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# Radiation-free digital cholangioscopy-guided removal of bile duct foreign body and holmium laser lithotripsy for large common bile duct stones

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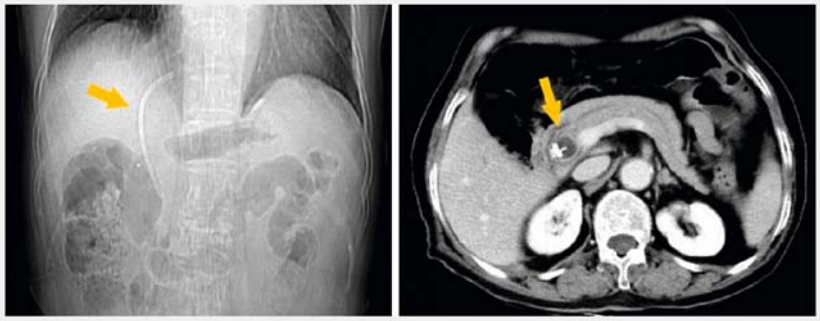
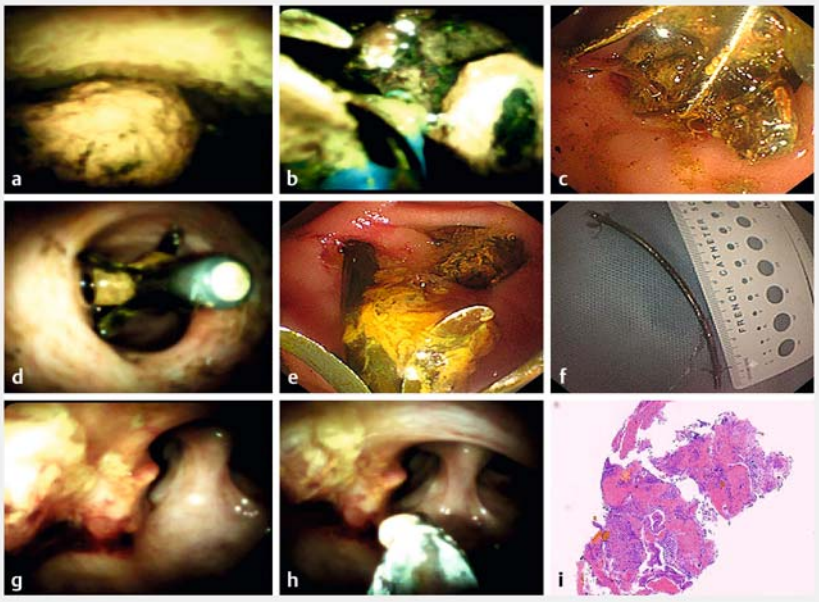
Digital cholangioscopy (SpyGlass; Boston Scientific, Marlborough, Massachusetts, USA) allows direct visualization of the biliary system for therapeutic interventions [1]. This is a report of cholangioscopy-guided removal of a biliary plastic stent and holmium laser lithotripsy for large common bile duct (CBD) stones.

A 77-year-old woman presented to our hospital with bile duct stones. The patient had undergone laparoscopic choledocholithotomy T-tube drainage and laparoscopic cholecystectomy more than a decade previously for acute cholangitis and cholecystitis. She underwent further endoscopic retrograde cholangiopancreatography with biliary stenting for choledocholithiasis 6 months prior to presentation. The laboratory findings and physical examination were normal. The abdominal computed tomography scan revealed dilatation of the bile duct with intraductal high-density stent image and large bile duct stones (▶ **Fig. 1**).

Radiation-free digital cholangioscopy was performed, and successful biliary cannulation was confirmed by visible bile aspiration and biliary view [2]. Cholangioscopy showed a large stone and a plastic stent in the CBD (▶ **Fig. 2**). We first fragmented the stone using holmium laser lithotripsy (1.2 J/20Hz; Dahua Systems, Wuxi, Jiangsu, China) and removed the fragments with a mesh basket and balloon catheter (Olympus Medical, Tokyo, Japan) [3]. Subsequently, we removed the plastic stent with a specialized mesh basket (Microtech, Nanjing, China). When we probed the hepatic ducts, mucosal edema and hyperplasia were observed, and biopsies were performed using SpyBite (Boston Scientific). Finally, a 7-Fr plastic biliary stent (Microtech) was inserted after the intervention (▶ **Video 1**). No complications were recorded, and histopathological examination showed inflammatory cell infiltration.



▶ **Fig. 1** Computed tomography scan showed a bright linear object extending from the bile duct to the left intrahepatic biliary tree, and a slightly high-density shadow was found proximal to the plastic stent (yellow arrow).




▶ **Fig. 2** Cholangioscopy findings. **a** A bile duct stone was found in the common bile duct. **b, c** Holmium laser lithotripsy and basket removal were carried out. **d** The biliary plastic stent was found after stone removal. **e, f** Grasping of the plastic stent wall and its removal. **g** Mucosal edema, erythema, and polypoid bulge were seen when the hepatic duct was probed. **h** Biopsy was performed using SpyBite forceps (Boston Scientific, Marlborough, Massachusetts, USA) under direct visualization. **i** Histopathological examination showed inflammatory cell infiltration.


**Video 1** Radiation-free digital cholangioscopy-guided removal of bile duct foreign body and holmium laser lithotripsy for large common bile duct stones.

In conclusion, the new digital cholangioscope equipped with higher image quality and a larger working channel allows for a variety of direct-view biliary therapeutic interventions. Meanwhile, radiation hazards can be avoided in conjunction with radiation-free cannulation techniques.

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## Competing interests

The authors declare that they have no conflict of interest.

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