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How a Few Centimetres can Make all the Difference: An Unusual Treatment for Recurrent Postoperative Cholangitis in a Patient with a Biliary-Enteric Anastomosis

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Abstract

A 56-year-old man was referred to our department for recurrent postoperative cholangitis. In 2009 he had undergone a Roux-en-Y hepaticojejunal anastomosis for chronic pancreatitis. Six years later he began experiencing recurrent episodes of cholangitis. Radiographic cholangiography showed no signs of the stenosis of hepaticojejunal anastomosis. After a series of examinations and multidisciplinary discussions, we concluded that the recurrent infections were being caused by reflux through the hepaticojejunal anastomosis, which was occurring because of the short length of the Roux limb. The Roux limb was surgically lengthened from 15 cm to 30 cm. After the procedure no further attacks of cholangitis occurred.

Keywords: Recurrent cholangitis; Roux-Y limb; Hepaticojejunostomy; Hepaticojejunoanastomosis structure

Abbreviations: CT: Computed Tomography; ERCP: Endoscopic Retrograde Cholangiopancreatography; GIT: Gastrointestinal Tract; HJA: Hepaticojejunal Anastomosis; PTC: Percutaneous Transhepatic Cholangiography; PTD: Percutaneous Transhepatic Drainage

Introduction

Infections of the common bile duct typically occur in patients with biliary obstruction, hepatic abscesses, biliary-enteric fistulae, after interventions on the biliary tree, or after forming biliary enteric anastomoses. We present a case study of a patient who suffered from recurrent bouts of postoperative cholangitis of an unknown cause, which was eventually treated by elongating the Roux limb connected to the hepaticojejunal anastomosis by a mere 15 cm.

Case Report

A 56-years-old man was referred to our department for diagnostic work-up and treatment for recurrent cholangitis. In his youth he had undergone a gastric resection with Billroth type II anastomosis for peptic ulcer disease. In the year 2009, based on clinical and radiological examinations, he was diagnosed with and operated for a pancreatic tumour. The operative finding was a locally advanced unresectable tumour of the head of the pancreas. A cholecystectomy and a Roux-en-Y hepaticojejunal anastomosis were performed and a biopsy was taken from the tumour (Figure 1).

The histological examination did not reveal any malignant changes in the biopsy and a diagnosis of chronic pancreatitis was presumed. Over the following years the patient was without complaints until 2015, when he began suffering from recurrent bouts of cholangitis, for which he was repeatedly hospitalised at the department of internal medicine. As his condition failed to improve and the patient began to lose weight he was sent to our department for a diagnostic hospitalisation.

Abdominal computed tomography (CT) showed no signs of neoplasm, abscess or any other pathological process that could explain recurrent biliary tract infections. In May 2016 percutaneous transhepatic cholangiography (PTC) was performed, which ruled out stenosis. In January 2017 the patient had another episode of cholangitis, and again, PTC showed no stenosis of the anastomosis. A stent inserted into the biliary tree did not influence the recurrence of infection. It was only when a barium follow-through study was performed that our team realised the cause of the recurrent infections; the examination revealed reflux of contrast into the hepatic limb of the Roux-en-Y anastomosis (Figure 2).

Based on the barium follow-through study, we concluded that the recurrent cholangitis was a consequence of the reflux of intestinal contents through the hepaticojejunal anastomosis. We decided to perform a surgical revision to lengthen the Roux-en-Y limb. During the operation, after releasing thick adhesions the Roux limb was identified; it was about 15 cm in length. A new entero-enteric anastomosis was formed, lengthening the limb by an additional 15 cm (Figures 3 and 4).

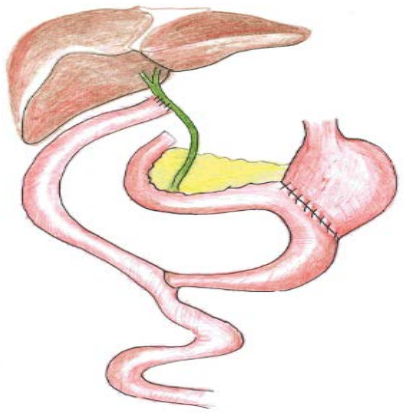

Figure 1: Billroth type II anastomosis with cholecystectomy and a Roux-en-Y hepaticojejunal anastomosis.

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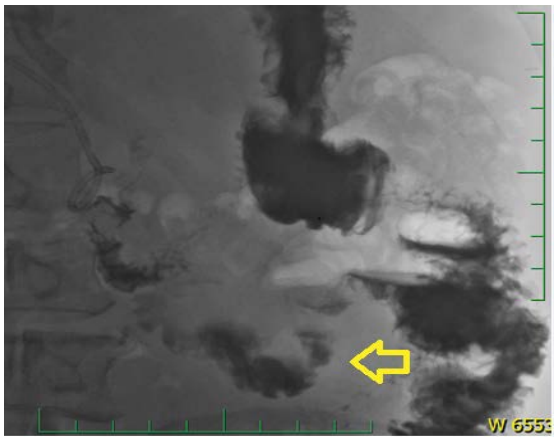

Figure 2: Water-soluble contrast follow through study: The arrow shows regurgitation of the intestinal content into the hepaticojejunal anastomosis.

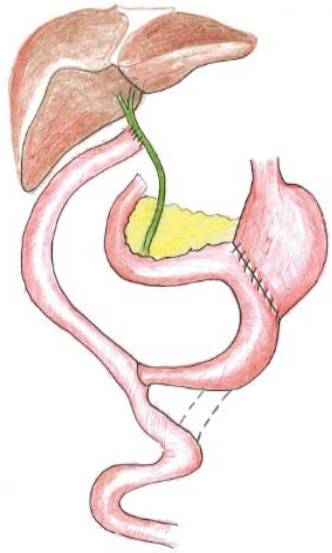

Figure 3: Situation before elongation of the Roux limb.

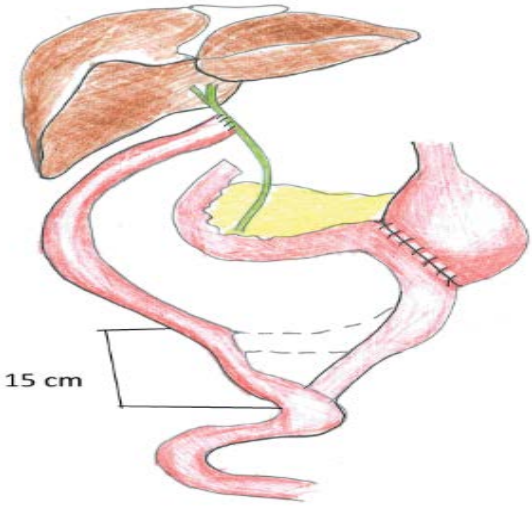

Figure 4: Situation after elongation of the Roux limb.

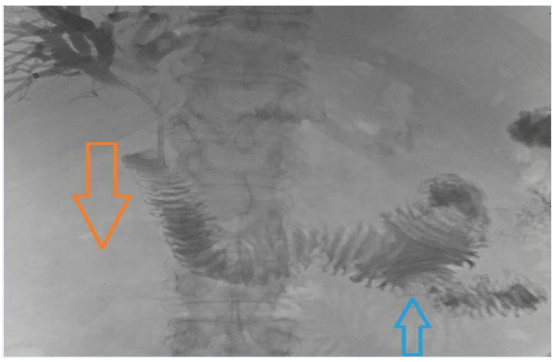

Figure 5: PTD before the operation: orange arrow shows slow passage of contrast through the Roux limb, the blue arrow shows the position of the original entero-enteric anastomosis.

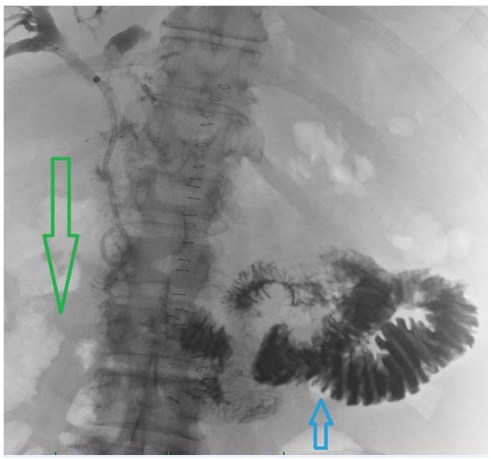

Figure 6: PTD after the operation: the green arrow shows free movement of contrast through the HJA anastomosis and the Roux limb, the blue arrow shows the location of the new entero-enteric anastomosis.

No complications occurred during the postoperative hospital stay. Follow-up PTC demonstrated free movement of contrast through the new anastomosis; the stent was subsequently removed (Figures 5 and 6). After discharge no more bouts of cholangitis occurred. During the following 12 months the patient was without complaints and gained 8 kilograms in weight.

Discussion

Stenosis of the common bile duct can be caused by a benign or malignant neoplasm or can result from iatrogenic injury. Surgical treatment consists of the creation of a biliary-enteric anastomosis, which may be choledochoduodenal, hepaticojejunal or choledochojejunal. Choledochoduodenal anastomosis was introduced in 1891 by Oscar Sprengel to treat distal bile duct obstruction by gallstones [1]. In 1893 Cesar Roux introduced a means of diverting pancreatic and biliary secretions away from the stomach and preventing bilious vomiting after gastric resections by forming an end-to-side jejunojejunal anastomosis, known as a Roux-en-Y anastomosis [2].

Biliary-enteric anastomoses are complicated surgical procedures that carry a high rate of complications and should be reserved for experienced hepatobiliary surgeons. Among the more common complications are biliary leak, bleeding and wound infections. In a multicentre study by Ismael et al. published in 2017, the 30-day

morbidity and mortality in a group of 293 patients who underwent hepaticojejunal anastomoses for iatrogenic damage during laparoscopic cholecystectomy were 26.3% and 2%, respectively [3]. The most common late complications are stenosis of the biliodigestive anastomosis and recurrent cholangitis, which most commonly occurrs concurrently with stenosis. Okabayashi et al. report that postoperative cholangitis occurred in 45 patients (7.7%) in a group of 583 patients who had undergone biliary-enteric anastomoses in the reconstructive phase after various resections of the pancreas, liver and bile ducts. Anastomotic stenosis was present in 26 of the patients with postoperative cholangitis (57.8%) [4]. In a study by AbdelRafee et al. on 120 patients undergoing hepaticojejunal anastomosis for treatment of iatrogenic bile duct injuries, anastomotic stenosis occurred in 11.6% of the patients and postoperative cholangitis occurred in 14.2% of the total group and in 53.6% of the patients with anastomotic stenosis [5]. Recurrent cholangitis can lead to secondary biliary cirrhosis, which may lead to hepatic failure, for which the only treatment option is liver transplantation [6].

Little is known about the pathogenesis of postoperative cholangitis occurring with a patent anastomosis free from stenosis. Microbiological examinations often reveal bacteria from the intestinal flora, such as Gram-negative rods, most commonly *E. Coli*, *Klebsiella* and *Enterobacter,* and *Gram-positive*, particularly *Enterococci*. Such cases of cholangitis as presumed to be caused by ascending bacterial infections. Bacterial colonisation is presumed to be likely to occur if the Roux limb is too long or has a "C" shape, as both can lead to stasis of the contents, allowing bacteria to multiply and migrate. Conversely, when the Roux limb is too short retrograde regurgitation of intestinal contents is also facilitated. Other causes can be obstruction of the Roux limb by adhesions, concernments or volvulus [7,8]. Additionally, it has been postulated that forming a Roux-en-Y anastomosis can lead to disruption of the enteric nervous system leading to a motility disorder and reflux of the intestinal contents into the bile duct [9,10].

The treatment of recurrent cholangitis in patients with patent biliary-enteric anastomoses is not straightforward. Conservative approaches include long-term antibiotics in repeating cycles, but this carries the risk of developing antibiotic-resistant strains of bacteria. If the intestinal motility disorder hypothesis is accepted as the cause of the recurring infections, prokinetic therapy may be implemented, but recent studies on new prokinetic agents are not yet available. In our patient, long-term therapy with metoclopramide had no influence on the recurring infections. When conservative therapy fails, the next step is surgical intervention.

As our patient had suffered from multiple attacks of cholangitis and had undergone several previous operations, there were likely to be many adhesions, and so a decision to operate required serious consideration. We came to the decision to operate only after careful consultation in a multidisciplinary team comprising surgeons, gastroenterologists, endoscopists and radiologists. As the initial imaging method abdominal CT was consider. We used PTC to visualise the biliary tree and insert a stent. ERCP was not performed due to previous surgeries. In our case a traditional water-soluble contrast follows through study turned out to be very helpful. We do not have experience with MRCP in such situations.

The goal of the operation was revision of the biliary-enteric anastomosis and adhesiolysis to remove adhesions that may be causing stasis or regurgitation of intestinal contents or preventing the passage of bile or intestinal content. The length of the Roux limb might have to be altered, and this was the controversial aspect of this case.

The optimal length of Roux limbs is a controversial topic. The minimal length should allow the hepaticojejunal anastomosis to be formed without tension, but opinions in how much longer than this they should be made differ [11]. Like Roux, Whipple and Pearse and contemporaries were advocates of short Roux limbs; they used approximately 30 cm long Roux loops during the reconstructive phases of Whipple procedures during the 1950s. Recent work, from Felder et al. in 2013, supports the use of short Roux limbs; in 70 patients for whom Roux limbs 20 cm long were created, the incidence of complications was like that reported for other studies, and stenosis of the anastomosis occurred later in 10% of cases. The main advantage Felder saw in short Roux limbs is in facilitating ERCP, which is easier to perform through a shorter than a longer Roux limb; he described a 100% success rate for using ERCP for diagnosing the complications of Roux-en-Y anastomoses and a high rate of success for the therapeutic use of ERCP [12]. Similarly, successful endoscopic treatment for stenosis of the hepaticojejunal anastomosis by balloon enteroscopy in Roux limbs 20 cm long was described in a case study by a team of gastroenterologists from Brno in the Czech Republic in 2010 [13]. The classical surgical textbooks such as "Surgery of the Liver, Biliary Tract and Pancreas" published in 2007 and "Mastery of Surgery" published in 2006, recommend Roux limbs lengths around 40-50 cm [14,15]. In a study published in 2011, Marangoni reports on the use of longer Roux limbs. Five patients with recurrent cholangitis after creating a hepaticojejunal anastomosis underwent surgical revision to lengthen the Roux limbs from 40 to 70 cm [16]. This resulted in complete remission of cholangitis in three of the patients. The other two patients went on to have less severe attacks of cholangitis. In their 2014 case report Tsalis et al. describe the successful treatment of recurrent cholangitis by constructing a 100 cm long Roux limb in a patient 15 years after a Whipple procedure for an adenocarcinoma of the head of the pancreas.

Conclusion

Creating a biliary enteric anastomosis is indicated in otherwise refractory obstruction of the distal common bile duct of benign, malignant or iatrogenic origin. The second most common late complication is recurrent postoperative cholangitis. Most of such cases occur in combination with stenosis of the biliary enteric anastomosis. In cases where stenosis is not present, the length of the Roux limb should be considered as a cause of the recurrent infections.

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