

Submucosal Tunneling Endoscopic Resection (STER) for esophageal submucosal tumors: report of two cases

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Introduction

Submucosal tumors (SMTs) are defined as masses originating below the normal overlying mucosa and protruding into the gastrointestinal (GI) lumen. SMTs can be seen in any part of the gastrointestinal tract and are usually asymptomatic. The American Society for Gastrointestinal Endoscopy (ASGE) recommends that all SMTs arising from the GI tract larger than 3cm need to be removed. Those less than 3cm in size and without any signs of risk of malignancy on imaging can be managed with active surveillance [1]. With the advancement of endoscopic resection techniques and the advent of third-space endoscopy, these lesions are primarily resected endoscopically [2]. Endoscopic submucosal dissection (ESD) and endoscopic submucosal resection (EMR) are endoscopic techniques that are used to resect neoplasia from the mucosal and superficial submucosal layers while maintaining the integrity of the bowel wall. However, lesions arising from deeper submucosal layers or the muscularis propria traditionally needed surgery or thoracic enucleation for complete resection. Submucosal tunneling endoscopic resection (STER) has emerged as a therapeutic tool for the management of the SMTs which cannot be safely and completely removed by conventional endoscopic resection techniques and would have otherwise needed surgery.

In 2012 the technique of STER was first introduced, as a minimally invasive alternative to 1, 2 1 Open Access Case Report How to cite this article surgery for the removal of neoplasia from muscularis propria and deep submucosal layers, while still having the mucosa intact and without perforation [2,3]. STER combines the techniques of Endoscopic submucosal dissection (ESD) and Per Oral endoscopic myotomy (POEM) to remove SMTs arising from the esophageal wall.

We report two cases of large esophageal wall SMTs resected

completely by STER, which is the first time such a technique has been used for the resection of SMTs in Sri Lanka.

Case Presentation

Case 01

01 52-year-old female patient with a history of dysphagia for the past two years, presented with worsening of symptoms over five months. Dysphagia was more for solids than liquids and was associated with loss of appetite. She underwent esophagogastroduodenoscopy (OGD) where a polypoidal growth of 5.5 cm was noted just above the gastroesophageal junction (GOJ). (Figure 1)

Histopathological investigations done on a biopsy sample from the mass revealed a leiomyoma, without any evidence of malignancy. Upon further investigation by endoscopic ultrasonography (EUS), a submucosal mass of 55mm was noted in the lower esophagus, arising from the third (submucosal) layer. The patient was assessed to be ASA class II with chronic autoimmune thyroiditis and had a MET score of more than four. Submucosal tunneling endoscopic resection was done under general anesthesia in a tertiary care hospital by NF. (Figure 2) Follow-up endoscopy done at 6 and 15 months showed no recurrence. (Figure 3)

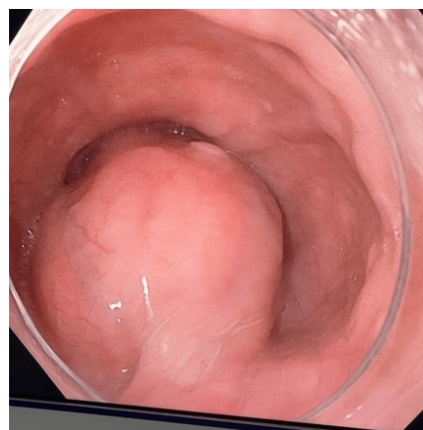


Figure 1: Polypoidal mass noted during OGD

OGD- Oesophagogastroduodenoscopy

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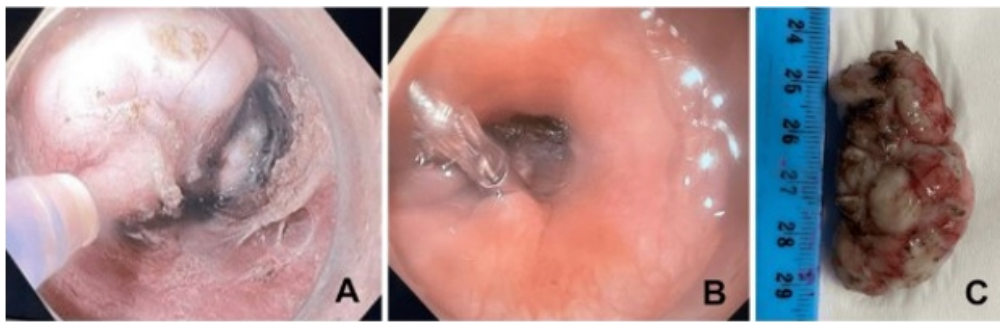


Figure 2: Submucosal Tunneling Endoscopic Resection (STER) Procedure

A- Tunneling through submucosa

B-Closure of incision

C-Specimen retrieved during procedure



Figure 3: OGD done during follow up at 6 months

OGD- Oesophagogastrroduodenoscopy

Case 02

A 55-year-old male patient presented with progressively worsening dysphagia for the past one year. He underwent an OGD and a polypoidal growth of 4 cm was noted just above the gastroesophageal junction. Endoscopic ultrasonography revealed a submucosal mass of 45mm by 20mm in the lower esophagus, arising from the third (submucosal) layer. The patient was assessed to be ASA class II without comorbidities and had a MET score of more than four. Submucosal tunneling endoscopic resection was done under general anesthesia in a tertiary care hospital by NF. Follow up endoscopy done after 6 and 12 months did not show any recurrence.

Histology of both resection specimens confirmed a benign leiomyoma which was completely resected and patient remained completely asymptomatic during the follow up period.

Technique of Submucosal tunneling endoscopic resection.

The accessories and equipment needed for the STER are similar to an ESD or POEM. The important steps in performing STER are mentioned below.

1. A longitudinal mucosal incision of 15-20mm is initially made approximately 5 cm away from the oral side of the lesion to create the submucosal tunnel.
2. A tunnel similar to POEM is created until the lesion is reached with similar electrosurgical settings to POEM – Triangular tip knife (TT Knife by Olympus) with spray coagulation (Electro surgical device ERBE™)
3. The lesion is dissected around and freed from the submucosal and deep muscularis attachments. Any intervening vessels are coagulated with a coag-grasper to have clean dissecting planes.
4. Once the lesion is completely dissected around it is held from a snare and removed through the mucosal opening
5. The mucosal opening is closed using endo clips.

There were no intraoperative complications and no significant blood loss. The patient was given peri operative and post operative intra venous cefuroxime and metronidazole for 72 hours and observed in the ICU for 24 hours. Both patients were discharged three days after endo surgery without any complications.

Discussion

SMTs include leiomyomas, schwannomas, gastrointestinal stromal tumors (GIST), fibrous tumors of which leiomyomas are the most common SMT in the esophagus. With the advancement of radiological imaging techniques and more frequent use of endoscopy for the evaluation of upper GI symptoms, SMTs are more frequently detected with a 3% incidence rate in the literature [4]. Biopsy techniques such as tunnel or biopsy on biopsy have proven to have a very poor yield in SMTs. Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) and biopsy would be the most reliable method to obtain a histological diagnosis. As done in most SMTs, lifelong follow-up not only increases the psychological stress to the patients, but it may also delay the

diagnosis in potentially malignant lesions which otherwise, would have curative treatment options [5].

Resecting these lesions surgically either by open surgery or video-assisted thoracoscopic surgery (VATS), would be invasive and associated with morbidity and mortality [6,7]. In comparison, STER can be regarded as the effective and safe method for resecting SMTs originating from the deep submucosal layers and muscularis propria with the advantage of high en bloc resection rates. Lesions arising from these layers and less than 4cm in size can be resected by STER, although the size criteria can be expanded as seen in our patient. [8].

Complications related to STER range from 5% to 25% with no reported deaths. Gas related complications (subcutaneous emphysema pneumomediastinum, and pneumothorax) are the most common (19.8%) reported significant complications with most other complications being mild [9].

Conclusion

In conclusion, submucosal tunneling endoscopic resection (STER) has emerged as a safe and effective alternative to surgery for large esophageal submucosal tumors (SMTs), particularly those originating from the deep submucosal layers and muscularis propria. The technique allows for complete resection while preserving mucosal integrity and minimizing complications such as perforation. In the two cases presented, STER was successfully performed for the first time in Sri Lanka, with both patients experiencing uneventful recoveries, minimal intraoperative blood loss, and no significant postoperative complications. Compared to traditional surgery, STER offers the advantages of shorter hospital stays, fewer adverse events, and quicker recovery times, making it an ideal treatment option for large SMTs. While some risks, such as gas-related complications, exist, they are typically mild and manageable, underscoring the potential of STER as a preferred modality in managing esophageal SMTs.

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