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Endoscopic ultrasound-guided hepaticojejunostomy for complete biliary anastomotic stricture: the echo-free space technique for scope insertion in surgically altered anatomy

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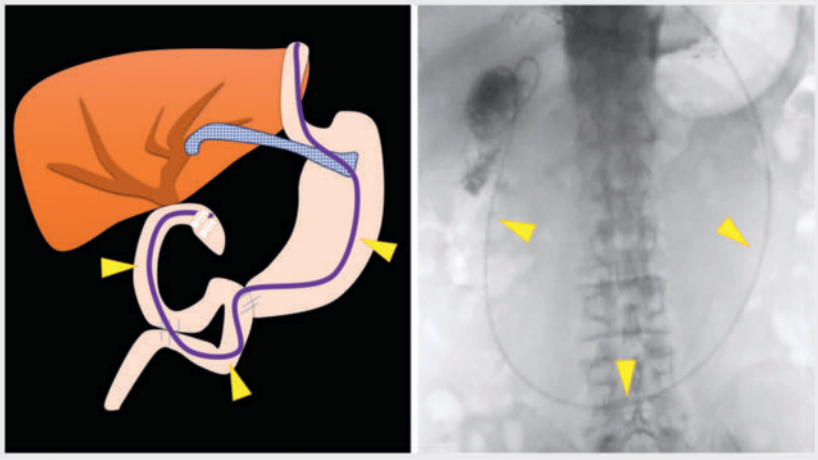
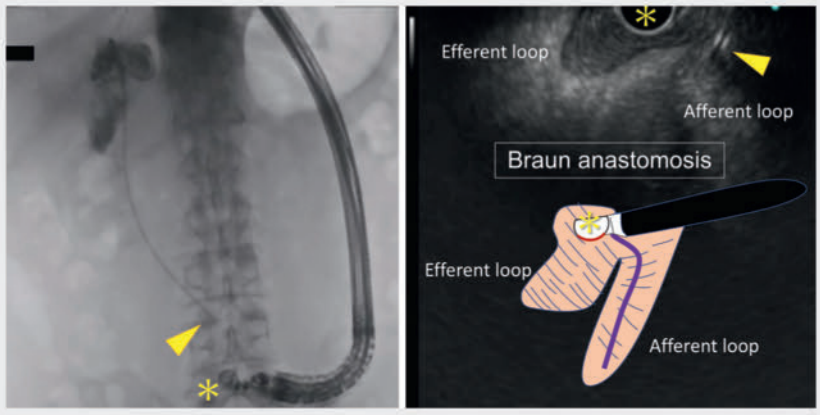
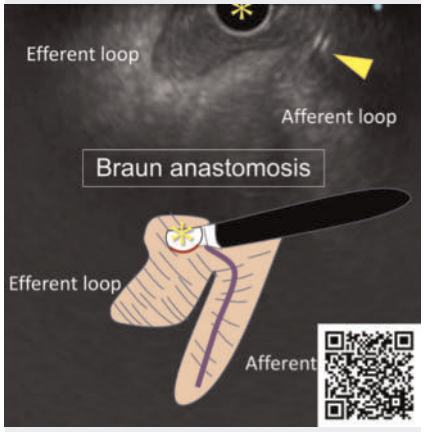


▶ **Fig. 1** Schematic diagram and fluoroscopic image showing a 6-Fr endoscopic nasobiliary drainage catheter (arrowheads) placed near the anastomotic stricture after a single-balloon enteroscope had been inserted up to the anastomosis, which was marked with a clip.



▶ **Fig. 2** A side-viewing linear endoscope (asterisk) is used to identify the Braun anastomosis, relying on careful observation of the echo image, the endoscopic nasobiliary drainage catheter (arrowhead) is used as a guide to reach the choledochojejunostomy.

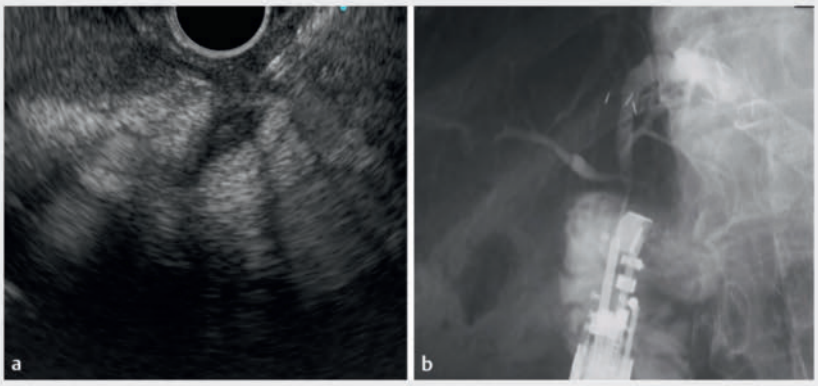


▶ **Video 1** Endoscopic ultrasound-guided hepaticojejunostomy is performed in a patient with complete biliary anastomotic stricture using the echo-free space technique to insert the scope into the choledochojejunostomy site.

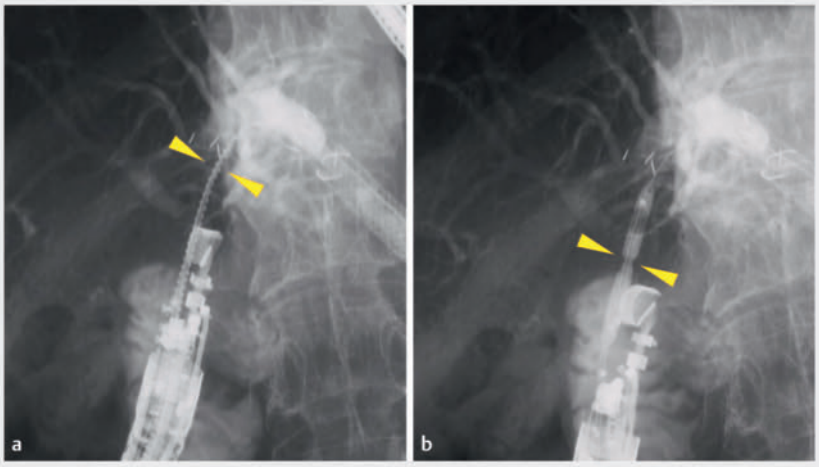
Postoperative biliary strictures are estimated to occur in 2.6% of patients. When endoscopic treatment is difficult, they can be treated with endoscopic ultrasound-guided hepaticojejunostomy (EUS-HJS) using a forward-viewing linear endoscope [1–4]. However, in many institutions, the forward-viewing scope is not readily available, making immediate intervention difficult. We have developed a safe and reliable method for inserting a side-viewing linear endoscope using the "echo-free space" technique [5].

We present the case of a 71-year-old man who underwent total pancreatectomy and choledochojejunostomy for pancreatic cancer. After 8 months, he developed cholangitis due to an anastomotic stricture and was referred to our department. Single-balloon endoscopic retrograde cholangiopancreatography (ERCP) and EUS-guided hepaticogastrostomy (EUS-HGS) were attempted, but the patient continued to have recurrent cholangitis. We therefore decided to perform EUS-HJS from the anastomotic site.

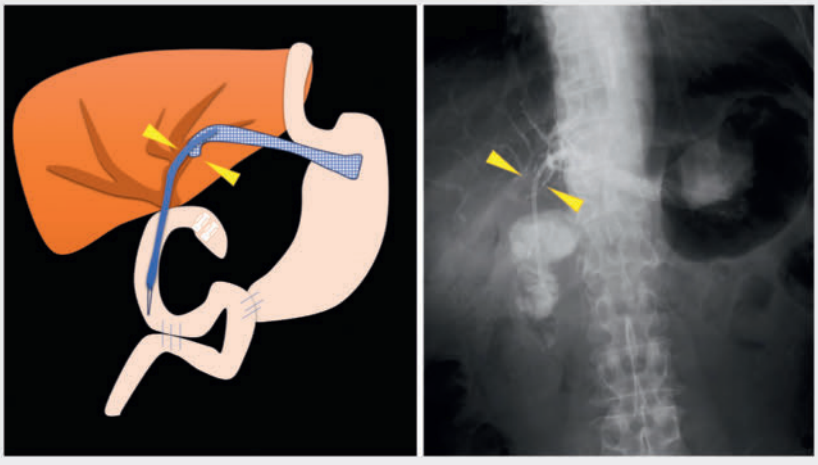
The single-balloon enteroscope was first inserted up to the anastomosis, which was marked with a clip; a 6-Fr endoscopic nasobiliary drainage (ENBD) catheter was placed near the anastomotic stricture (▶ **Fig. 1**). The scope was switched to a side-viewing linear endoscope (GF-UCT260) and the Braun anastomosis was identified on careful observation of the echo image, with the ENBD catheter used as a guide to reach the HJS (▶ **Fig. 2**; ▶ **Video 1**). The bile duct was punctured



▶ **Fig. 3** Endoscopic ultrasound and fluoroscopic images showing: **a** the bile duct being punctured through the anastomosis using a 19G needle; **b** the appearance after the injection of contrast medium.



▶ **Fig. 4** Fluoroscopic images showing the stenosis being dilated with a spiral drill dilator and tapered-tip balloon catheter.



▶ **Fig. 5** Schematic diagram and fluoroscopic image showing a 7-Fr, 9-cm inside stent (arrowhead) placed to complete the procedure.

through the anastomosis with an 19G EZ Shot 3 Plus (Olympus) and a guidewire was placed (▶ **Fig. 3**). The stenosis was dilated with a spiral drill dilator (Tornus ES; Olympus) and then with a tapered-tip balloon catheter (REN; Kaneka) up to 4 mm (▶ **Fig. 4**), and the procedure was completed with the placement of a 7-Fr, 9-cm inside stent (▶ **Fig. 5**).

This case suggests that the echo-free space technique using a side-viewing linear endoscope can be useful in post-operative patients and represents a new option for EUS-HJS in the treatment of complete biliary anastomotic stricture.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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