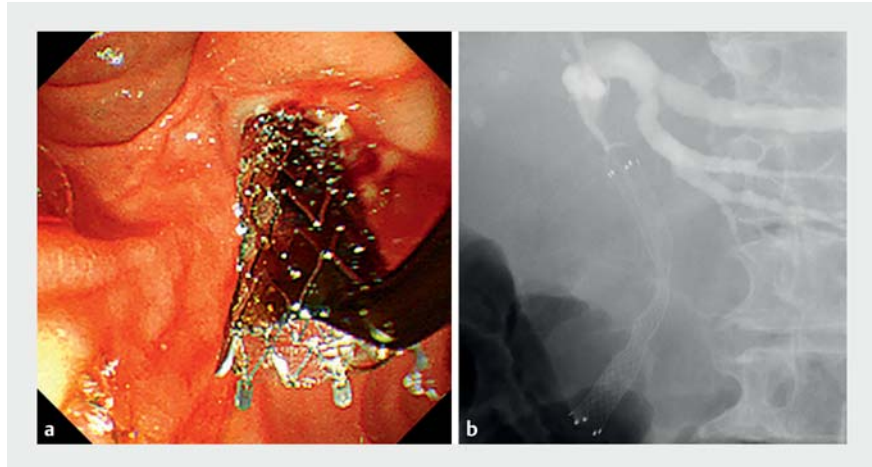


Hemorrhage after laser-cut covered self-expandable metal stent removal

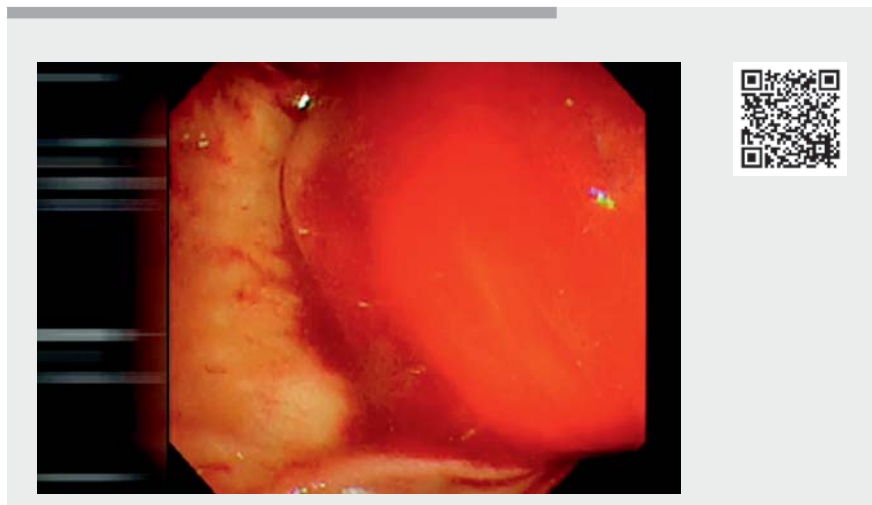
Endoscopic covered self-expandable metal stent (CSEMS) placement is widely used for distal malignant biliary obstruction (MBO) as the stent prevents ingrowth and is easily removed [1,2]. The usefulness of the laser-cut CSEMS (LC-CSEMS) and its endoscopic removal have been reported [3–5]; there have been no previous reports of complications related to LC-CSEMS removal. We here report a case of hemorrhage following LC-CSEMS removal.

An 83-year-old woman was referred for cholangitis. She had undergone endoscopic LC-CSEMS (X-Suit NIR covered biliary metal stent; Olympus Medical Systems, Tokyo, Japan) placement 7 months previously for unresectable pancreatic cancer. Endoscopic retrograde cholangiopancreatography (ERCP) was performed because recurrent biliary obstruction was suspected (► **Fig. 1**; ► **Video 1**). Cholangiography revealed defects suggestive of sludge (► **Fig. 2**). We therefore decided to remove the LC-CSEMS and replace it with a new one.

A snare forceps was used to hold the LC-CSEMS, which was moved toward the papilla by pushing, along with clockwise torsion of the endoscope while adjusting the axis of the bile duct [3]. The initial attempt to pull the LC-CSEMS out was effective; however, the snare subsequently could not be released, with the plan having originally been to release it from the LC-CSEMS and reposition it nearer the papilla (► **Fig. 3 a**). Consequently, the LC-CSEMS was instead removed by withdrawing the endoscope. After stent removal, we inserted the endoscope to the papilla and found that a hemorrhage had been induced from the papilla during LC-CSEMS removal (► **Fig. 3 b**). Although biliary cannulation was possible, the hemorrhage disturbed the endoscopic view, so re-insertion of the new LC-CSEMS was performed under fluoroscopic guidance. The LC-CSEMS suffers from minimal stent shortening because of the laser-cut structure; there-



► **Fig. 1** Endoscopic retrograde cholangiopancreatography findings showing: **a** the endoscopic appearance of the successfully placed laser-cut covered self-expandable metal stent (LC-CSEMS) for a patient with unresectable pancreatic cancer; **b** the fluoroscopic appearance of the successfully placed LC-CSEMS.



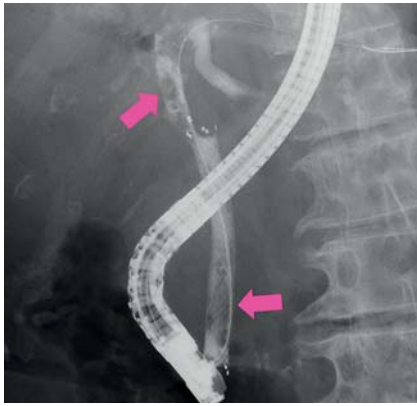
► **Video 1** Difficult removal of a laser-cut covered self-expandable metal stent (LC-CSEMS) causing hemorrhage from the papilla that was subsequently controlled by insertion of a replacement LC-CSEMS.

fore, it could be placed easily in an accurate position (► **Fig. 4 a**) and the hemorrhage was finally stopped by compression from the LC-CSEMS (► **Fig. 4 b**). Although this hemorrhage was induced by LC-CSEMS removal, it was easily stopped after the LC-CSEMS was replaced.

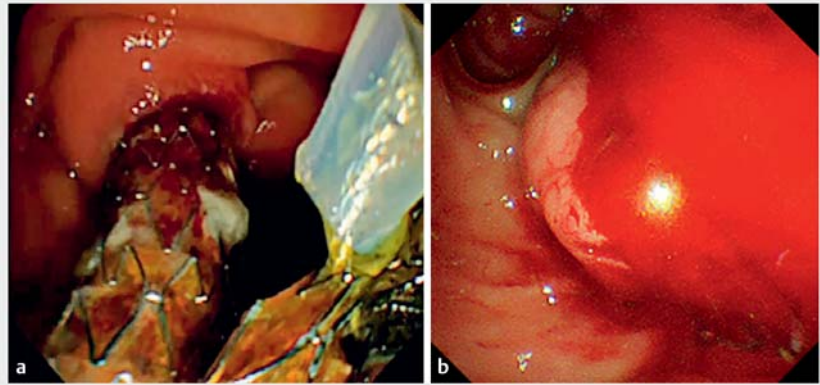
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Competing interests

The authors declare that they have no conflict of interest.



► **Fig. 2** Cholangiographic appearance with defects (pink arrows) suggestive of sludge.



► **Fig. 3** Endoscopic views showing: **a** the snare forceps, which could not be released, holding the partially withdrawn laser-cut covered self-expandable metal stent; **b** hemorrhage that was induced during laser-cut covered self-expandable metal stent removal.

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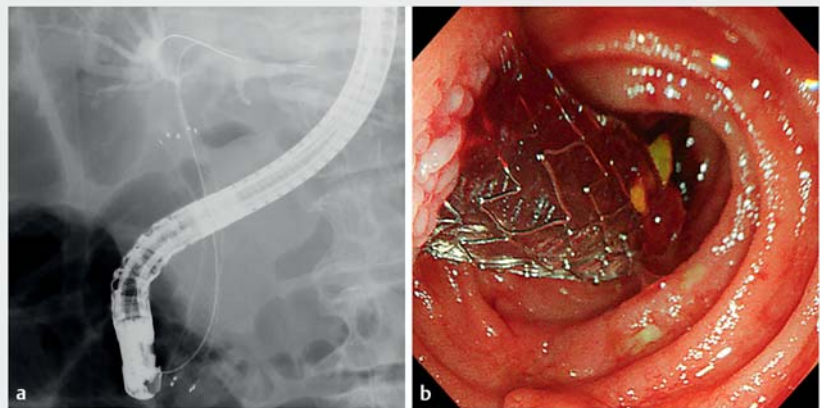
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► **Fig. 4** Endoscopic retrograde cholangiopancreatography findings showing: **a** the fluoroscopic appearance of the successfully placed accurately positioned laser-cut covered self-expandable metal stent (LC-CSEMS); **b** the endoscopic appearance with hemostasis successfully achieved by compression from the LC-CSEMS.

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