

## Downstream balloon dilation technique for endoscopic removal of an impacted pancreatic duct stone after pancreatoduodenectomy

Endoscopic retrograde pancreatography is an established modality for the treatment of pancreatic duct stones [1,2]. Although it is technically challenging in patients with prior pancreatoduodenectomy [3,4], balloon-assisted endoscopic retrograde pancreatography and/or endoscopic ultrasound-guided pancreatic

drainage has been increasingly utilized to manage pancreatic diseases in patients with surgically altered anatomy [5]. Here we report a simple and feasible technique for the endoscopic removal of an impacted pancreatic duct stone after pancreatoduodenectomy using a short-type single-balloon enteroscope.

A 61-year-old man, who underwent pylorus-preserving pancreatoduodenectomy with modified Child's reconstruction three years earlier for pancreatic neuroendocrine tumor, was referred to our department for the treatment of acute pancreatitis. Contrast-enhanced computed tomography showed three radiopaque stones in the main duct; one of the three stones was impacted in the main pancreatic duct, resulting in obstructive pancreatitis (► Fig. 1). Therefore, an endoscopic intervention was performed using a short-type single-balloon enteroscope (SIF-H290S; Olympus Medical Systems, Tokyo, Japan) with a transparent hood. A tapered double-lumen catheter with a tip diameter of 3.6 Fr (Uneven Double Lumen Cannula Standard Type; Piolax Medical Devices, Kanagawa, Japan) was advanced through the

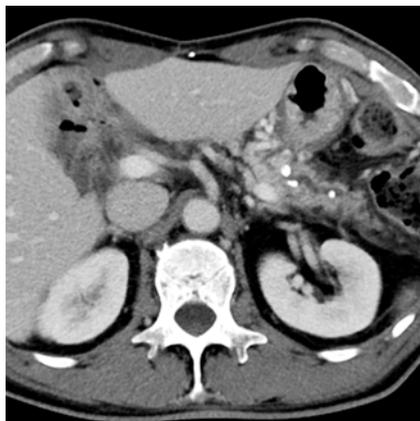
pancreaticojejunal anastomosis, and a 0.025-inch guidewire (VisiGlide 2; Olympus Medical Systems) was placed into the pancreatic duct; however, the catheter could not pass through the impacted stone at all. After placing an additional guidewire, the section downstream of the stone was dilated with a 6-mm balloon catheter (REN; Kaneka Medix, Osaka, Japan) (► Fig. 2a), and as the balloon deflated, the impacted stone moved downstream toward the balloon (► Fig. 2b, ► Video 1).

Finally, the pancreatic stones were successfully retrieved by using a wire-guided basket catheter (TetraCatch V; Olympus Medical Systems) (► Fig. 2c, ► Fig. 3). The downstream balloon dilation technique is simple and is worth a try when confronting impacted pancreatic duct stones.

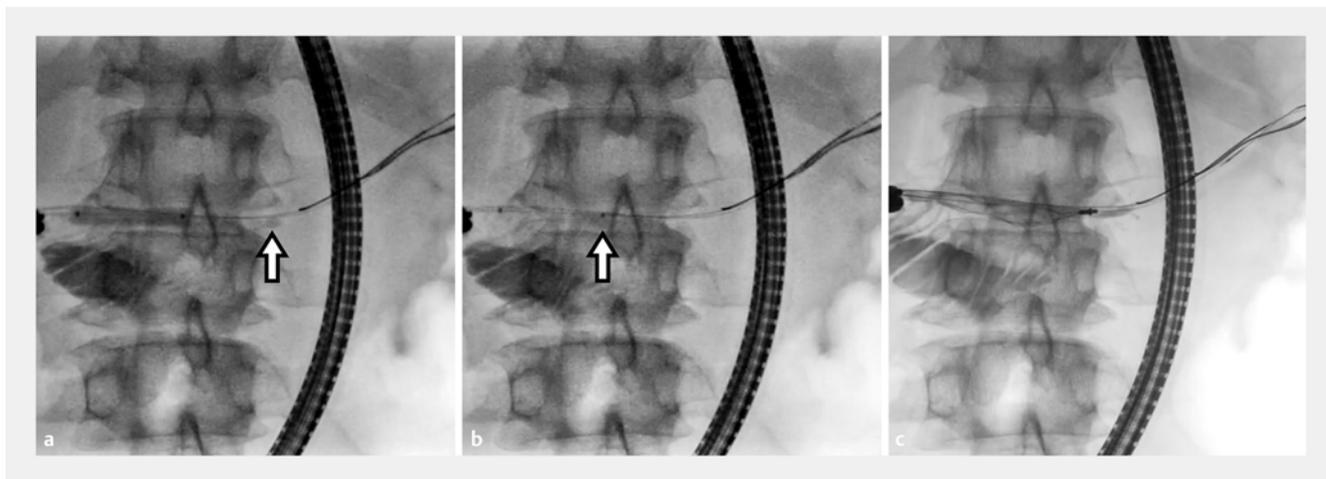
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### Competing interests

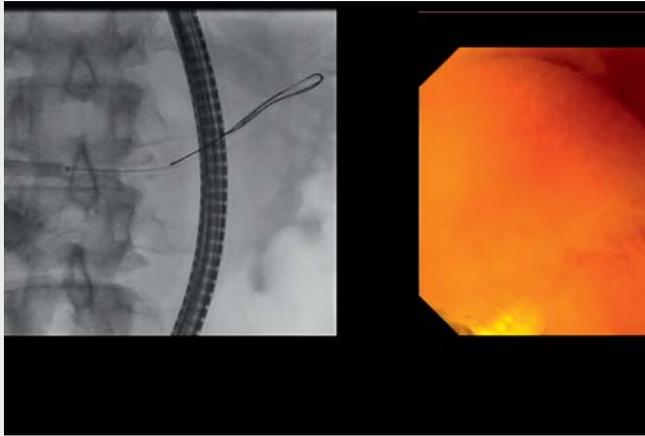
The authors declare that they have no conflict of interest.



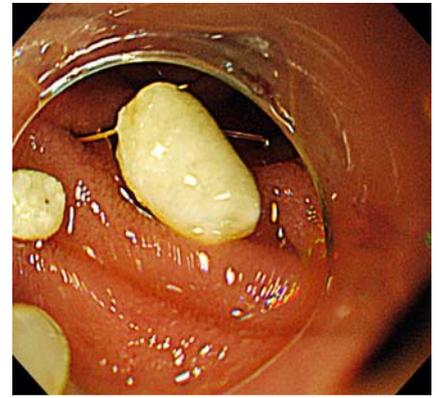
► Fig. 1 Contrast-enhanced computed tomography showed three radiopaque stones in the main duct; one of the three stones was impacted in the main pancreatic duct, resulting in obstructive pancreatitis.



► Fig. 2 Fluoroscopic images. **a** An impacted pancreatic duct stone (arrow) during the downstream balloon dilation. **b** As the balloon deflated, the pancreatic duct stone (arrow) moved downstream toward the balloon. **c** The pancreatic stone was captured with a wire-guided basket catheter.



**▶ Video 1** Downstream balloon dilation technique for endoscopic removal of an impacted pancreatic duct stone after pancreatoduodenectomy.



**▶ Fig. 3** Endoscopic view of pancreatic duct stones retrieved from the main pancreatic duct.

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