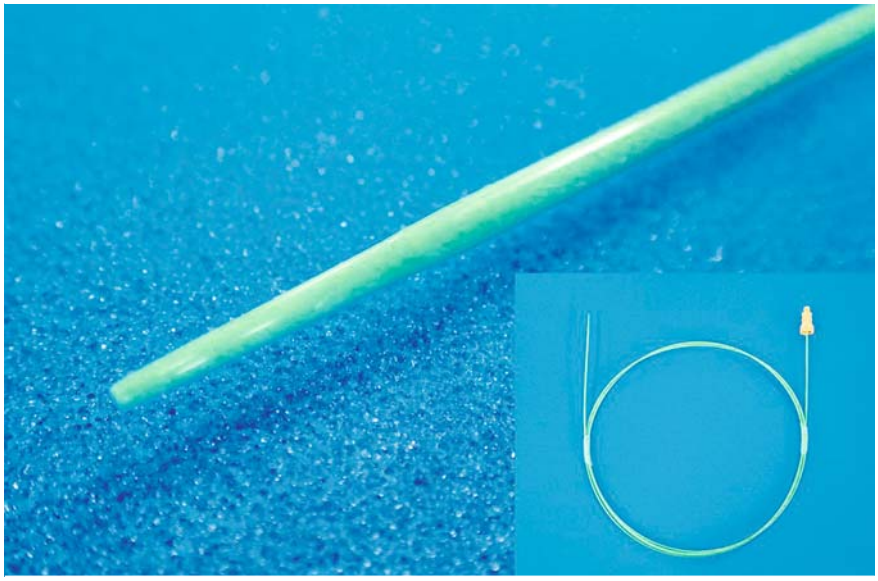
Novel wire-guided fine-gauge bougie dilator for transpapillary or endoscopic ultrasonography-guided biliary drainage

Endoscopic management of biliary stricture generally requires dilation using devices such as an endoscopic retrograde cholangiopancreatography (ERCP) balloon dilation catheter before stenting [1]. Endoscopic ultrasonography (EUS)-guided biliary drainage (EUS-BD) also requires fistula dilation before stenting. Recently, ultraslim balloon catheters [1] and diathermic dilators [2] have also been developed as dilation devices. These devices must be wire-guided, coaxial with the guidewire, fine-gauge, and sufficiently stiff.

Herein, we present two patients who successfully underwent biliary dilation using a novel wire-guided fine-gauge bougie dilator (ES dilator soft type; Zeon Medical Inc., Tokyo, Japan) (▶ **Fig. 1** and ▶ **Fig. 2**) for transpapillary drainage and EUS-BD.

The first patient was a 79-year-old man who was admitted with obstructive jaundice having undergone placement of self-expandable metal stents (SEMSs) for perihilar bile duct cancer 5 months previously. An ERCP showed occlusion of the SEMSs (▶ **Fig. 3 a**). First, a 0.025-inch hard-type guidewire (VisiGlide 2; Olympus, Tokyo, Japan) was advanced across the occluded SEMSs. A tapered ERCP catheter and a dilation catheter (SBDC-6; Cook Japan, Tokyo, Japan) could not be passed through the stricture (▶ **Video 1**). The novel dilator was then inserted, resulting in successful passage through the occluded SEMSs (▶ **Fig. 3 b**; ▶ **Video 1**). Finally, an uncovered SEMS was placed without any complications.

The second patient was an 85-year-old man who was admitted with obstructive jaundice and a history of total gastrectomy and Roux-en-Y reconstruction for gastric cancer 21 years previously. A computed tomography (CT) scan showed an ampullary tumor and treatment by EUS-BD was selected. Firstly, B3 was punctured with a 19-gauge needle via the jejunum and a 0.025-inch hard-type guidewire (VisiGlide 2; Olympus) was placed. A tapered ERCP catheter was tried without success to dilate the fistula. Subsequently, dilation with the novel dilator was attempted, and this was successfully inserted into the intrahepatic bile duct (▶ **Fig. 4**; ▶ **Video 2**). Finally, EUS-guided antegrade stenting



▶ **Fig. 1** The tip of the novel fine-gauge bougie dilator (ES dilator soft type; Zeon Medical Inc., Tokyo, Japan) is 3.2-Fr in diameter, tapered, and coaxial with the 0.035-inch guidewire, and has a radiopaque marker to help during insertion. Its maximum diameter is 7.4-Fr. Inset: Image of the whole dilator.

VIDEO 1

▶ Video 1: Images from patient #1 during endoscopic retrograde cholangiopancreatography showing that a Soehendra biliary dilation catheter could not be passed through the stricture but the ES dilator soft type was easily passed through the stricture. Finally, an uncovered self-expandable metal stent insertion for revision was performed.

▶ **Fig. 2** The novel fine-gauge bougie dilator (ES dilator soft type; 3.2-Fr tip; Zeon Medical Inc., Tokyo, Japan; right side in all images) is compared with: **a** a conventional bougie dilator (SBDC-6; 4-Fr tip and maximum diameter of 6-Fr; Cook Japan, Tokyo, Japan) shown placed over a 0.035-inch guidewire; **b** an ultraslim balloon catheter (ZARA EPBD balloon; 3.1-Fr tip and maximum diameter of 6.3-Fr; Century Medical Inc., Tokyo, Japan) shown placed over a 0.035-inch guidewire; **c** an ultraslim balloon catheter (REN biliary dilation catheter; 3-Fr tip and maximum diameter of 6.4-Fr; Kaneka Corporation, Osaka, Japan) shown placed over a 0.025-inch guidewire. The ES dilator and ZARA EPBD balloon are excellent for having minimal difference in caliber between the guidewire and the catheter.

was performed without any complications (▶ **Video 2**).

The novel wire-guided fine-gauge bougie dilator is useful for both transpapillary and fistula dilation in EUS-BD owing to its ideal thickness and stiffness.

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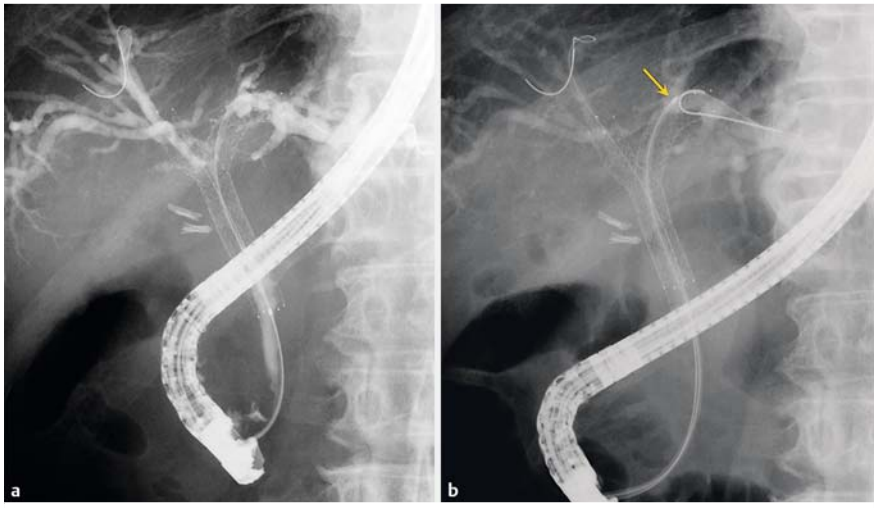
Competing interests

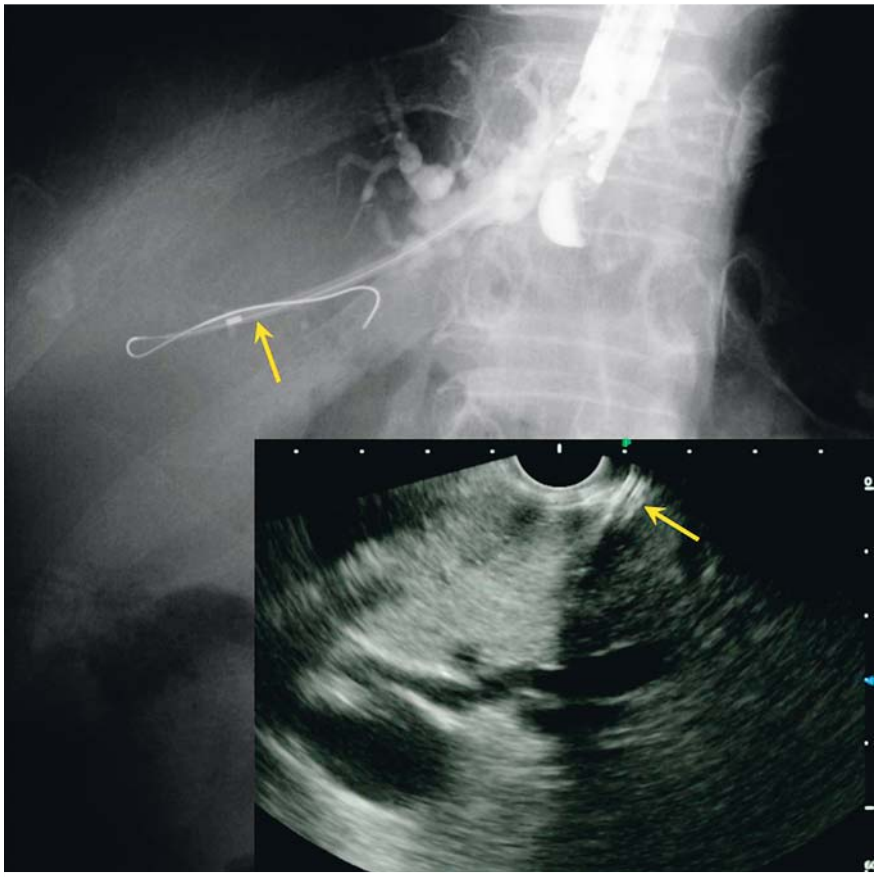
The novel bougie dilator has been developed through collaborative research between Dr. Kawakami and Zeon Medical Inc., Tokyo, Japan. Dr. Kawakami is a consultant and gives lectures for the Zeon Medical Inc. The authors declare no conflict of interests for this article.

VIDEO 2

▶ Video 2: Images from patient #2 during endoscopic ultrasonography (EUS)-guided biliary drainage showing a guidewire placed in the intrahepatic bile duct after puncture of B3 with a 19-gauge needle. A tapered endoscopic retrograde cholangiopancreatography (ERCP) catheter could not be passed through the stricture; however, the ES dilator soft type was inserted with ease. It was then possible to pass a tapered ERCP catheter through the distal biliary stricture and finally EUS-guided antegrade stenting was performed for the distal biliary obstruction.



▶ **Fig. 3** Radiographic images from patient #1 showing: **a** recurrent perihilar biliary obstruction after multistenting in a stent-in-stent fashion; **b** the ES dilator soft type (arrow) that has been passed through the refractory biliary stricture.



▶ **Fig. 4** Radiographic image from patient #2 showing the ES dilator soft type (arrow) that was successfully advanced through the jejunal wall and intrahepatic bile duct after a failed attempt at fistula dilation using a tapered endoscopic retrograde cholangiopancreatography catheter. Inset: Endoscopic ultrasonography view showing the ES dilator soft type (arrow).

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