fibrosis. Therefore, a Roux-en-Y jejunal loop was passed through the trans mesocolic route: a lateral incision of the jejunum was performed for 5 cm at about 15 cm from the distal sinking and an hepatic parenchyma fistulo-jejunostomy was performed incorporating the hepatic parenchyma, laterally the hepatic pedicle including the CBD and inferiorly the fibrosis present in Morrison's recess. As a precaution, a new ERCP was performed and a biliary prosthesis was inserted passing through the CBD near the fistula in order to have an additional drainage route of the anastomosis. A second hepatic parenchyma fistulo-jejunostomy was created in the left lobe between the hepatic surface and a lateral incision of the jejunal loop about 3 centimetres from the distal closure (Figures 3,4). For both anastomoses, a double layer suture was carried out: the outermost one with separated stitches in 2/0 absorbable

monofilament and the second inner layer with continuous suture in 3/0 absorbable monofilament (Figures 5,6). Both anastomoses were covered with sealing BioGlue®. Two subhepatic drains were placed, the right one was removed on the ninth post-operative day, while the left one presented, starting from the fifth post-operative day, a 30 ml/24 hours drainage of entero-biliary fluid. Therefore, the patient received parenteral nutrition for fifteen days before spontaneous resolution of the leak and subsequent removal of the drainage on the 22nd postoperative day. On the first post-operative day, the patient presented an initial elevation of bilirubin to 4mg/dl and increased liver enzymes. A postoperative ultrasound and a contrast-enhanced CT scan did not show dilatation of the biliary tracts, confirming the presence of an intrahepatic vascular shunt and an increase in the size of the portal vein. Steroids were administered intravenously for two days. The patient was discharged after 26 days in good general condition with bilirubin values of 0.96 mg/dl and normalization of the liver function. The CBD was removed by a ERCP performed two months later the stenting.

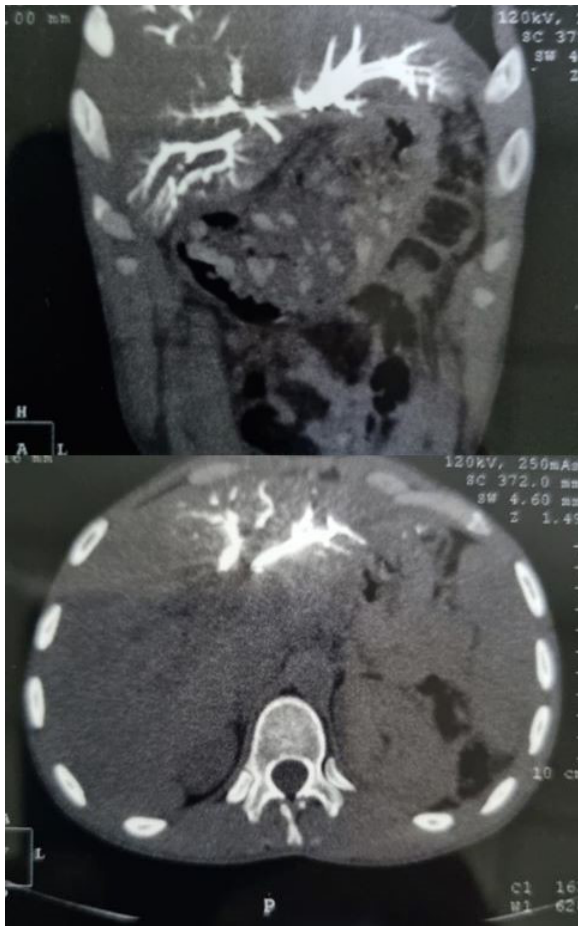


Figure 1: Bilateral occlusion of the bile ducts.

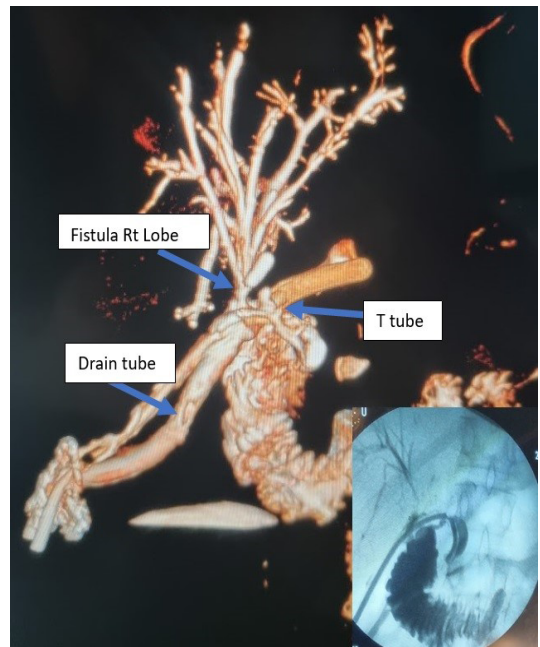


Figure 2: 3D CT scan reconstruction showing the hepatobiliary fistula in the fifth segment of right lobe eighty days after the first operation.

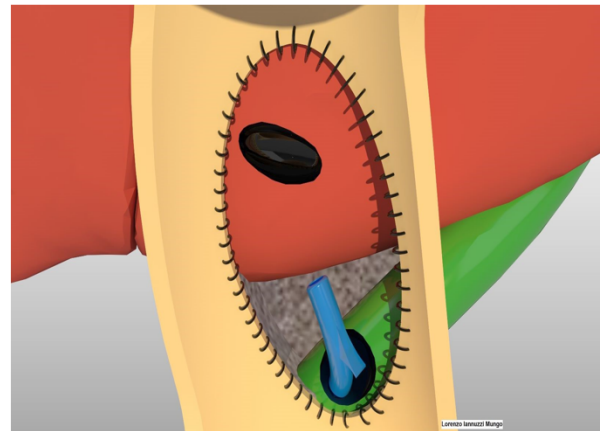


Figure 3: Reconstruction by 3D imaging technique of the detail of the anastomosis to the right hepatic lobe. In blue color, bile endoprosthesis coming out of the CBD used as further anastomosis drainage.

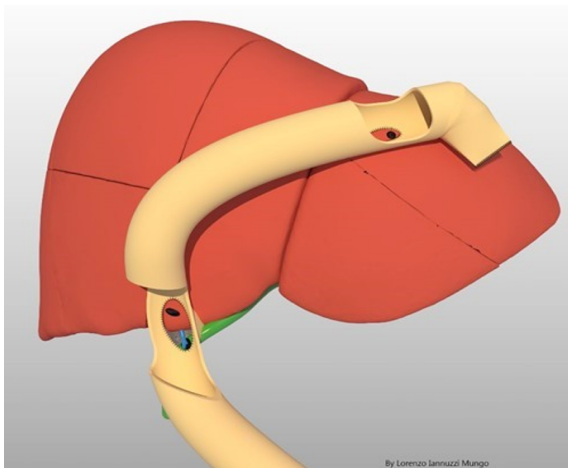


Figure 4: Reconstruction 3D imaging technique of the double right and left liver lobe anastomosis for both fistulas with Roux-en-Y jejunal loop.

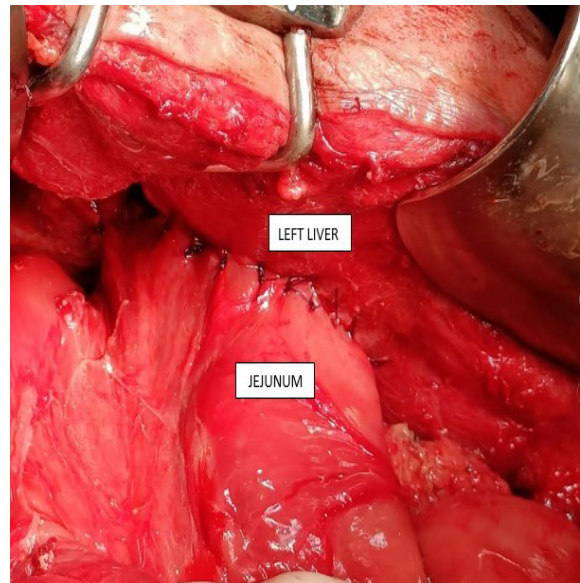


Figure 6: Anastomosis' second layer with separate stitches between left lobe of liver and jejunum.

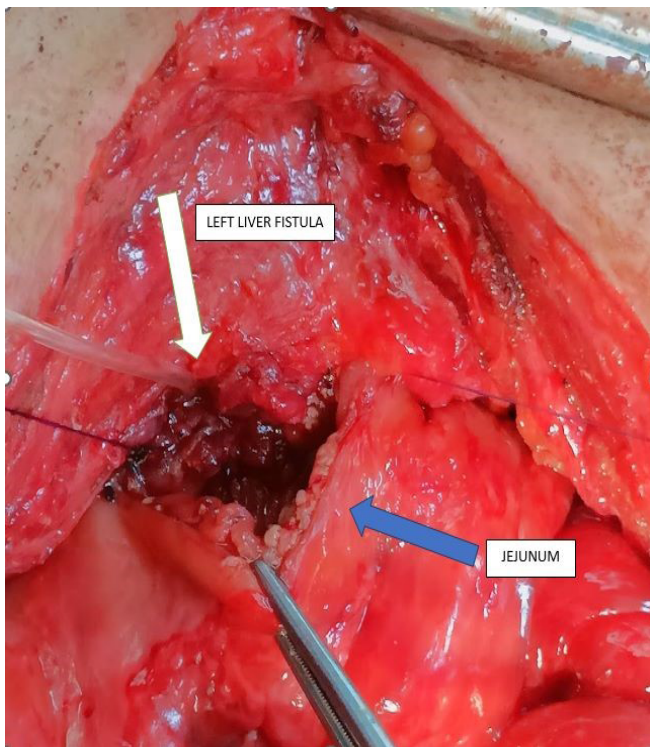


Figure 5: Anastomosis between jejunum and left lobe of the liver: first layer absorbable continuous suture.

Discussion

Hepatic parenchymal fistula, especially when associated with bilio-cutaneous fistula, is a rare occurrence that usually follows liver trauma or stenosis of the intra-extra-hepatic bile ducts caused by chronic inflammatory or neoplastic diseases and in case of previous liver resection. Biliary leaks after liver trauma can vary between 2% and 28% [1] and often, if sustained by a biliary low-flow, they heal spontaneously with biliary drainage and conservative procedures [9]. Most post-traumatic liver fistulas are treated by the reduction of intrahepatic pressure with Endoscopic Treatments (ERCP) or with Percutaneous Procedures (PTC). The choice of the optimal approach depends on many factors such as the in-hospital availability of an interventional radiology and operative endoscopic units, the patient's condition and the type of liver damage that caused the biliary fistula. If not drained, an intra-abdominal biliary fistula causes peritonitis requiring urgent surgical treatment, while a bilio-cutaneous fistula occurs more slowly, allowing for a more accurate study of the case by fistulography, ERCP, MRI cholangiography and CT scan. Therefore, particularly in cases of complex hepatic trauma, a multidisciplinary approach, involving radiologists, gastroenterologists and surgeons has a pivot role [2,3]. Usually, the first-choice treatment is ERCP followed by the insertion of a biliary prosthesis while PTC can be

an alternative approach especially in case of biliary tract dilatation. Both minimally invasive procedures are safe and often decisive [8]. When the above options are unsuccessful or even unavailable, a valid option was proposed more than 50 years ago by Galeev [10], a Russian surgeon, who described the anastomosis between the wall of a biliary fistula and jejunum with a Roux-en-Y loop as a treatment for chronic fistulas of various origins. A literature review over the last 50 years (PubMed, Scopus) found only 18 publications reporting this technique for a total of 54 patients, of which 15 (27.8%) presented with a post-traumatic hepatic fistula [4-8]. To the best of our knowledge, the present is the first report in literature on the treatment of a double post-traumatic biliary fistula affecting both lobes of the liver. The case presented has the peculiarity that the patient, with a penetrating liver wound, received a biliary prosthesis that perforated the CBD, causing a duodenal hepatic fistula with consequent chronic cholangitis and complete obstruction of all the main bile tract (common, right and left hepatic ducts). Due to the intrahepatic biliary pressure, two fistulas developed in both the hepatic lobes and they further complicated with a chronic biliocutaneous fistula. As no other conservative treatments were applicable, a Roux-en-Y double hepatic parenchyma fistulo-jejunosomy was carried out between both fistulas, one of them connected to a portion of the hepatic pedicle and a jejunal loop. This procedure was effective in the resolution of this complex clinical condition. Some authors suggested a trans-jejunal drainage of the anastomosis for a few days [11] in order to reduce the intra-anastomotic pressure. Accordingly, we used a defect, already present in the CBD left after removal of the T tube, to insert a biliary prosthesis for anastomosis drainage. In cases of biliary fistula with hyperbilirubinemia, another option in critically ill patients, is to further enlarge the fistula with an hepatic parenchymal incision and to insert a perihepatic drainage to contain hyperbilirubinemia and to postpone a definitive surgery with hepatic parenchyma fistulojejunosomy.

Conclusion

The fistulo-jejunosomy in presence of liver parenchymal fistulas represents a valid surgical option especially when other endoscopic or percutaneous procedures are not applicable or available, avoiding demanding and dangerous dissections of the hepatic hilum.

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