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Brief Report

BRIEF REPORT

Submucosal tunneling endoscopic biopsy and myotomy for management of unknown esophageal stenosis

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Introduction

Esophageal stenosis is usually congenital or secondary to esophageal injury, esophagitis, and esophageal neoplasia [1, 2]. The mainstay treatment for benign esophageal stenosis is dilatation with either balloons or esophageal bougienage [3, 4]. A self-expandable metal stent (SEMS) is recommended for malignant and refractory esophageal stenosis [5]. The treatment can be distinct according to different etiology. Endoscopic ultrasonography-guided fine-needle aspiration/biopsy (EUS-FNA/FNB) may be conducive to clarifying the etiology of esophageal stenosis. However, the small amount of tissue obtained by EUS-FNA/FNB may provide less pathological information. Here we report a new technique—submucosal tunneling endoscopic biopsy and myotomy (STEBM) derived from the peroral endoscopic myotomy (POEM) procedure to relieve stenosis and get a sufficient amount of tissue to make a definite diagnosis.

Case report

A 48-year-old male patient complained of severe dysphagia for 1 month. He was diagnosed with lung cancer 4 years ago. Metastases in the chest cavity and brain occurred 1 year after comprehensive therapy. Given his medical history, the recurrence and metastasis of lung cancer and the side effects of comprehensive therapy might cause esophageal stenosis. However, positron emission tomography-computed tomography (PET-CT) suggested inflammatory lesions in the middle thoracic esophagus and mediastinal lymphadenitis (Figure 1A). Endoscopic ultrasound (EUS) revealed thickened muscularis propria of ≤5.2 mm in the narrowing segment without enlarged lymph nodes detected (Figure 1B). Ultra-thin gastroscopy showed esophageal stenosis 28–30 cm from the incisors with intact mucosa (Figure 1C). Since no evidence indicated cancer recurrence or metastasis, and the clinical characteristics were highly similar to achalasia, endoscopic myotomy and muscle biopsy via submucosal tunnel were decided upon.

The patient was under general anesthesia with endotracheal intubation. The surgery included five steps as follows (Supplementary Video 1).

Step 1. Mucosal incision. The submucosal injection of a mixture solution of normal saline and indigo carmine was performed followed by a 2-cm longitudinal esophageal mucosal incision as the submucosal tunnel entry at 3 cm above the narrow ring (Figure 1D).

Step 2. Submucosal tunneling. A short submucosal longitudinal tunnel was created as far as the narrow ring (Figure 1E and F).

Step 3. Full-thickness myotomy. Reaching the stenosis, submucosal tunneling was difficult due to severe submucosal adhesion. Partial adhesion was released and full-thickness

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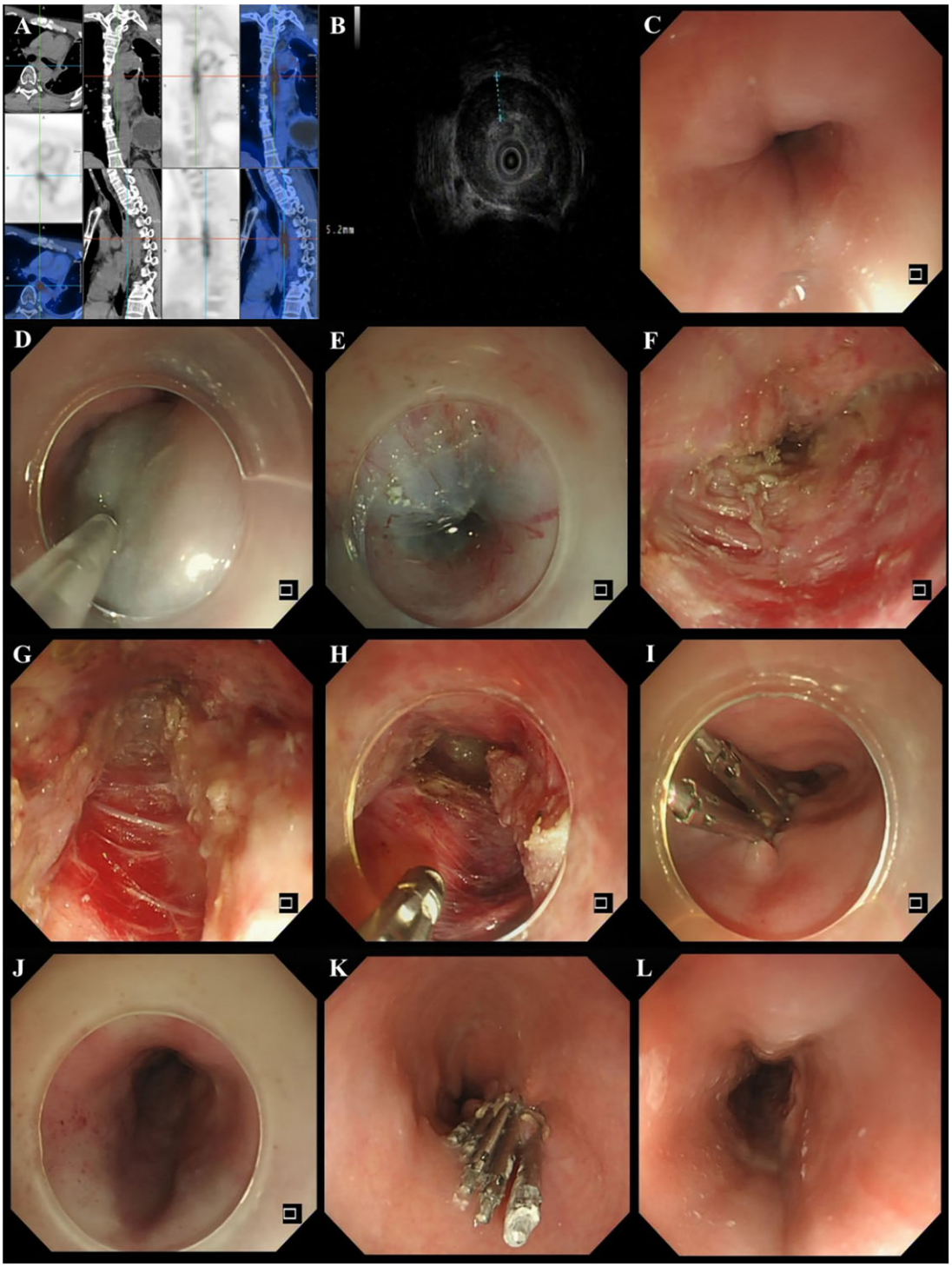

Figure 1. Myotomy and muscle biopsy via a peroral endoscopic myotomy (POEM) tunnel for treatment and diagnosis of esophageal stenosis with unknown causes. (A) Visualization of the esophageal stenosis under PET-CT. (B) Visualization under endoscopic ultrasound. (C) The narrow segment of the esophagus 28–30 cm from the incisors with smooth mucosa. (D) Submucosal injection. (E) Submucosal tunneling. (F) Established tunnel above the narrow ring. (G) Full-thickness myotomy. (H) Muscle biopsy. (I) Closure of mucosal entry. (J) The dilated narrow segment. (K) and (L) The endoscopy inspection on Post-Operative Day 3.

myotomy was performed through the narrow segment (Figure 1G). Given that the stenotic segment was ~2 cm, myotomy was for 4 cm. Mucosal injury was avoided.

Step 4. Muscle biopsy. Muscle biopsy for three pieces from the muscularis propria in the stricture ring was obtained (Figure 1H).

Step 5. Mucosal closure. The tunnel entrance was closed using endoclips (Figure 1I).

After surgery, the gastroscope could pass through the original stricture site without any resistance (Figure 1J). The patient complained of retrosternal pain on Post-Operative Day 1 (POD 1). The endoscopy inspection on POD 3 before discharge showed

the smooth and intact mucosa in the original stricture site without any stenosis (Figure 1K and L). The final pathological diagnosis was metastatic lung adenocarcinoma.

Discussion

Tunnel endoscopic surgery utilizes "the third space" inside the intramural cavity to establish a submucosal tunnel for endoscopic surgery. POEM has been optimized into a mature tunnel endoscopic treatment in the past 14 years. With the advantage of the submucosal tunnel, the incidence of post-operative perforation and gastrointestinal fistula can be reduced. In this case, the clinical characteristics were highly similar to achalasia with intact mucosa and thickened muscularis propria, which gave us a hint that STEBM could be an effective approach in relieving stenosis and clarifying diagnosis in unison. The difficulty for this case was that submucosal injection could not be stored effectively at the stricture site resulting in limited operation space. When going through the narrow segment in the tunnel, the transparent cap was removed temporarily to widen the operation space. No adverse events occurred. If mucosal injury happens, placement of a fully covered SEMS can be used as a remedy.

In conclusion, STEBM is a feasible and safe attempt for the management of esophageal stenosis with unknown causes. Although the surgical effect of stenosis release is controversial, the technique derived from POEM can contribute to definite diagnosis while bringing a brief respite from dysphagia. Further clinical studies are necessary to confirm the indication and evaluate the safety and efficacy systemically.

Supplementary Data

Supplementary data is available at *Gastroenterology Report* online.

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Conflict of Interest

None declared.

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