Untying the knot: technique of unraveling a guidewire knot created during EUS-guided biliary drainage

Inadvertent knotting of guidewires and catheters has been reported in several procedures, including cardiac catheterization [1], central venous access [2], and urologic procedures [3]. However, there are no reports of guidewire knotting during endoscopic procedures. We describe successful untangling of a knot created in a guidewire during endoscopic ultrasound (EUS)-guided rendezvous biliary drainage.

A 70-year-old man with biliary obstruction due to a 4-cm head of pancreas adenocarcinoma presented for endoscopic retrograde cholangiopancreatography (ERCP) and biliary stent placement. Two attempts at ERCP were performed; however, biliary access could not be obtained due to a tight distal biliary stricture. As previously described [4], the patient underwent EUS-guided biliary drainage. The tip of the linear echoendoscope (UC140P-ALS; Olympus America, Center Valley, PA, USA) was positioned in the duodenal bulb. A segment of dilated bile duct proximal to the site of obstruction was punctured with a 19-gauge fine-needle aspiration needle (Expect 19 Flex; Boston Scientific, Natick, MA, USA). Contrast injection and fluoroscopic imaging confirmed a dilated proximal common bile duct with a tight distal common bile duct stricture (Fig. 1). A 0.025-inch guidewire (VisiGlide; Olympus) was passed through the needle. Antegrade guidewire passage through the site of obstruction and across the papilla was achieved (Fig. 2).

The wire was coiled within the duodenum. The echoendoscope was withdrawn and the transduodenal portion of the wire was held by an assistant. A side-viewing duodenoscope was passed to the papilla and a forceps was used to grasp the papillary portion of the guidewire. As the wire was withdrawn through the endoscope, it slipped and could not be fully withdrawn into the endoscope channel. The elevator was used to hold the wire while the endoscope (and wire) were withdrawn from the patient. Both ends of the wire were now held by an assistant. The papillary portion of the wire was back-loaded through a sphincterotome that was already advanced through the working channel of the duodenoscope. As the endoscope was advanced, tension was applied to the wire. However, resistance was met as the sphincterotome was advanced. The endoscope was advanced into the duodenum. A knot had formed within the wire (Fig. 3, Videos 1, 2). The sphincterotome was withdrawn and a rat-toothed forceps was used to grip one portion of the wire. The forceps and endoscope were withdrawn out of the patient while the wire was allowed to slip through the teeth of the forceps and the knot was untangled (Videos 1, 2). The procedure was completed by cannulating the bile duct with a sphincterotome over the wire and placing a 10 mm × 60 mm fully covered self-expandable metallic biliary stent.

Guidewire knotting can occur during rendezvous procedures if the wire forms a loop during endoscope or catheter exchanges, as occurred in this case. To prevent looping, it is important to main-
tain constant tension on the wire during all exchanges. Knots and tangling of the guidewire become apparent when a catheter meets resistance as it is advanced over the wire. Fluoroscopy can confirm the problem, which can be solved using the technique described.

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