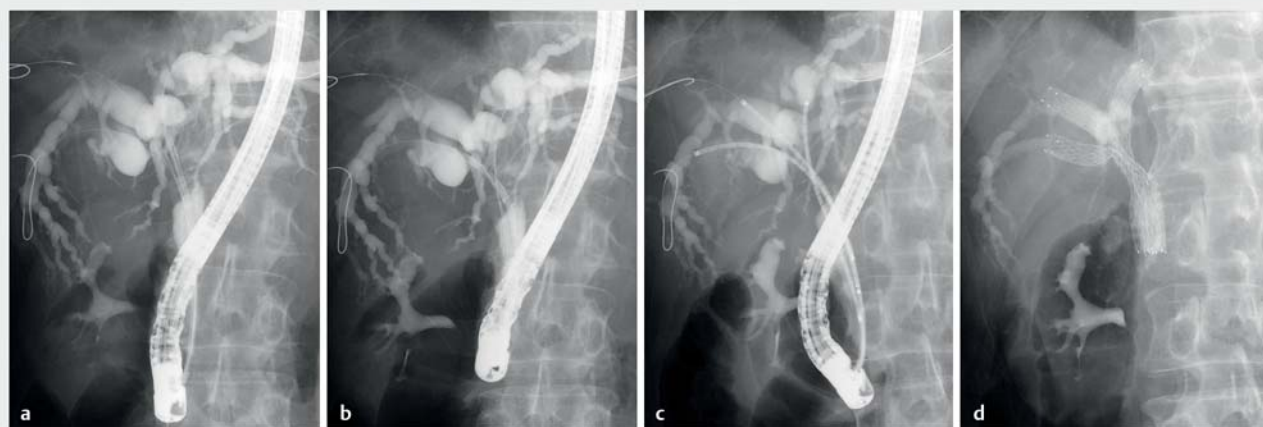


Simultaneous triple stent-by-stent deployment following endobiliary radiofrequency ablation for malignant hilar biliary obstruction



► **Fig. 1** Triple stent-by-stent deployment. **a, b** After three guidewires were inserted across the Bismuth type IIIa stricture, radiofrequency ablation was performed to the left and right hepatic duct strictures. **c** Three metal stent delivery systems were simultaneously introduced to the left, right posterior, and right anterior hepatic ducts. **d** The stents were released and placed in a stent-by-stent manner with their distal ends at the same level.

The simultaneous triple stent-by-stent (SBS) technique can prevent failure of the third stent insertion for trisectoral metal stenting in patients with malignant hilar biliary obstruction (MHBO) [1, 2]. However, simultaneous insertion of three stent delivery systems is often challenging, especially for tight strictures. Endobiliary radiofrequency ablation (RFA), which can prolong stent patency in MHBO [3], renders the stricture and tumor degenerative [4], resulting in decreased tightness of the stricture. Here, we describe an initial case of simultaneous triple SBS deployment following endobiliary RFA for unresectable MHBO. A 78-year-old man developed obstructive jaundice because of Bismuth type IIIa MHBO. As diameter of the common bile duct was large, we chose the triple SBS method. After placement of three guidewires into the left hepatic duct (LHD), anterior branch of the right hepatic duct (a-RHD), and posterior branch of the RHD (p-RHD), the RFA catheter (Habib EndoHPB catheter; Boston Scientific, Marlborough, Massachusetts, USA) was introduced over the LHD guidewire, and



► **Video 1** Simultaneous triple stent-by-stent deployment following endobiliary radiofrequency ablation in a patient with high-grade malignant hilar biliary obstruction.

the stricture of the LHD was subsequently ablated for 90 seconds at 7 W (VIO300 D generator; ERBE Elektromedizin GmbH, Tübingen, Germany). Then, the stricture of the RHD was also ablated over the p-RHD guidewire using the same settings. After RFA, three metal stents (Zeo

Stent V; Zeon Medical, Tokyo, Japan) were simultaneously introduced and passed smoothly through the stricture. Finally, the stents were released and placed in the order LHD, p-RHD, a-RHD (► **Fig. 1**, ► **Video 1**). All stents used were 8 mm in diameter and 80 mm in length.

The patient's symptoms improved immediately, with no adverse events.

Endobiliary RFA, which can help prolong the patency of metal stents in patients with MHBO, may also be useful for the simplification of simultaneous insertion of delivery systems.

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Competing interests

Dr. Inoue has received honoraria from Boston Scientific Japan and Japan Lifeline Co., Ltd. All other authors declare that they have no conflict of interest.

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