Endoscopic ultrasound-guided antegrade bile duct stone treatment followed by direct peroral transhepatic cholangioscopy in a patient with Roux-en-Y reconstruction

Endoscopic ultrasound (EUS)-guided antegrade treatment for biliary disorders was developed for patients with an altered anatomy [1–5]. This report describes a case of successful EUS-guided bile duct stone (BDS) treatment followed by direct peroral transjejunal-hepatic cholangioscopy in a patient with Roux-en-Y reconstruction.

An 80-year-old woman with a BDS and a history of total gastrectomy with Roux-en-Y reconstruction was admitted to the Hokkaido University Hospital. The papilla could not be reached even with balloon enteroscopy. Therefore, transhepatic EUS-guided antegrade BDS treatment was attempted.

A B3 branch duct was punctured using a 19-gauge needle (SonoTip Pro Control; Medi-Globe GmbH, Rosenheim, Germany), and a 0.025-inch guidewire (VisiGlide 2; Olympus Medical Systems, Tokyo, Japan) was placed (Video 1). A 6-Fr wire-guided diathermic dilator (Cysto-Gastro-Set; Endo-Flex GmbH, Voerde, Germany) was used to dilate the tract. Papillary balloon dilation (Hurricane RX Biliary Balloon Dilatation Catheter; Boston Scientific Japan) was also performed under fluoroscopic guidance according to the size of the distal bile duct (Video 1). The retrieval balloon (Extractor Pro RX retrieval balloon catheter, 15–18 mm; Boston) and mechanical lithotripter (Litho Crush V, BML-V437QR-30; Olympus) both failed to extract the stone (Video 1). A 6-Fr nasobiliary drainage catheter (NBDC; Flexima ENBD Catheter; Boston Scientific Japan) was placed across the papilla for drainage into the duodenum and to facilitate a rendezvous procedure using balloon enteroscopy (Video 1).

The next day, the patient developed acute cholangitis. Re-intervention through the fistula tract was attempted. After advancing the guidewire into the bile duct, the BDS was captured by a standard basket catheter (FG-V435P; Olympus) (Video 1). However, the basket catheter could not pass the papilla and was impacted instead (Video 1). Emergency, di-

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**Video 1**

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Endoscopic ultrasound (EUS)-guided bile duct stone (BDS) treatment and direct, peroral, transjejun- al-hepatic cholangioscopy in a patient with Roux-en-Y reconstruction. First, EUS-guided antegrade papillary balloon dilation was performed using a standard balloon catheter. An attempt was made to retrieve the stone using the balloon catheter. The attempt failed and a nasobiliary catheter was placed across the papilla for drainage. Second, an attempt was made to retrieve the stone using a standard basket catheter. Third, this attempt at stone retrieval also failed and therefore emergency, direct, peroral lithotripsy using a mechanical lithotripter was performed to crush the stone. An endoscopic antegrade nasobiliary catheter was placed. Finally, direct, peroral, transhepatic cholangioscopy was performed 6 days later to confirm clearance of stones or debris.

Complete BDS clearance was confirmed (Video 1). An EUS-guided rendezvous procedure is generally performed when EUS-guided antegrade BDS treatment fails. However, endoscopic re-intervention through the fistula tract should be considered in patients with altered gastrointestinal anatomy. To our knowledge, this is the first report of a troubleshooting technique for BDS impaction using direct, peroral, mechanical lithotripsy and confirmation of BDS clearance by direct antegrade cholangioscopy following EUS-guided biliary drainage. Although challenging, this stone extraction technique combined with EUS-guided antegrade cholangiography and cholangioscopy (EUS-guided ACC) should be recognized as a treatment for BDS in patients with altered gastrointestinal anatomy.

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