

# Submucosal Tunneling Endoscopic Resection (STER) Prevents Esophagectomy for Esophageal Mass: Patient Preference at Tertiary Medical Center

by Bo Hyung Yoon, Justin Robbins, Alexander Schlachterman

Traditionally, upper gastrointestinal (GI) tract tumors have been treated with conventional surgical techniques. More recently, interventional endoscopic techniques have been utilized in the management and resection of these tumors with lower perioperative risks. Here, we describe our experience with submucosal tunneling endoscopic resection (STER) for a large esophageal tumor. A 55 mm mass was successfully removed by STER with pathology revealing a leiomyoma. No procedural or postoperative complications were noted. This early experience suggests that STER is a safe and efficient alternative technique for treating upper gastrointestinal tract mass.

## INTRODUCTION

Submucosal esophageal tumors describe a subclass of esophageal masses that originate from the submucosal layer and muscularis propria. The most common types include leiomyomas, gastrointestinal stromal tumors (GISTs), and lipomas. The incidence of these tumors has been relatively low (<1% of all esophageal masses); however, it has increased with widespread use of endoscopic techniques.<sup>1</sup> Indications for resection of these masses include dysphagia, obstruction, pain, or cases in which diagnostic testing does not rule out malignancy.<sup>2</sup> Throughout the late 1900s and early 2000s, surgical intervention was the only option for resection of these masses. Over the last decade, interventional endoscopy has become more widely utilized as a reasonable alternative to surgery.

Submucosal tunneling endoscopic resection (STER) was introduced in 2011 for the treatment of upper GI submucosal tumors originating from

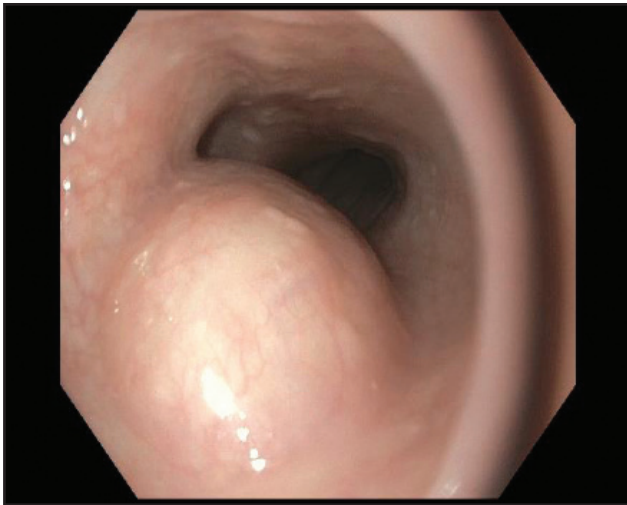
the muscular propria layer as a viable alternative to surgical (open or laparoscopic) resection.<sup>3</sup> STER is a direct offshoot of the endoscopic tunneling technique and received wide clinical adoption while peroral endoscopic myotomy (POEM) became standard practice.<sup>4</sup> Compared to more invasive approaches, STER offers the advantage of preserving mucosal integrity with decreased risk of perforation in resection of submucosal esophageal tumors.

## Case Presentation

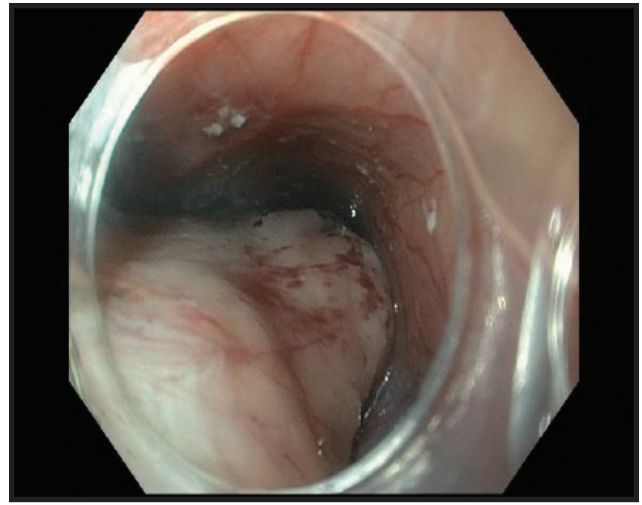
A 70-year-old female presented for treatment options regarding a subepithelial esophageal lesion. In March 2018, the patient underwent an upper endoscopy for dysphagia and weight loss, revealing a moderately severe extrinsic compression in the middle third of the esophagus. After a gap in care, an upper endoscopy with endoscopic ultrasonography performed in August 2019 showed

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**Figure 1: Steps for submucosal tunneling endoscopic resection 1(a). Mass at 21 cm to 27 cm from the incisors**



**Figure 1(b). Mass in submucosa after dissection**

a subepithelial lesion in the proximal esophagus arising from the muscularis mucosa and extending into the submucosa. The lesion was a single oval hypoechoic and heterogenic mass measuring 27 mm x 14 mm with well-defined margins in the upper to mid esophagus, 20 cm from the incisor. Fine-needle aspiration was concerning for granular cell tumor given spindle cell on cytology.

In February 2020, the patient underwent STER under general anesthesia. An upper endoscope was used to evaluate the entire esophagus, and a 55 mm mass was identified at 21 cm to 27 cm from the incisors (Figure 1a). White light and narrow band imaging with near focus was utilized to evaluate the lesion. An upper endoscope with distal cap was used, and injection of lifting agent (Orise, BSCI) 6 cc was used for incision at 20 cm from the incisors. An initial 10 mm incision was made with an ERBE hybrid-T knife with continued injection, dissection, and hemostasis of small vessels. The tumor was fully dissected with intact mucosa, muscle, and capsule surrounding the lesion (Figure 1b). A rescue net was used to remove the lesion after extending the incision site as the lesion was 20 mm in diameter. The resected tumor was sent for analysis (Figure 1c). The tunnel was evaluated for bleeding, and hemostasis was achieved. Eight TTS (through the scope) clips (360, BSCI) were used for full closure of the mucosotomy site (Figure 1d).

The tumor was fixed in formalin which was then processed. Immunohistochemical stains were

performed including smooth muscle actin, desmin, C-KIT, DOG1 and S-100. The pathology of the tumor was diffusely positive for smooth muscle actin and desmin, while negative for C-KIT, DOG1 and S-100, consistent with leiomyoma. Follow-up with annual surveillance with endoscopy was recommended.

Post-procedure esophagram did not show any leak, and no post-procedural bleeding occurred. She was continued on ciprofloxacin and metronidazole for seven days prophylactically.

## DISCUSSION

STER differs from conventional laparoscopic surgery as it utilizes the space between the gastrointestinal mucosa and muscularis propria layers for manipulation. STER aligns with the true definition of a NOTES (natural orifice transluminal endoscopic surgery) procedure. In our case report, we showed that a 55 mm esophageal mass was successfully treated by STER. The lesion was completely resected with no complications. The patient was discharged after a 23-hour observation.

Although interventional endoscopic technology has rapidly developed in the last decade, surgery is still preferred for the removal of larger submucosal esophageal tumors.<sup>5</sup> Some studies have described their experience with endoscopic techniques including STER.<sup>1,6,7</sup> A study from China shared the experience of 24 cases with large symptomatic submucosal tumors, size ranging from 3.5 to 6.5

A CASE REPORT



Figure 1(c). 55 mm encapsulated mass

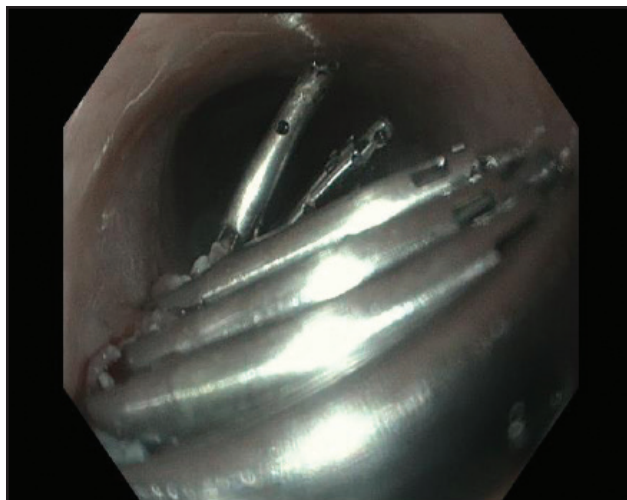


Figure 1(d). Closure of mucosal site

cm, in the esophagus who underwent STER. Wang et al. reported procedure-related complications in eight patients including pneumoperitoneum, pneumothorax and small pleural effusion.<sup>7</sup> Given the high-risk endoscopic procedure, the safety of STER is closely related to the experience of the operator. Marcella et al. reported a retrospective single-center study with 97 patients who underwent endoscopic treatment for subepithelial tumors with majority of which were smaller than 5 cm in size and concluded that endoscopic management was effective and safe.<sup>8</sup>

**CONCLUSION**

STER is safe and effective for treatment of large symptomatic submucosal tumors in the esophagus. It can be used to achieve the complete curative resection of lesions with a low rate of complications while also providing accurate pathological evaluations. We hope this report will encourage STER as a more frequent therapeutic choice for treatment of large symptomatic tumors in the esophagus. ■

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