# Successful removal of a biliary metal stent using the stent-in-stent-in-stent technique



A 60-year-old woman with unresectable pancreatic cancer underwent endoscopic biliary stenting with a covered self-expandable metal stent (SEMS) with an antireflux valve (>Fig.1). She was readmitted 15 months later due to cholangitis. Cholangiography revealed contrast defect inside the stent, suspected to be the result of tumor invasion. As the stent could not be removed, the stent was trimmed below the ampulla. The removal attempt led to severe biliary hemorrhage that completely obstructed the endoscopic view, and therefore a covered SEMS was deployed under fluoroscopic guidance, leading to successful hemostasis and biliary drainage (> Fig. 2). The two stents could not be removed when cholangitis recurred just 1 month later, possibly owing to the short duration of the stent-in-stent configuration. Another covered SEMS with an antireflux valve was deployed inside the two existing stents, as the patient clearly had longer time to recurrent biliary obstruction when an antireflux value was present (> Fig. 3).

The patient presented with a third episode of cholangitis 10 months later. Endoscopic retrograde cholangiopancreatography revealed stent obstruction due to biliary stones and debris. When sweeping the lumen of the three stents using stone extraction balloons, all three stents gradually migrated toward the duodenum. We therefore removed all three stents together using an endoscopic snare (> Fig. 4), which was successfully performed with no resistance (> Fig. 5). A new laser-cut covered SEMS with an antireflux valve was placed, leading to resolution of the patient's symptoms (> Video 1).

Successful removal of both uncovered [1, 2] and covered SEMSs [3] has been reported using the stent-in-stent technique. The duckbill-type stent is a novel covered SEMS with an antireflux valve [4]. The removal of this kind of SEMS can



▶ Fig. 1 Initial placement of a duckbilltype self-expandable metal stent (Duckbill IT Biliary Stent: Kawasumi Laboratories Inc., Tokyo, Japan).



► Fig. 2 Stent-in-stent placement of a fully covered self-expandable metal stent (HANAROSTENT; Boston Scientific Corp., Marlborough, Massachusetts, USA).

be difficult [4, 5]. When the stent-in-stent technique proves unsuccessful, the addition of a third stent may facilitate removal.



▶ Fig. 3 Stent-in-stent-in-stent placement of a duckbill-type self-expandable metal stent (Duckbill Biliary Stent; Kawasumi). The antireflux value can be seen protruding from the second stent.



▶ Fig.4 Sweeping with a stone extraction balloon (Multi-3V Plus, 15 mm; Olympus Medical Systems Corp., Tokyo, Japan) led to migration of the three stents toward the duodenum.

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#### Competing interests

The authors declare that they have no conflict of interest.



► Fig. 5 The stent-in-stent-in-stent complex was removed with a snare.



**Video 1** Successful removal of a biliary metal stent using the stent-in-stent-in-stent technique.

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### References

- Arias Dachary FJ, Chioccioli C, Deprez PH. Application of the "covered-stent-in-uncovered-stent" technique for easy and safe removal of embedded biliary uncovered SEMS with tissue ingrowth. Endoscopy 2010; 42: E304–E305
- [2] Tan DM, Lillemoe KD, Fogel EL. A new technique for endoscopic removal of uncovered

biliary self-expandable metal stents: stentin-stent technique with a fully covered biliary stent. Gastrointest Endosc 2012; 75: 923–925

- [3] Menon S. Removal of an embedded "covered" biliary stent by the "stent-in-stent" technique. World J Gastroenterol 2013; 19: 6108–6109
- [4] Yamada Y, Sasaki T, Takeda T et al. Removal of Duckbill-type laser-cut anti-reflux metal stents: clinical evaluation and in vitro study. DEN Open 2023; 3: e217
- [5] Familiari P, Bulajic M, Mutignani M et al. Endoscopic removal of malfunctioning biliary self-expandable metallic stents. Gastrointest Endosc 2005; 62: 903–910

# Bibliography

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