

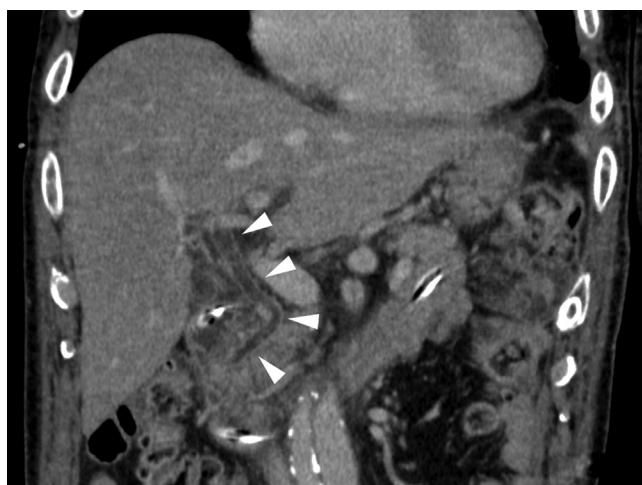


## Endoscopic stone extraction for choledocholithiasis with an ultra-slim endoscope via a gastrostomy after esophagectomy

Yoshihiro Nishikawa, MD, PhD, Norimitsu Uza, MD, PhD, Tomoaki Matsumori, MD, Masahiro Shiokawa, MD, PhD, Hiroshi Seno, MD, PhD

A 69-year-old man with epigastric pain and fever was referred to our hospital. The patient had undergone placement of an aortic stent for treatment of an aortic dissection 8 years earlier. He had undergone esophagectomy without upper GI reconstruction for an aorto-esophageal fistula caused by an artificial blood vessel infection a half year before this admission.

Physical examination revealed epigastric tenderness. Blood tests showed elevated concentrations of aspartate aminotransferase at 2157 U/L (normal range, 12-30 U/L), alanine aminotransferase at 1839 U/L (10-42 U/L), alkaline phosphatase at 764 U/L (110-359 U/L),  $\gamma$ -glutamyl transpeptidase at 450 U/L (9-54 U/L), total bilirubin at 1.8 mg/dL (0.3-1.3 mg/dL), amylase at 1150 U/L (45-140 U/L), and lipase at 2141 U/L (11-53 U/L). The white blood cell count was also elevated to 13,400/ $\mu$ L (3200-9400/ $\mu$ L). Although no obvious common bile duct stones or dilatations were identified on CT (Fig. 1), choledocholithiasis was strongly suspected because of symptomology and laboratory results. ERCP was planned for further examination, but the esophagectomy prevented oral insertion of an endoscope. We therefore focused on the patient's surgical gastrostomy (30F), which had been placed for enteral nutrition, and attempted to perform ERCP via the gastrostomy using an ultra-slim endoscope.

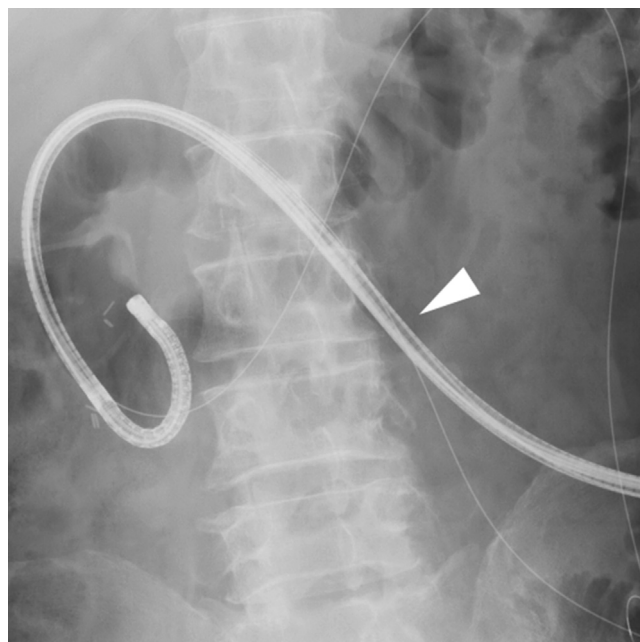


**Figure 1.** No obvious common bile duct stones or dilatations were identified on CT. *White arrowheads* indicate the common bile duct.

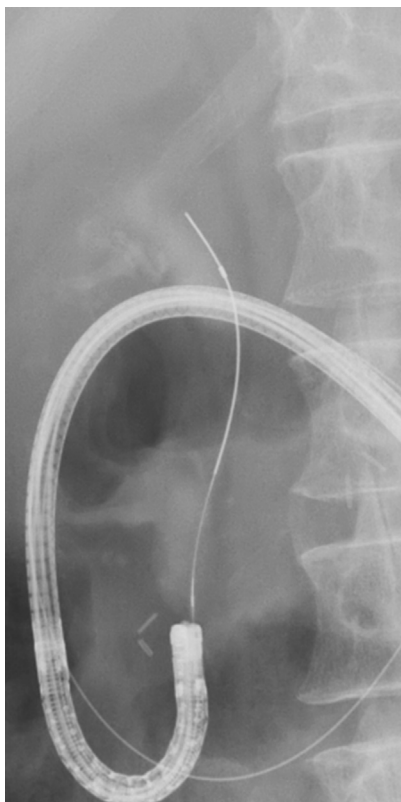
### ERCP PROCEDURES

An ultra-slim endoscope with an outer diameter of 5.8 mm and a 2.0-mm instrument channel (GIF-XP260N; Olympus, Tokyo, Japan) was inserted via the gastrostomy without dilation, carefully inverted in the descending part of the duodenum (Fig. 2), and cannulated into the bile duct using a thin cannula (PR-110Q-1, 1.8-mm outer diameter; Olympus) and guidewire (VisiGlide 2, 0.025 in; Olympus) (Fig. 3). No apparent filling defect was observed, but a 5F nasobiliary drainage tube (SilkyPass; Boston Scientific, Tokyo, Japan) was placed to resolve the cholangitis.

After the cholangitis improved with drainage and antibiotic administration, endoscopic stone extraction was performed using another ultra-slim endoscope with a larger instrument channel (EG-L580NW7, 5.9-mm outer diameter and 2.4-mm instrument channel; Fujifilm, Tokyo, Japan). After cannulation with a thin cannula and guidewire, a



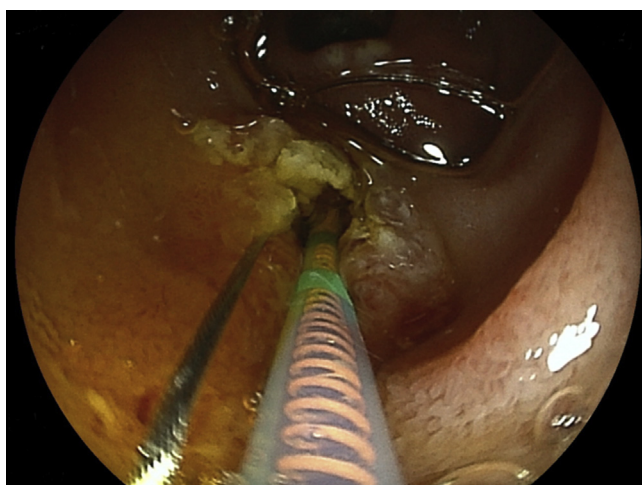
**Figure 2.** An ultra-slim endoscope was inserted via the gastrostomy and inverted in the descending part of the duodenum. *White arrowhead* indicates the gastrostomy.



**Figure 3.** No apparent filling defect was detected on cholangiography.



**Figure 5.** The bile duct was swept with a balloon catheter.



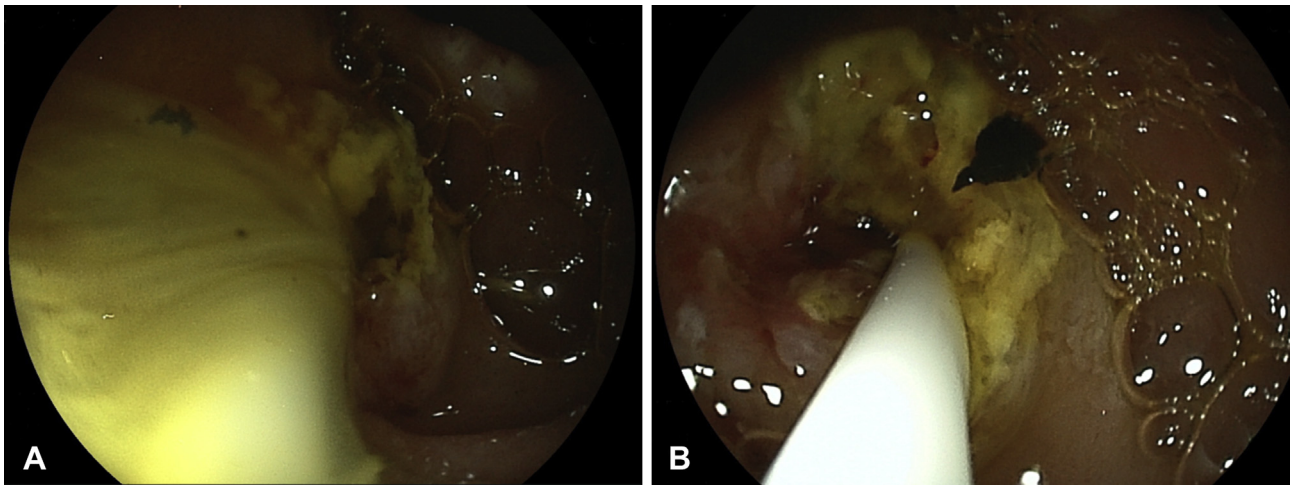
**Figure 4.** The sphincterotomy was performed using a papillotome.

sphincterotome (Howell D. A. S. H., 2.1-mm outer diameter; Cook Japan, Tokyo, Japan) and Pathfinder (0.018 in; Boston Scientific) were inserted and a sphincterotomy was performed. An additional sphincterotomy was done with another papillotome (KD-6Q-1, 2.05-mm outer diameter; Olympus) (Fig. 4). Subsequently, small stones with pus were extracted using a balloon catheter (B5-2LA,

1.95-mm outer diameter; Olympus) (Figs. 5, 6A, and B). The patient recovered and was discharged without adverse events (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)).

### DISCUSSION

This is the first report of a sphincterotomy and stone extraction performed with an ultra-slim endoscope via a gastrostomy. Peroral endoscopic lithotripsy/stone extraction for choledocholithiasis is not feasible in patients with esophageal obstruction or esophagectomy without upper GI reconstruction. In such conditions, a gastrostomy is often created for enteral nutrition and has also been used as an ERCP route. Schapira et al<sup>1</sup> first reported ERCP via a gastrostomy in 1975. Gray et al<sup>2</sup> reported endoscopic lithotripsy via a gastrostomy. Since then, ERCP has been performed via a gastrostomy using side-viewing or forward-viewing endoscopes. In this procedure, however, dilation of the gastrostomy is needed to insert such endoscopes, potentially leading to gastrostomy breakage. In 2007, Mori et al<sup>3</sup> reported performing ERCP with an ultra-slim endoscope via a gastrostomy, in which the endoscope could be inserted without dilation and with successful placement of a plastic



**Figure 6.** Pus (A) and small black stones (B) were extracted with a balloon catheter.

stent in the bile duct. Because of the limited number of devices available and the small instrument channel diameter, this method restricts the number of feasible procedures that can be performed. Mori et al<sup>3</sup> used an endoscope with a 2.0-mm instrument channel, whereas we used one with a diameter of 2.4 mm, enabling the application of several devices. Thus, endoscopic stone extraction was successful. Even in patients with restricted endoscope insertion routes, skillful selection of endoscopes and devices can adapt this technique to various procedures.

## DISCLOSURE

*All authors disclosed no financial relationships.*

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Department of Gastroenterology and Hepatology, Graduate School of Medicine, Kyoto University, Kyoto, Japan.

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