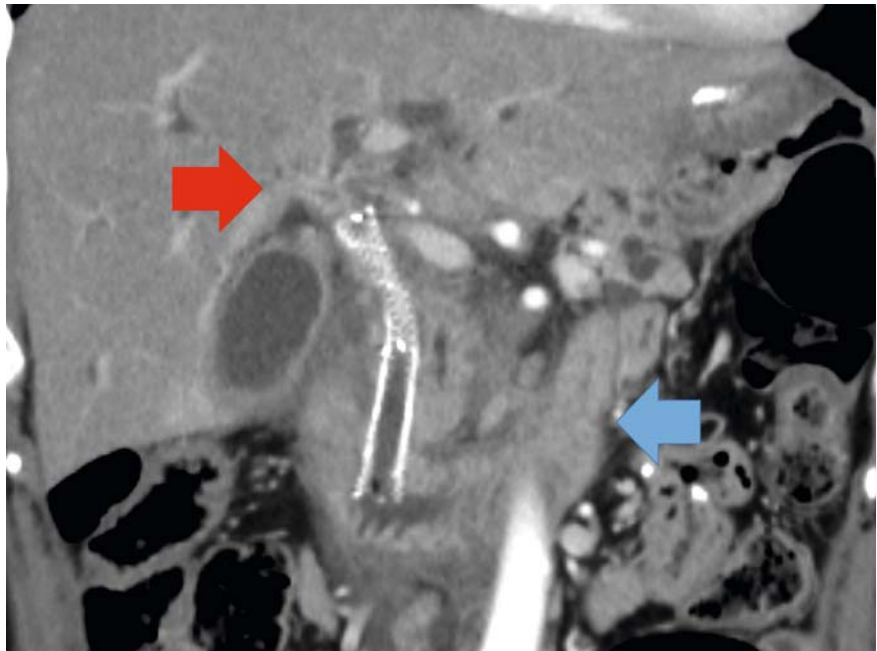


## Re-intervention with endoscopic ultrasound-guided hepaticogastrostomy for unresectable hilar biliary drainage using a multipath occlusion balloon

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.

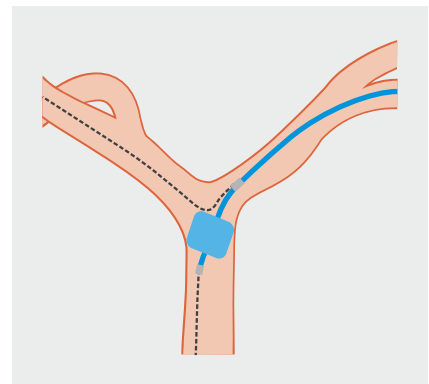
Contrast-enhanced computed tomography (CT) showed strictures of the hilar bile duct and duodenum (▶ Fig. 1) associated with dissemination of the gastric cancer. EUS-HGS was performed (▶ Fig. 2), and a 7-Fr plastic stent (TYPE-IT; Gadelius Medical, Tokyo, Japan) was placed into the B3 bile duct [4]. However, 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.

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