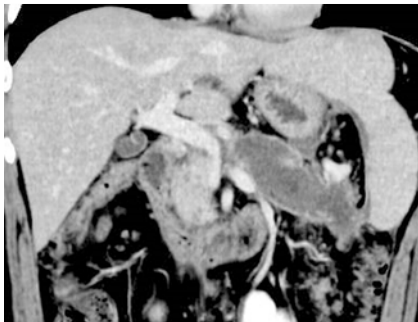
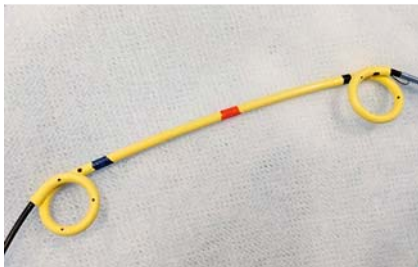


A three-color marking method to prevent stent migration in endoscopic ultrasound-guided drainage for peripancreatic fluid collections

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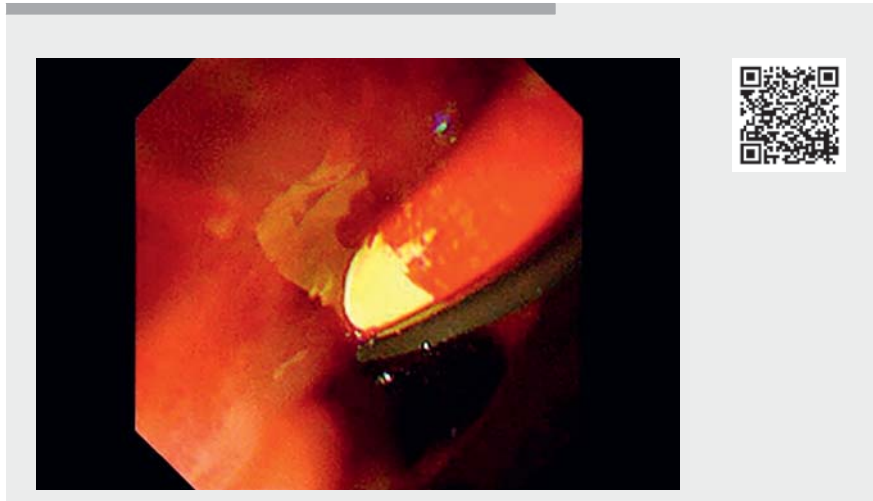


► **Fig. 1** Computed tomography showed a 64-mm walled-off necrosis in the pancreas tail.



► **Fig. 2** A 7 Fr 7-cm double-pigtail stent for internal drainage. The left side is the stent insertion direction. A blue mark meaning “still safe, insert stent further” was placed at the base of the distal pigtail. A red mark meaning “stent center, form distal pigtail” was placed in the middle of the stent with a permanent marker. There was originally a black mark meaning “final point, deploy the stent” at the base of the proximal pigtail.

Endoscopic ultrasound (EUS)-guided drainage using a plastic stent for peripancreatic fluid collections has been widely performed. It is an established procedure with a high success rate [1]. However, it is often difficult to see how far the stent has been inserted during EUS-guided drainage. A rare but serious complication of stent migration has been reported [2]. We developed a novel three-color-marking method to prevent stent migration.



► **Video 1** Three-color marking method to prevent stent migration in endoscopic ultrasound-guided draining for peripancreatic fluid collections.

A man in his 40s with severe acute pancreatitis developed a 64-mm infectious walled-off necrosis (WON) in the pancreas tail (► **Fig. 1**). We decided to perform EUS-guided internal and external drainage. First, an echoendoscope (GF-UCT260; Olympus Medical Systems, Tokyo, Japan) was inserted and the WON was visualized transgastrically. Then, a puncture was performed using a 19G needle (EZshot3; Olympus Medical Systems), and a 0.025-inch guidewire (Visiglide2; Olympus Medical Systems) was manipulated into the WON. After dilation using a 4-mm balloon (REN biliary balloon catheter; KANEKA, Osaka, Japan), a double-lumen catheter (uneven double-lumen cannula; PIOLAX, Tokyo, Japan) was inserted and a second guidewire was placed.

A 7 Fr 7-cm double pigtail stent (Through and Pass; Gadeliuss, Tokyo, Japan) was chosen for internal drainage. A blue marker was added to the base of the distal pigtail and a red marker was placed to the middle of the stent with a permanent marker. The base of the proximal pigtail

originally had a black marker, making three colored marks (► **Fig. 2**). A blue mark means “still safe, insert stent further” and a red mark means “stent center, form the distal pigtail.” A black mark means “final point, deploy the stent.” By confirming the three colored marks, the stent could be deployed safely. After that, a 6 Fr endoscopic nasocystic drain was placed (► **Video 1**). Notably, no complications were seen.


This three-color marking method is cheap, easy, and anyone can use it. Using this method, the position of the stent can be reliably recognized on the endoscopic image, and the stent can be deployed safely without migration.

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Competing interests

The authors declare that they have no conflict of interest.

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