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Case Report

Totally percutaneous rendezvous technique for the treatment of complete biliary obstruction after liver transplant ☆,☆☆

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ABSTRACT

Biliary complications, including biliary stricture and obstruction, remain a major cause of morbidity and mortality after living donor liver transplantation. In these patients the biliary system may not be accessible by endoscopic approach due to Roux-en-Y hepaticojejunostomy, and a percutaneous approach may be considered to avoid surgical interventions. When there is complete biliary obstruction, the conventional percutaneous approaches may not be successful to cross the hepaticojejunostomy anastomosis. In this study, a totally percutaneous rendezvous technique was used to create a neo-biliary-enteric tract using a transbiliary Rosch-Uchida needle in a patient with complete biliary obstruction and Roux-en-Y anastomosis after a split liver transplant. A biodegradable stent was placed after recanalization with long-term patency on follow up.

Introduction

Endoscopic repair is limited in patients with previous history of bowel altering procedures like Roux-en-Y surgery, because an endoscopic access to the biliary tree may be challenging with a success rate of 33%-67% [1]. When repair of biliary stenosis and biliary leaks fail endoscopically or percutaneously, a combined percutaneous-endoscopic rendezvous technique can be used as an alternative. Rendezvous techniques utilize 2 individual access pathways that separately reach 1 common site to create a through and through access. This is achieved by passing a snare catheter through one of the access sites and sinching the trailing end of a guidewire passed through the second access site. This technique is classically achieved with one endoscopic access and 1 percutaneous access to simultaneously access the biliary tree for treatment. A few case studies have reported successful utilization of totally percutaneous rendezvous techniques to repair biliary leaks or stenosis in patients with altered bowel

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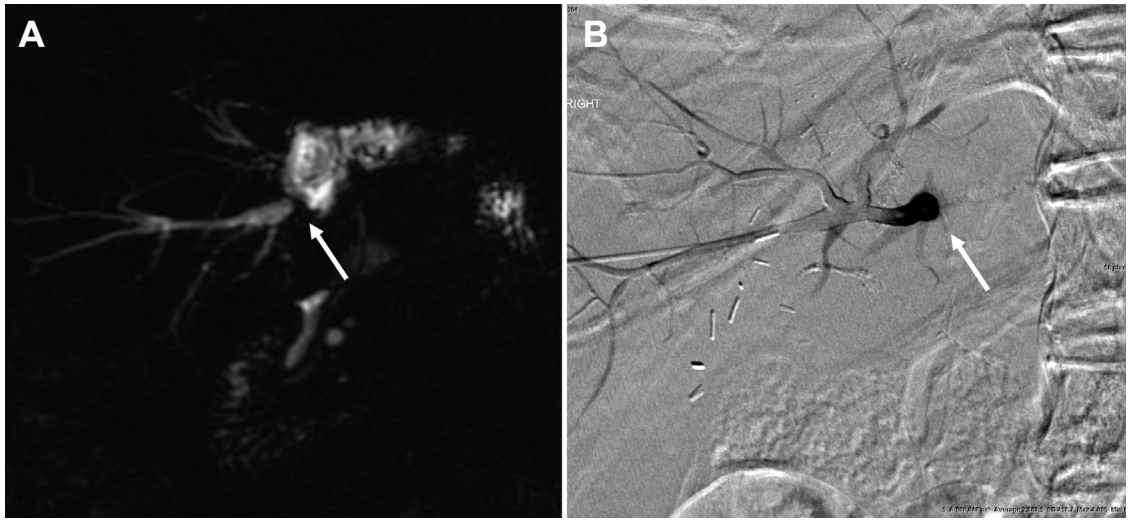

Fig. 1 – Thick slap magnetic resonance cholangiopancreatography image (A) shows complete biliary anastomotic obstruction (white arrow). Percutaneous transhepatic cholangiography (B) confirmed complete biliary obstruction (white arrow) with no contrast passing to the small bowel.

Table 1 – Liver function tests before and after biliary stent placement.

	Before biliary stent	After biliary stent
Total bilirubin (mg/dL)	3.3	0.5
Direct bilirubin (mg/dL)	2.2	0.2
Alkaline phosphatase (U/L)	500	149
Aspartate transaminase (U/L)	96	25
Alanine aminotransferase (U/L)	215	28

anatomy [2,3], or to restore the hepaticojejunostomy anastomosis after pediatric liver transplant [4,5]. In this study, we present a case of totally percutaneous rendezvous technique for treatment of complete biliary obstruction in an adult patient with Roux-en-Y anastomosis after a split liver transplant.

Case report

A 61-year-old male with a past surgical history of Roux-en-Y surgery and split liver orthotopic liver transplant transferred to our hospital from a nursing home facility with fever and chronic generalized abdominal pain. Postoperatively, the liver transplant was complicated by hepatic vein outflow stenosis treated with vascular stent placement and a biliary occlusion (Fig. 1) requiring placement of an indwelling 8 Fr external biliary drain (Boston Scientific, Natick, USA). The liver function tests (LFTs) at presentation were abnormal as summarized in Table 1. Patient had persistent high drain output requiring repeated drain exchanges over the past several months. Percutaneous and endoscopic attempts to internalize the biliary drain or place a biliary stent was unsuccessful due to complete occlusion of the biliary anastomosis and fail to access hepaticojejunostomy via the Roux limb, retrospectively. Interventional radiology was consulted for another attempt to internalize the biliary drain. Given the complete obstruction of the biliary tract, the patient was considered a candidate for a totally percutaneous rendezvous technique for creation of a neo-biliary-enteric tract and biliary stent placement.

Procedural details

The patient was brought to the IR unit. The procedure was performed in a supine position under general anesthesia. Initial fluoroscopy images showed an appropriate positioning of the existing 8 French external biliary drain (Boston Scientific, Natick, USA) which was exchanged for a 10 French sheath (Terumo Medical Corporation, NJ) under fluoroscopic guidance. Percutaneous cholangiography was performed through the sheath which demonstrated complete biliary anastomosis obstruction (Fig. 1). Attempt with convention guidewire and catheter recanalization using a 5 French angled glide catheter and an 0.035-inch guidewire (both from Terumo Medical Corporation, NJ) across the biliary occlusion was unsuccessful.

Transabdominal enteric roux-limb access

Review of the preprocedural computed tomography (CT) showed the Roux limb of the hepaticojejunostomy in the right upper quadrant. Under ultrasound and fluoroscopic guidance, a 21-gauge Accustick needle (Boston Scientific, MA, USA) was advanced into the small bowel loop and intraluminal access was confirmed with contrast injection. Following serial dilation, an 8 Fr pigtail catheter (Boston Scientific, Natick, USA) was placed into the jejunal Roux limb. The position of the jejunal catheter and its relation to the biliary anastomosis and biliary catheter was evaluated with a CT scan (Fig. 2).

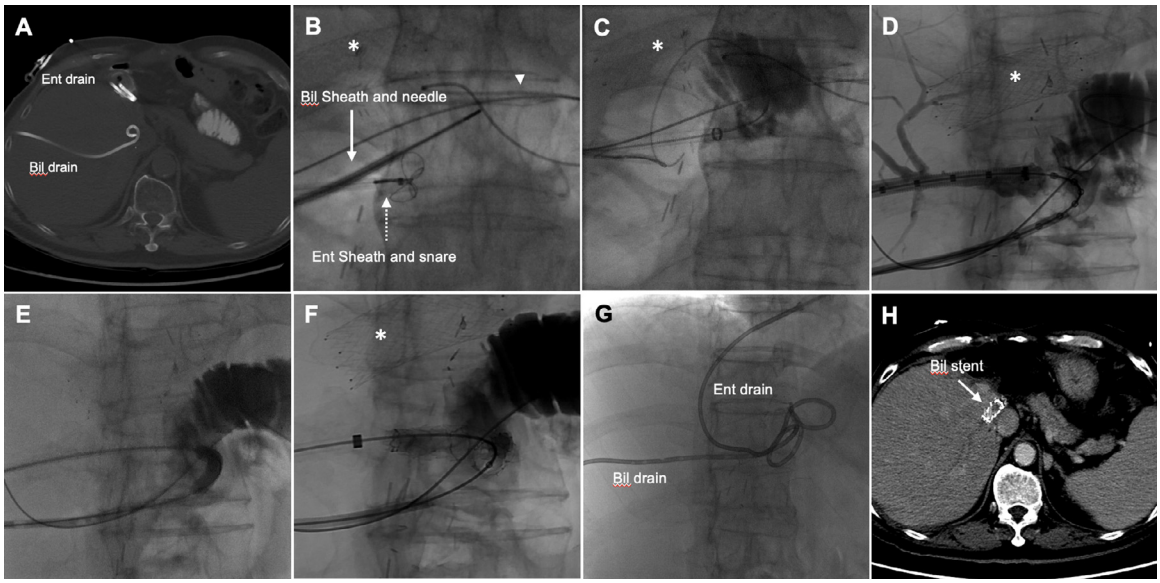

Fig. 2 – A noncontrast CT of the abdomen (A) shows an external biliary drain and an enteric drain in place. Two sheaths were placed through the biliary (solid white arrow) and enteric (dashed white arrow) accesses (B). A safety wire was placed next to the enteric sheath in a tandem fashion (arrowhead, B). A neo-biliary-enteric tract was created using a Rosch-Uchida access needle via the biliary sheath (B) and a wire advanced into the bowel (C). A snare was used to capture the trans-biliary wire (C) to establish a through and through access (D). The biliary-enteric tract was dilated using 6 x 60 mm balloon (E) and a 10 x 60 mm biliary stent was placed (F). An internal-external biliary catheter was placed through the internal biliary stent (G). A follow up CT 3 years after procedure (H) demonstrated appropriate positioning of the biliary stent (partially visualized) without biliary ductal dilation. Star shows a stent in the right hepatic vein (B-F). Bil = biliary; Ent = enteric.

Neo-biliary-enteric conduit creation

Next, the jejunal catheter was exchanged for a 6 Fr sheath (Terumo Medical Corporation, NJ) and a 15 mm EN snare (Merit Medical Systems, Inc.) was placed into the Roux limb with a safety wire in a tandem fashion (Fig. 2). Through a transhepatic 10 Fr biliary sheath, a Rosch-Uchida access needle and metal cannula (Cook Medical, IN, USA) were advanced to the area of the obstruction under fluoroscopic guidance. Air was inflated into the Roux limb through the 6 Fr sheath and the Rosch Uchida needle was advanced at a 60-degree angle anteriorly towards the Roux limb access. Contrast injected through the access needle to ensure intra-enteric access and an 0.035-inch stiff glidewire (Terumo Medical Corporation, NJ) was advanced into the bowel. The trans-biliary wire was then captured using the snare loop from the percutaneous Roux limb access to establish a through and through access (Fig. 2).

A 6 × 60 mm balloon (Boston Scientific, Marlborough, Massachusetts) was used to dilate the tract and a 10 × 60 mm Viabahn covered stent (Gore Medical, DE, USA) was placed from the transbiliary access. Post-stent dilation was performed with a 7 × 60 mm balloon (Boston Scientific, Marlborough, Massachusetts). An 8 Fr internal-external biliary catheter (Boston Scientific, Natick, USA) was placed through the internal biliary stent. The final cholangiogram with the biliary catheter in place showed an excellent flow through the biliary stent and into the bowel without occlusion (Fig. 2). The biliary catheter was capped and secured to the skin. The 6 Fr sheath from the percutaneous Roux limb access was exchanged for an 8 Fr pigtail drain (Boston Scientific, Natick, USA) and was capped to prevent risk of bowel leakage. The enteric catheter was secured to the skin.

Patient was followed clinically as outpatient. The LFTs improved 2 weeks after the procedure and the biliary catheter was removed. The percutaneous enteric catheter was kept in place until tract maturation occurred to prevent intraabdominal leak and infection and was removed 6 weeks after the procedure. A CT of the abdomen and pelvis during an unrelated hospital admission 3 years after the initial procedure confirmed appropriate positioning of the biliary stent.

Discussion

Biliary complications remain a major cause of morbidity in liver transplant patients and may occur in 5%-15% of diseased donor liver transplants (DDLTs) and in 28%-32% of living donor liver transplants (LDLTs) [6]. In DDLTs a direct duct-to-duct anastomosis is created, and the biliary interventions is routinely performed by endoscopic retrograde cholangiopancreatography (ERCP). In some of the LDLTs and split liver transplants due to Roux-en-Y hepaticojejunostomy the biliary system may not be accessible by ERCP. In these cases, with a failed endoscopy, percutaneous transhepatic cholangiography (PTC) is the first line to diagnose and treat biliary complications. In patients with biliary strictures a variety of percutaneous procedures may be offered if the stricture can be crossed such as

external biliary placement, balloon dilation or laser incision of the biliary stricture, external-internal biliary drain placement, and retrievable covered stent placement across a stricture [7]. In cases where there is complete biliary obstruction or severe stenosis, and the stricture cannot be crossed, a combined Rendezvous technique may be helpful. Conventionally, in a combined percutaneous-endoscopic Rendezvous technique a percutaneous access to the biliary system and crossing the stenosis by wire into the bowel is combined by endoscopic balloon dilation and placement of stent across the anastomosis. Although in some patients with altered bowel anatomy including selected patients with LDLTs and split liver transplants, an endoscopic access to the Roux limb may fail. In these selected cases, similar to our patient in this study, a totally percutaneous Rendezvous technique may be considered.

There are a few case reports in which a totally percutaneous Rendezvous technique has been used to treat biliary strictures [2], or bile injury and leakages [2,3], or to restore the hepaticojejunostomy anastomosis after pediatric liver transplant [4,5]. More recently, percutaneous cholangioscopy-assisted guidewire placement has been reported in post-liver transplant patients with severe biliary anastomotic strictures and failed endoscopic and conventional percutaneous approaches [8,9]. The technical success rate of the cholangioscopy-based technique has been reported up to 60% [9]. In our patient, a totally percutaneous Rendezvous technique was utilized to create a neo-biliary-enteric tract. The biliary stent placed in our patient remained patent in the last visit 3 years after the procedure. These novel percutaneous approaches are helpful to avoid surgical repair in the perioperative period and to prevent undesirable significant morbidities [10].

Conclusion

In summary, a successful case of neo-biliary-enteric tract creation using a totally percutaneous Rendezvous technique with long-term patency was described in this study. This percutaneous approach may overcome the need for surgical repair in selected post-liver transplant patients when percutaneous and endoscopic approaches are unsuccessful.

REFERENCE

[1] Lopes TL, Baron TH. Endoscopic retrograde cholangiopancreatography in patients with Roux-en-Y anatomy. J Hepatobiliary Pancreat Sci 2011;18:332–8.
[2] De Robertis R, Contro A, Zamboni G, Mansueto G. Totally percutaneous rendezvous techniques for the treatment of bile strictures and leakages. J Vasc Interv Radiol 2014;25:650–4.
[3] Meek J, Fletcher S, Crumley K, Culp WC, Meek M. Percutaneous rendezvous technique for the management of a bile duct injury. Radiol Case Rep 2018;13:175–8.
[4] Huespe PE, Oggero S, de Santibanes M, et al. Percutaneous patency recovery and biodegradable stent placement in a totally occluded hepaticojejunostomy after paediatric living donor liver transplantation. Cardiovasc Intervent Radiol 2019;42:466–70.
[5] Miraglia R, Luca A, Maruzzelli L, et al. Percutaneous recanalization of an occluded hepatico-jejunostomy, using Colapinto needle, in a two-yr-old patient after partial liver transplantation. Pediatr Transplant 2007;11:676–9.
[6] Ryu CH, Lee SK. Biliary strictures after liver transplantation. Gut Liver 2011;5:133–42.
[7] Chang JM, Lee JM, Suh KS, et al. Biliary complications in living donor liver transplantation: imaging findings and the roles of interventional procedures. Cardiovasc Intervent Radiol 2005;28:756–67.
[8] Martins FP, Ferrari AP. Cholangioscopy-assisted guidewire placement in post-liver transplant anastomotic biliary stricture: efficient and potentially also cost-effective. Endoscopy 2017;49:E283–4.
[9] Woo YS, Lee JK, Noh DH, Park JK, Lee KH, Lee KT. SpyGlass cholangioscopy-assisted guidewire placement for post-LDLT biliary strictures: a case series. Surg Endosc 2016;30:3897–903.
[10] Davidson BR, Rai R, Nandy A, Doctor N, Burroughs A, Rolles K. Results of choledochojejunostomy in the treatment of biliary complications after liver transplantation in the era of nonsurgical therapies. Liver Transpl 2000;6:201–6.