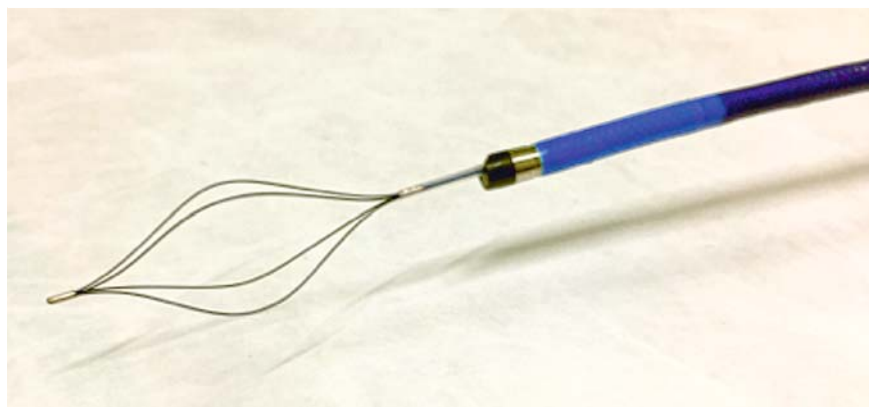


## Intrahepatic bile duct stone removal through endoscopic ultrasound-guided hepaticogastrostomy using novel basket catheter under digital cholangioscopy guidance

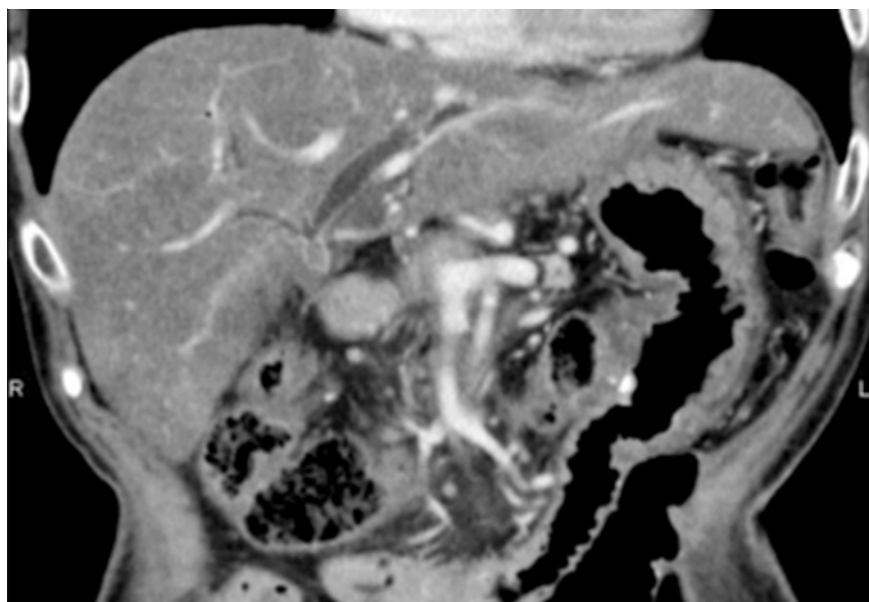
Although the digital single-operator cholangioscope (SpyGlass DS, Boston Scientific, Marlborough, Massachusetts, USA) has clinical impact in various procedures, such as forceps biopsy or endoscopic hydraulic lithotripsy [1–4], the small diameter of the working channel is one of the limitations of this scope. Recently, a novel basket catheter (Micro-Catch; MTW Endoskopie, Düsseldorf, Germany) has become available. This basket catheter, which has a sheath diameter of only 1 mm, can be inserted into the SpyGlass DS (► Fig. 1). Herein, we describe intrahepatic bile duct stone removal using this basket catheter via SpyGlass DS through an endoscopic ultrasound (EUS)-guided hepaticogastrostomy (HGS) route.

A 72-year-old man was admitted to our hospital because of obstructive jaundice caused by hepaticojejunostomy anastomotic stricture (HJAS). On computed tomography, intrahepatic bile duct dilatation and the HJAS were observed (► Fig. 2). An EUS-guided approach was therefore attempted.

First, the intrahepatic bile duct was punctured using a 19-gauge fine-needle aspiration needle and contrast medium was injected. After cholangiography, the endoscopic retrograde cholangiopancreatography (ERCP) catheter and a 0.025-inch guidewire (VisiGlide; Olympus Medical Systems, Tokyo, Japan) were inserted. Next, contrast medium was injected again, and the intrahepatic bile duct stone was seen above the HJAS (► Fig. 3). EUS-HGS was performed using a covered metal stent (10 mm × 10 cm, Niti-S Biliary S-Type Stent Long Suture; TaeWoong Medical, Seoul, Korea). After 1 week, the metal stent was removed, and the SpyGlass DS catheter was inserted into the biliary tract through the EUS-HGS route. Next, the intrahepatic bile duct stone was grasped



► Fig. 1 Novel basket catheter (Micro-Catch; MTW Endoskopie, Düsseldorf, Germany). The sheath diameter is only 1 mm, allowing insertion into the cholangioscope.



► Fig. 2 On computed tomography imaging, a dilated intrahepatic bile duct and stricture at the hepaticojejunostomy anastomosis were observed.

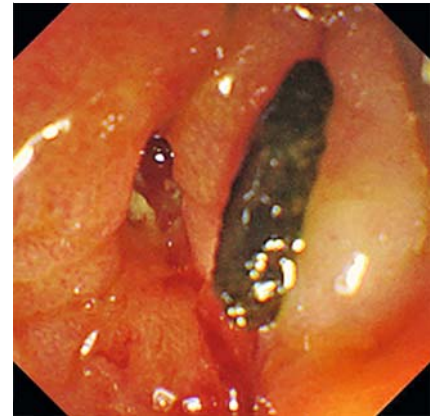
using a novel basket catheter through the SpyGlass DS (► Fig. 4, ► Video 1), and the stone was removed into the stomach (► Fig. 5). Finally, EUS-HGS using a plastic stent (Type IT; Gadelius Medical Co., Ltd., Tokyo, Japan) was performed without any adverse events.

This basket may be useful for the removal of intrahepatic bile duct stones using SpyGlass DS under ERCP and EUS-HGS guidance.

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► **Fig. 3** The intrahepatic bile duct stone was seen in the hepaticojejunostomy anastomosis during endoscopic ultrasound-guided hepaticogastrostomy.



► **Fig. 5** The intrahepatic bile duct stone was successfully removed.

### Competing interests

None

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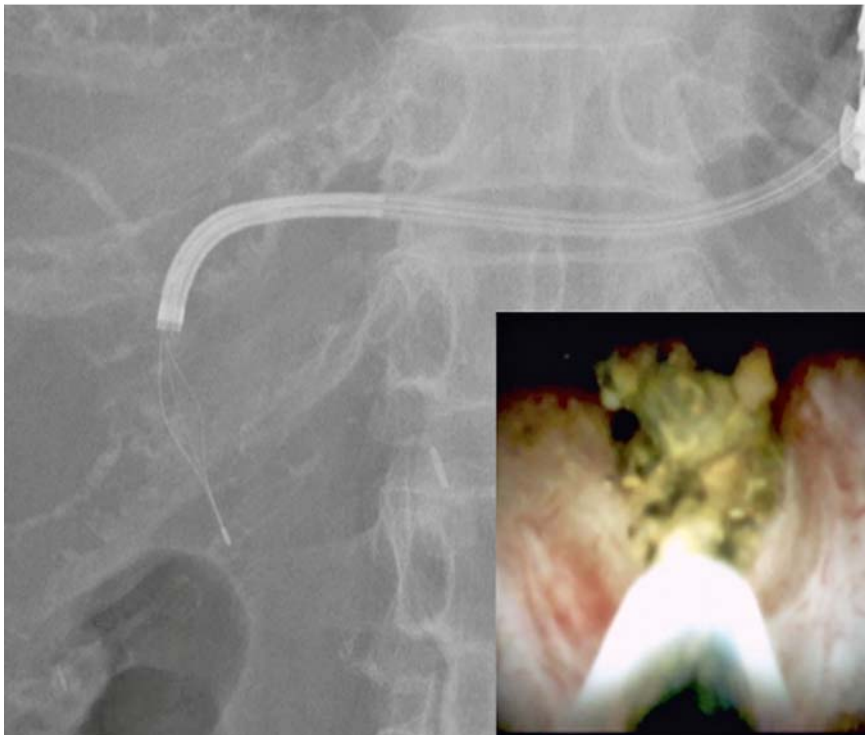
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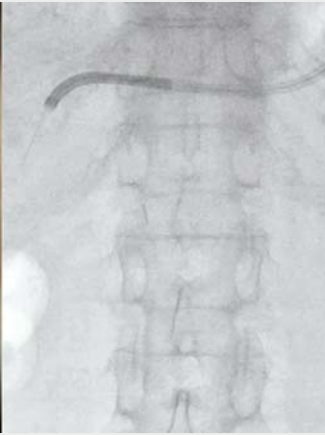
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► **Fig. 4** The intrahepatic bile duct stone was grasped using a novel basket catheter under cholangioscopic guidance.



**Video 1** The cholangioscope was inserted into the biliary tract through an endoscopic ultrasound (EUS)-guided hepaticogastrostomy (HGS) route. The intrahepatic bile duct stone was observed and grasped by a novel basket catheter under cholangioscopic guidance. Finally, stone removal was successfully performed into the stomach through the EUS-HGS.

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