A novel technique for partial stent-in-stent placement of three metal biliary stents using a short double-balloon enteroscope

The endoscopic partial stent-in-stent (PSIS) placement of self-expandable metal stents (SEMSs) is effective for the palliation of malignant hilar biliary strictures [1–5]. Despite its efficacy, however, PSIS placement is technically challenging, especially when placing second or subsequent stents. We report a novel technique for PSIS placement of three SEMSs using a short double-balloon enteroscope (DBE), which was used in a patient with a malignant hilar biliary stricture and surgically altered anatomy.

A 74-year-old man who had undergone distal gastrectomy with Billroth II reconstruction was admitted with jaundice due to cholangiocarcinoma with a Bismuth type IV hilar biliary stricture (Fig. 1a). To aid biliary drainage, we placed a 7-Fr plastic stent in the left hepatic duct, another in the right posterior hepatic duct, and a third in the right anterior hepatic duct using a short DBE (EI-530B; Fujifilm, Tokyo; working channel, 2.8-mm diameter). Although this led to immediate resolution of the patient’s jaundice, we diagnosed unresectable cholangiocarcinoma and therefore went on to perform PSIS placement of three SEMSs (Zilver 635; Cook Medical, Winston-Salem, North Carolina, USA) using the DBE before the patient commenced chemotherapy.

First, the stricture was dilated (Quantum, 6-mm diameter; Cook Medical) then, to identify the bifurcation of the common hepatic duct and the target bile duct, two 0.018-inch landmark guidewires (Roadrunner; Cook Medical) were inserted into the right posterior hepatic duct and the right anterior hepatic duct [1,2]. The first SEMS (10-mm diameter, 80-mm long) was then placed into the left hepatic duct over a stiff 0.035-inch guidewire (THSF; Cook Medical) using a small-diameter (6-Fr), 200-cm-long delivery system, while keeping the two landmark guidewires in the right anterior and posterior hepatic ducts (Fig. 1b).

Next, a 0.035-inch hydrophilic guidewire (NaviPro; Boston Scientific, Natick, Massachusetts, USA) was easily inserted into the right posterior hepatic duct through the stricture and the interstices of the first SEMS following the landmark guidewire (Fig. 1c). A second SEMS (10-mm diameter, 60-mm long) was then successfully placed in the right posterior hepatic duct using a stiff guidewire that had been exchanged for the hydrophilic guidewire (Fig. 1d). The third SEMS (10-mm diameter, 60-mm long) was then placed over a 0.035-inch guidewire passing through the interstices of the two previous stents and into the right anterior hepatic duct, over which the third stent was placed (Fig. 1e). The three Zilver 635 stents forming a partial stent-in-stent arrangement (Fig. 1f).

Fig. 1 Cholangiographic views using a short double-balloon enteroscope showing: a Bismuth type IV malignant hilar biliary obstruction; b the two landmark guidewires in the right anterior and posterior hepatic ducts and the first stent, which was placed across the bifurcation into the left hepatic duct; c a 0.035-inch hydrophilic guidewire passing into the right posterior hepatic duct through the stricture and the interstices of the first stent; d the second stent in the right posterior hepatic duct; e a guidewire passing through the interstices of the two previous stents and into the right anterior hepatic duct, over which the third stent was placed; f the three Zilver 635 stents forming a partial stent-in-stent arrangement.
into the right anterior hepatic duct over a guidewire that had been passed in similar fashion through the interstices of the two previous stents (Fig. 1 e, f).

Therefore, the combined use of the 6-Fr Zilver 635 SEMSs [5] and 0.018-inch landmark guidewires facilitated the PSIS placement of multiple SEMSs for malignant hilar biliary stricture using a short DBE with a small working channel.

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