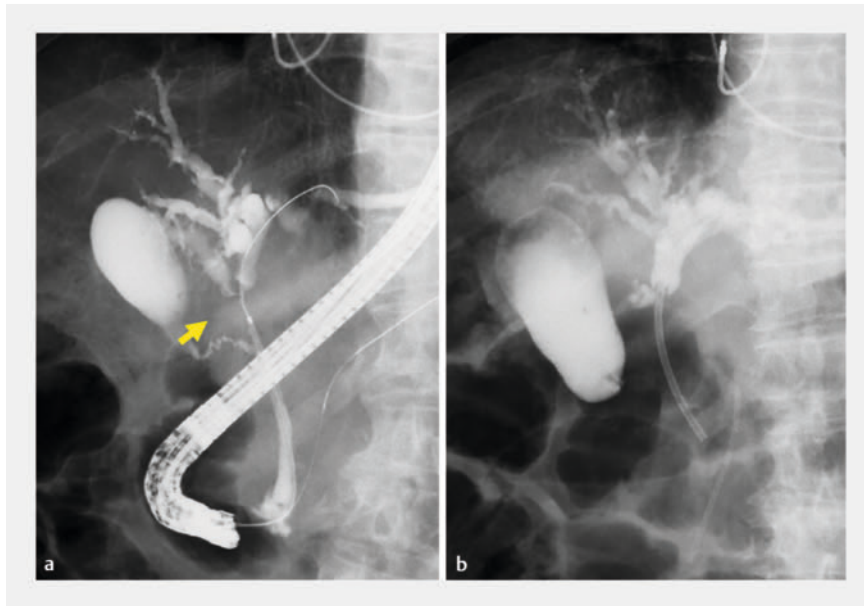
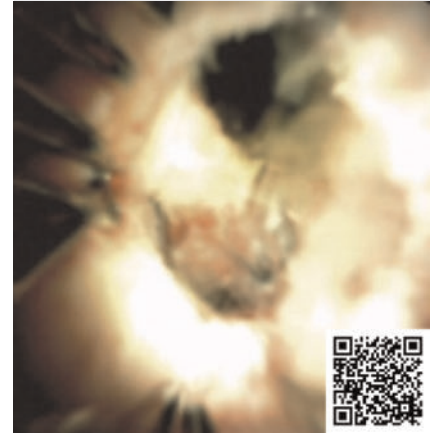


Cholangioscopy-assisted partial stent-in-stent method useful for bilateral biliary drainage of hilar cholangiocarcinoma



► **Fig. 1** Endoscopic retrograde cholangiography (ERCP) images of hilar cholangiocarcinoma. **a** A high degree of hilar bile duct stenosis was observed. **b** Biliary drainage resulted in insertion only into the left hepatic duct.



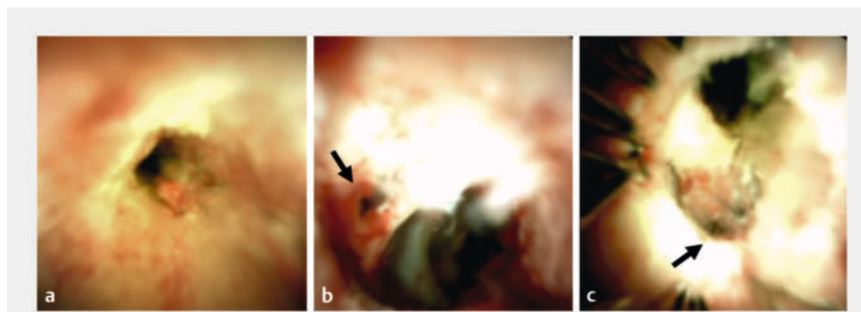
► **Video 1** Cholangioscopy-assisted bilateral biliary drainage method using partial stent-in-stent. The guidewire is inserted into the targeted bile duct revealed by cholangioscopy, followed by insertion of a self-expandable metal stent.

Bilateral drainage with the use of a partial stent-in-stent method is well known to resolve bile duct obstruction associated with a hilar cholangiocarcinoma. Unfortunately, the results are sometimes unsatisfactory because of the difficulty passing the guidewire through the targeted bile ducts, with reported success rates ranging from 80–95% [1–3]. Presented here is a novel cholangioscopy method.

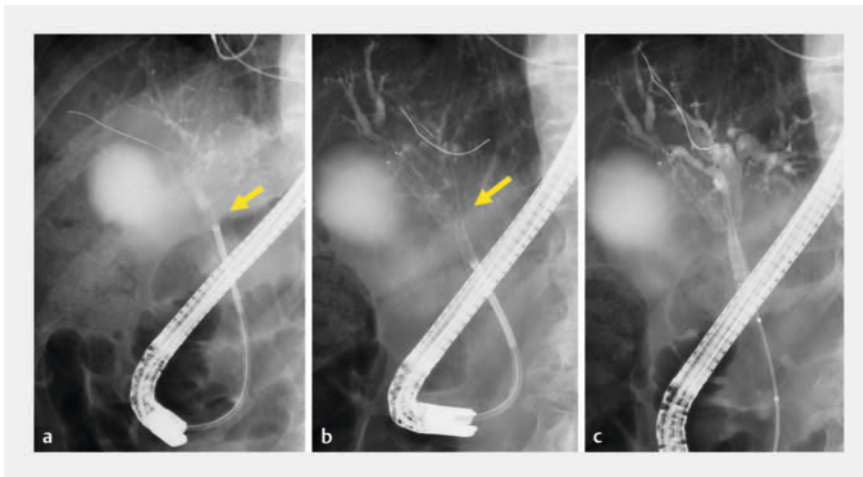
A 94-year-old man with hilar cholangiocarcinoma presented with jaundice, and endoscopic retrograde cholangiography (ERCP) showed a high degree of hilar bile duct stenosis (► **Fig. 1 a**). The guidewire failed to pass through the right hepatic duct and biliary drainage resulted in insertion into only the left hepatic duct with a plastic stent (► **Fig. 1 b**). Thus, for jaundice, use of a partial stent-in-stent method to insert a self-expandable metallic stent (SEMS) with cholangioscopy was planned (► **Video 1**). The

right hepatic duct was not fully contrasted, and cholangioscopy (SpyScope DSII; Boston Scientific Corp., Marlborough, Massachusetts, USA) was performed to locate the entrance. However, stenosis of the common hepatic blocked cholangioscope advancement (► **Fig. 2 a**). Fol-

lowing balloon dilatation, the cholangioscope was successfully advanced and the right hepatic duct entrance found (► **Fig. 2 b**), with guidewire insertion performed (► **Fig. 3 a**). A SEMS, with a diameter of 10 mm and length of 60 mm (ZEOSTENT V; Zeon Medical Inc., Tokyo,



► **Fig. 2** Cholangioscopy images. A SpyScope DS II was used. **a** Malignant stenosis of common bile duct. **b** Entrance to right bile duct. **c** Entrance to left bile duct. The self-expandable metallic stent (SEMS) mesh leading straight to the left bile duct was chosen.



► **Fig. 3** ERCP images of partial stent-in-stent. Two SEMSs were inserted, each with a diameter of 10 mm and length of 60 mm. **a** Insertion of guidewire into right hepatic duct shown by cholangioscopy. **b** Insertion of guidewire through SEMS mesh into the left hepatic duct shown by cholangioscopy. **c** Bilateral biliary drainage was successfully performed by use of a partial stent-in-stent method.

Japan) was then inserted and expanded, followed by cholangioscope insertion into the detained SEMS, with a mesh connected directly to the left hepatic duct chosen (► **Fig. 2 c**). The guidewire was passed through the mesh (► **Fig. 3 b**), then a second SEMS (ZEOSTENT V) with same diameter and length was inserted and expanded (► **Fig. 3 c**).

In hilar cholangiocarcinoma cases with a high degree of bile duct stenosis, guidewire insertion into the targeted bile duct is difficult. Notably, placement of the second SEMS was difficult in the present patient and required searching for the mesh leading to the targeted bile duct, passage of which was often obstructed by the mesh itself. In the present case, cholangioscopy revealed the entrance location. When biliary drainage is difficult, cholangioscopy findings can help resolve such problems.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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