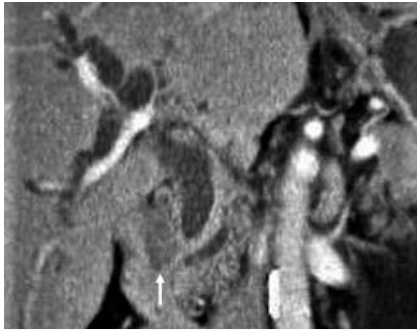


Endoscopic ultrasound-guided one-step antegrade metal stent placement with an ultra-slim introducer for preoperative biliary drainage

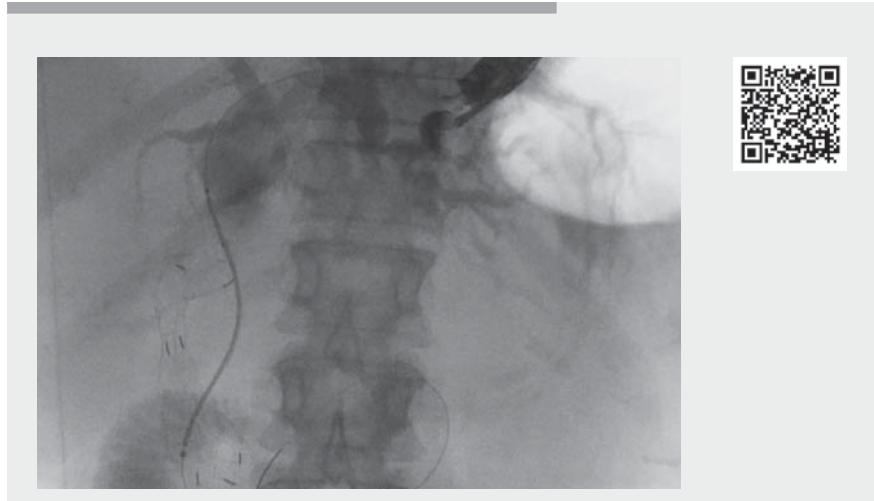


► **Fig. 1** A coronal image of contrast-enhanced computed tomography showed a dilated common bile duct due to pancreatic head cancer (arrow).



► **Fig. 2** A novel uncovered self-expandable metal stent with an ultra-slim 5.4-Fr introducer and an ultra-tapered stiff tip.

A 55-year-old-female suffered from advanced obstructive jaundice due to resectable pancreatic cancer (► **Fig. 1**). Preoperative biliary drainage via endoscopic retrograde cholangiopancreatography (ERCP) was attempted but unsuccessful due to duodenal obstruction. We then attempted endoscopic ultrasound-guided antegrade stenting using a novel uncovered self-expandable metal stent (SEMS) with an ultra-slim 5.4-Fr introducer and an ultra-tapered stiff tip (YABUSAME; Kaneka Medix, Osaka, Japan) (► **Fig. 2**) after placement of a duodenal stent (► **Video 1**). B2 was punctured with a 19-gauge needle via the stomach followed by contrast injection to depict the biliary tree (► **Fig. 3 a**). Then, a 0.025-inch angle-tip guidewire (INAZUMA;



► **Video 1** Endoscopic ultrasound-guided one-step antegrade metal stent placement with an ultra-slim introducer.

Kaneka Medix) was successfully manipulated antegrade into the duodenum through the stricture. Just after a removal of the needle, an introducer of a YABUSAME (10×60 mm) was inserted into the bile duct without any tract dilation and easily passed through the stricture (► **Fig. 3 b**). Finally, the stent was deployed (► **Fig. 3 c**). No adverse events had occurred for two weeks until surgery. EUS-guided biliary drainage includes bilioenterostomy, the rendezvous technique, and antegrade stenting. In preoperative biliary drainage, endoscopic ultrasound-guided bilioenterostomy seems unfavorable because the influence of a bilioenteric fistula on surgery is unknown [1]. Although the EUS-guided rendezvous technique and antegrade stenting do not form a fistula, both have pros and cons. In the rendezvous technique, tract dilation is usually unnecessary, but complicated steps including scope exchange, grabbing and pulling the guidewire, and cannulation are required. EUS-guided antegrade stenting is a simpler method; however, tract dilation

with a dilator [2] or catheter [3] prior to insertion of a SEMS introducer is usually required and that increases a risk of the bile leak. In antegrade stenting, this novel introducer is likely to allow a SEMS to be placed just after needle removal and the bile leak and procedural time to be decreased. This method could be a useful alternative after failed ERCP in preoperative biliary drainage.

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Competing interests

The authors declare that they have no conflict of interest.

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► **Fig. 3** Fluoroscopic views of endoscopic ultrasound-guided one-step antegrade stenting. **a** Cholangiogram after the puncture of B2 via the stomach depicted the dilated intrahepatic bile ducts and proximal common bile duct. A duodenal stent was placed in the second part of the duodenum (arrow). **b** Just after the removal of the needle leaving a guidewire in the duodenum, an introducer of an uncovered self-expandable metal stent was inserted into the duodenum over the guidewire. **c** The stent (10×60 mm) was deployed across the stricture.

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