

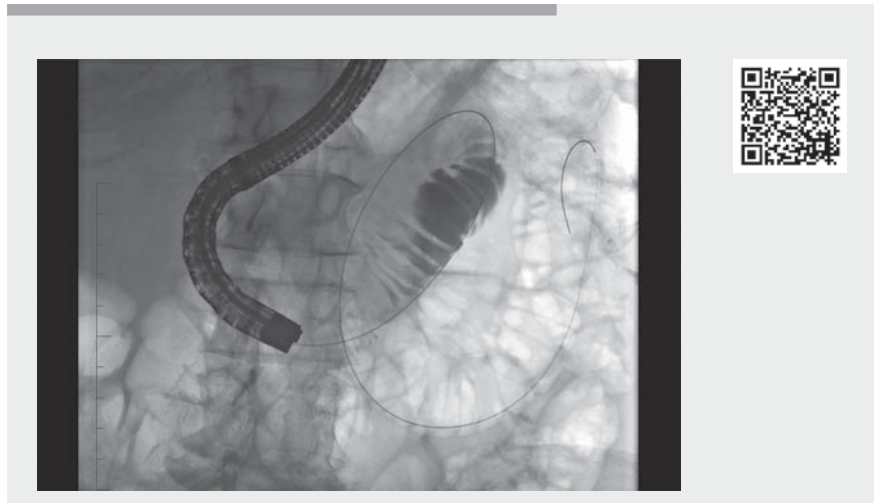
Endoscopic ultrasound-guided gastrojejunostomy and choledochoduodenostomy with lumen-apposing metal stents: an efficient approach to double endoscopic bypass



Concomitant malignant gastric outlet and biliary obstruction is a morbid complication of pancreatic cancer [1]. Double endoscopic bypass with endoscopic ultrasound-guided gastroenterostomy (EUS-GE) and an EUS-guided choledochoduodenostomy or hepatogastrotomy is a promising but technically challenging modality in gastric outlet and biliary obstruction [2]. The advent of dedicated biliary lumen-apposing metal stents (LAMS) [3] has the potential to greatly facilitate double endoscopic bypass and enhance its adoptability [2].

An 80-year-old woman with stage IV pancreatic cancer presented with gastric outlet and biliary obstruction secondary to tumor progression. An endoscopic retrograde cholangiopancreatography was unsuccessful owing to the inability to reach the papilla. Following informed consent, we proceeded with a double endoscopic bypass (► **Video 1**).

A therapeutic gastroscope was advanced to the level of the obstruction in the duodenum. A 0.035-mm wire was inserted up to the jejunum followed by a 7-Fr nasobiliary drain to the ligament of Treitz (► **Fig. 1 a**). Saline combined with contrast and methylene blue was injected into small bowel (400 ml) (► **Fig. 1 b**). The echoen-



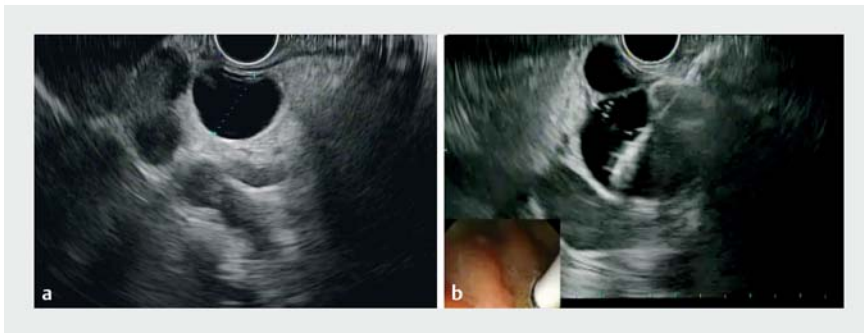
► **Video 1** Endoscopic ultrasound-guided gastrojejunostomy and choledochoduodenostomy with lumen-apposing metal stents: an efficient approach to double endoscopic bypass.

doscope was then inserted and the distended small bowel located under endoscopic ultrasound (EUS). A 15×10-mm lumen-apposing metal stent (LAMS) (Axios; Boston Scientific, Marlborough, Massachusetts, USA) was then inserted directly using cautery assistance and deployed successfully forming the gastroenterostomy (► **Fig. 1 c**). The echoendo-

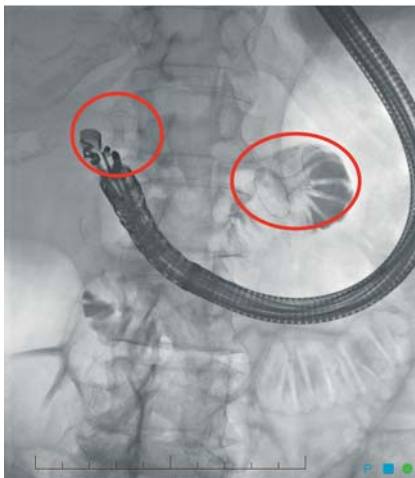
scope was then advanced to the bulb of duodenum to locate the dilated common bile duct measuring 12.5 mm in diameter (► **Fig. 2 a**). A 6×8-mm biliary LAMS was then inserted using cautery assistance and deployed to establish the choledochoduodenostomy (► **Fig. 2 b**). The total procedure time was 36 minutes. The patient's bilirubin decreased as expected



► **Fig. 1 a** Fluoroscopy images for nasobiliary drain in the small bowel. **b** Endoscopic ultrasound (EUS) image shows dilated small bowel following infusion. **c** EUS image shows insertion of lumen-apposing metal stent in the small bowel.



► **Fig. 2** **a** Endoscopic ultrasound (EUS) image shows dilated common bile duct (CBD) measured at 12.5 mm. **b** EUS image shows insertion of lumen-apposing metal stent in the CBD.



► **Fig. 3** Successful double endoscopic bypass with endoscopic ultrasound-guided gastroenterostomy and choledocho-duodenostomy.

and her diet advanced. The patient was discharged from hospital 7 days after the double endoscopic bypass. Double endoscopic bypass is potentially the ideal modality for relieving gastric outlet and biliary obstruction. Our case demonstrates the ease with which this procedure can be performed using LAMS for both obstructions. Larger studies will be needed to ascertain the efficacy and safety of double endoscopic bypass using LAMS in malignant gastric outlet and biliary obstruction.

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Competing interests

The authors declare that they have no conflict of interest.

The authors

Abdulrahman Qatomah¹, **Abrar Nawawi**¹, **Ali Bessissow**², **Jeffrey Barkun**³, **Corey Miller**⁴, **Yen-I Chen**¹

- 1 Division of Gastroenterology and Hepatology, McGill University Health Centre, Montreal, QC, Canada
- 2 Division of Radiology, McGill University Health Centre, Montreal, QC, Canada
- 3 Department of Surgery, McGill University Health Centre, Montreal, QC, Canada
- 4 Division of Gastroenterology and Hepatology, Jewish General Hospital, McGill University, Montreal, QC, Canada

Corresponding author

Abdulrahman Qatomah, MD
 McGill University Health Centre,
 Gastroenterology and Hepatology,
 1001 Decarie Boulevard, Montreal,
 Quebec H3G 0E4, Canada
 abdulrahman.qatomah@mail.mcgill.ca

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