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Case Report

Novel case of percutaneous access of afferent limb of Roux-en-Y hepaticojejunostomy for biliary decompression and jejunoplasty in a patient with primary sclerosing cholangitis ☆☆☆

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ABSTRACT

Primary sclerosing cholangitis is a rare condition characterized by multifocal fibrotic bile duct strictures and progressive liver disease. Due to its recurrence even after liver transplantation, an alternative surgical procedure, the Roux-en-Y hepaticojejunostomy, is practiced with positive outcomes. We present a case of a 55-year-old female with history of primary sclerosing cholangitis and Roux-en-Y hepaticojejunostomy approximately 25 years ago who presented to the emergency department with acute cholangitis. Computed tomography of the abdomen revealed a dilated loop of small bowel in the right upper quadrant and mid-abdomen with normal bile duct caliber. Interventional radiology was consulted for percutaneous biliary and Roux limb decompression. Ultrasound was utilized to identify and percutaneously access the dilated afferent jejunal limb. With the help of a T-fastener, the jejunal loop was tacked against the anterior abdominal wall and the system was successfully decompressed with a drain left in place. On follow-up, delayed contrast transit through the Roux limb and a stricture in the native jejunum distal to the anastomosis was identified. Hampering of the downstream flow of bile was noted and this was determined to be the likely cause of the initial episode of cholangitis. The strictured bowel segment was balloon-dilated by interventional radiology. Repeat injection of contrast revealed significant improvement in the caliber of the stenotic segment. At 3 weeks' postprocedure, a follow-up enteroscopy of the bowel was performed through the same percutaneous access site. Using this technique, the patient avoided a major invasive surgical procedure.

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☆ Written consent from the patient obtained by the authors. All attempts to remove identifying information and personal health information (PHI) have been made.

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Introduction

Primary sclerosing cholangitis (PSC) is a rare condition characterized by multifocal fibrotic bile duct strictures and progressive liver disease. PSC occurs in 3%-5% of patients with ulcerative colitis and is associated with a 400 times higher risk of developing cholangiocarcinoma [1,2]. Despite the definitive treatment of liver transplantation, the disease may recur post-transplant [3]. Thus, Sanders et al. first described an alternative surgical procedure in 1949, the hepaticojejunostomy (HJ), which is still practiced with positive outcomes [4]. Roux-en-Y HJ is a surgical procedure performed for benign or malignant strictures, large gallstone burden, bile duct injury, chronic biliary infection, bile duct tumors, and adjunct with liver transplantation [5]. One of the more common complications (10%-30%) of HJ is an anastomotic stricture [6,7].

We present a novel treatment approach in a case of a 55-year-old woman who presented with obstructive jaundice and cholangitis 25 years after HJ. The patient was found to have an isolated benign jejunal stricture distal to the jejunojejunal anastomosis in the native bowel hampering the downstream flow of bile. This stricture was successfully dilated using percutaneous access balloon angioplasty/dilation.

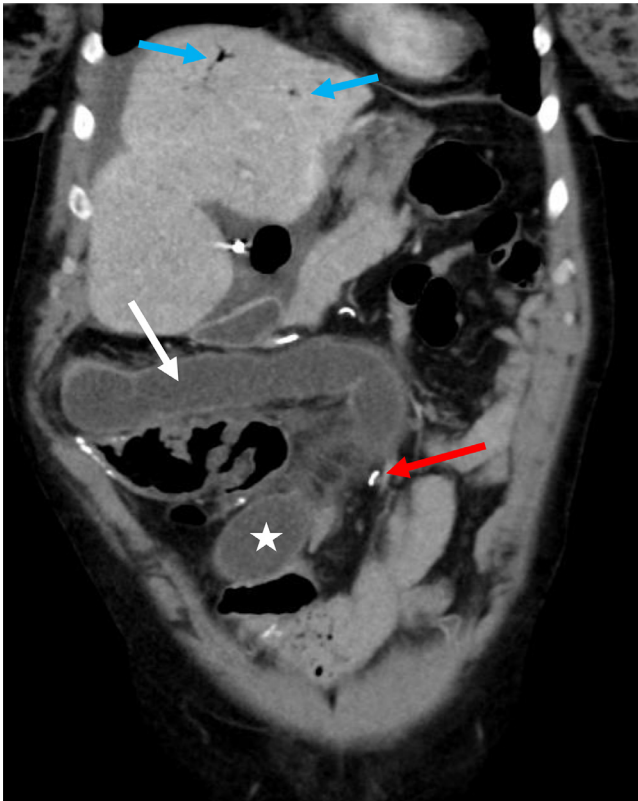


Fig. 1 – Coronal contrast-enhanced CT abdomen and pelvis reveals dilated Roux limb (white arrow) and proximal jejunum which continues distal (white star) to the surgical staples (red arrow) demarcating her re-anastomosis site.



Fig. 2 – Limited intraprocedural ultrasound revealing dilated loop of small bowel which was subsequently percutaneously accessed.



Fig. 3 – Fluoroscopy images in the left oblique projection after the injection of contrast into the roux limb demonstrates a focal stenotic or strictured segment of bowel.



Fig. 4 – Intraprocedural fluoroscopy images show subsequent balloon dilatation of the stenotic segment of small bowel.

Case presentation

A 55-year-old Caucasian woman presented to the emergency department for sudden onset right-sided abdominal pain, projectile nonbilious vomiting, and diarrhea. Past medical history is significant for ulcerative colitis and biliary strictures secondary to PSC for which she underwent surgical bile duct resection with Roux-en-Y HJ approximately 25 years ago.

The patient was then transferred to our tertiary hospital for a higher level of care. In the emergency department, she was hypotensive (91/63 mm Hg) and tachycardiac (115 beats per minute). Laboratory tests revealed a total bilirubin level of 4.9 mg/dL, aspartate aminotransferase of 167 U/L, alanine aminotransferase of 128 U/L, alkaline phosphatase of 158 U/L, and white blood cell count of 11,800/mm³. Repeat CT of the abdomen revealed a dilated afferent loop of jejunum, pneumobilia, and the intrahepatic biliary ducts was of normal caliber and decompressed (Fig. 1). The IR team was consulted for percutaneous transhepatic cholangiography and biliary drain placement. On percutaneous transhepatic cholangiography, the intrahepatic biliary ducts were of normal size and appearance; therefore, a decision was made to drain the dilated jejunal loop to decompress/relieve the biliary system.

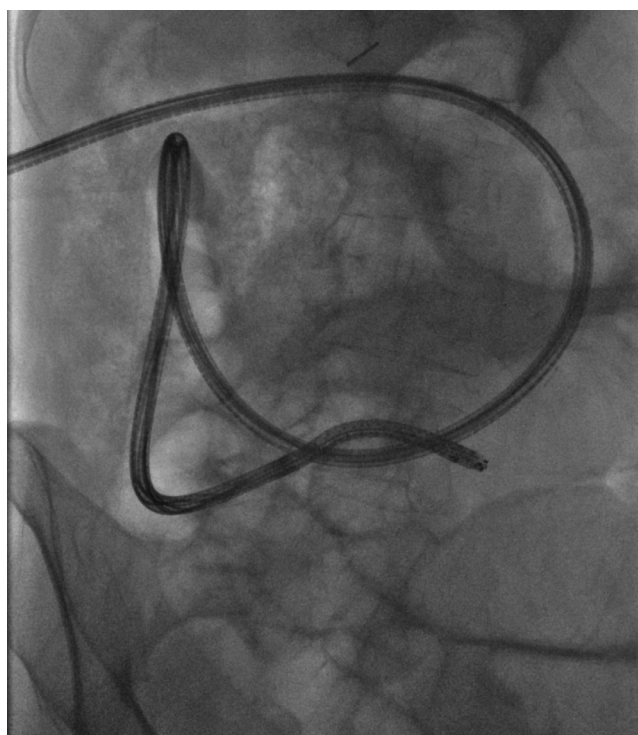
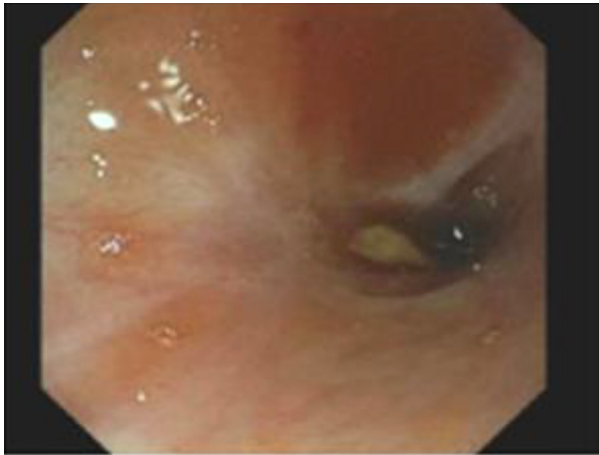


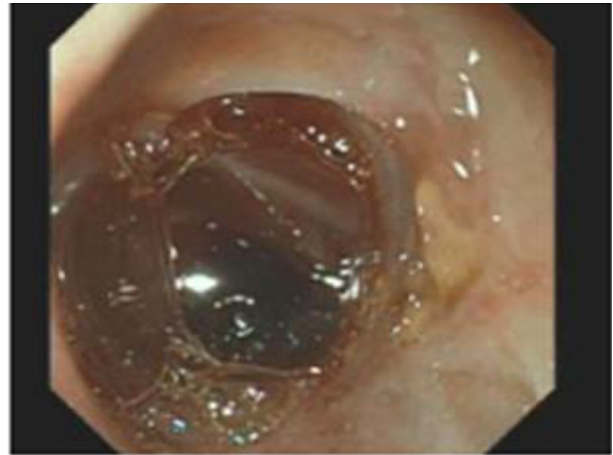
Fig. 5 – Fluoroscopic images demonstrate small bowel enteroscopy being performed through the percutaneous opening created by interventional radiology for decompression.

Ultrasound was utilized to identify and percutaneously access the dilated afferent jejunal limb. With the help of a T-fastener, the jejunal loop was tacked against the anterior abdominal wall. A 19-gauge needle was then introduced into the jejunal loop. Aspiration revealed thick, dark green, bilious-appearing fluid. A 0.018 inch wire was advanced into the jejunum and a 6-French catheter was placed with the location confirmed with contrast injection. A 0.035 inch Amplatz (Merit Medical Systems, South Jordan, UT) wire was advanced and a new 8.5-French resolve catheter was placed over the wire within the jejunum. The catheter was connected to a bellows bag and the patient was asked to follow-up in 3 weeks.

The patient started developing biliary leakage and mild right upper quadrant abdominal pain just short of 3 weeks after the procedure. The patient was taken back to the fluoroscopy suite and both intraprocedural ultrasound (Fig. 2) and injection of contrast showed the jejunal roux limb required decompression. The catheter was then removed over a Bentson wire and a long vascular sheath was passed over the wire into the proximal roux limb. After further investigation, it became evident that there was no stricture at the HJ site. Careful observation of the jejunal peristalsis revealed a short segment stenosis distal to the afferent and roux limb anastomosis of the patient's native jejunum (Fig. 3). However, endoscopic evaluation of the site was technically difficult due to postoperative changes. Under ultrasound guidance, a 19-gauge needle was used to gain access to the bowel. Then, using a 0.018-inch



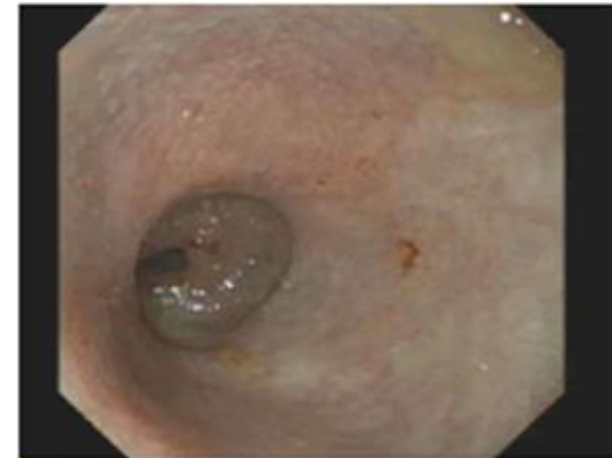
1 Jejunum



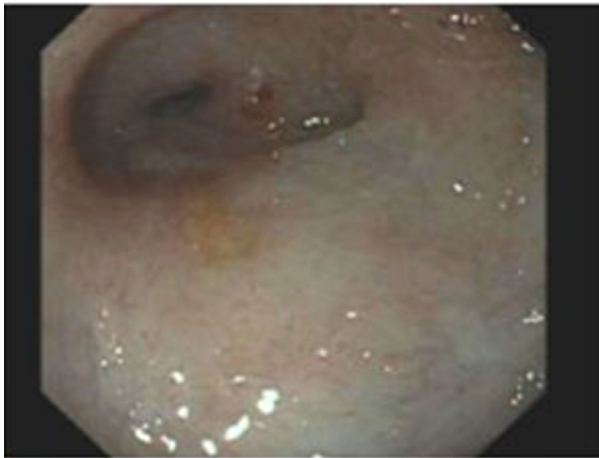
2 Jejunum



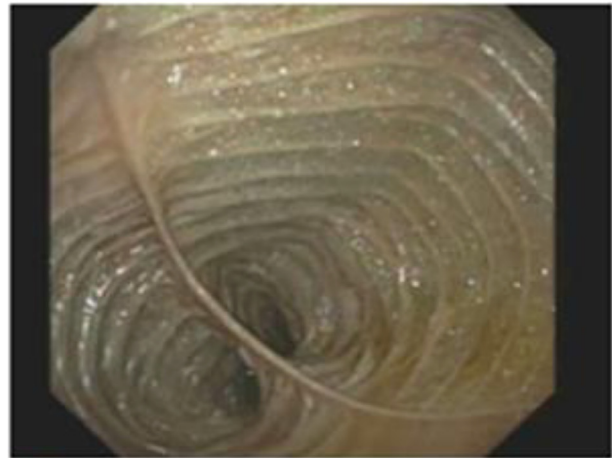
3 Jejunum



4 Jejunum



5 Jejunum



6

Fig. 6 – Roux limb and jejunal enteroscopy photographs.

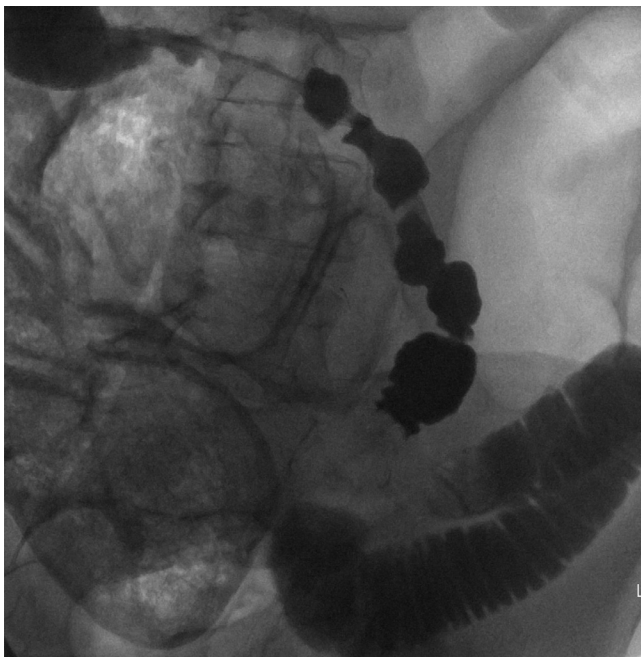


Fig. 7 – Follow-up imaging approximately 2 months later did not demonstrate further evidence of persistent stenosis or stricture of the small bowel.

wire, a glide catheter and sheath were then advanced distal to the narrowed segment. The area of stricture was initially dilated with a 10 mm × 40 mm balloon and subsequently by a 14 mm × 40 mm balloon (Fig. 4). Repeat injection of contrast revealed significant improvement in the caliber of the stenotic segment. A 14-French internal/external biliary drain was placed with the proximal holes in the afferent limb and distal holes distal to the previously dilated area of stricture. A catheter was placed for external biliary drainage, which was then capped after 2 hours to begin internal biliary drainage.

After 3 weeks following the dilation procedure, small bowel endoscopy through the percutaneous access site was performed (Fig. 5). Endoscopy revealed normal peristaltic contractions in the distal bowel as well as mild jejunal inflammation, characterized by erosions and erythema (Fig. 6). Some areas of mild luminal narrowing, which were not related to any anastomosis, had been adequately dilated by the IR balloon dilation. No evidence of persistent jejunal stricture was observed. The drain was capped and removed after 1 week. Per electronic medical records, the patient has not had any adverse effects from the balloon dilation or small bowel endoscopy through the percutaneous site (Fig. 7).

Discussion

Roux-en-Y HJ is a definitive surgical procedure commonly performed for malignant or benign strictures, large gallstone burden, bile duct injury, chronic infection, common bile duct or

hepatic duct tumors, and during liver transplantation. The procedure in most cases of PSC involves resection of the affected bile ducts complemented with a cholecystectomy and the creation of a jejunal “blind loop” to drain bile from the liver to the proximal jejunum. The Roux limb is either created to be “short” (approx. 20 cm) or “long” (approx. 75 cm). The long limb Roux-en-Y is thought to have a lower rate of acute cholangitis due to a reduced risk of biliary reflux [8]. This procedure is generally paired with the creation of a cutaneous anastomosis with tattooing of the skin at the surgical site to facilitate future retrograde percutaneous access to the bile ducts as endoscopic approach is difficult through a long Roux limb.

Recent studies have not shown a significant difference in complication rates for short versus long Roux limb, despite the rising occurrence of interventional procedures [8]. Early complications from surgery are intra-abdominal collections (25.8%), bile leak (19.2%), wound infection (5.8%), and internal hemorrhage (1.7%) [9]. Late complications are HJ anastomotic stricture (11.6%), recurrent cholangitis (14.2%), secondary biliary cirrhosis (6.7%), incisional hernia (3.3%), and, in less than 3% of patients, duodenal ulcer and intrahepatic stones [9].

Benign strictures or those secondary to anastomosis were previously treated with surgery. Surgery, especially those patients who require multiple resections, may develop short bowel syndrome with secondary malnutrition [10]. Baars et al. published a systematic review revealing that patients treated with enteroscopic double-balloon assisted dilatation oftentimes (83%) did not require surgery due to relapse [11]. Despite this, almost half of all patients with inflammatory bowel disease who undergo a stricturoplasty will require re-dilatation [11].

As in the case of the presented patient, IR was able to provide both therapeutic benefit and postoperative percutaneous access for enteroscopy. Gaining access to the strictured bowel was necessary for patient management as in our experience, a 19-gauge needle was adequate for both IR and gastroenterology intervention. The size of the wire and French catheters may vary depending on the caliber of the bowel; however, it is best practice to use a smaller French catheter and progressively increase the catheter diameter. Further evaluation of this treatment approach could promote a treatment that is less invasive, safer, and more versatile than surgical revision.

Conclusion

In this context, we propose that percutaneous ultrasound guidance is an alternative approach for accessing a strictured Roux limb HJ and subsequent benign stricturoplasty. Treatment may be performed by interventional radiological techniques, especially if the access to the site is technically complicated. This technique is relatively safe, easy, and quick as compared to re-operation for strictured HJ or bowel. Re-operation is associated with increased morbidity and mortality, in addition to being time consuming, with a continued high rate of recurrence.

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