



## Pancreatic stent removal with a novel drill dilator

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### CASE PRESENTATION

A 58-year-old man underwent regular follow-up to evaluate chronic alcoholic pancreatitis. He had a plastic pancreatic stent placed to treat the main pancreatic duct (MPD) stricture and pancreatic fistula resulting from chronic pancreatitis (Fig. 1). ERCP was performed periodically for 3 years to replace the stent. The most recent ERCP was performed 3 months previously. Stricture dilation using a 4-mm balloon catheter (REN biliary dilation catheter; Kaneka Co, Inc, Osaka, Japan) was necessary to place an 8F, 12-cm plastic pancreatic duct stent (Gadelius Medical, Tokyo, Japan) in the MPD (Fig. 2).

### ERCP PROCEDURES

First, we tried to remove the plastic stent using grasping forceps (FG-44NR-1; Olympus, Tokyo, Japan) and a snare (SD-5U-1; Olympus); however, the stent removal was difficult because the distal flap was trapped in the pancreatic branch duct, and the stent was strongly anchored and fixed in the MPD. During stent removal, its proximal tip was torn and broken, making removal with a stent retriever impossible. Therefore, we inserted a catheter (MTW Endoscopic Manufaktur, Wesel, Germany) and a 0.025-inch guidewire (Visiglide2; Olympus) into the plastic stent from the broken proximal tip (Fig. 3). After guidewire placement in the MPD through the stent, a novel drill dilator was inserted (Tornus ES; Olympus) along the guidewire, which pushed the broken stent tip while rotating it clockwise (Fig. 4). The dilator tip was firmly attached to the stent, thus allowing removal with little resistance. We placed a 5F endoscopic nasopancreatic drainage tube (Gadelius Medical) because of the possibility of adverse events, such as bleeding and

pancreatitis, caused by the stent removal procedure. ERCP was performed after 3 days to replace the existing endoscopic nasopancreatic drainage tube with a 7F, 12-cm plastic stent (Flexima; Boston Scientific Corp, Boston, Mass, USA). This procedure revealed the presence of residual pancreatic fistula (Fig. 5). Finally, a plastic stent was positioned to traverse the fistula, bringing the procedure to completion. Four days after stent placement, a pancreatic fistula was not observed in the CT image (Fig. 6), and the patient was discharged without symptoms.

### DISCUSSION

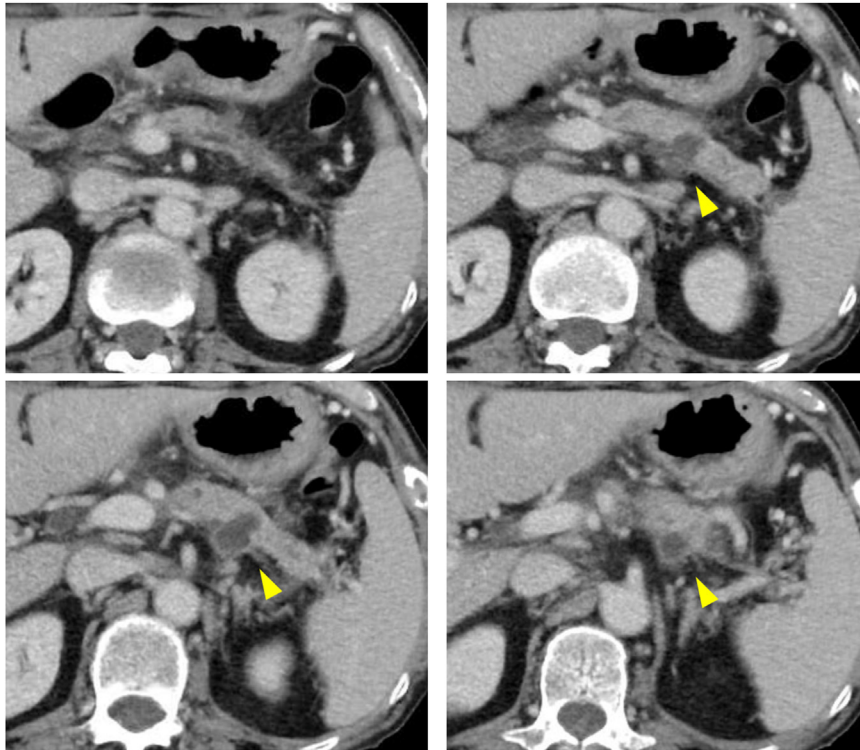
Pancreatic stents are often used for the treatment of benign or malignant MPD strictures and pancreatic stones. Previous studies have reported pancreatic stent migration, fracture, and dislocation frequencies of 1.5%, 1.2%, and 0.8%, respectively.<sup>1</sup> In such cases, the stent should be removed because the remaining pancreatic stent might cause harmful adverse events like acute pancreatitis, pancreatic duct disruption, and pseudocysts. However, pancreatic stent removal is technically challenging in some cases because of the presence of MPD strictures and their features, such as a narrow diameter and bent course. Matsumoto et al<sup>2</sup> reported the following main retrieval techniques for pancreatic stents: using a balloon catheter; forceps, baskets, or snares to perform direct grasping; and a stent retriever. In this case, none of these methods successfully removed the stent. Because the stent was broken, neither the proximal tip nor a stent retriever could be used; only a guidewire could be passed through. Therefore, a novel drill dilator that could be inserted along the guidewire was used, and its tapered tip facilitated passage through the broken stent tip and allowed for a secure grip on the stent, resulting in successful removal of the stent.

The drill dilator is a rotatable dilator with a drill-shaped tapered tip that can dilate severe strictures. The size of the dilation part is 7F (2.62 mm), and that of the shaft part is also 7F (2.64 mm). Two types of dilators conformed with guidewire (0.025 or 0.018 inch) are available. There have been reports on the use of this device for dilating pancreatic duct strictures and performing EUS-related procedures.<sup>3-5</sup> This tapered-tip shape enables us to insert the tip easily into the stent, even if the stent tip is broken or deformed, along the guidewire. Additionally, the corkscrew shape allows the stent to be firmly engaged using the clockwise rotation

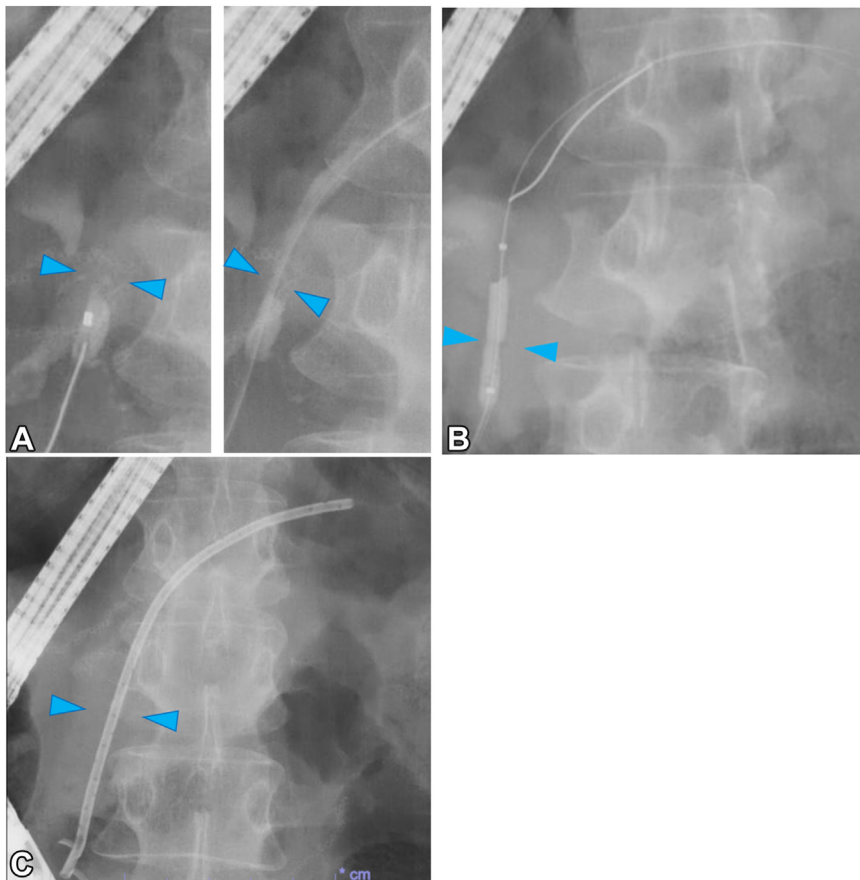
Abbreviation: MPD, main pancreatic duct.

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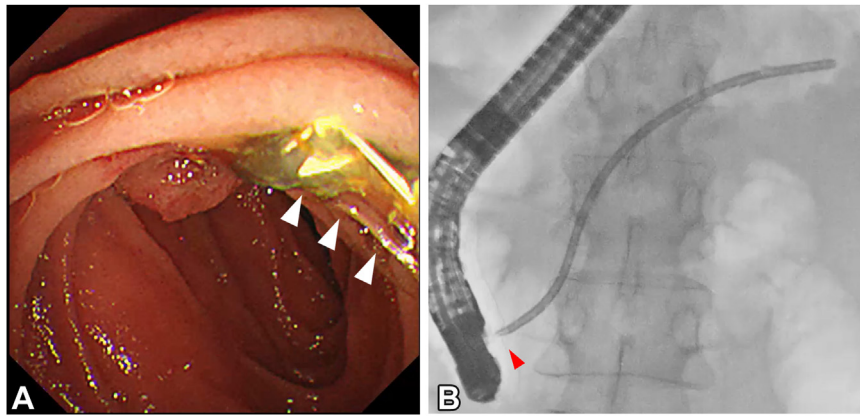
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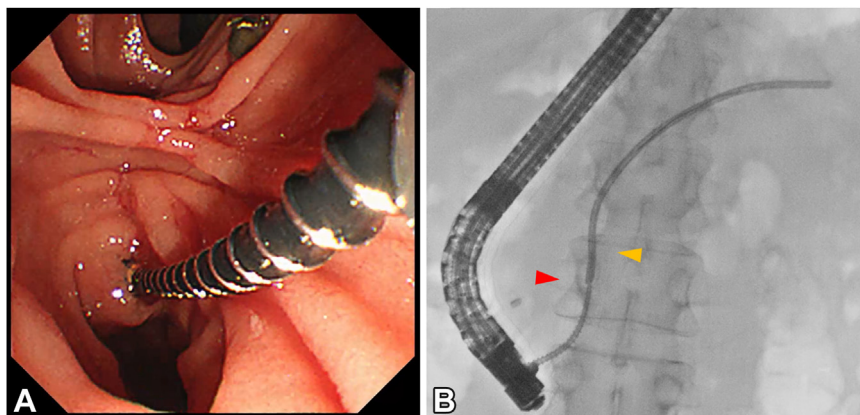
**Figure 1.** CT images of the pancreatic fistula. Pancreatic leakage associated with the fistula of the caudal main pancreatic duct. *Yellow arrowheads* indicate pancreatic fistula.



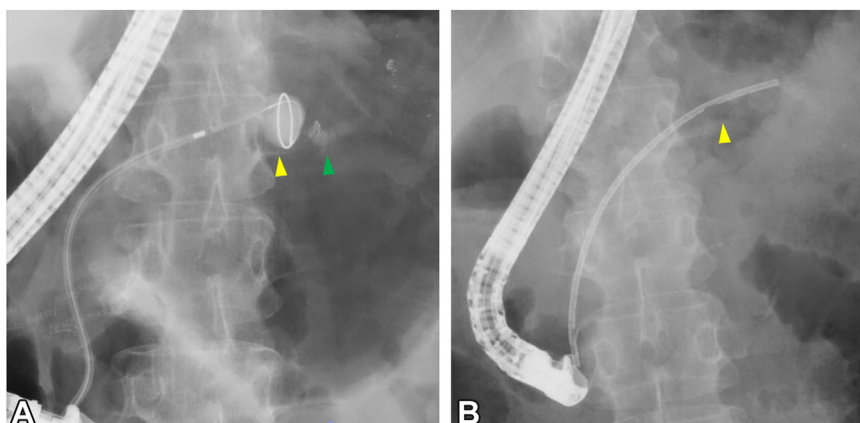
**Figure 2.** Images of endoscopic retrograde pancreatography. **A**, The main pancreatic duct (MPD) stricture at the pancreatic head. **B**, Balloon catheter dilation of the strictures. **C**, A plastic stent placement in the MPD (8F, 12 cm). *Blue arrowheads* indicate MPD stricture area.



**Figure 3.** Images of the broken and torn pancreatic stent. **A**, Fragments of the broken plastic pancreatic stent. **B**, Fluoroscopic image of the broken pancreatic stent. *White arrowheads* indicate fragment of the pancreatic stent; *red arrowhead* indicates proximal tip of the broken pancreatic stent.



**Figure 4.** Images of pancreatic duct stent removal using a novel drill dilator. **A**, The drill dilator was inserted in the stent via clockwise rotation. **B**, A fluoroscopic image of the novel drill dilator inserted in the broken pancreatic stent. *Red arrowhead* indicates proximal tip of the pancreatic stent; *orange arrowhead* indicates the tip of the novel drill dilator inserted in the pancreatic stent.



**Figure 5.** Fluoroscopic images of pancreatic stent placement over the main pancreatic duct (MPD) disruption site. **A**, Pancreatic fistula and dilation of the caudal MPD compared with the MPD disruption site. **B**, Placement of a plastic pancreatic stent (7F, 12 cm) to cover the pancreatic fistula. *Yellow arrowheads* indicate pancreatic fistula; *green arrow* indicates dilated caudal MPD.



**Figure 6.** Contrast-enhanced CT images showing improvement of the pancreatic fistula. The pancreatic fistula disappeared, and a pancreatic stent was implanted across the fistula. *Red arrowheads* indicate pancreatic stent.

technique. From these facts, the drill device can be inserted easily with a slight push and the clockwise rotation technique. When a pancreatic duct stent cannot be removed using conventional methods, this stent removal method using a novel drill dilator may be effective ([Video 1](#), available online at [www.videogie.org](http://www.videogie.org)).

## DISCLOSURE

The authors disclosed no financial relationships relevant to this publication.

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