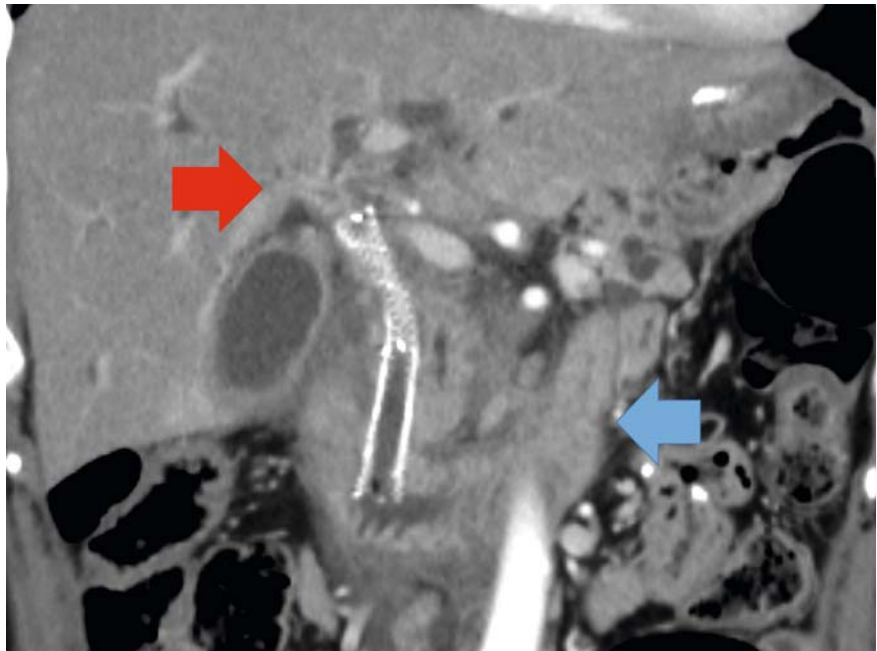


Re-intervention with endoscopic ultrasound-guided hepaticogastrostomy for unresectable hilar biliary drainage using a multipath occlusion balloon

Endoscopic ultrasound (EUS)-guided hepaticogastrostomy (EUS-HGS) and antegrade stenting (EUS-AS) have been developed as alternative biliary drainage methods; however, treating unresectable malignant hilar biliary strictures remains challenging [1–3]. We successfully performed re-intervention for malignant hilar biliary drainage after EUS-HGS using a multipath occlusion balloon.

A 46-year-old woman who was on medication for a postoperative recurrence of gastric cancer presented with jaundice. She had previously undergone double-balloon enteroscope (DBE)-assisted biliary drainage with a self-expandable metal stent (SEMS) for malignant biliary stricture of the lower bile duct.

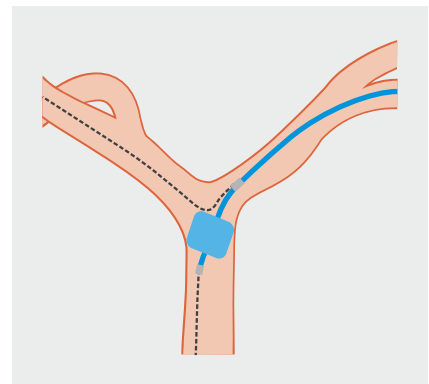
Contrast-enhanced computed tomography (CT) showed strictures of the hilar bile duct and duodenum (▶ **Fig. 1**) associated with dissemination of the gastric cancer. EUS-HGS was performed (▶ **Fig. 2**), and a 7-Fr plastic stent (TYPE-IT; Gadelius Medical, Tokyo, Japan) was placed into the B3 bile duct [4]. However, the patient's jaundice was not improved, and re-intervention was required. A 0.025-inch guidewire was placed into the duodenum beyond the papilla, and the plastic stent was removed. A second 0.025-inch guidewire was placed into the B5 bile duct using a multipath occlusion balloon (Bouncer; Cook Medical, Tokyo, Japan) (▶ **Fig. 3**). This balloon has a multilumen located at either end of the balloon, which enables guidewires to be passed easily into crooked bile ducts (▶ **Fig. 3** and ▶ **Fig. 4 a**; ▶ **Video 1**). A Zilver 635 biliary SEMS (Cook Medical, Tokyo, Japan) was introduced over the first guidewire and placed into the B5 bile duct, bridging the right and left hepatic ducts (▶ **Fig. 4 b**). Finally, a modified Niti-S GIOBOR biliary stent (Century Medical, Tokyo, Japan) was placed into the B3 bile duct (▶ **Fig. 4 c**). The jaundice subsequently improved, and no adverse events occurred.



▶ **Fig. 1** Contrast-enhanced computed tomography image showing strictures of the hilar bile duct (red arrow) and duodenum (blue arrow) associated with the dissemination of gastric cancer.



▶ **Fig. 2** Endoscopic ultrasound-guided hepaticogastrostomy was performed and a 7-Fr plastic stent was placed into the B3 bile duct.



▶ **Fig. 3** The multipath occlusion balloon (Bouncer; Cook Medical, Tokyo, Japan) has a multilumen located at either end of the balloon, which enables guidewires to be passed easily into crooked bile ducts.

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Competing interests

None



► **Fig. 4** Radiographic images showing: **a** a guidewire placed into the B5 bile duct using a multipath occlusion balloon (red arrow); **b** a self-expandable metal stent (SEMS) introduced over the first guidewire and placed into the B5 bile duct, bridging the right and left hepatic ducts; **c** a second SEMS placed into the B3 bile duct bridging the hepatogastric stoma.



► **Video 1** Re-intervention with endoscopic ultrasound-guided hepaticogastrostomy (EUS-HGS). Drainage of the right hepatic duct was challenging, but we achieved technical success using a multipath occlusion balloon.

The authors

Daisuke Uchida, Hironari Kato, Hiroyuki Okada

Department of Gastroenterology, Okayama University Hospital, Okayama, Japan

Corresponding author

Daisuke Uchida, MD, PhD

Department of Gastroenterology, Okayama University Hospital, 2-5-1 Shikata-cho, Okayama 700-8558, Japan
 Fax: +81-86-2255991
 d.uchida0309@gmail.com

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