

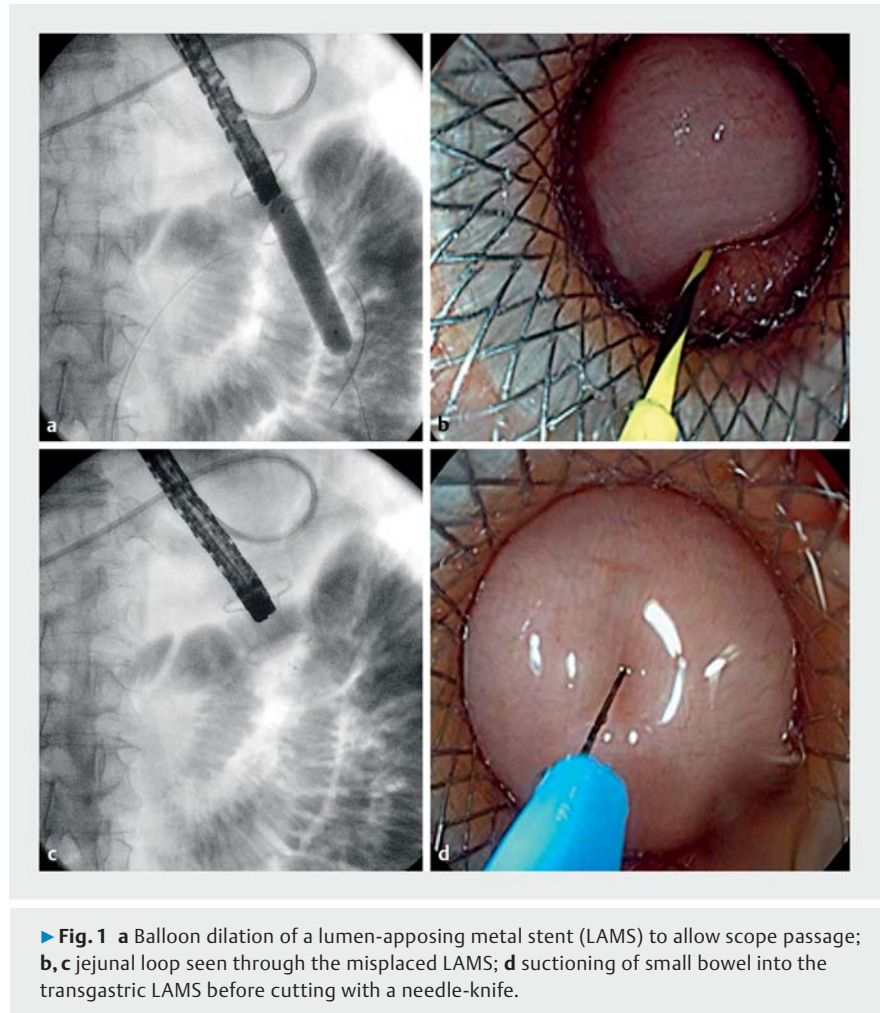
## Helpful technical notes for intraperitoneal natural orifice transluminal endoscopic surgery (NOTES) salvage in a failed EUS-guided gastroenterostomy scenario

The main reasons for dislodgement of the distal flange of a lumen-apposing metal stent (LAMS) into the peritoneum during endoscopic ultrasound (EUS)-guided gastroenterostomy are that the delivery catheter pushes away the small bowel without entering it, or else that advancement of a preloaded guidewire tents away the jejunal loop (in both cases, the EUS window is lost).

The main question is: Is the guidewire still in place? If yes, the action of choice is coaxial insertion of a second (coaxial) stent (LAMS, enteral self-expandable metal stent) through the misdeployed LAMS. If not, three options have been reported: LAMS-in-LAMS rescue with intraperitoneal EUS guidance; natural orifice transluminal endoscopic surgery (NOTES); or surgery.

We offer some helpful technical notes for intraperitoneal NOTES salvage (► **Fig. 1**, ► **Fig. 2**, ► **Fig. 3**; ► **Video 1**):

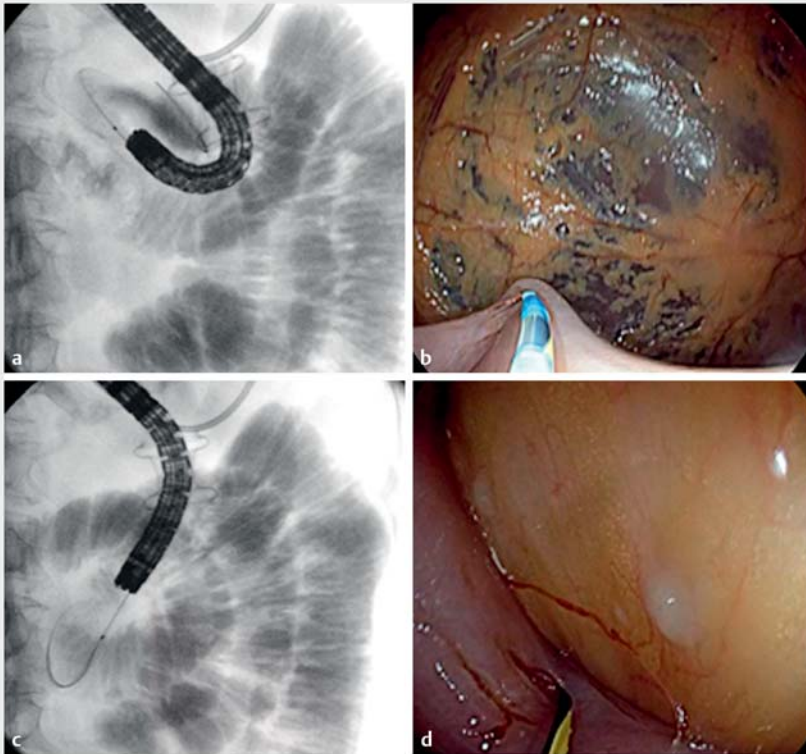
1. Do not remove the transgastric misplaced LAMS! Use it as an internal trocar for intraperitoneal NOTES.
2. Exchange the echoendoscope for a therapeutic gastroscope (single or double-channel). After balloon expansion of the LAMS up to 15 mm, the scope is ready for NOTES through the misplaced LAMS.
3. NOTES: From the stomach, (i) suction a jejunal loop into the distal LAMS flange and access it by cutting with a needle-knife, or (ii) access the peritoneal cavity and incise the bowel wall with a needle-knife. After this, advance a guidewire through the needle-knife and coil it in the jejunum. (If a double-channel scope is used, the jejunal loop can be grasped with a rat-tooth forceps and the needle-knife can be advanced through the second channel).



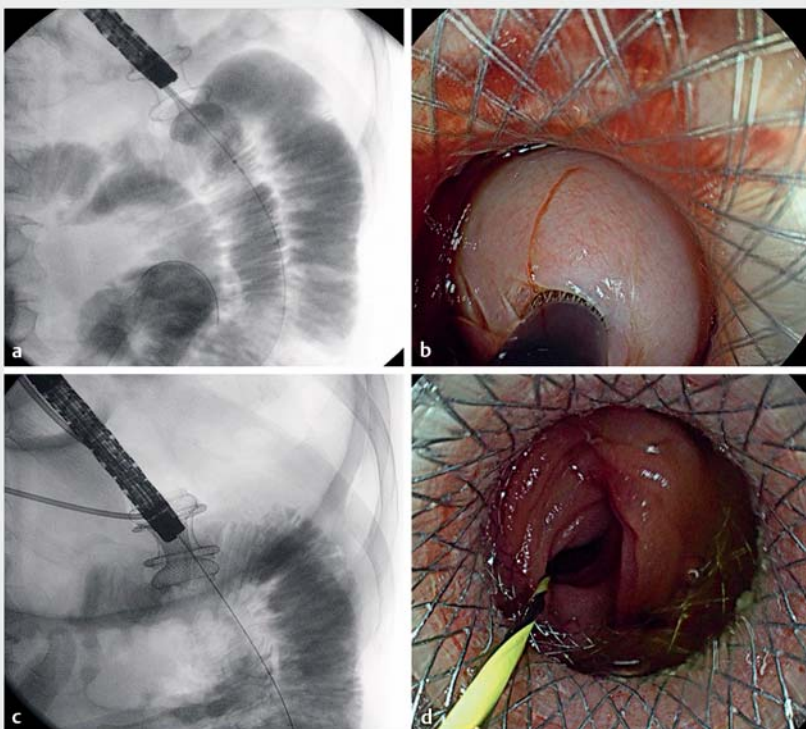
4. Under endoscopic/fluoroscopic guidance, deploy a second coaxial rescue stent within the misplaced stent to create a bridge between the small bowel and the stomach. A LAMS-in-LAMS option may be preferred, given that the cautery system will help to gain access through the jejunum wall.

Relevant technical aspects during NOTES are to: limit CO<sub>2</sub> insufflation; maneuver carefully; stabilize the guidewire; ensure meticulous fluoroscopic monitoring to help advancement of the second LAMS delivery catheter into the small bowel [1–4].

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► **Fig. 2 a–d** Peritoneoscopy: accessing a jejunal loop. **a, b** Avoid an acute angle like this (the liver is seen). **c, d** Try to maintain the LAMS and the scope in the same plane.



► **Fig. 3 a, b** The second LAMS delivery catheter with its distal flange deployed inside the jejunal loop is pulled into the misplaced LAMS. **c, d** The second LAMS in position within the first LAMS, creating a bridge between the small bowel and the stomach.

## Competing interests

J. B. Gornals is a consultant for Boston Scientific.

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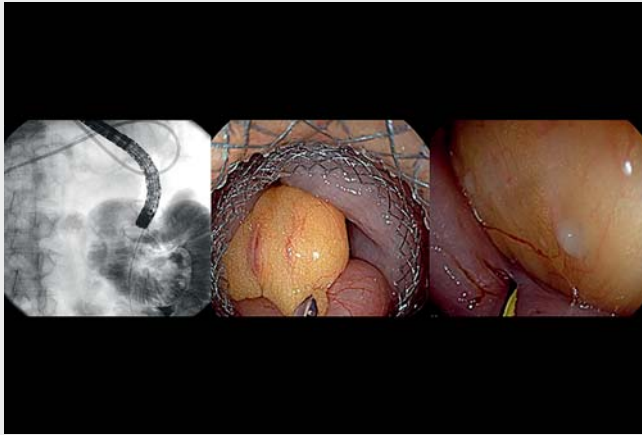
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**▶ Video 1** Helpful technical notes for intraperitoneal natural orifice transluminal endoscopic surgery (NOTES) salvage in the scenario of a failed endoscopic ultrasound-guided gastroenteroanastomosis with a misdeployed lumen-apposing metal stent.

## Bibliography

Endoscopy 2022; 54: E287–E289

DOI 10.1055/a-1519-6401

ISSN 0013-726X

published online 2.7.2021

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Georg Thieme Verlag KG, Rüdigerstraße 14,  
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