



EUS-directed transenteric ERCP with giant intrahepatic stone lithotripsy after a LAMS-in-LAMS rescue in response to a misdeployment

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BACKGROUND AND INTRODUCTION

ERCP is technically challenging in patients with surgically altered anatomy, especially Roux-en-Y reconstructions. EUS-directed transenteric ERCP (EDEE), involving the creation of a gastro-enteric or entero-enteric shortcut allowing endoscopic access to the biliary loop, represents an emerging alternative for biliary interventions in patients with Roux-en-Y hepaticojejunostomy (RY-HJ).¹⁻³

CASE REPORT

An 80-year-old woman with a former surgical RY-HJ for complex choledocholithiasis was admitted for cholangitis. An MRCP showed a 40-mm stone above the biliodigestive anastomosis (Fig. 1). After discussion of all alternatives, EDEE was proposed.

The procedure was performed with the patient under deep sedation in spontaneous breathing with orotracheal intubation to protect the airways. A prophylactic broad-spectrum antibiotic dose was administered during the procedure.

Under EUS guidance, through transgastric scans, we initially identified the left hepatic lobe, followed by the bile ducts and vessels to the hepatic hilum, where the common hepatic duct was identified. Following it to the biliodigestive anastomosis, we thus identified the biliary loop. To reduce peristalsis, we administered 20 mg of hyoscine butyl-bromide intravenously. Under EUS guidance, the biliary loop

was punctured with a 19-gauge needle through the gastric wall and distended with saline mixed with contrast medium; an over-the-wire 15 × 10 mm electrocautery-enhanced lumen-apposing metal stent (LAMS) (Hot Axios; Boston Scientific, Marlborough, Mass, USA) was released and dilated up to 15 mm (Fig. 2).⁴

On endoscopic view, the distal flange of the LAMS appeared misdeployed in the peritoneal cavity. The jejunal loop with a large enterotomy was luckily clearly visible through the LAMS lumen (type II misdeployment⁵) (Fig. 3). The enterotomy was intubated with a therapeutic gastroscope and a new over-the-wire 20 × 10 mm LAMS-in-LAMS was placed under endoscopic control and dilated up to 12 mm.^{6,7} Contrast injection showed no leak (Fig. 4). The patient remained asymptomatic under prophylactic antibiotics.

Forty-eight hours later, a therapeutic gastroscope was easily passed through the LAMS-in-LAMS and directed toward the biliodigestive anastomosis. The giant stone was successfully managed by electrohydraulic lithotripsy, with fragments extracted by basket and balloon swipes, saline injection, and suction (Fig. 5).

Eleven months later, the patient was admitted for recurrent cholangitis. A CT scan with contrast revealed biliary stones within the common hepatic duct and intrahepatic bile ducts. At endoscopic revision, the LAMS-in-LAMS was partially

Abbreviations: EDEE, EUS-directed transenteric ERCP; LAMS, lumen-apposing metal stent; RY-HJ, Roux-en-Y hepaticojejunostomy.

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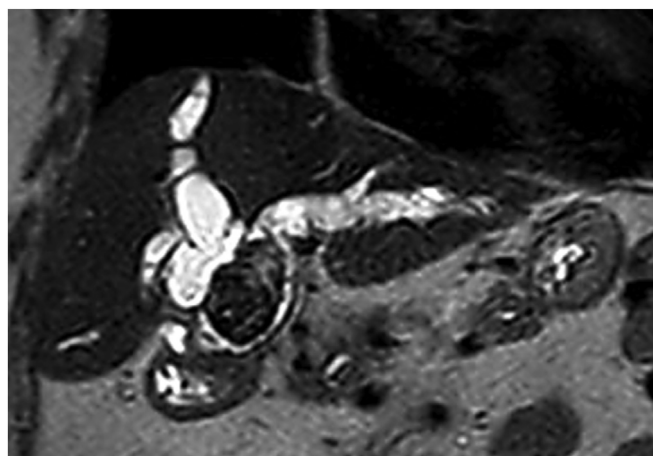


Figure 1. Giant intrahepatic stone. Magnetic resonance imaging showing biliary dilation and a 40-mm biliary stone above the hepatico-jejunostomy in a patient with Roux-en-Y reconstruction.



Figure 2. EUS-guided gastroenterostomy. Under EUS guidance the biliary loop was identified from the stomach and punctured with a 19-gauge needle (A) for distension with saline mixed with contrast medium (B). C and D, Gastroenterostomy was created via over-the-wire release of a 15- × 10-mm electrocautery-enhanced lumen-apposing metal stent.

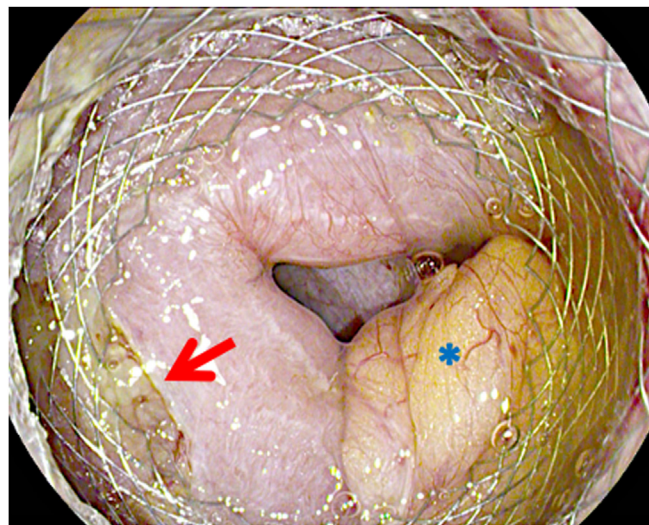


Figure 3. Lumen-apposing metal stent (LAMS) misdeployment. Through the LAMS lumen, the peritoneum (blue asterisk) and the biliary loop with enterotomy (red arrow) were clearly visible, identifying a type II LAMS misdeployment.

embedded by tissue ingrowth through the meshes, making access to the biliary loop difficult. The LAMS-in-LAMS was removed using a foreign-body forceps. A clearance of biliary lithiasis was performed by passing the therapeutic gastroscope through the established gastro-jejunal fistula, and finally, a new 20 × 10 mm LAMS was placed over-the-wire to ensure persistent access to the biliary loop in case of further recurrences (Fig. 6).⁸

CONCLUSIONS

EDEE represents an effective alternative for repeated biliary interventions in RY-HJ. LAMS misdeployment is a serious adverse event, but a larger LAMS-in-LAMS rescue might allow for uneventful completion of the anastomosis and administration of through-the-LAMS therapeutics (Video 1, available online at www.videogie.org).

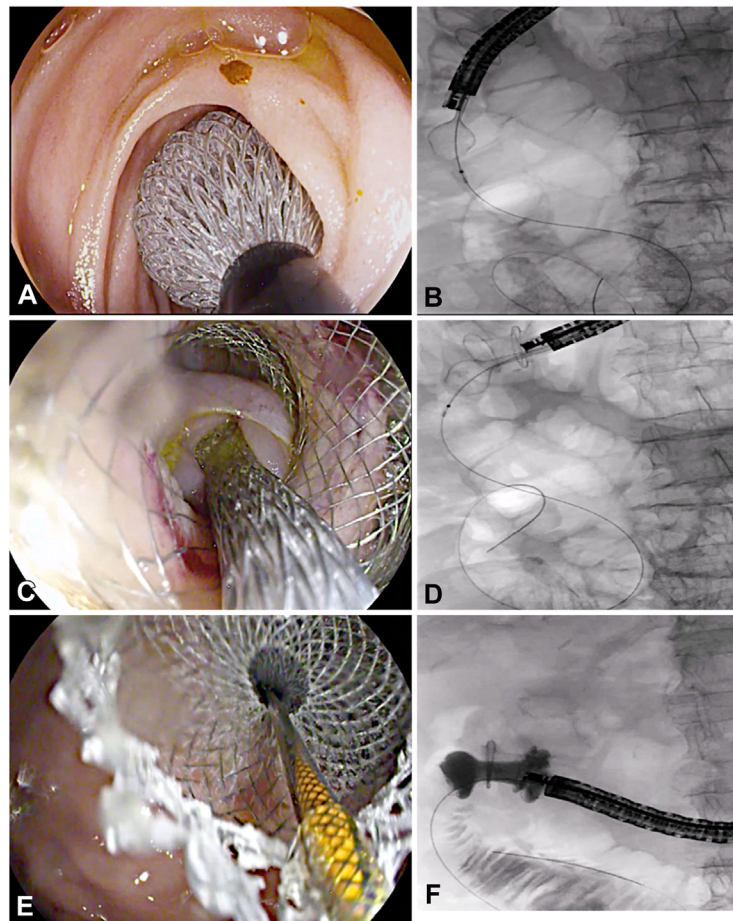


Figure 4. LAMS-in-LAMS rescue strategy. **A and B**, The enterotomy was intubated with a gastroscope; a guidewire was placed into the biliary loop; and a new LAMS-in-LAMS (20 × 10 mm, larger than previous one) was released. **C and D**, The distal flange of the LAMS was released inside the loop and then pulled up so that the biliary loop overlapped the gastric wall. **E**, The gastroscope was retracted in the stomach and the proximal flange released coaxial to the former LAMS in the gastric lumen. **F**, Contrast injection showed no leak through the LAMS-in-LAMS. *LAMS*, Lumen-apposing metal stent.

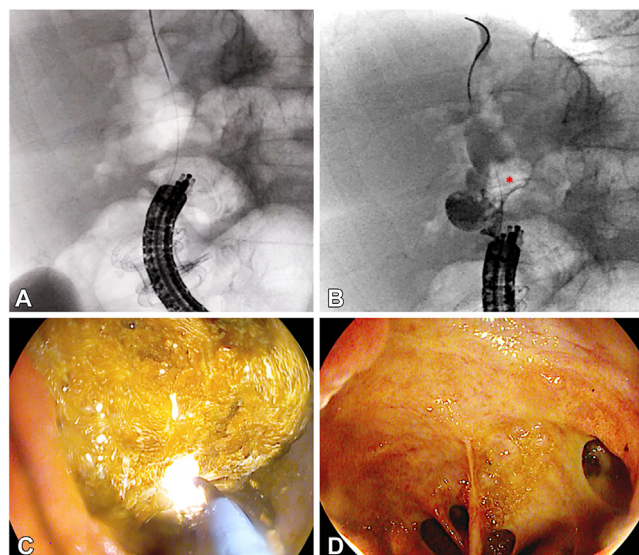


Figure 5. EUS-directed ERCP. **A**, A gastroscope was advanced through the lumen-apposing metal stent into the biliary loop for cannulation of the biliodigestive anastomosis. **B**, Cholangiography confirmed the presence of the 40-mm stone above the biliodigestive anastomosis (*red asterisk*). **C**, Electrohydraulic lithotripsy was used to effectively fragment the stone. **D**, Endoscopic control confirming the complete biliary clearance.

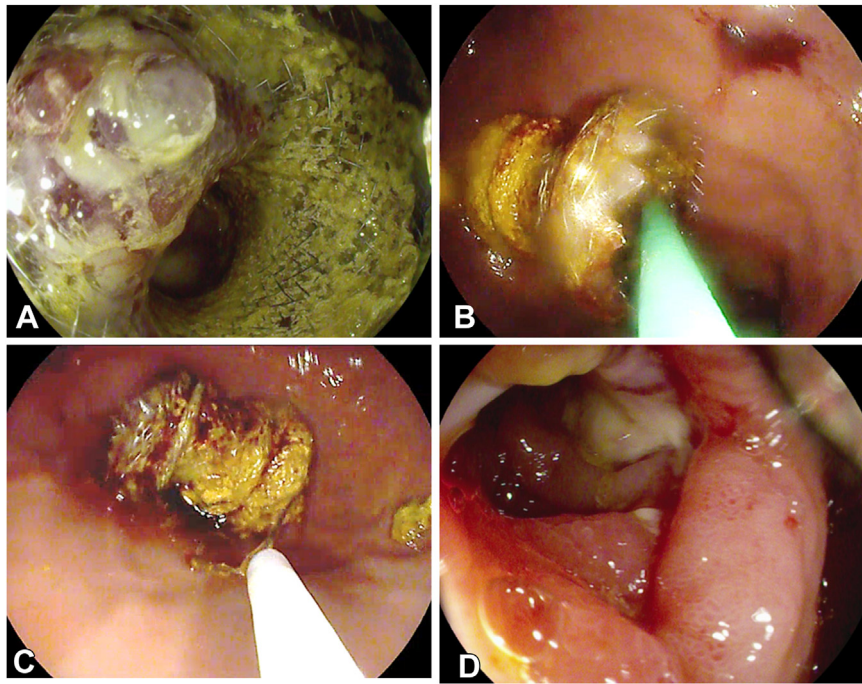


Figure 6. One-year revision. **A**, A gastroscopy showed inflammatory ingrowth through the meshes of the LAMS-in-LAMS complex, which also appeared substenotic. **B and C**, Removal of the LAMS-in-LAMS complex with rat tooth forceps and snare. **D**, Stable gastro-jejunal fistula. LAMS, Lumen-apposing metal stent.

DISCLOSURE

The authors disclosed no financial relationships relevant to this publication.

REFERENCES

1. van der Merwe SW, van Wanrooij RLJ, Bronswijk M, et al. Therapeutic endoscopic ultrasound: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. *Endoscopy* 2022;54:185-205.
2. Khashab MA. Endoscopic ultrasound-directed transenteric ERCP (EDEE) in patients with postsurgical anatomy - novel but challenging. *Endoscopy* 2019;51:1119-20.
3. Mutignani M, Forti E, Larghi A, et al. Endoscopic entero-enteral bypass: an effective new approach to the treatment of postsurgical complications of hepaticojejunostomy. *Endoscopy* 2019;51:1146-50.
4. van Wanrooij RLJ, Bronswijk M, Kunda R, et al. Therapeutic endoscopic ultrasound: European Society of Gastrointestinal Endoscopy (ESGE) Technical Review. *Endoscopy* 2022;54:310-32.
5. Ghandour B, Bejjani M, Irani SS, et al. Classification, outcomes, and management of misdeployed stents during EUS-guided gastroenterostomy. *Gastrointest Endosc* 2022;95:80-9.
6. Ligresti D, Amata M, Barresi L, et al. The lumen-apposing metal stent (LAMS)-in-LAMS technique as an intraprocedural rescue treatment during endoscopic ultrasound-guided gastroenterostomy. *Endoscopy* 2019;51:E331-2.
7. Pandey S, Aggarwal N, Edhi A, et al. Dislodged lumen-apposing metal stent (LAMS) in EUS-guided gastrojejunostomy salvaged by LAMS-in-LAMS technique. *Gastrointest Endosc* 2023;97:799-800.
8. Vanella G, Dell'Anna G, Mariani A, et al. Over-the-wire lumen-apposing metal stent exchange for management of a long-term choledochoduodenostomy dysfunction. *Amer J Gastroenterol* 2022;117:1192.