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Lost in the tunnel: Submucosal tunneling endoscopic resection guided by endoscopic ultrasound coils

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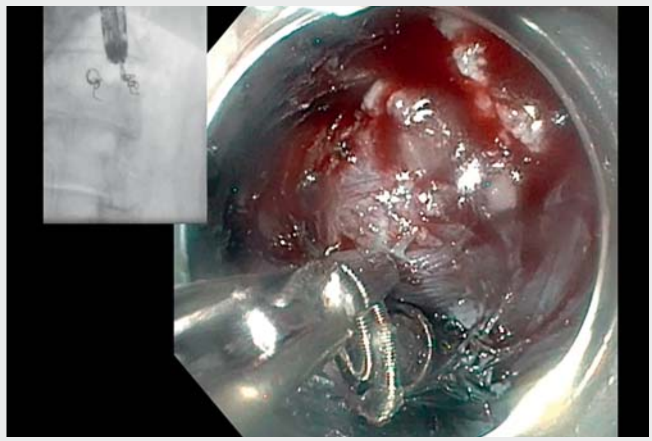
Submucosal tunneling endoscopic resection (STER) is a technique that involves the creation of a tunnel to reach a lesion. The tunnel allows resection of lesions involving the muscularis and/or serosa, decreasing the risk of infection and/or fistula [1].

It is usually reserved for lesions <3.5 cm at tubular sites such as the esophagus or gastric cardia. Sometimes tunneling can become challenging in non-tubular structures [2].

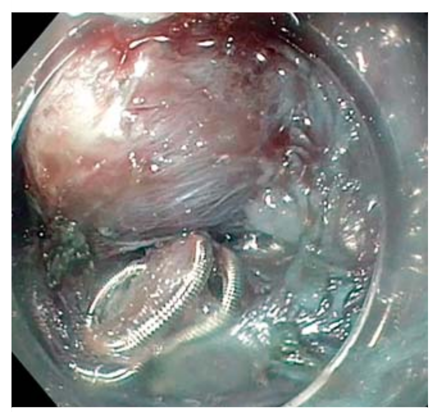
A 68-year-old woman with a history of obstructive sleep apnea, asthma, obesity, hypertension, and autoimmune hepatitis was evaluated for dysphagia and belching. Endoscopy was performed and we found an oval 2-cm submucosal lesion at the lesser curvature, at the level of the gastric body, about 5 cm from the gastroesophageal (GE) junction. She was referred for endoscopic resection. During endoscopic ultrasound, the lesion was located at the muscularis propria; a gastrointestinal stromal tumor (GIST) was suspected.

Owing to the location and layer of origin of the lesion, STER was chosen as the method of resection. Initially a submucosal tunnel was started about 1 cm above the GE junction, and the tunnel was guided based on the location of the lesion. However, after significant tunneling (▶ **Fig. 1**), the lesion could not be identified in the submucosal tunnel, and the submucosal injection made it impossible to identify from the mucosal side. The decision was made to place coils on both sides of the lesion using endoscopic ultrasound, aiming to guide the submucosal dissection with the aid of fluoroscopy. Two embolization coils (Wilson Cook, Bloomington, Indiana, USA) were delivered into the submucosal space in close proximity to the lesion using a 19-gauge fine needle aspiration needle (▶ **Video 1**). After this, the submucosal tunnel was directed towards the space between the two coils using intermittent fluoroscopy. With further submucosal dissection, the coils were identified at the submucosal tunnel (▶ **Fig. 2**) as well as the subepithelial lesion. The coils were removed from the tunnel using a rat tooth forceps. To remove the lesion en bloc, the mucosa had to be fenestrated. The area of mucosotomy was closed endoscopically using a running suture with 2–0 polypropylene, then the submucosal tunnel was instilled with gentamycin and the opening of the tunnel at the esophagus level was closed with four endoscopic clips. The patient was admitted for observation. An upper GI series was obtained the next day showing no contrast extravasation, diet was started, and the patient was discharged home



Video 1 Demonstration of coils placement under endoscopic ultrasound to locate a submucosal lesion in the tunnel created to perform a protected dissection.

▶ **Fig. 1** Long tunnel created.



▶ **Fig. 2** Representation of the coils placed in close proximity to the lesion.

the day after the procedure. The pathology of the lesion showed a unifocal 1.4 × 1.3 × 1.2 cm GIST, low grade, spindle cell type, mitotic rate 1 per 5 mm^2, with zero risk of progressive disease.
Small subepithelial lesions could be easily missed during STER. Third space endoscopy is in continuous evolution, and the use of coils and fluoroscopy is an effective strategy to guide the tunnel to the site of the lesion. Skills in third space endoscopy as well as endoscopic ultrasound are required, along with a radiology technologist well versed in endoscopic procedures.

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Competing interests

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The authors

Rodrigo Duarte-Chavez, Khaled Elfert, Michel Kahaleh
Department of Gastroenterology & Hepatology, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey

Corresponding author

Michel Kahaleh, MD
Robert Wood Johnson University Hospital, Department of Gastroenterology & Hepatology, 1 RWJ Place, MEB 464, New Brunswick, NJ 08901, USA
Fax: +1-732-235-5537
mkahaleh@gmail.com

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