



Electrohydraulic lithotripsy through a fistula of EUS-guided hepaticogastrostomy: a new approach for right intrahepatic stones

Tatsuya Sato, MD,¹ Yousuke Nakai, MD, PhD,¹ Hirofumi Kogure, MD, PhD,¹ Hiroyuki Isayama, MD, PhD,² Kazuhiko Koike, MD, PhD¹

A 50-year-old man with a history of hepaticojejunostomy and Roux-en-Y reconstruction for congenital biliary dilatation presented with repeated episodes of cholangitis due to bilateral intrahepatic stones (Fig. 1). An approach to hepaticojejunostomy anastomosis by double-balloon endoscope failed because of intestinal adhesions and a long afferent loop, and percutaneous transhepatic biliary access was impossible because of poor US visualization of the intrahepatic bile duct (IHBD), which was not dilated on MRCP. A decision was made to perform EUS-guided hepaticogastrostomy (EUS-HGS) as a port for stone removal (Fig. 2).

Using a linear echoendoscope (EG-580UT; Fujifilm Medical, Tokyo, Japan), we performed EUS-HGS with the patient in a prone position. The bile duct of segment 3 was punctured by a 19-gauge needle (EZ Shot 3; Olympus, Tokyo, Japan), followed by a cholangiogram, which delineated multiple intrahepatic stones. Subsequently, a 0.025-inch guidewire (VisiGlide2; Olympus) was successfully passed into the jejunum. After dilation of the HGS fistula with a 4-mm-wide balloon catheter, a 7F-wide,

20-cm-long plastic stent was placed between the stomach and jejunum (Fig. 3). A plastic stent was placed because the use of a covered metal stent for benign biliary diseases had not been approved in Japan. A month later, endoscopic treatment through an EUS-HGS fistula was attempted with a standard duodenoscope (TJF-260V; Olympus). Biliary cannulation was achieved alongside the indwelling HGS stent by use of the wire-guided cannulation technique with a straight-tip ERCP cannula (0.025-inch ERCP catheter; MTW Endoskopie, Wesel, Germany) and a 0.025-inch guidewire (VisiGlide2). Subsequently, the indwelling stent was removed using a snare, and the guidewire was left in place. After balloon dilation of the anastomotic stricture with a 10-mm balloon catheter (Fig. 4), antegrade extraction of left IHBD stones into the jejunum was successfully achieved with a retrieval balloon (Extractor ProRX; Boston Scientific Japan, Tokyo, Japan) (Fig. 5); however, access to the right IHBD was

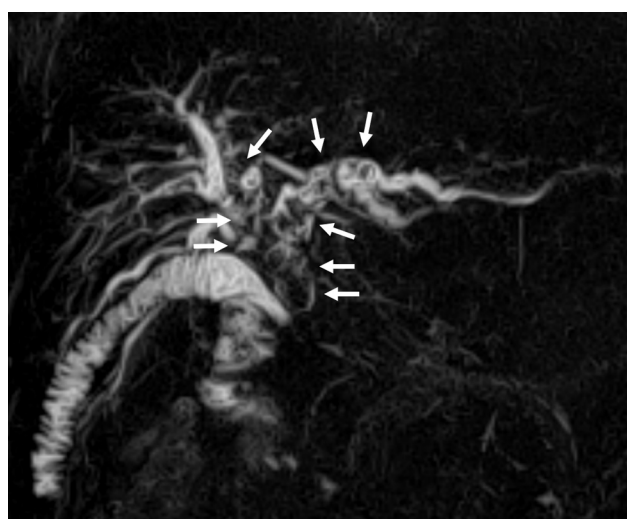


Figure 1. Magnetic resonance cholangiopancreatographic view delineating multiple large stones in the bilateral intrahepatic bile ducts (arrows) in a patient with a history of hepaticojejunostomy and Roux-en-Y reconstruction.

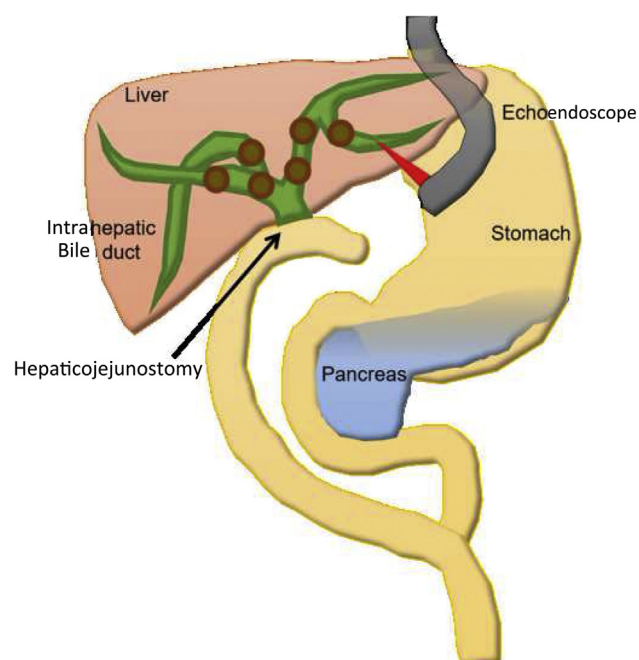


Figure 2. Schema of Roux-en-Y hepaticojejunostomy and EUS-guided approach to the left intrahepatic bile duct.

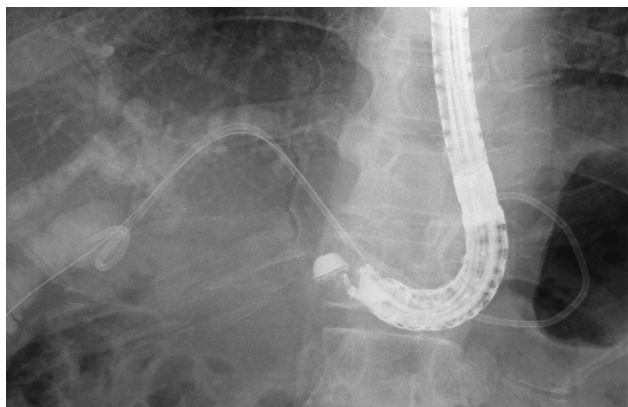


Figure 3. EUS-guided hepaticogastrostomy by placement of a 7F-wide, 20-cm-long, double-pigtail plastic stent between the stomach and jejunum.

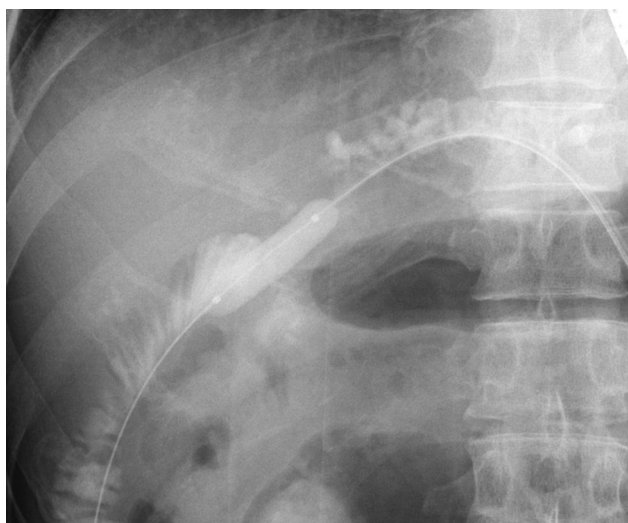


Figure 4. Balloon dilation of hepaticojejunostomy anastomosis.

not possible (Fig. 6). In a subsequent session, we inserted a digital cholangioscope (SpyGlass DS Direct Visualization System; Boston Scientific Japan)¹ over the guidewire through the EUS-HGS fistula dilated by a 6-mm balloon catheter. The residual right IHBD stones were successfully fragmented by electrohydraulic lithotripsy (EHL; Autolith touch biliary EHL system; Boston Scientific) under direct visualization (Video 1, available online at www.VideoGIE.org; Fig. 7). Fragmented stones in the right IHBD were flushed into the common bile duct through cholangioscopic irrigation and pushed out into the jejunum with a retrieval balloon. Cholangiography showed no residual stones in the intrahepatic bile ducts despite the slightly irregular bile ducts, which suggested secondary sclerosing cholangitis (Fig. 8). The final fluoroscopic image demonstrated smooth bile flow into the jejunum, suggesting sufficient dilation of the hepaticojejunostomy anastomosis. Therefore, the HGS stent was removed endoscopically at the final

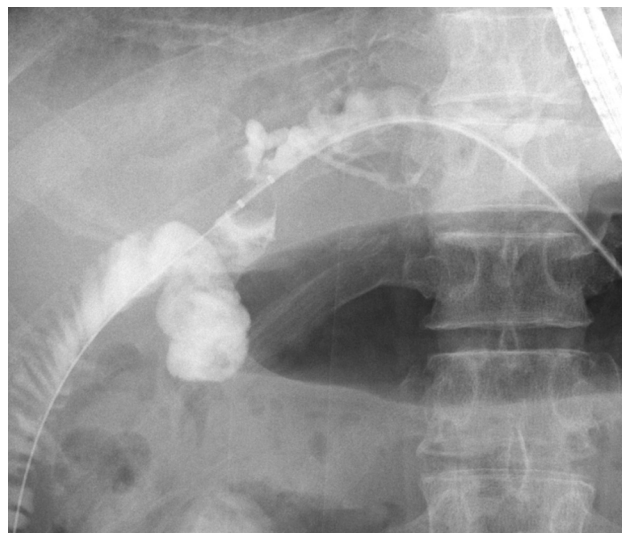


Figure 5. Fluoroscopic image of antegrade removal of left intrahepatic bile duct stones by use of a retrieval balloon.

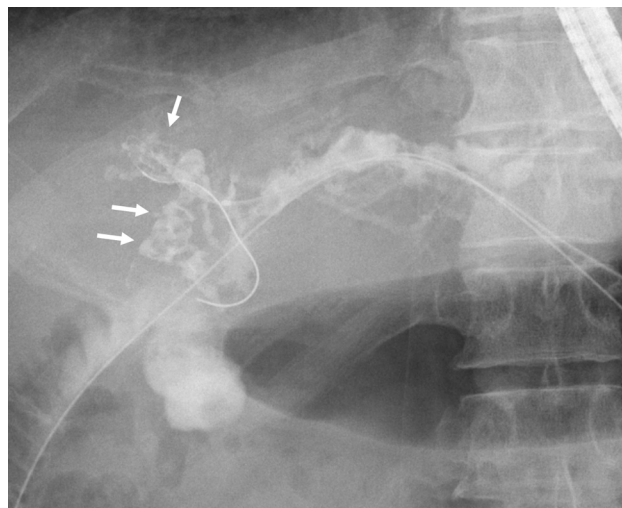


Figure 6. Fluoroscopic image of residual right intrahepatic bile duct stones (arrows).

session, and the HGS fistula closed spontaneously. No adverse events were observed. The patient was followed up at our outpatient clinic without recurrence of IHBD stones or anastomotic stricture.

The usefulness of an EUS-guided antegrade approach for bile duct stones was reported in patients with surgically altered GI anatomy.^{2,3} Because the EUS-HGS route is usually constructed in the left IHBD, stone extraction in the right IHBD is sometimes technically challenging as a result of biliary angulation. In patients with large or multiple bile duct stones, cholangioscopy combined with EHL through an EUS-HGS fistula is a treatment option.⁴⁻⁷ The current report suggests that the indication for this technique can be expanded to right-side biliary stones because the

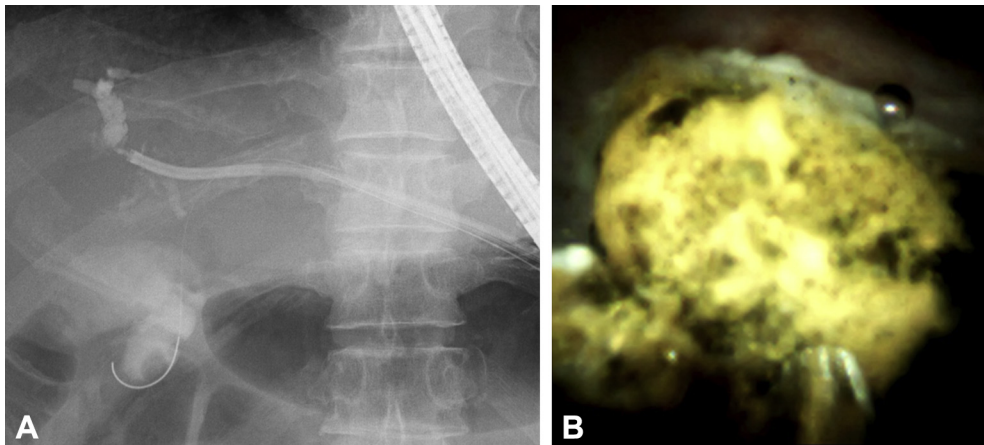


Figure 7. **A,** Fluoroscopic image of electrohydraulic lithotripsy through a cholangioscope inserted through an EUS-guided hepaticogastrostomy fistula. **B,** Cholangioscopic image of electrohydraulic lithotripsy.



Figure 8. Fluoroscopic image suggesting complete stone clearance.

improved maneuverability of cholangioscopy enabled access of the right IHBD across the hilum. To minimize the potential adverse events, including bile peritonitis, a 2-step procedure after fistula maturation was helpful in considering through-the-fistula cholangioscopy.⁸

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviations: HGS, hepaticogastrostomy; IHBD, intrabepatic bile duct.

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Department of Gastroenterology, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan (1), Department of Gastroenterology, Graduate School of Medicine, Juntendo University, Tokyo, Japan (2).

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