

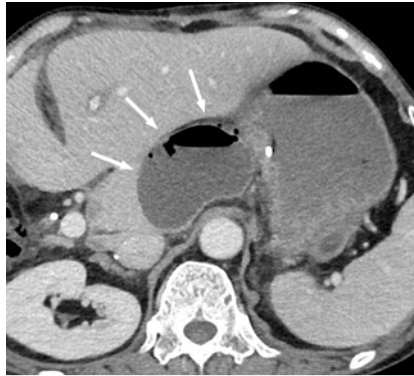
## The use of clip anchoring to ensure safe transgastric puncture during endoscopic ultrasound-guided transmural drainage

Endoscopic ultrasound (EUS)-guided transmural drainage (EUS-TD) was recently developed and has proven to be a useful alternative approach for various intra-abdominal conditions [1–3]. In this procedure, an intrathoracic passage should be avoided, because it causes severe complications, such as mediastinitis [4, 5]. Unfortunately, however, it is difficult to confirm whether a puncture route can be used to pass the thorax using EUS observation alone when approaching from the gastric cardia. Here, we describe the usefulness of clip anchoring at the esophagogastric junction to minimize the risk associated with intrathoracic passage.

A 66-year-old man presented with a high fever after hepatectomy for hepatocellular carcinoma. The contrast-enhanced computed tomography (CT) scan showed fluid collection with gas, indicating an intra-abdominal abscess at the omental bursa (▶ Fig. 1). Although there was no appropriate route for extracorporeal insertion, a curvilinear echoendoscope clearly showed the abscess just beneath the gastric cardia. Using a forward-viewing endoscope, two clips were placed at the esophagogastric junction, avoiding the hiatal hernia (▶ Fig. 2 a). A 19-gauge needle was then inserted into the abscess cavity under EUS guidance and fluoroscopic observation at a point distal to the clips (▶ Fig. 2 b). Next, a 6-Fr naso-abscess catheter and 7-Fr double-pigtail stent were inserted (▶ Fig. 2 c, ▶ Video 1).

The patient's condition quickly improved the next day, and the naso-abscess catheter was removed on the fifth day without any complications.

A CT scan approximately 5 weeks later showed complete resolution of the abscess (▶ Fig. 3 a). The puncture point was endoscopically reconfirmed at a point distal to the clip, which was located at the esophagogastric junction (▶ Fig. 3 b), and the stent was removed.



▶ Fig. 1 Computed tomography scan showing a 7-cm omental bursa abscess adjacent to the stomach (arrows).

The clips do not physically anchor anything in this procedure, but they do anchor a virtual track of insertion and make EUS-TD at the gastric cardia safer.

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▶ Video 1 The esophagogastric junction was marked with two clips. Endoscopic ultrasound-guided transmural drainage was performed by inserting a needle at a point distal to the clips, and placing a naso-abscess tube and double-pigtail stent into the abscess under fluoroscopic observation. Video still image Fluoroscopic image showing the puncture point positioned distally to the clips (allow).

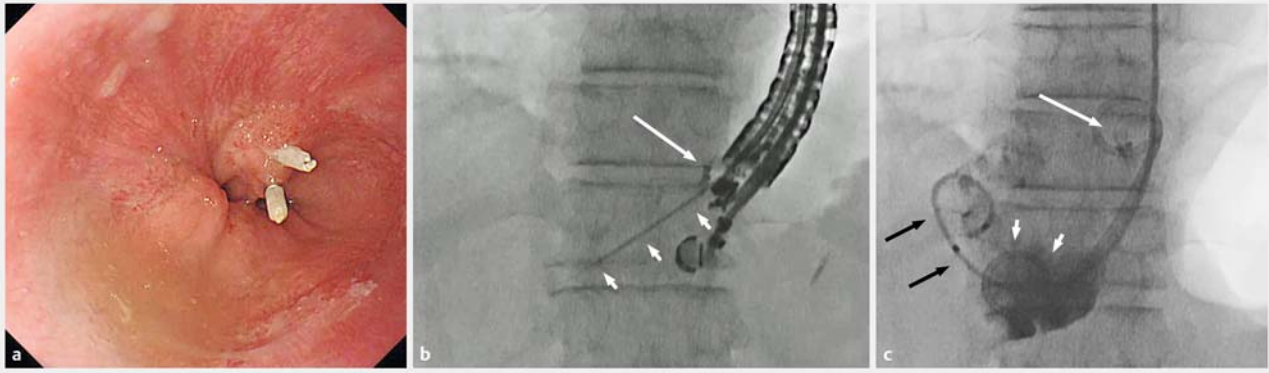
### Competing interests

None

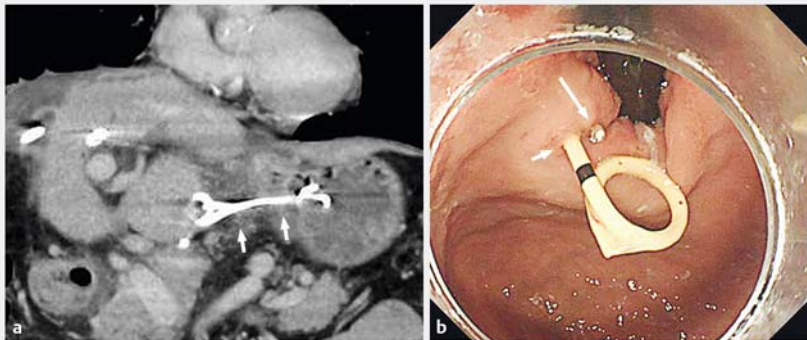
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► **Fig. 2** Drainage procedure. **a** Two clips were placed at the esophagogastric junction. **b** A 19-gauge needle (arrowheads) was inserted into the abscess cavity at a point distal to the clips (arrow). **c** A 6-Fr naso-abscess catheter (black arrows) and a 7-Fr double-pigtail stent (arrowheads) were then inserted into the abscess cavity through the puncture point distal to the clips (white arrow).



► **Fig. 3** Follow-up at 5 weeks. **a** Computed tomography scan showing the stent (arrowheads) placed through the intra-abdominal route, and the resolved abscess. **b** Reverse viewing endoscopic image showing the double-pigtail stent (arrowhead) inserted at a point distal to the clip (arrow) at the esophagogastric junction.

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