Totally Percutaneous Rendezvous Techniques for the Treatment of Bile Strictures and Leakages

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ABSTRACT

Some challenging pathologic conditions of the biliary tract cannot be treated with endoscopy alone, and a combined approach with rendezvous techniques is frequently needed. Three different totally percutaneous rendezvous techniques were successfully applied in three cases. The rendezvous techniques were performed either with bilateral catheterization of bile ducts to treat a challenging type IV biliary stenosis and iatrogenic biliary damage or with biliary catheterization and percutaneous puncture of the anastomotic loop to treat a biliodigestive anastomosis failure with bile leakage.

ABBREVIATIONS

BC = biliary confluence, CBD = common bile duct, PTBD = percutaneous transhepatic biliary drainage, PTC = percutaneous transhepatic cholangiography, RPBD = right posterior bile duct

Rendezvous techniques are performed using two separate access pathways to reach one common site, with subsequent capture of the trailing end of one access wire with a snare catheter positioned through the second access site. Combined rendezvous techniques can be used as an alternative to treat challenging cases of biliary stenosis and bile leakages when endoscopic or percutaneous access to the biliary system fails. These techniques can be used to treat inflammatory or neoplastic biliary stenosis (1–3) or to restore the anatomic continuity of the biliary tree (4–6) after iatrogenic damage. Generally, percutaneous access aids the endoscopic approach; percutaneous placement of a guide wire allows guidance for endoscopic cannulation and further therapy. Rendezvous techniques do not always involve the endoscopy team; in some instances, after percutaneous access has been obtained, biliary interventions may be performed with rendezvous techniques that do not require endoscopy. We describe applications of three different totally percutaneous rendezvous techniques to treat a challenging neoplastic stenosis of the biliary confluence (BC), an iatrogenic biliary transection with bile leakage, and a complete failure of a bilioenteric anastomosis.

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CASE REPORTS

Case 1

A 67-year-old woman with a hilar cholangiocarcinoma (Bismuth type IV) was referred to the interventional radiology unit to undergo bilateral percutaneous transhepatic biliary drainage (PTBD) to relieve jaundice after a failed attempt at endoscopic drainage. Before the procedure, the patient's serum bilirubin level was 18 mg/dL. The patient had pruritus secondary to hyperbilirubinemia and fever and right upper quadrant pain secondary to cholangitis.

The intrahepatic bile ducts were markedly dilated on percutaneous transhepatic cholangiography (PTC). The percutaneous crossing of the hilar stenosis by means of a combined use of a 0.035-inch, 150-cm-long, angled hydrophilic wire (Radifocus Guide Wire M; Terumo, Tokyo, Japan) and a 5-F, 70-cm-long, nonbraided straight catheter (C5F70D; Ab Medica, Milano, Italy) was feasible only from the right side (**Fig 1a**), despite many repeated attempts at bilateral crossing. It was important to obtain bilateral drainage because incomplete drainage is usually associated with cholangitis and sepsis (7).

We performed an "anatomic" rendezvous technique—so named because it employs normal anatomic access pathways, such as intrahepatic bile ducts, to reach the

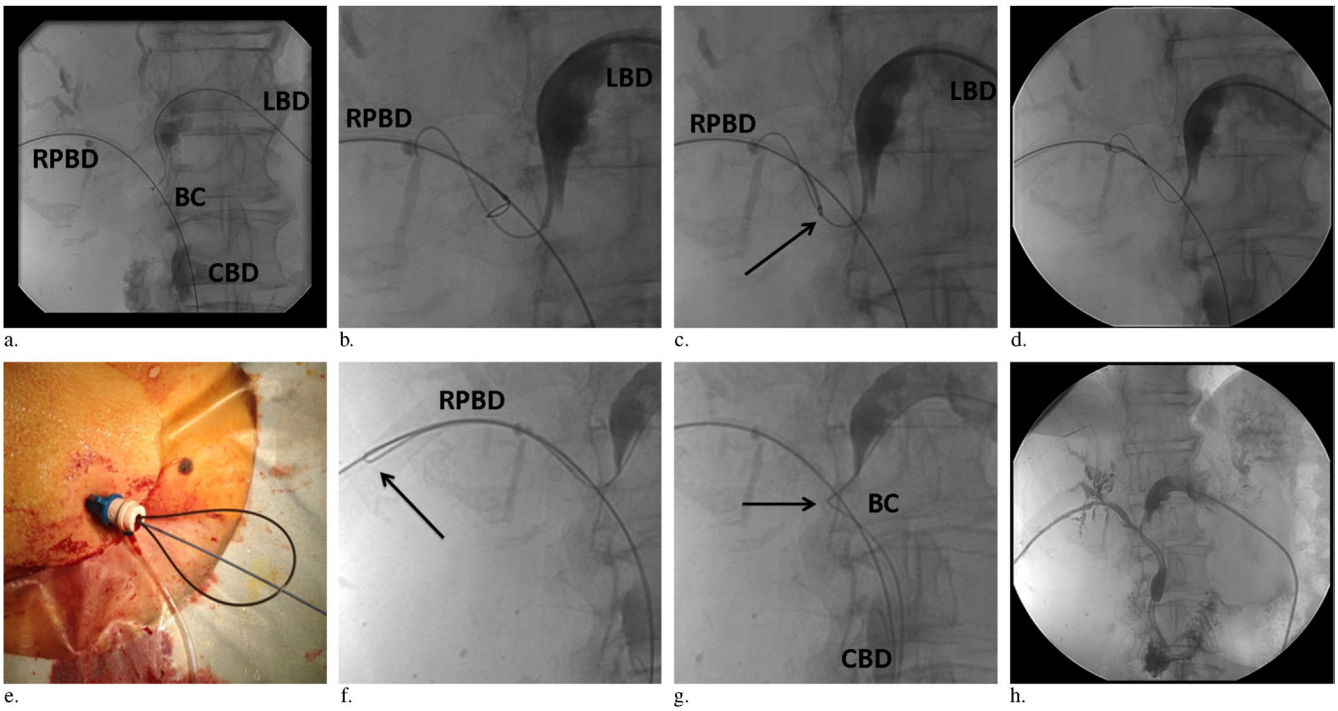

Figure 1. **(a)** A 0.035-inch, straight tip guide wire was positioned through the RPBD and the BC in the duodenum, and a 0.035-inch angled hydrophilic wire was positioned within the left bile duct (LBD). **(b)** Through a 5-F straight catheter, the hydrophilic wire was pushed in the RPBD, next to the snare loop catheter. **(c, d)** The trailing end of the hydrophilic wire was grasped (arrow, **c**) with the snare loop catheter. **(e)** The wire was folded over itself and reinserted in the right introducer. **(f, g)** The folded wire (arrow, **f**) was pushed close to the BC, until it found the pathway for the CBD (arrow, **g**). **(h)** Two 8-F PTBD catheters were positioned. (Available in color online at *www.jvir.org*.)

site for rendezvous. After percutaneous catheterization of both sides of the biliary tree, two 8-F, 10-cm-long introducers (Radifocus Introducer II; Terumo) were positioned within the percutaneous access sites. Through the right-side introducer, a 0.035-inch, 145-cm-long, straight tip guide wire (Amplatz Super Stiff; Boston Scientific Corporation, Natick, Massachusetts) was pushed in the duodenum, followed by a 6-F, 120-cm-long, snare loop grasping catheter (Amplatz GooseNeck Snare Kit; ev3, Plymouth, Minnesota), which was positioned at the BC (Fig 1a). This catheter was used to grasp the trailing end of a 0.035-inch, 150-cm-long, angled hydrophilic wire (Radifocus Guide Wire M) positioned through the left percutaneous access (Fig 1b, c). The wire was grasped and pulled out of the patient's body through the right percutaneous access (Fig 1d) and folded over itself and reinserted within this introducer (Fig 1e, f); its trailing end was carefully pushed close to the hilar stricture (Fig 1f), until it entered into the BC and the common bile duct (CBD) (Fig 1g), obtaining the crossing of the hilar lesion. Finally, two 8-F, 50-cm-long, transhepatic biliary drainage catheters (Ultrathane ring biliary duct drainage catheter; Cook, Inc, Bloomington, Indiana) were positioned bilaterally (Fig 1h). The patient was evaluated 5 days after the procedure with transabdominal ultrasound, which did not show any intrahepatic bile duct dilatation. The symptoms of cholangitis resolved, and serum bilirubin levels rapidly decreased (14 mg/dL 2 d after the procedure, 10 mg/dL 1 wk after the procedure). The patient died of metastatic disease 3 months after the procedure.

Case 2

A 40-year-old man had undergone laparoscopic cholecystectomy for cholelithiasis at another hospital. The procedure was complicated by the iatrogenic transection of the right posterior bile duct (RPBD), which had an aberrant drainage into the lateral side of the CBD. This condition was not recognized at first; evaluation with transabdominal ultrasound showed a fluid collection next to the hepatic hilum, and the patient was treated as if he had a cystic duct fistula by positioning a percutaneous drainage catheter within the biloma and a nasobiliary catheter, which was then endoscopically replaced with a 11.5 F, 7-cm-long plastic biliary stent (Cotton-Huibregtse Biliary Stent Set, Cook Inc, Bloomington, Indiana). Because of persistence of fever and right upper quadrant pain, the patient was referred to our institution 20 days after the cholecystectomy. Abdominal magnetic resonance cholangiopancreatography was performed, which showed the persistence of the biloma next to the CBD, produced by a bile leakage from the transected aberrant RPBD (Fig 2a).

The patient was referred to the interventional radiology unit. PTC, performed with percutaneous catheterization