

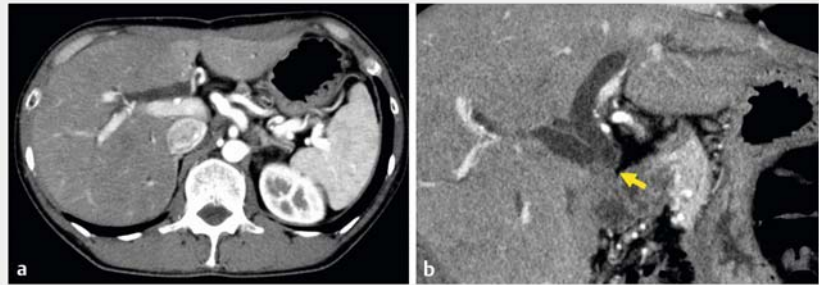
Endoscopic ultrasound-guided choledochojejunostomy using a forward-viewing echoendoscopic saddle-cross technique



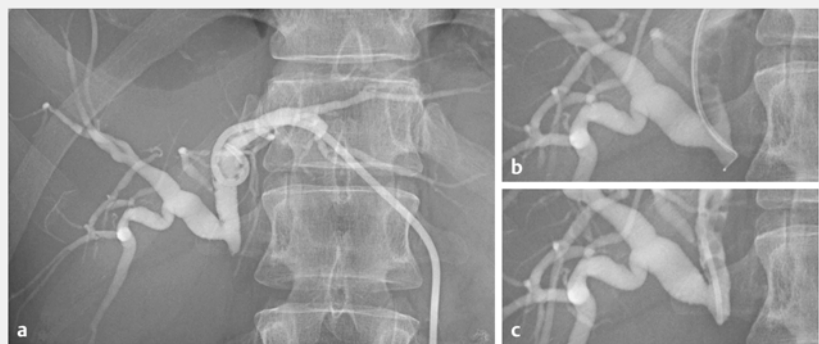
We reported good results for endoscopic treatment of benign hepaticojejunostomy anastomotic stricture (HJAS) using two fully covered self-expandable metallic stents (FCSEMSs) with the saddle-cross technique [1]. A completely occluded HJAS requires drainage by percutaneous transhepatic biliary drainage (PTBD) or endoscopic ultrasound-guided hepaticogastrostomy (EUS-HGS) [2]; PTBD and EUS-HGS cannot be stent-free, which may decrease patients' activities of daily living. We present a modified saddle-cross technique for a completely occluded HJAS using a forward-viewing echoendoscope and two FCSEMSs.

A 30-year-old man underwent duodenal gastrointestinal stromal tumor surgery. Liver dysfunction occurred 1 year postoperatively; computed tomography showed bile duct dilatation (► Fig. 1). The transgastrointestinal approach and breakthrough in anastomosis under PTBD failed. The patient was referred to our hospital for internal fistulization (► Fig. 2).

Endoscopic ultrasound (EUS)-guided choledochojejunostomy using a forward-viewing endoscope (TGF-UC260; Olympus Medical Systems, Tokyo, Japan) with the saddle-cross technique was performed for internal fistulization (► Video 1). A forward-viewing endoscope was inserted up to the HJAS; anastomosis was confirmed using endoscopy and ultrasound (► Fig. 3). The bile duct was punctured through the anastomosis using a 19-gauge needle (EZ shot 3 plus; Olympus Medical Systems), and a 0.025-inch guidewire (M-through; Medico's Hirata, Osaka, Japan) was advanced into the bile duct. The fistula was dilated using an electrocautery dilator (Fine025; Medico's Hirata) and an 8-mm dilation balloon (REN; Kaneka, Tokyo, Japan). Two guidewires were placed in the right and left bile ducts and two FCSEMSs (BONASTENT M-Intraductal, 8 mm, 3 cm; Medico's Hirata) were placed (► Fig. 4).



► Fig. 1 Computed tomography scan showing dilation of the right and left bile ducts from the beginning of the hepaticojejunostomy anastomosis (arrow). **a** Axial image. **b** Coronal image.



► Fig. 2 Hepaticojejunostomy anastomotic stenosis approach from percutaneous transhepatic biliary drainage (PTBD). **a** Contrast from the PTBD shows complete occlusion of the hepaticojejunostomy anastomosis. **b** The guidewire could not pass through the hepaticojejunostomy anastomosis. **c** Contrast did not flow when the catheter was pressed against the hepaticojejunostomy anastomosis.

After PTBD removal, the two FCSEMSs were endoscopically removed 2 months postoperatively. Sufficient dilation of the fistula was observed (► Fig. 5). The patient experienced no restenosis 6 months postoperatively.

Although there are reports on EUS-guided choledochojejunostomy [3, 4], this is the first on treatment using a modified saddle-cross technique, which may be an option for primary endoscopic treatment of a completely occluded HJAS.

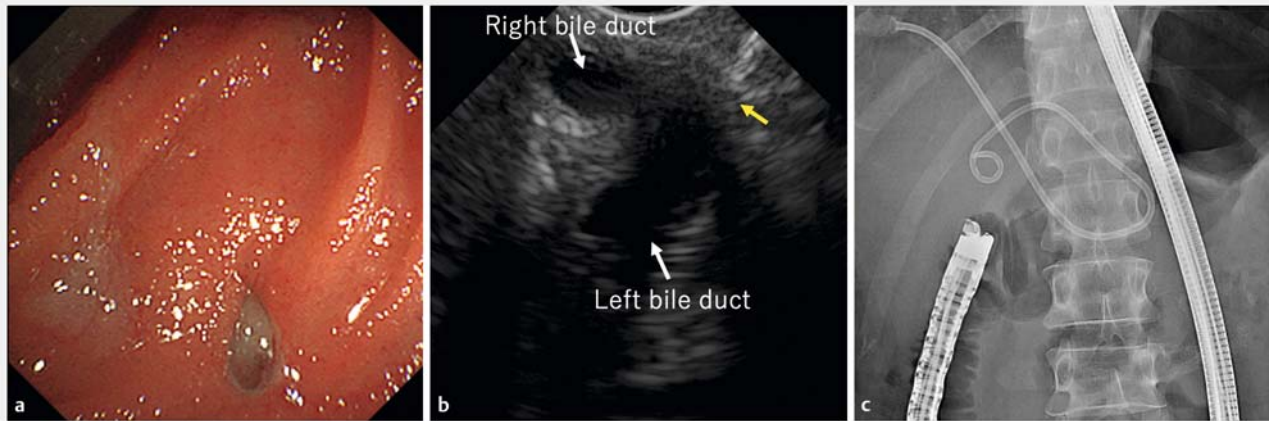
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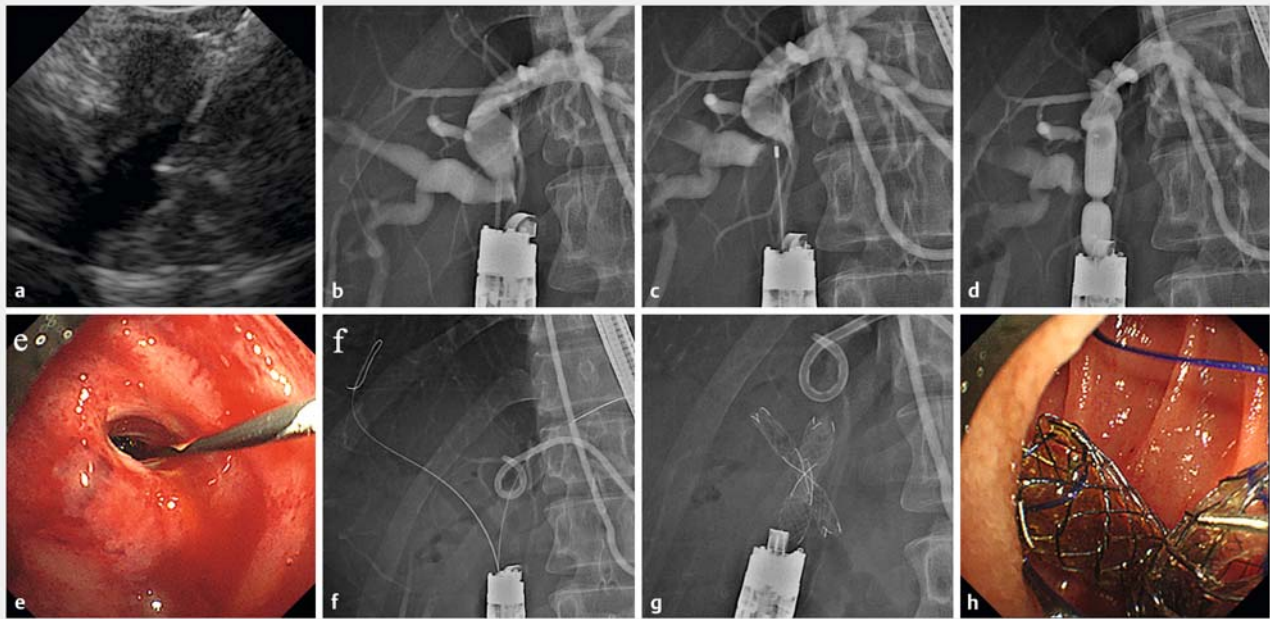
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Competing interests

The authors declare that they have no conflict of interest.



► **Fig. 3** Trans-gastrointestinal endoscopic approach for hepaticojejunostomy anastomotic stenosis using a forward-viewing echoendoscope. **a** Endoscopic image of hepaticojejunostomy anastomotic stenosis. **b** Endoscopic ultrasound image of hepaticojejunostomy anastomotic stenosis (yellow arrow). **c** Radiograph of hepaticojejunostomy anastomotic stenosis.



► **Fig. 4** Endoscopic ultrasound (EUS)-guided choledochojejunostomy. **a** Puncture of the bile duct under EUS guidance using a 19-gauge needle. **b** Contrast enhancement confirms the bile duct. **c** Fistula dilation with an energized dilator. **d** Fistula dilation with a balloon dilator. **e** Endoscopic image of the fistula after dilation. **f** Two guidewires are placed in the right and left bile ducts. **g** Two fully covered self-expanding metal stents (FCSEMSs) are placed. **h** Endoscopic image after placement of the FCSEMSs.

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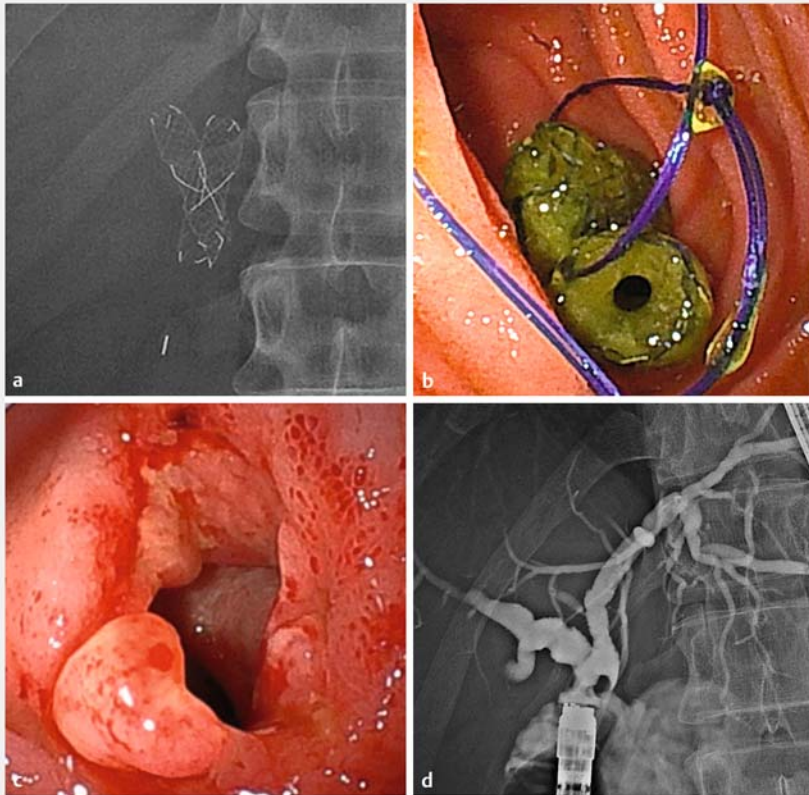
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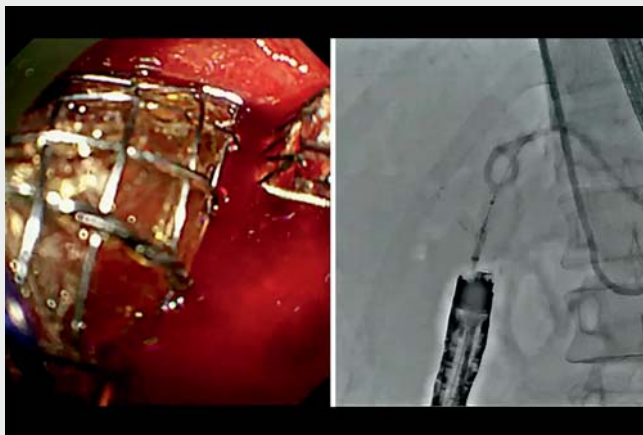
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► **Fig. 5** Endoscopic removal of two FC-SEMSs 2 months after the procedure. **a** Radiograph of the two FCSEMSs. **b** Endoscopic image of the two FCSEMSs. **c** Endoscopic image after FCSEMS removal. **d** Radiograph shows good contrast spillage.



► **Video 1** Internal fistulization of completely occluded hepaticojejunostomy anastomotic stricture is difficult. We performed endoscopic ultrasound-guided choledochojejunostomy using a forward-viewing echoendoscope and two metallic stents with a modified saddle-cross technique.



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