

Utility of a stent pusher catheter as a “mini-over-tube” in the endoscopic management of post-liver transplant biliary strictures

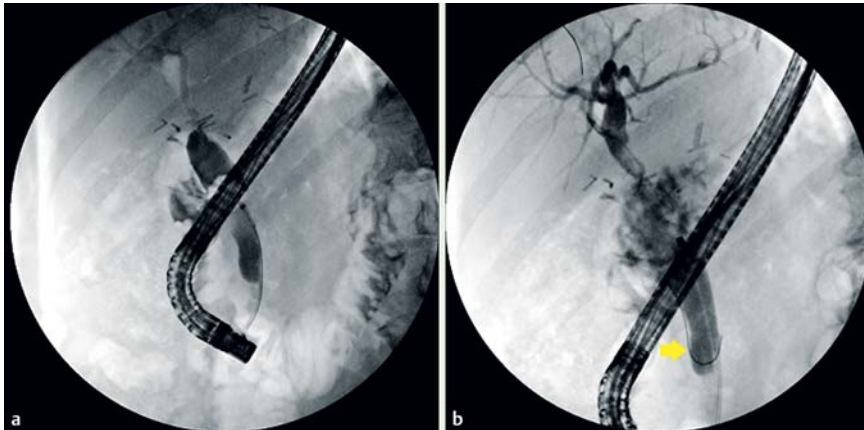


Fig. 1 **a** Cholangiography showing a severe and complex anastomotic stricture following a liver transplant. **b** Only one guidewire could be passed through the stricture: the second wire has flipped back (yellow arrow).

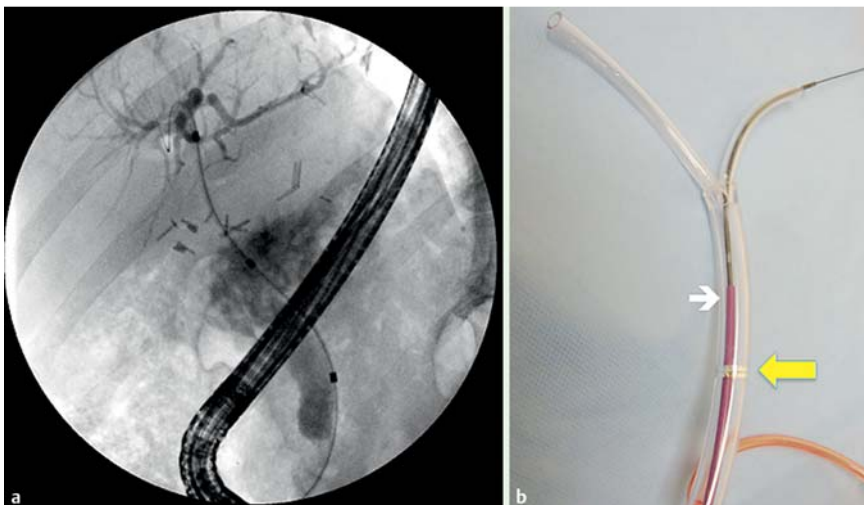


Fig. 2 **a** Insertion of a pusher tube over the first guidewire. The pusher tube would serve as a “mini-overtube.” **b** Illustration of the technique. Once the pusher tube (white arrow) was above the stricture (yellow arrow), the inner guiding catheter would be removed. A second wire could then be advanced through the mini-overtube (i.e., the pusher tube).

Biliary strictures and biliary leaks are the most common forms of post-transplant biliary complication [1–3]. These are thought to be due to multiple factors including ischemia, ischemia–reperfusion injuries, cytomegalovirus infection, and surgical techniques [2]. Endoscopic retrograde cholangiopancreatography (ERCP), percutaneous transhepatic cholangiography, and surgery are the primary approaches used in addressing strictures, with ERCP being the gold standard as a

diagnostic and therapeutic tool with the use of balloon dilations and placement of multiple parallel plastic stents [1–3]. However, some strictures have proven to be technically challenging or untreatable, mandating the use of percutaneous transhepatic cholangiographic drainage or even surgical hepaticojejunostomy. Herein we report a new method to deliver two wires above an impassable and severe anastomotic stricture by utilizing the pusher catheter as a “mini-overtube.”

Video 1



Demonstration of the pusher-overtube technique for difficult bile duct strictures. Stepwise approach to using a pusher catheter as a mini-overtube, allowing the insertion of two guidewires and thus two stents to the left and right hepatic ducts.

A 55-year-old man had undergone orthotopic liver transplantation (OLT) because of hepatitis C virus-related cirrhosis and hepatocellular carcinoma. After the OLT he had elevated results in liver function tests but biopsy had shown a viable liver transplant. Therefore the patient had undergone ERCP, which had shown an anastomotic biliary stricture. This had been managed by sphincterotomy and placement of a single 10-Fr 12-cm plastic stent because of the severity of the stricture.

At follow-up ERCP, the previous stent was removed using a snare. Biliary sphincterotomy and balloon dilation of the stenosis was performed (6-mm Titan balloon; Cook Medical, Winston Salem, North Carolina, USA) with removal of debris and sludge and extraction of the balloon without complications. However, on further evaluation only a single 0.035-inch guidewire (Metro; Cook Medical) could be advanced through the anastomosis (Fig. 1).

Several techniques and accessories were used without success in the attempt to pass a second wire: a tapered tip catheter, various sphincterotomies, balloons, and straight and J-tipped wires. Because the path was so narrow and tortuous, an alternative approach was pursued as follows. A stent delivery device (Cook Medical), namely the inner guiding catheter and pusher without the stent, was passed over the existing

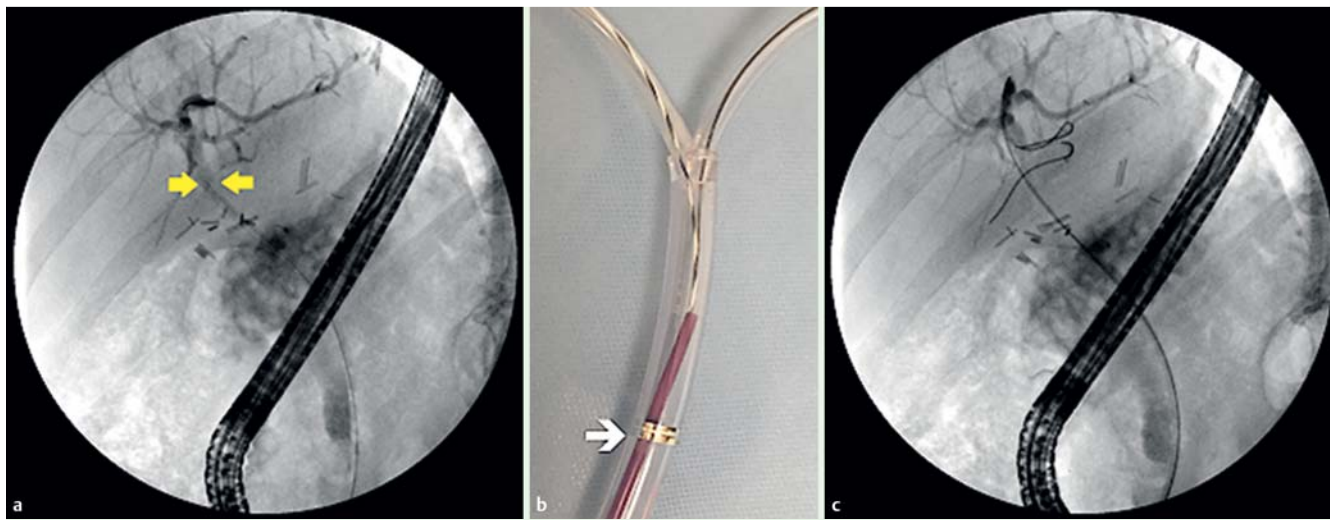


Fig. 3 a Cholangiography showing the pusher tube above the stricture. The yellow arrows show the upper end of the pusher tube. b Illustration of the technique. The “above-the-stricture” (white arrow) location of the pusher tube allows the the placement of two or more wires. c Cholangiography shows two wires above the stenosis.

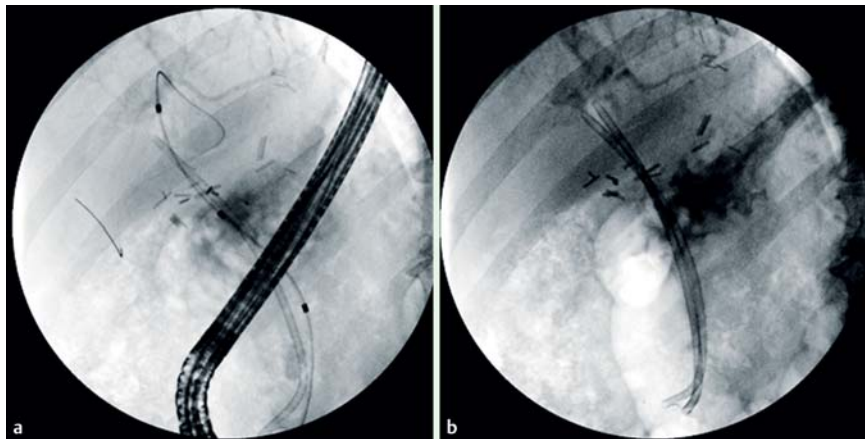


Fig. 4 a Deployment of two 10-Fr plastic stents. b Final appearance of the deployed stents.

guidewire that had crossed the stricture proximally (▶ Fig. 2a, ▶ Video 1). Once the tip of the pusher was above the stricture (▶ Fig. 2b), the inner guiding catheter was removed, leaving the pusher in situ (▶ Video 1). The pusher could thus be utilized as a “mini-overtube” allowing the advancement of a second wire inside across the severe anastomotic stricture, so that now two wires could be delivered above the stenosis, one each into the right and left hepatic ducts (▶ Fig. 3b, ▶ Video 1). The pusher tube was then withdrawn, thus allowing the successful insertion of two 10-Fr 12-cm plastic stents (Cotton-Huibregtse; Cook Medical), one along each wire with both stents crossing the stricture (▶ Fig. 3, ▶ Video 1).

On subsequent ERCP, dilation of the stenosis was more easily obtained (8-mm balloon, Titan; Cook Medical), and again successful insertion of two plastic stents, one along each wire with both stents crossing the stricture (10-Fr Solus plastic double-pigtail 4-cm; 12-cm Cotton-Huibregtse Amsterdam plastic stent) (▶ Fig. 4, ▶ Video 1).

In summary, we have presented a novel method that allows passage of two (or more) wires above a tight biliary stricture, thus permitting the use of more than one stent to treat a complex stricture. The concept of “mini-overtube” in ERCP is useful as it expands the therapeutic possibilities in complex cases such as the one presented.

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Competing interests: None

G. Bruno Pereira, Juan P. Gutierrez, Marco D’Assuncao, Lucia C. Fry, Klaus Mönkemüller

Basil I. Hirschowitz Endoscopic Center of Excellence, Division of Gastroenterology and Hepatology, University of Alabama at Birmingham, Alabama, USA

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Corresponding author

Klaus Mönkemüller, MD, PhD
Division of Gastroenterology and Hepatology
Basil I. Hirschowitz Endoscopic
Center of Excellence
Endoscopy Unit, JT 664
619 19th Street S
Birmingham, AL 35249
USA
Fax: +1-205-934-1537
klaus1@uab.edu