

## CASE REPORT

# Transjejunal endoscopic ultrasound-guided pancreatic drainage for pancreatic jejunostomy stricture using a forward-viewing echoendoscope in a patient with altered anatomy

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**ABSTRACT**

Pancreatic jejunostomy stricture (PJS) is one of the major late complications after pancreaticoduodenectomy. Endoscopic ultrasound-guided pancreatic drainage (EUS-PD) is considered a salvage treatment for symptomatic PJS after endoscopic retrograde pancreatography failure; however, the technical success rate of the endoscopic treatment of PJS remains unsatisfactory, mainly due to surgically altered anatomy. Herein, we describe a case of PJS successfully treated with transjejunal EUS-PD using a forward-viewing echoendoscope. A 62-year-old man who suffered from repetitive severe back pain due to PJS was referred to our hospital. Since transgastric EUS-PD was difficult, we attempted transjejunal EUS-PD using a forward-viewing echoendoscope. To facilitate scope insertion, we first straightened the afferent jejunal loop and placed a stiff guidewire. With this scheme, we successfully performed transjejunal EUS-PD and placed a 5-Fr plastic stent. In conclusion, this technique is useful for treating patients with PJS when transgastric EUS-PD is difficult.

**KEYWORDS**

endoscopic retrograde pancreatography, endoscopic ultrasound, forward-viewing echoendoscope, pancreatic drainage, pancreatic jejunostomy stricture

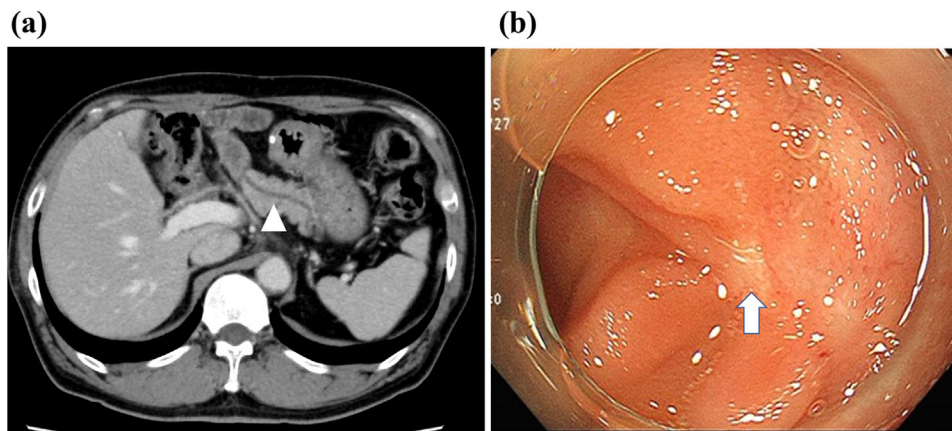
**INTRODUCTION**

Pancreatic jejunostomy stricture (PJS) is one of the major late complications after pancreaticoduodenectomy, accounting for 2%–10%.<sup>1–3</sup> While endoscopic treatments, endoscopic retrograde pancreatography (ERP), or endoscopic ultrasound-guided pancreatic

drainage (EUS-PD), are the first choice for symptomatic PJS after PD, the technical success rate of the endoscopic treatment of PJS remains unsatisfactory, mainly due to postsurgical altered anatomy.<sup>4–8</sup> Herein, we describe a case of PJS successfully treated with transjejunal EUS-PD using a forward-viewing echoendoscope.

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**FIGURE 1** Pretreatment imaging findings. (a) Computed tomography revealed a dilated main pancreatic duct from the anastomosis (arrowhead) in the remnant pancreas. (b) Endoscopic imaging of obstructed pancreatic jejunostomy anastomosis

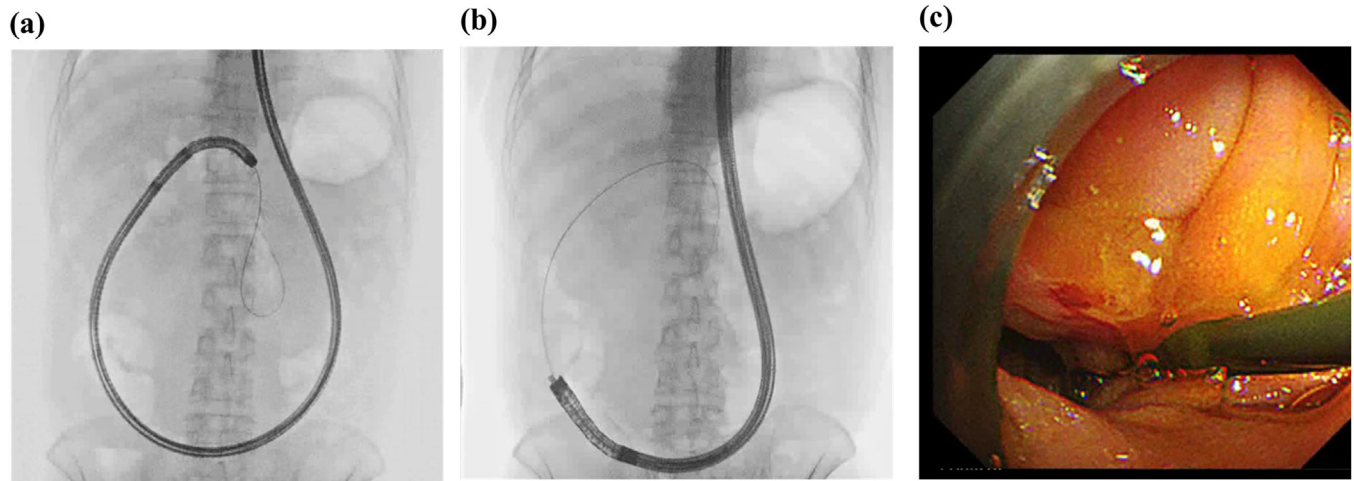
## CASE REPORT

A 62-year-old man who had undergone subtotal pancreaticoduodenectomy reconstructed by the modified Child's method with Braun anastomosis for intraductal papillary mucinous adenoma 4 years prior was referred to our hospital for endoscopic treatment for PJS. The man had visited a referral hospital complaining of recurrent severe back pain, and imaging studies at the hospital revealed pancreatic duct dilatation without any evidence of pancreatitis (Figure 1a). While laboratory data did not show any abnormalities, including pancreatic enzymes, there were no other causes of symptoms other than pancreatic dilatation. ERP with an enteroscope (SIF-H290S; Olympus, Tokyo, Japan) was attempted but failed because the pancreatic jejunostomy was obstructed as a scar (Figure 1b). We firstly planned EUS-PD from the remnant stomach with an oblique-viewing linear EUS as the first-line treatment; however, EUS from the remnant stomach barely revealed pancreatic duct dilatation at the proximal part of the anastomosis. It was difficult to puncture the pancreatic duct from the remnant stomach and insert an oblique-viewing linear echoendoscope into the deep part of the afferent jejunal loop due to its anatomical condition (e.g., the distance between stomach and pancreatic duct and the maneuverability of echoendoscope). To overcome these limitations and accomplish successful pancreatic drainage, we attempted transjejunal EUS-PD using a forward-viewing echoendoscope. We first inserted an enteroscope (SIF-H290S; Olympus) into the end of the afferent loop and placed a stiff guidewire (1.32 mm in diameter, 4500 mm long; Create Medic, Yokohama, Japan) to facilitate echoendoscope insertion (Figure 2a). After withdrawing the enteroscope, a forward-viewing echoendoscope (TGF-UC260J; Olympus) was inserted along the guidewire that was passed through the scope's working channel

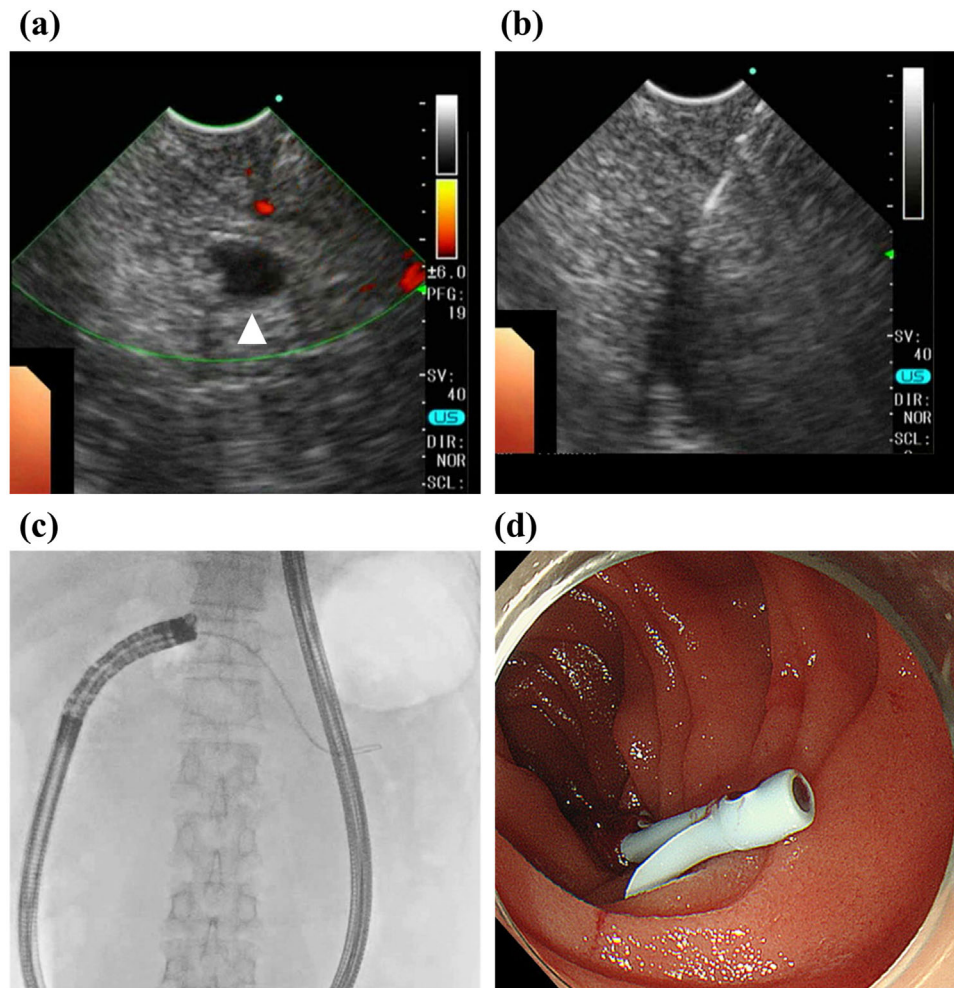
(Figure 2b&c). The dilated pancreatic duct was successfully visualized immediately beneath the scarred pancreatic jejunostomy anastomosis and punctured using a 19-gauge needle (EZ shot 3Plus; Olympus) (Figure 3a,b). We inserted a 0.025-inch guidewire (Visiglide2; Olympus) and then an ERCP catheter (MTW ERCP catheter; Düsseldorf, Germany) along with the guidewire. ERP imaging confirmed successful accession into the pancreatic duct. Furthermore, the puncture site was dilated with a bougie dilator (ES dilator soft type; Zeon Medical Inc., Tokyo, Japan), and a 5-Fr 9 cm plastic stent (HarmoRay; Hanako Medical Co. Ltd, Saitama, Japan) was placed. Even though the patient was compromised with acute pancreatitis after the procedure, only conservative treatment was required until he totally recovered 5 days after the procedure. Five months after the intervention, the patient is totally asymptomatic, and stent replacement is scheduled.

## DISCUSSION

Symptomatic PJS is one of the most problematic adverse events after pancreaticobiliary surgery. EUS-PD is considered a salvage technique after ERP failure, but it is sometimes difficult to perform due to anatomical reasons. In the present case, we found that conventional EUS-PD from the stomach was difficult to perform for the same reasons. While transjejunal EUS-PD around the PJ anastomosis was an ideal choice, in this case, deep insertion of a conventional lateral-viewing echoendoscope into the deep part of the afferent loop was expected to be difficult. To overcome this limitation, we utilized a forward-viewing echoendoscope with the guidance of a stiff guidewire and successfully performed transjejunal EUS-PD. To the best of our knowledge, this is the first case to use this technique.



**FIGURE 2** Endoscopic scheme of a forward-viewing echoendoscope insertion. (a) An enteroscope (SIF-H290S; Olympus, Tokyo, Japan) was inserted into the end of the afferent jejunal loop. Subsequently, a stiff guidewire was placed. (b,c) A forward-viewing echoendoscope was inserted along with the guidewire



**FIGURE 3** Transjejunal endoscopic ultrasound-guided pancreatic drainage. (a) Dilated pancreatic duct (5 mm) was detected under anastomosis by endoscopic ultrasound (arrowhead). (b) The pancreatic duct was punctured by a 19-gauge needle (EZ shot 3 plus; Olympus, Tokyo, Japan). (c,d) A 5-Fr plastic stent was finally placed in the pancreatic duct

The selection of puncture sites is very important in EUS-PD.<sup>7</sup> Given the technical difficulty in guidewire manipulation and device delivery, the puncture site should be carefully selected based on the distance between the stomach and pancreatic duct and the size of the pancreatic duct. In cases with surgically altered anatomy with gastrectomy, the selection of a suitable puncture site may be difficult due to the reduced volume of the remnant stomach. If the pancreatic duct is punctured in the region where the stomach and pancreas are far apart, subsequent device delivery can be difficult and may result in treatment failure. Therefore, transjejunal EUS-PD may be an ideal technique for PJS since the jejunum and pancreatic duct are closely anastomosed.

Insertion of EUS into the deep part of the afferent jejunal loop is a task to be solved for transjejunal EUS-PD. Two Japanese groups originally reported the usefulness of a forward-viewing echoendoscope for EUS-PD in patients with surgically altered anatomy.<sup>9,10</sup> More recently, Iwai et al. reported a case series that described the usefulness of EUS-guided drainage using a forward-viewing echoendoscope for biliopancreatic anastomosis stricture in patients with surgically altered anatomy.<sup>11</sup> In this report, they performed successful EUS-guided drainage in eight patients who had undergone Child's reconstruction with Braun anastomosis which was similar to the present case. While they concluded that insertion of a forward-viewing echoendoscope is feasible and safe, this technique can be difficult if the afferent jejunal loop is long and twisted. Therefore, we utilized a stiff guidewire, which is used in endoscopic long intestinal tube insertion, to modify this technique. After straightening the twisted afferent jejunal loop by an enteroscope, the guidewire was placed to retain the shape of the afferent jejunal loop. Furthermore, by deploying the guidewire into the scope's working channel of a forward-viewing echoendoscope (rope-way method), scope insertion was performed smoothly.

However, we would like to emphasize the potential risks and difficulties of the presented intervention for patients in a similar situation. First, the stiff guidewire may cause mucosal injury owing to its stiffness. Second, it may be troublesome to replace a pancreatic stent which locates in the deep part of the afferent jejunal loop compared to transgastric EUS-PD. Third, it can be difficult to insert a forward-viewing echoendoscope when the afferent loop is long and twisted even with the assistance of a stiff guidewire. Considering these risks and difficulties, the presented intervention can be a salvage treatment when ERCP and transgastric EUS-PD is difficult to perform or failed.

In conclusion, we recommend transjejunal EUS-PD for PJS using a forward-viewing echoendoscope with

the assistance of a stiff guidewire in a patient with altered anatomy. We believe this scheme can secure EUS-PD in patients with surgically altered anatomy.

## ACKNOWLEDGMENTS

None.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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## ETHICS STATEMENT

Statement on Helsinki Declaration applied for Ethical Committee approval.

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