EUS-guided cholecystoduodenostomy and ERCP in a patient with surgically altered anatomy with a double-balloon endoluminal interventional platform

Andrew A. Li, MD, Andrew Ofosu, MD, MPH, Joo Ha Hwang, MD, PhD

EUS and ERCP in patients with surgically altered anatomy can be technically challenging. For Roux-en-Y and diverting gastrojejunostomy, achieving deep advancement into the pancreaticobiliary limb for EUS and EUS-guided interventions can be difficult because of the linear echoendoscope's oblique viewing nature, a longer fixed nonbending portion, and the relatively sharp and stiff tip.[1] For ERCP, there are similar challenges with intubating the surgical anastomosis, navigating the variable length of the afferent jejunal limb, and cannulation.[2] If a forward-viewing endoscope is used, the longer length and smaller channel diameter limit the use of some accessories, and the lack of an elevator makes cannulation and manipulation more challenging.

A recently introduced double-balloon interventional platform (DBIP) (DiLumen Endoscopic Interventional Platform, Lumendi, Westport, Conn, USA) consisting of an over-the-scope device with anchoring balloons and a sheath with an internal hydrophilic coating has been demonstrated to improve stability and tissue manipulation in complex colon procedures such as endoscopic submucosal dissection.[3] We report a novel off-label use of the DBIP to facilitate EUS-guided gallbladder drainage (EUS-GBD) and subsequently transpapillary ERCP with a duodenoscope in a patient with malignant gastric outlet obstruction and gastrojejunostomy (Video 1, available online at www.giejournal.org).

CASE

A 48-year-old man with metastatic pancreatic cancer complicated by malignant gastric outlet obstruction requiring a gastrojejunostomy and biliary obstruction treated with percutaneous metal stent placement presented with fever and right upper quadrant pain. A CT scan demonstrated findings concerning for cholecystitis with a small adjacent abscess (Fig. 1). Given his high surgical risk, EUS-GBD was requested for the management of acute cholecystitis.

To determine whether it could be reached endoscopically, a slim colonoscope (PCF-H190, Olympus, Tokyo, Japan) was advanced via the gastrojejunostomy retrograde through the pancreaticobiliary limb to the proximal duodenum but required the insertion of the entire length of the colonoscope. The endoscope was then reinserted with a mounted DBIP, using the double-balloon system to facilitate advancement. The DBIP was advanced to the distal duodenum, and both balloons were inflated. The DBIP and colonoscope were then reduced together. Next, the colonoscope was exchanged for a linear echoendoscope (GF-UCT180, Olympus) through the DBIP device through a cut made in the DBIP tubing near the patient's mouth, which served as a new insertion site to accommodate the shorter length of the echoendoscope (Figs. 2 and 3).

On EUS examination, there was cholelithiasis and the gallbladder was underdistended, so contrast and saline were injected into the gallbladder (Fig. 4) to create a larger target. A cholecystoduodenostomy was created using a 10-mm × 10-mm electrocautery-enhanced lumen-

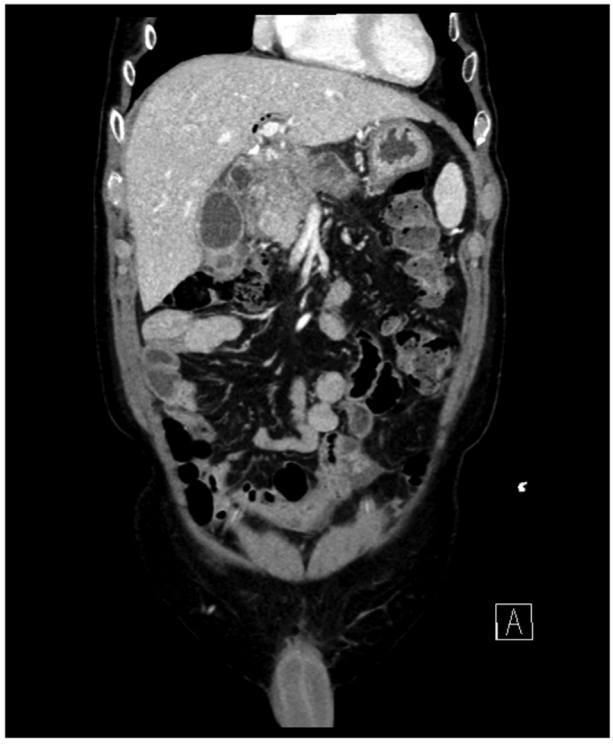

Figure 1. Coronal CT image demonstrating a distended gallbladder with wall hyperemia and a small adjacent abscess consistent with cholecystitis, the head of pancreas mass, and the metal biliary stent.

Figure 2. Demonstration of the modified double-balloon interventional platform with a linear echoendoscope or duodenoscope. A cut was made in the overtube (*arrow*) to accommodate the shorter length of the echoendoscope or duodenoscope and to provide endoscope maneuverability.

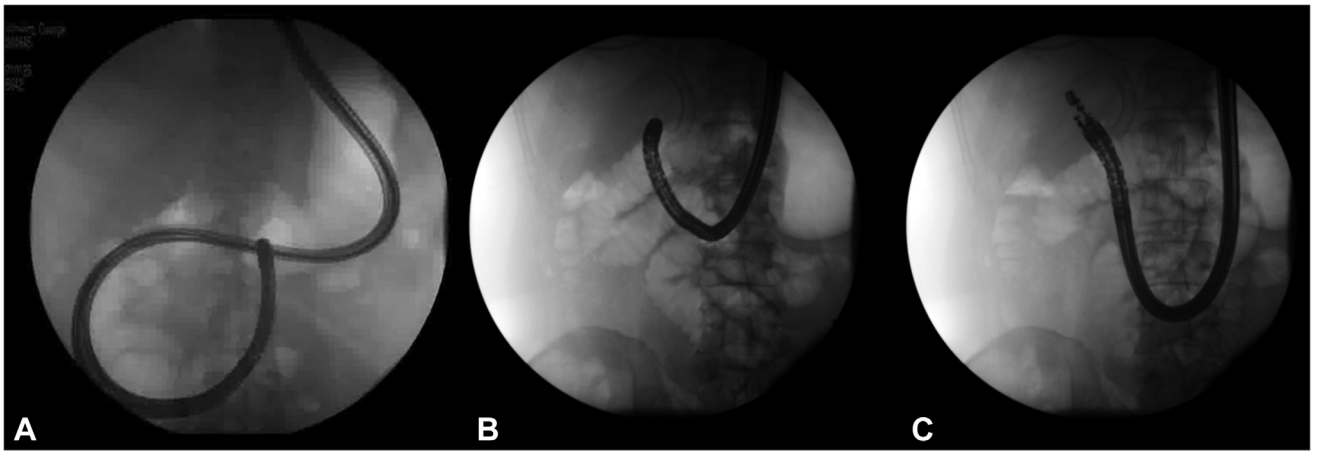

Figure 3. Fluoroscopic images demonstrating scope position before reduction **(A)**, after inflating double-balloon interventional platform balloons and reducing the loop **(B)**, and after exchanging for a linear echoendoscope through the modified double-balloon interventional platform **(C)**.

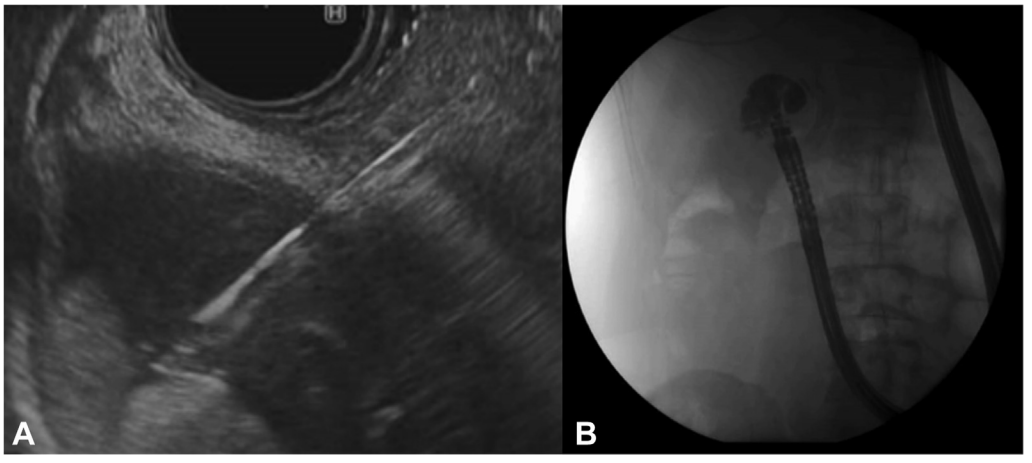

Figure 4. Injection of the gallbladder with saline solution and contrast: echoendoscopic view **(A)** and fluoroscopic view **(B)**.

apposing metal stent (LAMS) (Axios, Boston Scientific, Marlborough, Mass, USA) (Fig. 5), with drainage of pus. The LAMS was dilated to 8 mm before exchanging for an ultrathin endoscope (GIF-XP190, Olympus) that was advanced through both the DBIP and the LAMS into the gallbladder, which contained multiple stones (Fig. 6).

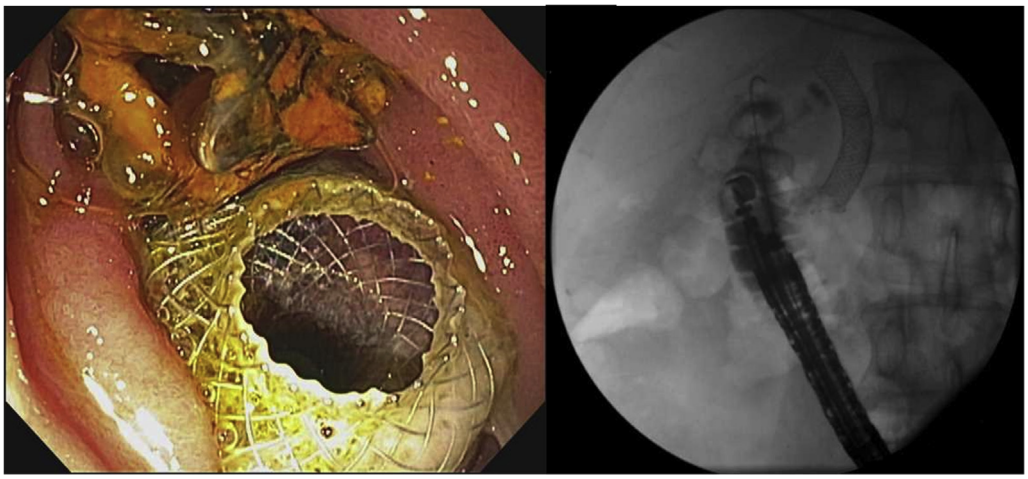

Figure 5. Lumen-apposing metal stent deployed to create a cholecystoduodenostomy near the previously placed metal biliary stent.

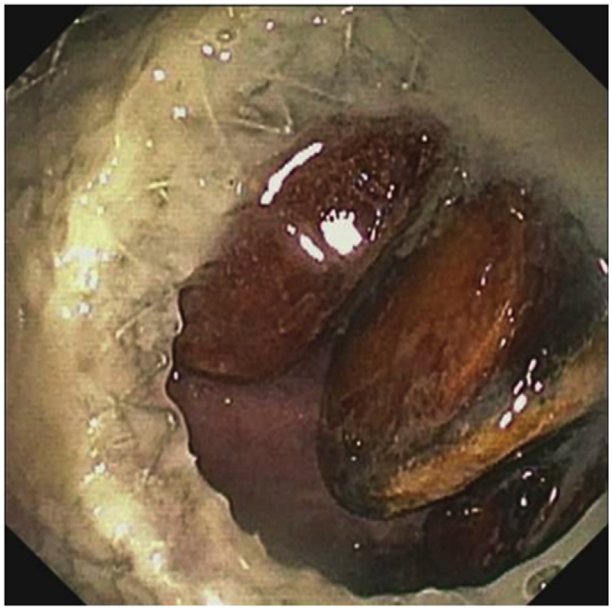

Figure 6. Gallstones within the gallbladder as viewed through the cholecystoduodenostomy lumen-apposing metal stent.

The same patient presented 1 month after EUS-GBD placement with fever, obstructive liver function tests, leukocytosis, right upper quadrant pain, and increased intrahepatic biliary dilation on a CT scan. For management of ascending cholangitis, ERCP was requested.

A similar strategy using a DBIP device was used to facilitate ERCP with a duodenoscope. After advancing a slim colonoscope with a mounted DBIP into the pancreaticobiliary limb, the DBIP was advanced to and inflated in the mid-duodenum. The DBIP and colonoscope were reduced, and a duodenoscope (TJF-Q180, Olympus) was exchanged for the colonoscope through a new insertion site cut into the DBIP sheath (Fig. 3). The duodenoscope was advanced to the ampulla, where the bile duct was cannulated through the previously placed metal biliary stent. Tumor ingrowth was seen in the previously placed stent (Fig. 7). Balloon sweeps extruded sludge and debris, and an 8-mm × 6-cm covered metal stent was placed within the pre-existing metal stent, with resulting brisk drainage of bile and contrast (Fig. 8).

In conclusion, patients with surgically altered anatomy present unique challenges for EUS-directed therapy and ERCP. In this case, an off-label and modified use of the DBIP in a patient with a diverting gastrojejunostomy for gastric outlet obstruction provided a stable conduit for EUS-GBD and ERCP with a duodenoscope, which otherwise likely would not have been possible. Although this

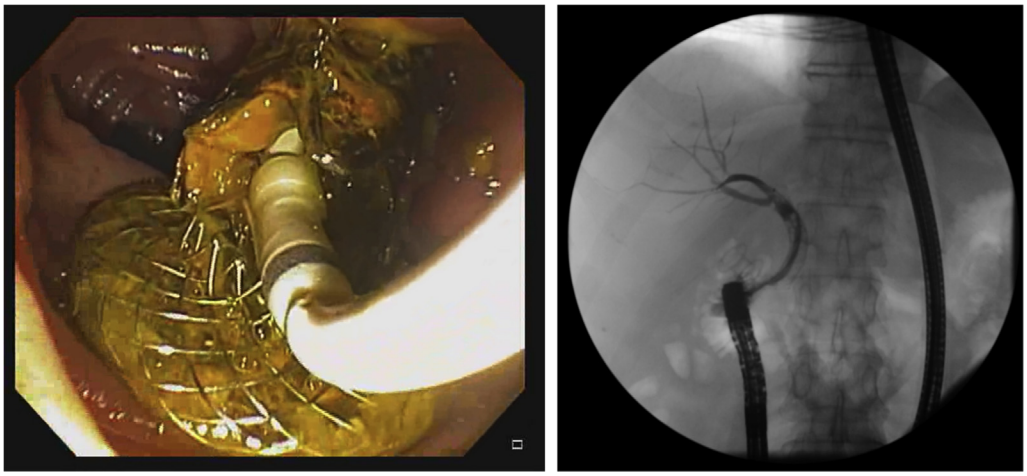

Figure 7. Cannulation of pre-existing metal stent and tumor ingrowth causing biliary obstruction.

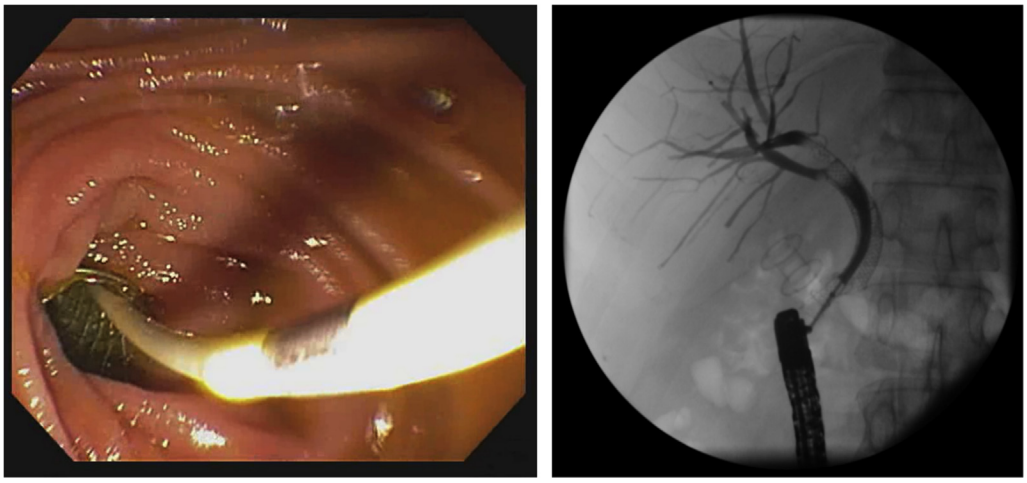

Figure 8. Covered metal biliary stent placed within pre-existing metal stent.

approach remains to be demonstrated in other surgically altered anatomy, such as Roux-en-Y, it can be considered in principle for similar scenarios in which the required insertion length is longer than an echoendoscope or duodenoscope but can be substantially reduced with a DBIP.

DISCLOSURE

Dr Hwang is a consultant for Olympus, Medtronic, Boston Scientific, Micro-Tech, and LumenDi. All other authors disclosed no financial relationships.

Abbreviations: DBIP, double-balloon interventional platform; EUS-GBD, endoscopic ultrasound guided gallbladder drainage; LAMS, lumen-apposing metal stent.

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Division of Gastroenterology and Hepatology, Stanford University School of Medicine, Stanford, California.

If you would like to chat with an author of this article, you may contact Dr Li at andrewli@stanford.edu.

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