



A novel method of bilateral biliary decompression by EUS-guided hepaticogastrostomy with bridging stenting using the partial stent-in-stent method for reintervention of multiple metal stent failure

Hidenobu Hara, MD,¹ Susumu Hijioka, MD,¹ Yoshikuni Nagashio, MD,¹ Yuta Maruki, MD,¹ Mark Chatto, MD,^{2,3} Yutaka Saito, MD,⁴ Takuji Okusaka, MD⁵

EUS-guided hepaticogastrostomy (HGS) has become an effective method for biliary drainage, particularly hilar bile duct obstruction.¹⁻⁵ We present the case of an 84-year-old woman with unresectable perihilar cholangiocarcinoma of bismuth type IV, with occluded stents placed via the transpapillary route, and whose jaundice was ultimately alleviated by pursuing a novel method of bilateral biliary decompression by EUS-HGS with bridging stenting using the partial stent-in-stent method for re-intervention of multiple metal stent failure (Fig. 1). This study was approved by our institutional review board (Approval No. 2018-149).

Originally, the patient received multiple uncovered self-expandable metal stents (UCSEMSs) (8 × 80 mm and 8 × 60 mm; YABUSAME; Kaneka Medix, Tokyo, Japan) for bile duct drainage, using a transpapillary approach to the posterior and anterior bile ducts. Due to left portal vein obstruction, the left segment remained undrained. One month later, the patient had stent dysfunction in the posterior segment and a UCSEMS (8 × 80 mm; ZEOSTENT; ZEON Medical, Tokyo, Japan) was placed. To address recurrent biliary obstruction, plastic stents were inserted within the UCSEMS (Fig. 2A). However, 3 months later, stent dysfunction recurred (Fig. 2B and C), complicating further transpapillary re-intervention due to malignant duodenal stenosis (Fig. 2D). We attempted reintervention by EUS-HGS, removing the plastic stent using an upper endoscopy (GIF-H260; Olympus, Tokyo, Japan) (Fig. 2E and F).



Figure 1. Still figure from Video 1.

Abbreviations: HGS, hepaticogastrostomy; UCSEMS, uncovered self-expandable metal stent.

Copyright © 2024 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). 2468-4481

<https://doi.org/10.1016/j.vgie.2024.02.015>

Department of Hepatobiliary and Pancreatic Oncology, National Cancer Center Hospital, Tokyo, Japan (1), Department of Hepatobiliary and Pancreatic Oncology, National Cancer Center Hospital, Tokyo, Japan (2), Department of Gastroenterology, Makati Medical Center, Makati City, Philippines (3), Endoscopy Division, National Cancer Center Hospital, Tokyo, Japan (4), Department of Hepatobiliary and Pancreatic Oncology, National Cancer Center Hospital, Tokyo, Japan (5).

Using a convex echoendoscope (GF-UCT260; Olympus), we performed EUS-HGS (Video 1, available online at www.videogie.org). After enhancement (Fig. 3A), a 0.025-inch, 450-cm hydrophilic guidewire (Fielder 25; ASAHI Intec, Aichi, Japan) was placed in the posterior bile duct. Implantation of a larger guidewire was considered to straighten the bile duct and stabilize the procedure. However, a catheter was difficult to follow, and dilatation was performed. The stent mesh was dilated using a balloon dilator (8 mm wide; REN; Kaneka), but the catheter was difficult to follow. Therefore, additional dilation was performed using a spiral dilator (Tornus ES; Olympus), which is a tapered-tip dilator that fits 0.025-inch guidewires and is rotated clockwise while threading through the guidewire to dilate the lumen to 7F. After dilation, a 0.035-inch, 450-cm hydrophilic guidewire (RevoWave; PIOLAX Medical, Kanagawa, Japan) was placed in the posterior bile duct using a double-lumen cannula (Uneven Double Lumen Cannula; PIOLAX). A 0.025-inch, 450-cm hydrophilic guidewire (VisiGlide 2; Olympus) was then selected for the anterior bile duct (Fig. 3B). We planned to implant the stent first in the anterior bile duct where the angle is more acute, then place a second stent into the posterior. The anterior stent mesh was dilated using the spiral dilator. The first UCSEMS (8 × 60 mm;

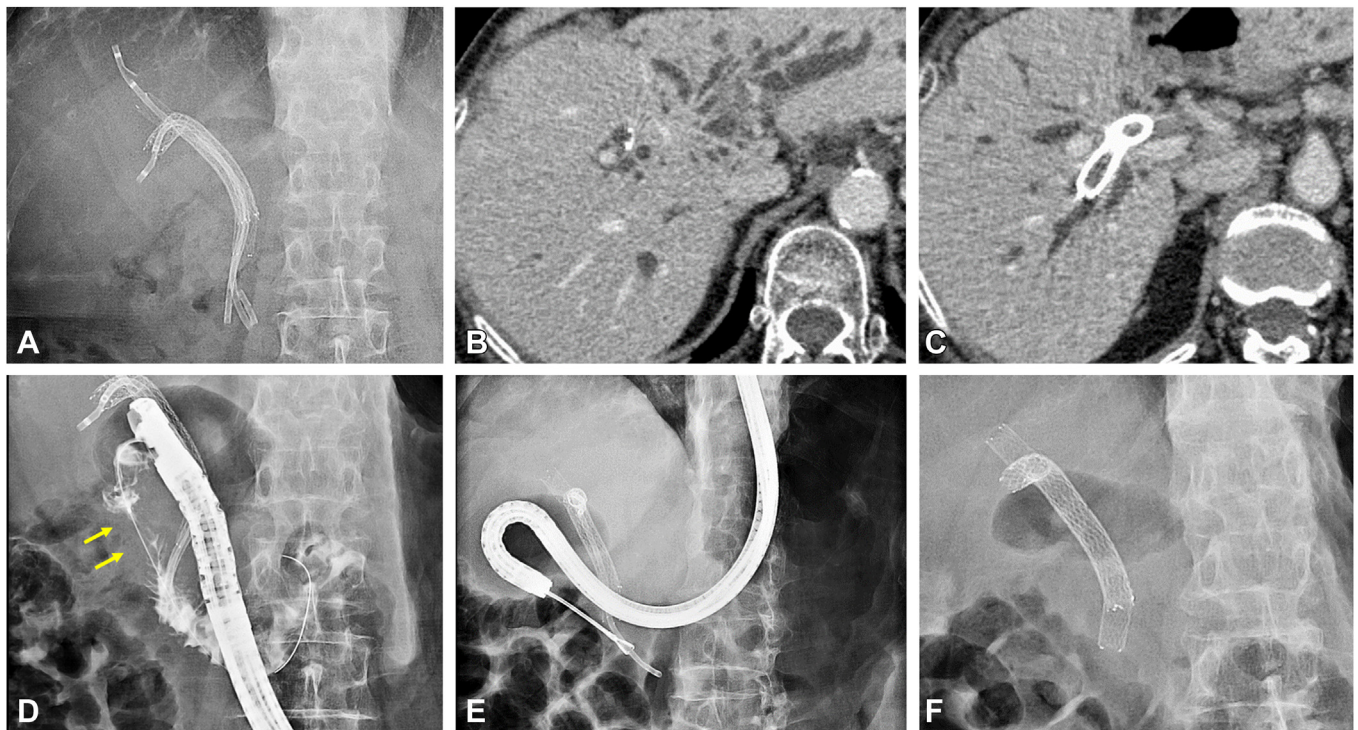


Figure 2. Pre-EUS-guided hepaticogastrostomy images. **A**, Radiographic image showing the positioning of uncovered metal stents in a partial stent-in-stent configuration using plastic stents. **B**, CT image depicting anterior segment stent dysfunction. **C**, CT image depicting posterior segment stent dysfunction. **D**, ERCP poses challenges owing to duodenal stenosis (arrows). **E**, Plastic stent removal was performed using an upper endoscope. **F**, Radiographic view showing the positioning of the uncovered metal stents in a partial “stent-in-stent” configuration.

YABUSAME Neo; Kaneka) was placed in the anterior bile duct (Fig. 3C). The patient had undergone multiple stent placements for hilar bile duct obstruction, which were performed using the partial stent-in-stent method to prevent overexpansion. We threaded the 0.025-inch guidewire through the posterior bile duct within the deployed stent. The meshes were dilated using the balloon dilator (Fig. 3D). A second UCSEMS (8 × 60 mm; YABUSAME Neo) was placed in the posterior bile duct (Fig. 3E).

The HGS fistula was dilated using only a spiral dilator, considering the low risk of bile leakage. A plastic stent (7F × 15 cm; Harmo Ray Stent; Hanaco Medical, Saitama, Japan) was deployed from the posterior bile duct into the HGS fistula (Figs. 4 and 5). After the procedure, the patient showed significant improvement in biliary drainage, confirmed by CT scans and blood tests, with bilirubin levels dropping from 11.3 to 0.7 mg/dL over 6 months. Patient was later placed on palliative care, and when malignant gastric outlet obstruction became apparent, a duodenal stent was inserted.

We believe that our approach is innovative and leads to successful re-intervention after transpapillary multistenting.

FUNDING

This work was supported by the National Cancer Center Research and Development Fund (2022-A-16).

DISCLOSURE

The authors disclosed no financial relationships relevant to this publication.

ACKNOWLEDGMENTS

The authors thank the members of the Endoscopy Team of the Department of Hepatobiliary and Pancreatic

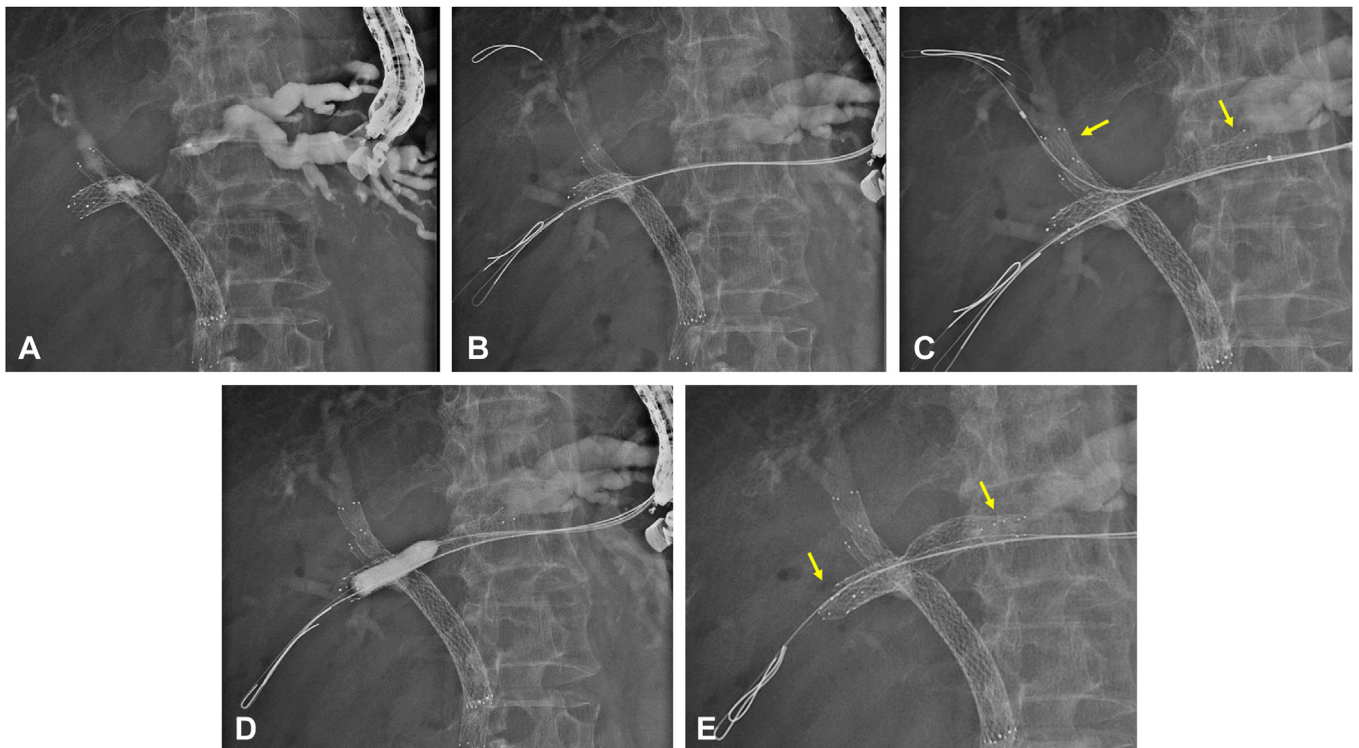


Figure 3. Additional bridging stenting using the partial stent-in-stent method via hepaticogastrostomy. **A**, Contrast-enhanced image of the bile duct via the hepaticogastrostomy route, illustrating malignant hilar biliary obstruction (bismuth type IV). **B**, Concurrent insertion of guidewires into the posterior bile duct and the anterior bile duct segments in parallel. **C**, Deployment of the first metal stent (*arrows*) from the anterior bile duct into the left bile duct. **D**, A guidewire was inserted through the mesh of the first stent at the posterior bile duct, followed by the use of a balloon catheter to dilate the stent mesh and alleviate the stricture. **E**, Using the partial stent-in-stent technique, we placed the second metal stent (*arrows*) from the posterior bile duct to the left bile duct.

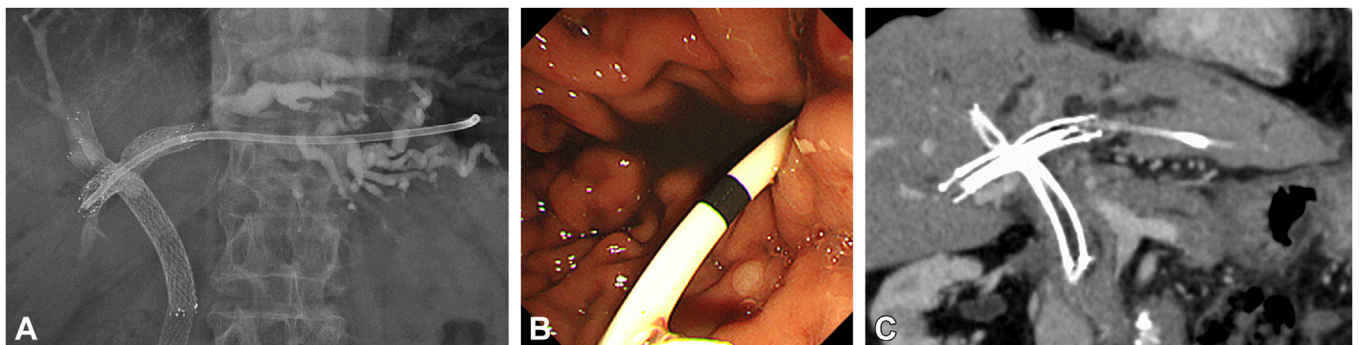


Figure 4. Hepatic drainage with additional partial stent-in-stent placement using EUS-guided hepaticogastrostomy. **A**, Insertion of a plastic stent extending from the posterior bile duct into the stomach. **B**, Endoscopic image of the stomach. **C**, Postprocedure CT image.

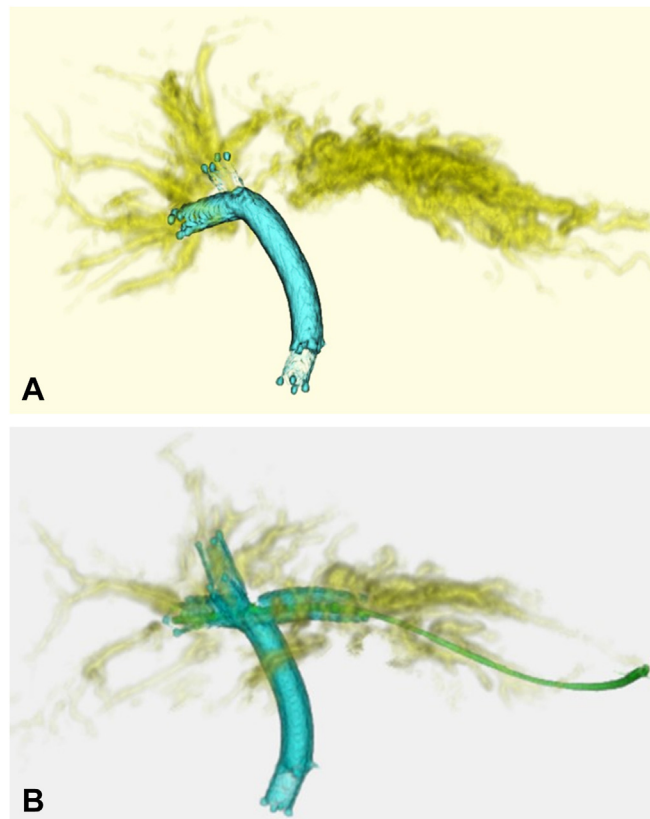


Figure 5. Pre- and post-EUS-guided hepaticogastrostomy 3-dimensional (3D) CT images. **A,** Preprocedural 3D image. **B,** Postprocedural 3D image.

Oncology, National Cancer Center Hospital, for their support of this research.

REFERENCES

1. Nakai Y, Kogure H, Isayama H, et al. Endoscopic ultrasound-guided biliary drainage for unresectable hilar malignant biliary obstruction. *Clin Endosc* 2019;52:220-5.
2. Caillol F, Bosshardt C, Reimao S, et al. Drainage of the right liver under EUS guidance: a bridge technique allowing drainage of the right liver through the left liver into the stomach or jejunum. *Endosc Ultrasound* 2019;8:199-203.
3. Ogura T, Sano T, Onda S, et al. Endoscopic ultrasound-guided biliary drainage for right hepatic bile duct obstruction: novel technical tips. *Endoscopy* 2015;47:72-5.
4. Maehara K, Hijioka S, Nagashio Y, et al. Simultaneous endoscopic ultrasound-guided hepaticogastrostomy and bridging stenting with partial stent-in-stent method. *Endoscopy* 2020;52:E381-2.
5. Kanai S, Saito T, Hakuta R, et al. Transverse stent placement for hilar malignant biliary obstruction through an endoscopic ultrasound-guided hepaticogastrostomy route. *Endoscopy* 2019;51:E245-6.