Hybrid Surgical and Endoscopic Transjejunal ERCP approach for Intra-Hepatic Biliary Stones Secondary to Recurrent Roux-En-Y Hepaticojejunal Anastomotic Strictures

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Abstract

Hepaticojejunal anastomotic stricture can result in intra-hepatic biliary stones and recurrent cholangitis. In the presence of altered small bowel anatomy, therapeutic ERCP has a low success rate. In patients with gastric bypass, there is increased expertise and efficiency in performing ERCP through transgastric access. Transjejunal access is an alternative in the absence of a gastric remnant.

We present a case of a 30-years-old female with recurrent cholangitis and intra-hepatic biliary stones resulting from hepaticojejunal anastomotic stricture. The presence of severe adhesions between jejunal loops resulted in failure of double balloon enteroscopy assisted ERCP. A hybrid surgical-endoscopic approach via transjejunal enterotomy allowed access to hepaticojejunal anastomotic stricture which was dilated with through the scope balloon and subsequent removal of multiple biliary stones.

A hybrid surgical-endoscopic transjejunal ERCP is a feasible approach after failure of other conventional endoscopic approaches to manage patients with hepaticojejunal anastomotic strictures.

Keywords: Transjejunal ERCP; Roux-en-Y; Hepaticojejunal anastomotic strictures; Intra-hepatic biliary stones

Introduction

Strictures of bilioenteric anastomosis occur in 2.6% to 30% of patients [1–4]. The mean time for stricture development varies between 13 and 21.6 months, being more frequent in proximal reconstructions, after iatrogenic injury and in younger patients [1,3,4]. Bilioenteric anastomotic strictures have been described in up to 85% of all patients with intrahepatic lithiasis, being more frequent in the left biliary duct and result in recurrent cholangitis, and possible liver atrophy and cholangiocarcinoma [5–7].

Conventional ERCP has success rates of 90% to 95% in the management of biliary duct lithiasis [8]. In patients with altered bowel anatomy with Roux-en-Y reconstruction, the therapeutic success rate of Double Balloon Enteroscopy (DBE) assisted ERCP decreases to around 70% [9].

We describe the use of a hybrid surgical and endoscopic technique via transjejunal approach to manage hepaticojejunal anastomotic stricture and intrahepatic biliary stones in a patient with a Roux-en-Y reconstruction. This hybrid technique is a feasible alternative when DBE assisted ERCP fails.
Case Presentation

We present the case of a 30-year-old female patient from Guinea-Bissau, who underwent at 2 years of age, surgical excision of a hepatic hamartoma (25 cm × 20 cm), complicated with left hepatic duct fistula, managed with a Roux-en-Y Hepaticojejunal (RYHJ) anastomosis of the right and left hepatic ducts.

The patient developed recurrent cholangitis from the age of 13 and was transferred to Portugal for medical management at 28 years of age. Evaluation with Magnetic Resonance Cholangiopancreatography (MRCP) revealed indefinite anastomosis, Intra-Hepatic Bile Duct (IHBD) dilation and several intraluminal filling defects in both left and right lobes (Figure 1).

She was hospitalized with obstructive jaundice (total bilirubin 14 mg/dL) and underwent urgent DBE-ERCP. The hepaticojejunal anastomosis was identified and strictures of both right and left hepaticojejunal anastomosis with anastomotic orifices measuring 4 and 2 mm were observed. Through the scope balloon dilation up to 9 mm of both strictures was performed with incomplete removal of left hepatic duct calculi (2 residual calculi in the proximal left hepatic duct, inaccessible to the stone removal balloon catheter) (Figure 2).

The patient maintained cholestatic jaundice and a new MRCP confirmed persistence of IHBD dilation and IHBD lithiasis in both left and right lobes (Figure 3). A second DBE-ERCP was performed 4 months later and a recurrent stricture of the right and left hepaticojejunal anastomosis measuring 5 mm and 2 mm were observed (Figure 4), which were again dilated 4 with TTS balloon till 10 mm and 8 mm, respectively. At the end of the second ERCP, there were no apparent intra-hepatic biliary repletion defects on cholangiography. After the procedure there was improvement of total bilirubin which however persisted above 6 mg/dL.

The patient was lost to follow-up, but 16 months later, was hospitalized with acute cholangitis with a total bilirubin of 10.2 mg/dL. An urgent DBE assisted ERCP was performed but access to the biliointestinal anastomosis was this time not possible probably due to small bowel adhesions. During the procedure it was possible to identify the biliopancreatic limb and this was tattooed with India ink to facilitated identification for subsequent procedures.

After evaluation in a multidisciplinary meeting, it was decided to perform a hybrid open surgical-endoscopic technique to manage the patient.

The presence of multiple adhesions in the final 10 cm of the hepatobiliary limb and a total length longer than 150 cm precluded manual guidance of a colonoscope introduced orally. Therefore we opted for an enterotomy with stay sutures, 10 cm away from the hepaticojejunal anastomosis to enable endoscopic access (Figures 5-7). The maintenance of a sterile field was warranted with surgical drapes around the enterotomy, a laparoscopic camera drape around the endoscope and the gastroenterologist wearing sterile gloves and
This technique allowed diagnostic and therapeutic approach of a right duct hepatic stenosis (5 mm) with balloon dilation (up to 11 mm) and calculi removal from right IHBD (Figure 8, 9). The left IHBD had no apparent filling defect on cholangiography.

Due to persistence of jaundice a new MRCP was performed which showed evidence of left IHBD stones (Figure 10). The patient was re-operated 3 weeks later, repeating the hybrid approach. The presence of the India ink tattoo enabled an easier identification of the biliopancreatic limb in the presence of firm and dense adhesions. Transjejunal endoscopic ERCP confirmed tight left hepaticojejunal anastomotic stricture (Figure 11) and allowed dilation with a TTS balloon until 10 mm and multiple calculi removal from left IHBD (Figure 12, 13). A cholangioscopy with a pediatric endoscope excluded the presence of residual lithiasis in IHBD. An intra-procedural liver biopsy ruled out secondary biliary cirrhosis due to recurrent hepaticojejunal anastomotic strictures.

The patient was discharged clinically well but due to persistent total serum bilirubin values of 3 mg/dL, MRCP was repeated and it showed 3 peripheral left IHBD calculi with left IHBD persistent dilation.
Their peripheral intrahepatic location precluded cholangioscopic approach and left hepatectomy has been planned if she develops recurrent cholangitis.

**Discussion**

Endoscopic treatment is currently the gold standard for management of benign biliary strictures approach, with percutaneous or surgical interventions being indicated for those patients with failed endoscopic procedures [10-12].

Surgical treatment of biliointestinal anastomotic stricture and secondary intra-hepatic biliary stones is complex requiring expertise from high volume centers and despite this is often associated with considerable morbidity including intra-abdominal collections, biliary/anastomotic fistulas and recurrent strictures [13-18].

In patients with RYHJ stricture and recurrent intrahepatic lithiasis, sub parietal or subcutaneous hepatojejunal loop allows permanent and easier access to biliary instrumentation with minimal morbidity [6,7].

ERCP is one of the most effective diagnostic and therapeutic modalities in patients with biliary disease [19]. In the presence of surgically altered gastrointestinal anatomy with a long Roux-en-Y loop, the use of pediatric or adult colonoscopes or enteroscopic assisted ERCP is recommended [19-24]. In patients with altered anatomy ERCP is challenging due to 1) difficulty in identification of the biliopancreatic limb 2) challenges in identification and cannulation of the papilla/biliointestinal anastomosis from an altered position 3) therapeutic limitations imposed by the lack of side view, elevator and compatible devices usually designed for standard ERCP [21-24].

Identifying the biliopancreatic limb can be complex, especially in the presence of adhesions but, as in the present report, India ink tattoo can help overcome this difficulty [25,26]. Saleem et al. [26] used transoral endoscopic insertion to identify the afferent limb.

Long total limb length and sharp angulations secondary to adherences can preclude ERCP success and increase the risk of complications [19,22,24,27].

Shorter Roux-en-Y reconstructions increase the success rates of access to the papilla/biliointestinal anastomosis. The therapeutic success rate of enteroscopic assisted ERCP drops from 88% to 33% with total Roux + biliopancreatic limb length under 150 cm or between 150 cm to 250 cm, respectively [28].

Percutaneous transhepatic biliary drainage alone or with endoscopic rendezvous is an alternative and useful technique for emergent biliary decompression in patients with IHBD dilation [19,24,27].

Schapira et al. [29], first described in 1975 an endoscopy and retrograde cholangiography via gastrostomy, resulting in a shorter route to the papilla/biliointestinal anastomosis and overcoming proximal anatomical obstacles [30-32]. Combined surgical and endoscopic approach either open or laparoscopic, enable therapeutic success in the presence of complex altered anatomy [21]. The increase in the incidence of morbid obesity and gastric bypass surgery has resulted in more frequent transgastric ERCP procedures which are also cost-effective in patients with long Roux + hepatobiliary limb length [21,28,33,34]. A recent multicentric study with 579 laparoscopy-assisted ERCP after gastric bypass, revealed success rates comparable with standard ERCP in normal anatomy patients, with total procedure time of 152 min [33].

EUS-directed transgastric or transenteric ERCP with lumen-apposing metal stent is gaining popularity [35], but it remains technically challenging with potentially serious adverse events, such as stent migration and perforation and can be associated with weight regain in RYGB for morbid obesity [36,37].

Surdeanu et al. [38] report a case where dense adhesions precluded gastric remnant gastroscopy construction, resulting in the...
need for a transjejunal access for choledocholithiasis resolution with laparoscopic assisted ERCP.

Lopes et al. [39] describe a patient with Roux-en-Y partial gastrectomy with symptomatic cholecystectomy secondary to sphincter of Oddi dysfunction, with a failed approach either with conventional ERCP either with percutaneous transhepatic endoscopic rendezvous. In this case, a hybrid endoscopic laparoscopic assisted technique via biliopancreatic limb enterotomy allowed the access to the papilla using a 15 mm trocar.

Transjejunal ERCP allows overtaking anatomical barriers like long limb distances or tortuous bowel secondary to adhesions. It also has the advantage of allowing the use of conventional ERCP endoscopes and all its armamentarium [33,34,38,40].

A review of the literature identified 15 cases of transjejunal ERCP with open or laparoscopic approach, summarized in Table 1 [11,25,26,38,41-49]. More than 70% of the patients where ≤ 50 years of age with ≥ 35% having altered anatomy after benign conditions. A laparoscopic approach was possible in 73% of the cases despite the presence of adhesions.

While using a laparoscopic approach, a mini-laparotomy to exteriorize the enterotomy site was used in 45% of the cases, with the intention of avoiding unnecessary intra-abdominal contamination risk [41].

Open surgery is safer than laparoscopy in the presence of dense/tight bowel adhesions which are frequently the cause of acute bowel angles that preclude the use of conventional ERCP [42,43]. Trocar placement can be hazardous and result in organ perforation. Abbas et al. [33] have reported 3 laparoscopy related perforations, with one resulting in multi-organ failure and death. The open approach has the advantage of tactile feedback and is extremely useful for manual endoscopic guiding and bowel telescoping [11,38].

All patients in the reviewed literature recovered after transjejunal ERCP, and most were discharged after 3 to 7 days. There is only one case mentioning associated morbidity.

**Conclusion**

In conclusion, we believe that a hybrid surgical-endoscopic transjejunal ERCP is a safe technique that can be useful after failure of conventional endoscopic techniques including DBE assisted ERCP in managing patients with RYHJ strictures.

**References**


