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Successful biliary biopsy in a patient with surgically altered anatomy using a slim peroral cholangioscope via an endoscopic ultrasound-guided biliary drainage fistula

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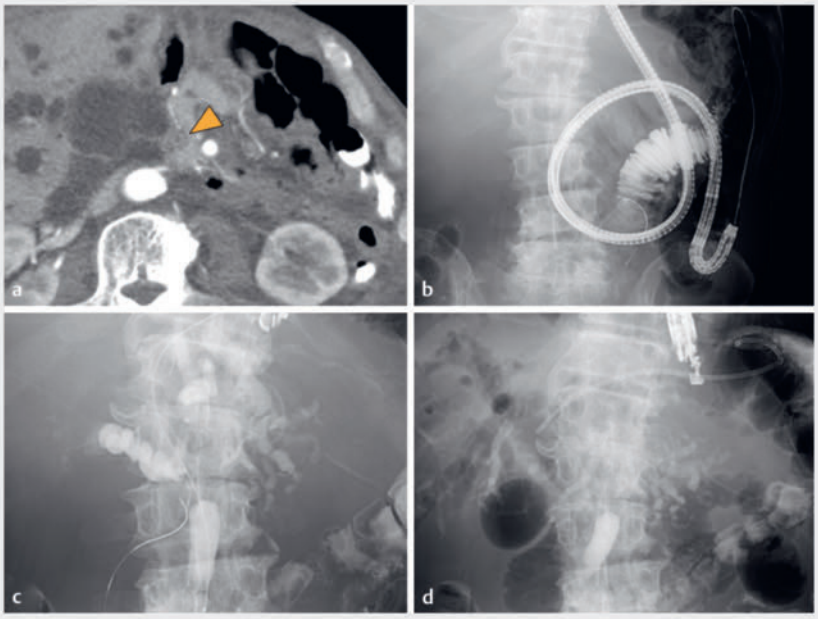

▶ **Fig. 1** **a** Abdominal contrast-enhanced computed tomography showing a stricture (arrowhead) in the distal bile duct and a small, high-attenuation mass encircling the duct. **b** Balloon-assisted enteroscope failed to reach the papilla. **c** Fluoroscopic image showing a stricture in the distal bile duct. **d** A 15-cm 7-Fr dedicated plastic stent was inserted through the fistula.

Video 1 Biliary biopsy was successfully performed in a patient with surgically altered anatomy using a slim peroral cholangioscope through an endoscopic ultrasound-guided biliary drainage fistula.

Endoscopic retrograde cholangiopancreatography (ERCP) can be performed in patients with surgically altered anatomy using a balloon-assisted enteroscope. However, postoperative adhesions and unique anatomical characteristics result in lower technical success rates, ranging from 75.8% to 94% [1–3]. Recently, endoscopic ultrasound-guided biliary drainage (EUS-BD) has been used after unsuccessful transpapillary biliary drainage attempts [4, 5]. Nevertheless, obtaining a biopsy through an EUS-BD fistula remains technically challenging. This report presents a case where distal cholangiocarcinoma was diagnosed macroscopically and pathologically using a slim peroral cholangioscope (eyeMAX; Micro-Tech Co., Ltd., Tokyo, Japan) via an EUS-BD fistula.

A 66-year-old man with a history of Roux-en-Y reconstruction following gastric cancer resection presented with obstructive jaundice. Abdominal contrast-enhanced computed tomography revealed a stricture with circumferential wall enhancement in the distal bile duct (▶ **Fig. 1a**). Balloon endoscopy-assisted ERCP was attempted; however, adhesions prevented enteroscope insertion into the major papilla (▶ **Fig. 1b**). Consequently, EUS-BD was attempted. The bile duct was punctured with a 22-gauge needle. Cholangiography confirmed a distal bile duct stricture. A 7-Fr dedicated plastic stent was inserted through the fistula (▶ **Fig. 1c, d**). Considering the anticipated difficulty of the EUS-guided rendezvous technique due to adhesions, we attempted a biopsy via the EUS-BD fistula.

One month later, we dilated the fistula using an ERCP catheter passed over the 7-Fr stent, allowing easy insertion of a 3.2-mm cholangioscope without additional balloon catheter dilation (▶ **Video 1**). The cholangioscope revealed a pinhole stricture with abnormal vascular proliferation in the distal bile duct (▶ **Fig. 2a**). Micro biopsy forceps were used to obtain specimens from the stricture (▶ **Fig. 2b, c**). The position of the stricture was confirmed fluoroscopically. Following cholangioscope withdrawal, additional biopsy specimens were acquired using an ERCP guide sheath (Olympus Medical, Tokyo, Japan) (▶ **Fig. 2d, e**). No procedure-related adverse events occurred. Both biopsy specimens indicated adenocarcinoma, and surgical intervention was scheduled (▶ **Fig. 2f**).

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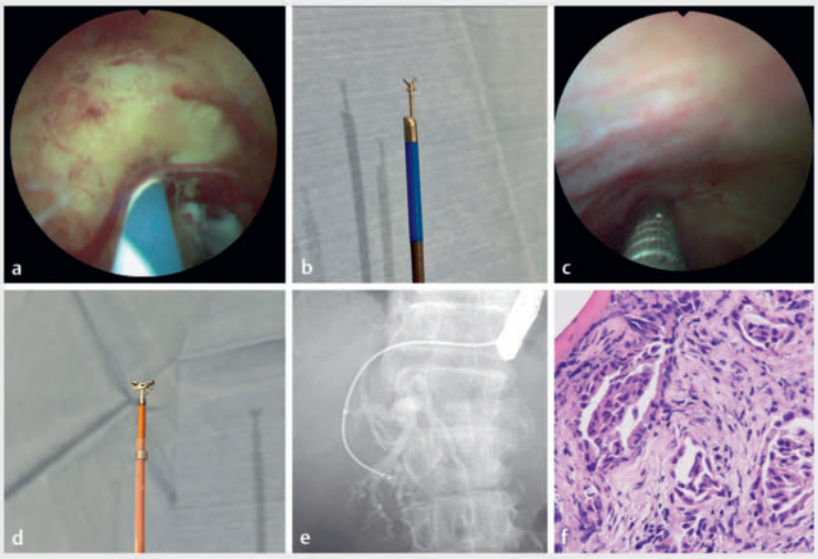

▶ **Fig. 2** **a** The distal bile duct was pinhole-shaped and had abnormal vascular proliferation. **b** Biopsy forceps used with the slim peroral direct digital cholangioscope (eyeMAX; MicroTech Co., Ltd., Tokyo, Japan). **c** The stricture site was identified endoscopically, and a biopsy was performed. **d** The biopsy forceps were deployed through an endoscopic retrograde cholangiopancreatography guide sheath (Olympus Medical, Tokyo, Japan). **e** Biopsy specimens were obtained from the stricture site under fluoroscopic guidance. **f** Biopsy specimens showed adenocarcinoma.

Conflict of Interest

The authors declare that they have no conflict of interest.

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