

## Stent gone rogue: endoscopic removal of a 3-year-old embedded cystogastrostomy stent



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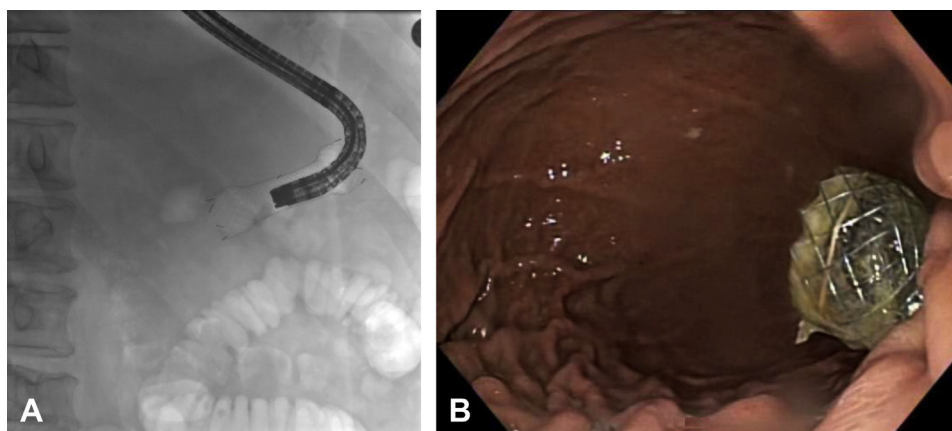
EUS-guided drainage of pancreatic collections using fully covered self-expandable metal stents (SEMSs) is both safe and effective, with low rates of adverse events.<sup>1</sup> Once deployed, these stents should be removed within 4 weeks to decrease the risk of adverse events, such as bleeding and migration.<sup>2</sup> We present a case of the successful endoscopic removal of a 3-year-old embedded, denuded, and mangled SEMS across the cystogastrostomy site in a patient presenting with perisplenic abscess.

A 60-year-old man with idiopathic acute necrotizing pancreatitis complicated by walled-off pancreatic necrosis who had undergone EUS-guided cystogastrostomy 3 years earlier presented with 3 weeks of worsening chronic abdominal pain and fever. A review of records revealed that cystogastrostomy was performed with a through-the-scope 18- × 60-mm fully covered SEMS (Fig. 1). The plan was to remove the SEMS after resolution of walled-off pancreatic necrosis; however, the patient was lost to follow-up.

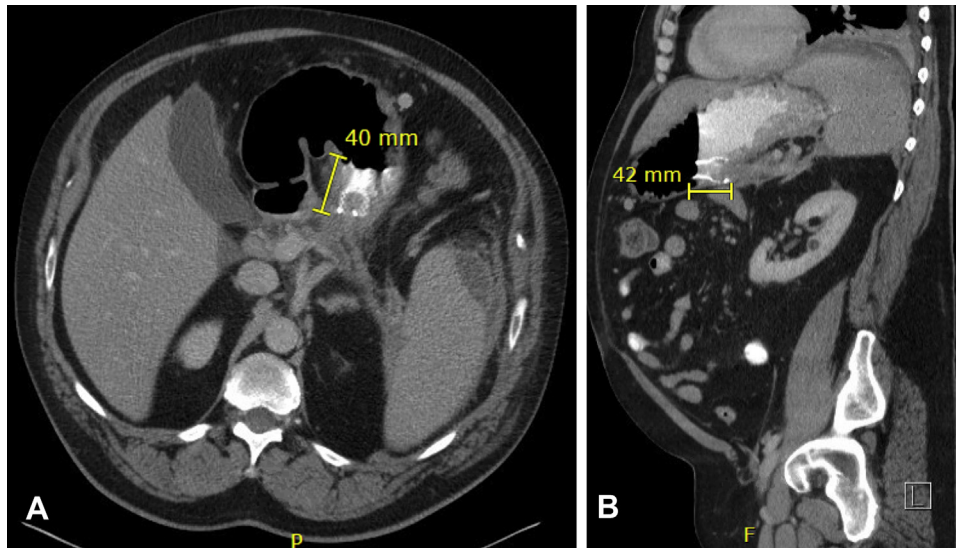
Laboratory test results were notable for a normal white blood cell count and lipase, as well as a hemoglobin level of 13.0 g/dL. A CT scan of the abdomen and pelvis revealed a hypoattenuating fluid collection replacing the pancreatic tail, measuring 4.8 × 1.9 cm; cyst-gastrostomy stent in situ, albeit separate from the collection; splenomegaly measuring 15.5 cm with a perisplenic hypoattenuating subcapsular collection along the lateral and superior splenic



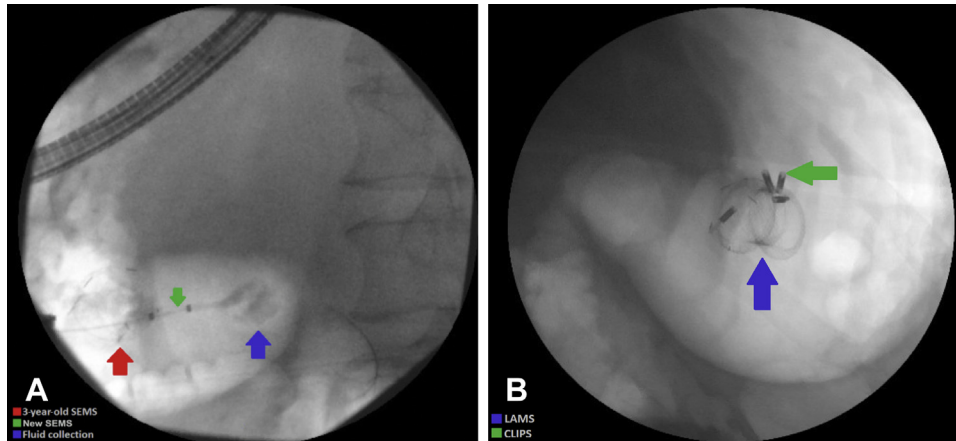
**Figure 2.** Initial CT of the abdomen and pelvis upon patient presentation. The image shows a splenic fluid collection (*blue arrow*).



**Figure 1.** Fluoroscopy (A) and endoscopy (B) views of the initial placement of the self-expandable metal stent in good position 3 years before the patient's presentation.



**Figure 3.** Initial CT of the abdomen and pelvis upon patient presentation. The images show the retained self-expandable metal stent with a reduced length of 40 mm.



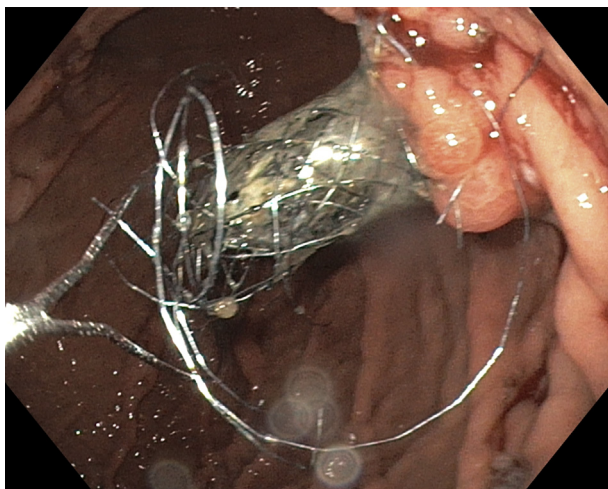
**Figure 4.** Fluoroscopy images of the 2 different stent-in-stent techniques used. **A**, A new self-expandable metal stent was placed. **B**, A lumen-apposing metal stent was also placed in an attempt to cause tissue necrosis.

margin, measuring 13.3 × 1.9 cm and accompanied by a thin fluid tract/collection extending from the pancreatic tail collection communicating with perisplenic collection (Fig. 2), and a small left-lung pleural effusion. In addition, the length of the embedded SEMS had been effectively reduced to approximately 3.5 to 4 cm as measured on the CT scan owing to collapse of the cavity tissue embedding it, leading to significant compression and distortion of the SEMS (Fig. 3).

After a multidisciplinary discussion with the surgery and radiology teams, the recommendation was to attempt endoscopic removal of the embedded SEMS. EGD/EUS was performed, and we noted the previously placed cyst-gastrostomy SEMS in the stomach; however, there was complete disintegration of the outer coating of the stent, with substantial tissue ingrowth, severely mangled stent ends, and lattice work. In addition, the struts of the stent

were embedded in the posterior retroperitoneal wall of a completely collapsed cavity. Under fluoroscopy, contrast was injected through the stent, and a very small linear tract of contrast extravasation was seen running toward the left upper quadrant, corroborating the previous CT scan findings.

A wire was advanced into this tract, with extravasation of purulent material. A through-the-scope fully covered 18- × 60-mm esophageal SEMS (Taewoong Medical, Los Angeles, Calif) was deployed via the stent-in-stent insertion technique to cause tissue necrosis for removal of the embedded stent (Fig. 4). Finally, a 20-cm-long single-pigtail stent fashioned from a 6F nasobiliary drainage catheter was inserted through the new SEMS into the left upper quadrant abscess, traversing the small caliber tract leading to the abscess. Our plan was to repeat abdominal imaging in 4 weeks and remove the stent.



**Figure 5.** Endoscopy view of endoscopic removal wire by wire by using a snare (shown) and later rat-tooth forceps (not shown) for successful removal of the 3-year-old stent.

A follow-up x-ray of the kidney, ureters, and urinary bladder performed 2 days later to ascertain the position of the nasojejunal feeding tube revealed migration of the newly placed SEMS. EGD was repeated and confirmed migration of the SEMS and pigtail stent. These were removed. It was ascertained that the 6-cm SEMS was too long to provide adequate anchoring and tissue apposition for necrosis of tissue overgrowth owing to severe disfiguration and embedding of the old stent leading to compression and stunting of stent length. Therefore, to cause tissue necrosis and facilitate removal of the embedded 3-year-old SEMS, we elected to insert a 20- × 10-mm lumen-apposing metal stent (LAMS; Axios; Boston Scientific, Marlborough, Mass) within the pre-existing 3-year-old SEMS; it was secured to the embedded stent with standard hemoclips (Cook Medical, Bloomington, Ind) to prevent spontaneous migration (Fig. 4). Although the LAMS was shorter than the embedded SEMS, the area covered by the LAMS led to partial tissue necrosis and facilitated the removal of the old SEMS. Furthermore, the gastric flanges of both stents were flush, allowing for clip placement to prevent premature migration.

A guidewire was advanced through these 2 stents (new LAMS and old SEMS) into the sinus tract in the left upper quadrant abscess, and a 6F × 20-cm-long stent fashioned from a nasobiliary lavage catheter (Boston Scientific) was placed again for drainage of the abscess. CT of the abdomen 3 weeks after discharge noted improvement of perisplenic fluid collections without any new abdominal fluid collections and with cyst-gastrostomy stents in place.

Follow-up EGD 4 weeks later allowed successful removal of the 6F drainage catheter and inner LAMS with rat-tooth forceps. The stent-in-stent technique led to



**Figure 6.** Follow-up CT of the abdomen and pelvis shows resolution of the splenic fluid collection.

some tissue necrosis; however, significant embedding and tissue ingrowth in the old stent remained. After prolonged efforts, using snare, biopsy forceps, and the technique of stent “unraveling” by individual grasping and removal of lattice wires (Fig. 5), the embedded 3-year-old SEMS with wire struts and lattice fixed into the gastric wall and retroperitoneum were removed in their entirety, as confirmed on endoscopy and fluoroscopy.

There were no postprocedure adverse events. Follow-up CT scan 1 month later revealed near resolution of the fluid collection, and the patient continues to do well and remains asymptomatic at 12-month follow-up (Fig. 6).

In summary, the first attempt of the stent-within-stent technique (with a SEMS) did not work because of premature migration of the new SEMS, owing to its longer effective length protruding into the stomach. However, the second attempt (with a LAMS) led to partial tissue necrosis, thus revealing the embedded wire struts, which facilitated the removal (wire unraveling) of the 3-year-old SEMS.

In conclusion, Video 1 (available online at [www.VideoGIE.org](http://www.VideoGIE.org)) demonstrates successful removal of a 3-year-old embedded, denuded, and mangled SEMS across the cystogastrostomy site using a stent-within-stent technique and with unraveling of the embedded SEMS lattice by removing one wire at a time. Endoscopists and endoscopy units should keep a list of all stents placed endoscopically with dates of stent placement

and due dates of follow-up for stent removal or exchange. This can facilitate the appropriate follow-up for stent management and avoid loss to follow-up, thus preventing long-term adverse events, such as occurred in our case.

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## DISCLOSURE

*All authors disclosed no financial relationships.*

*Abbreviations: LAMS, lumen-apposing metal stent; SEMS, self-expandable metal stent.*

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