



A case of pancreatic duct stones treated with electrohydraulic lithotripsy through a duodenal ulcer

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Pancreatic duct stone is a common adverse event associated with chronic pancreatitis. Asymptomatic pancreatic stones can be followed-up by observation, although some cases with severe symptoms require radical treatment, including extracorporeal shock wave lithotripsy, electrohydraulic lithotripsy (EHL), and surgical treatment.^{1,2} Among these options, EHL is effective, less invasive, and can be performed through a duodenal papilla under pancreatoscopy.^{3,4} Here, we present a rare case of pancreatic duct stones that were directly treated by an EHL device through a duodenal ulcer.

A 90-year-old man with severe upper abdominal pain was admitted to our hospital. He had previously been diagnosed with chronic pancreatitis secondary to heavy use of alcohol. A blood test showed elevated liver enzymes and a CT scan revealed acute cholangitis secondary to bile duct stricture resulting from distal common bile duct compression secondary to pancreatic duct stones (Fig. 1). We started antibiotics after admission, although the cholangitis was not controlled well. Esophagogastroduodenoscopy revealed pancreatic stones observed through a penetrating ulcer in the duodenal bulb (Fig. 2). Considering the general status of this very elderly patient, the endoscopic treatments were chosen as a less invasive treatment among the options above. Initially, we attempted to perform endoscopic retrograde cholangiopancreatography to insert a biliary stent, although the duodenoscope could not be inserted into the second portion of the duodenum because of bulb deformity. Therefore, we abandoned the treatment through the duodenal papilla and decided to

remove the stone through the penetrating duodenal ulcer after obtaining written informed consent. At first, we attempted to remove the stones using endoscopic forceps. However, we could only remove small pieces of the pancreatic stones (Fig. 3). Second, we attempted to crush these stones directly using an EHL device considering the

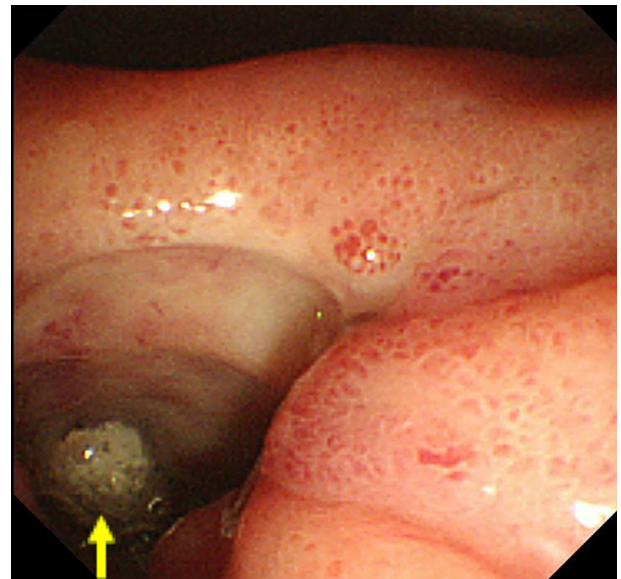


Figure 2. Pancreatic stones observed through the penetrating ulcer in the duodenal bulb.

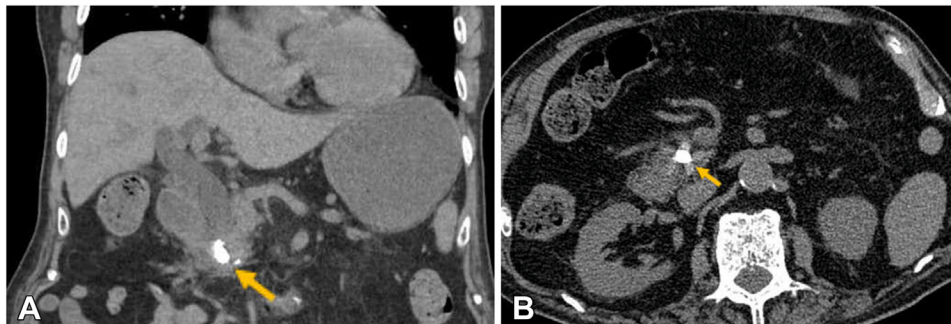


Figure 1. Bile duct stricture because of the pancreatic duct stones. **A,** Coronal image. **B,** Axial image.

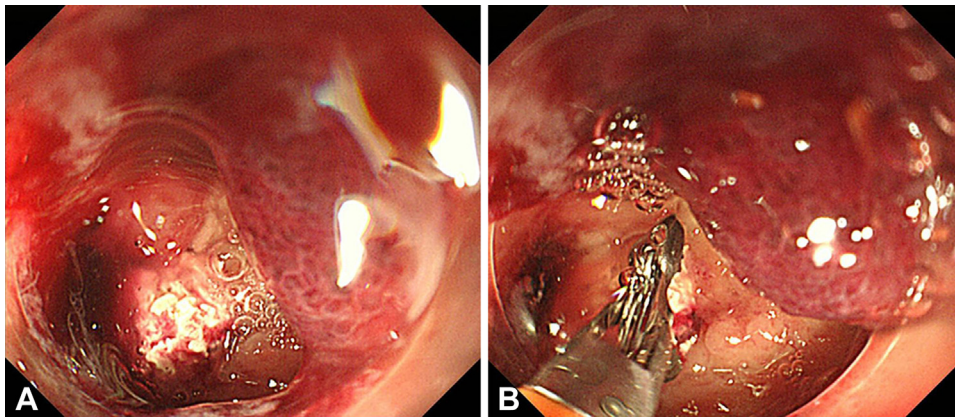


Figure 3. Removing the stones using endoscopic forceps. **A**, The stones observed through the duodenal ulcer. **B**, The removal of stones using biopsy forceps.



Figure 4. CT image after crushing pancreatic duct stones with electrohydraulic lithotripsy.

volume of the remaining large-sized stones ([Video 1](#), available online at www.giejournal.org).

We used a bipolar EHL system (Autolith Touch EHL System; Boston Scientific Corporation, Northgate Technologies Inc, Mass) with a 1.9-Fr \times 375-cm EHL probe. The probe was inserted directly through the forceps channel

of the forward-viewing endoscope with the water-jet function (GIF-Q260J; Olympus Corporation, Tokyo, Japan). A transparent hood was attached at the tip of the scope to keep the view clear. Filling water into the transparent hood, the probe was inserted until it was about to touch the stone directly through the penetrating duodenal ulcer. The output level of the EHL system was set to medium power, and a total of 600 pulses were performed with 5 to 10 pulses per foot pedal activation.

This method resulted in the effective removal of the majority of the pancreatic stones. After EHL, the patient recovered well without any adverse events. A CT scan the next day revealed a decrease in the size of the stones ([Fig. 4](#)). Unfortunately, despite the size reduction of the pancreatic stones, the improvement of the patient's symptoms was not sufficient. Finally, additional endoscopic ultrasound-guided bile drainage (EUS-BD) was required for the complete improvement of the symptoms. A double-pigtail plastic stent was placed in the common bile duct from the duodenal bulb by EUS-BD, and a self-expandable metal stent was placed for duodenal stenosis ([Fig. 5](#)). After these procedures, he was discharged from the hospital 1 week later without any symptoms or adverse events.

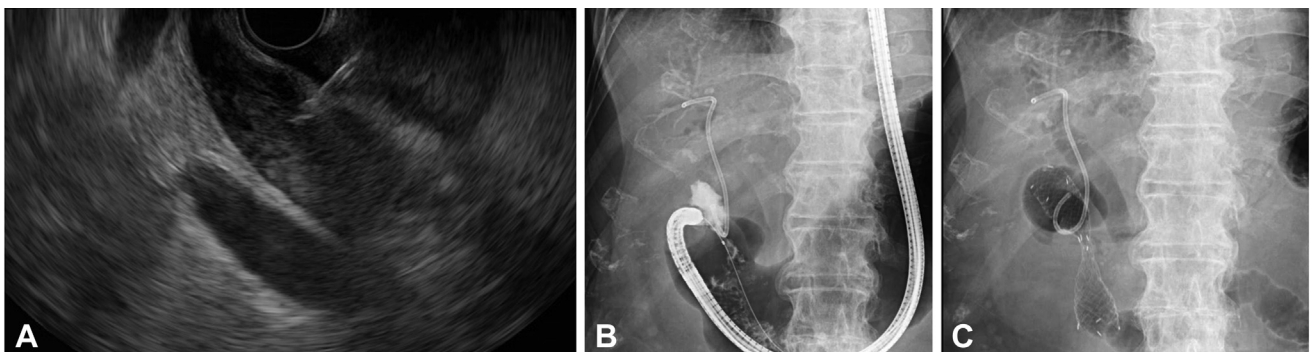


Figure 5. EUS-guided bile drainage, and a self-expandable metal stent was placed for duodenal stenosis. **A**, EUS-guided bile drainage was performed from the duodenal bulb. **B**, A double-pigtail plastic stent was placed in the common bile duct. **C**, A self-expandable metal stent was placed for duodenal stenosis.

The pancreatic stone was not a direct cause of cholangitis; a secondary bile duct stenosis from chronic pancreatitis might have caused cholangitis. EHL might not have improved the symptoms although the treatment method of directly destroying pancreatic stones with EHL through penetrating ulcers might be a choice for such cases.

SUMMARY

For cholangitis caused by pancreatic stones, ERCP could not be performed for stenosis of duodenal ulcers. We report a case of pancreatic stone removal that was performed using an EHL device through a penetrating duodenal ulcer.

DISCLOSURE

The authors disclosed no financial relationships.

Abbreviations: EHL, electrohydraulic lithotripsy; EUS-BD, EUS-guided bile drainage.

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REFERENCES

1. Sauerbruch T, Holl J, Sackmann M, et al. Disintegration of a pancreatic duct stone with extracorporeal shock waves in a patient with chronic pancreatitis. *Endoscopy* 1987;19:207-8.
2. Inui K, Tazuma S, Yamaguchi T, et al. Treatment of pancreatic stones with extracorporeal shock wave lithotripsy: results of a multicenter survey. *Pancreas* 2005;30:26-30.
3. Ito K, Igarashi Y, Okano N, et al. Efficacy of combined endoscopic lithotomy and extracorporeal shock wave lithotripsy, and additional electrohydraulic lithotripsy using the SpyGlass direct visualization system or x-ray guided EHL as needed, for pancreatic lithiasis. *Biomed Res Int* 2014;2014:732781.
4. Bekkali NL, Murray S, Johnson GJ. Pancreatoscopy-directed electrohydraulic lithotripsy for pancreatic ductal stones in painful chronic pancreatitis using SpyGlass. *Pancreas* 2017;46:528-30.

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