

Endoscopic Management of an Intramural Sinus Leak After Per-Oral Endoscopic Myotomy

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ABSTRACT

Per-oral endoscopic myotomy (POEM) was developed less than a decade ago for the treatment of achalasia. Its minimally invasive approach and the favorable short-term outcome have led to rapid adoption of the technique throughout the world. As with any new technique, there will be adverse events, and it is important that effective treatments for these adverse events be discussed. We present a case of successful endoscopic management of an intramural sinus leak after a POEM procedure using tandem fully covered esophageal stents.

INTRODUCTION

Per-oral endoscopic myotomy (POEM) was first conceptualized by Pasricha et al. in an animal model in 2007, and it was clinically implemented in patients by Inoue et al. in 2008.^{1,2} POEM was initially developed for the treatment of achalasia, but use of this technique is now being explored for other esophageal motility disorders, such as diffuse esophageal spasm and jackhammer esophagus.³ Modifications of the POEM technique are currently being applied to the stomach to perform a peroral pyloromyotomy in gastroparesis patients.⁴

CASE REPORT

A 43-year-old man with morbid obesity elected to have a POEM procedure for treatment of type 3 achalasia. The procedure was performed using the standard technique for an anterior esophageal myotomy. A 1.5-cm mucosal incision was made in the esophagus at 26 cm from the incisors. Through the incision, a 14-cm submucosal tunnel was formed that extended 3 cm into the stomach. The gastroesophageal junction (GEJ) was located at 38 cm. The extent of the tunnel was confirmed with retroflexion examination of blue dye in the cardia. An 11-cm circular muscle myotomy was started at 29 cm and believed to extend 2 cm into the gastric cardia. The mucosectomy site was closed with hemoclips. Fourteen days after the procedure the patient presented to the hospital with chest pain. An upper gastrointestinal series revealed a tight GEJ with a long intramural sinus originating from the mucosectomy site (Figure 1).

Our working hypothesis was that the incomplete myotomy resulted in increased esophageal pressures and disruption of the mucosectomy closure site. Therefore, our attention was focused on addressing both the open mucosectomy site and the pressure at the GEJ. We placed tandem fully covered esophageal stents (2.3 cm x 15 cm and 2.3 cm x 10 cm) to cover both the GEJ and the mucosectomy site (Figure 2). The esophageal stents were removed 1 week later, and a subsequent upper gastrointestinal series showed complete resolution of the intramural sinus leak (Figure 3). For long-term management of his achalasia, the patient subsequently underwent pneumatic dilation.

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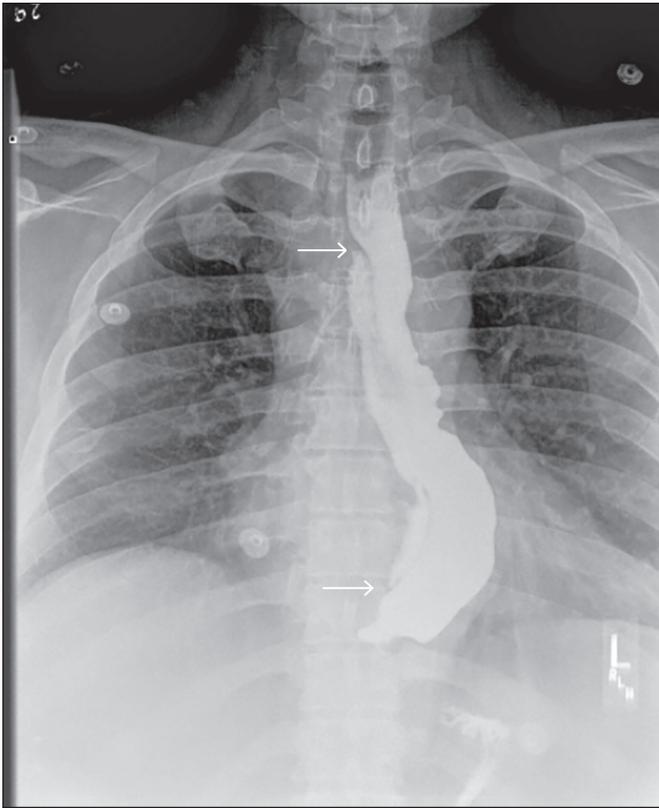


Figure 1. Upper GI series showed a tight GEJ with a long intramural sinus originating from the mucosectomy site.

DISCUSSION

The POEM technique exploits the fact that the submucosal layer can be expanded with the injection of fluid to allow an endoscope to enter within the esophageal wall and precisely dissect the submucosal and muscle fibers of the esophagus using electro-surgical knives. Inoue et al. initially described an anterior POEM approach that involved creating a 2-cm



Figure 2. Tandem fully covered esophageal stents covered both the GEJ and the mucosectomy site.

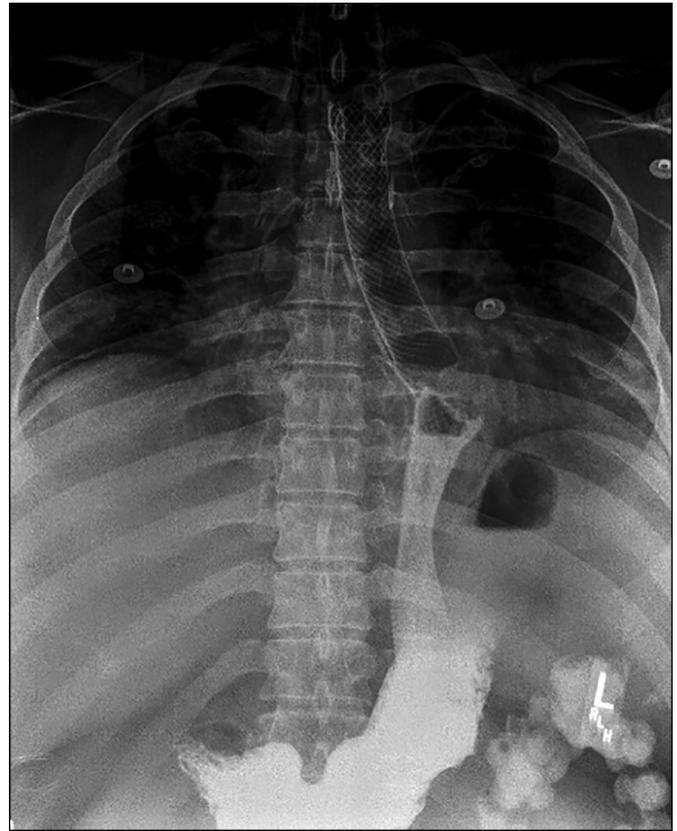


Figure 3. Subsequent upper GI series showed complete resolution of the intramural sinus leak.

mucosal incision on the anterior wall of the esophagus, allowing the formation of a submucosal tunnel that extends from the esophagus across the GEJ and 3 cm into the stomach. A circular muscle myotomy is started 3 cm distal to the mucosal entry and extended 2 cm distal to the GEJ. The scope is removed from the submucosal tunnel, and the mucosal entry site is closed with hemostatic clips.^{5,6} Since this initial description, variations of this technique have been described, including full thickness myotomy of both circular and longitudinal muscle layers, and use of a posterior myotomy approach.⁷ The minimally invasive approach of POEM is appealing to both patients and endoscopists and has been rapidly adopted worldwide, with favorable short-term outcomes.⁸ Adoption of any new technique will invariably have adverse events, and it is important that effective treatments for these adverse events are discussed.

Temporary tandem fully covered esophageal stents are an effective treatment of an intramural sinus leak after a POEM procedure. We suspect the disruption of the mucosectomy site occurred because of increased esophageal pressure from the incomplete myotomy. An incomplete myotomy can occur when the myotomy is not extended through the GEJ and into the stomach, leading to a failure of treatment.

Traditional methods used during POEM to ensure the submucosal tunnel extends into the stomach include identification of narrowing of the tunnel at the GEJ and widening of the tunnel as it enters the stomach, and retroflexion examination from within the stomach to identify the extent of blue dye (methylene blue, indigo carmine) within the cardia of the stomach. In our experience, both of these methods are imperfect because it is not always easy to identify your location from within the submucosal tunnel, and injected dye within the tunnel can diffuse into the submucosa beyond the tunnel, which can give a false impression of the tunnel's extent. Great care needs to be taken to ensure both the submucosal tunnel and myotomy extend beyond the GEJ and into the stomach. Newer techniques are being explored for more accurate identification of the extent of the submucosal tunnel, such as fluoroscopic examination using hemoclips placed at the GEJ,⁹ use of a second neonatal scope to retroflex in the stomach to confirm the position of the primary scope within the tunnel,¹⁰ and use of an endoluminal functional lumen imaging probe (EndoFLIP; Crospon Ltd., Dangan, Galway, Ireland), which involves the use of a specific catheter with a balloon attached to the end of the scope to measure the GEJ diameter and its cross-sectional area during POEM.¹¹

While the tandem fully covered esophageal stents were able to treat the intramural sinus leak effectively, the patient still required treatment of his achalasia. Treatment options for this patient included a posterior POEM approach to complete a myotomy while avoiding the scar tissue from the previous anterior approach POEM, Botox injection, and pneumatic dilation. After discussion with the patient, a decision was made to proceed with a pneumatic dilation. Post-POEM mucosectomy site leaks may be successfully treated with covered esophageal stent placement. In treating mucosectomy site leaks, an underlying etiology should be sought and addressed as well.

DISCLOSURES

Author contributions: H. Al Taii wrote the manuscript and is the article guarantor. B. Confer, S. Gabbard, M. Kroh, S. Jang,

J. Rodriguez, MA Parsi, JJ Vargo, J. Ponsky, and A. Bhatt reviewed and made critical revisions to the manuscript.

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Informed consent was obtained for this case report.

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