



Peroral endoscopic myotomy with diverticulum resection

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For esophageal diverticula with symptoms, thoracoscopic or laparoscopic surgery is usually performed. Epiphrenic diverticulum is often acquired because of the pressure caused by esophageal motility disorders.¹ We devised a method of endoscopic esophageal diverticulum resection by applying the peroral endoscopic myotomy (POEM)² and POEM + fundoplication³ technique, thus enabling a safer and less-invasive treatment that was equivalent to surgical treatments.

CASE PRESENTATION

A 47-year-old man presented with reflux symptoms after meals. The patient underwent an EGD (Fig. 1), a CT scan (Fig. 2), high-resolution manometry (Fig. 3), barium esophagogram (Fig. 4), and 24-hour pH monitoring. EGD showed an epiphrenic diverticulum and resistance in passing through the esophagogastric junction.

A CT scan revealed that the diverticulum occurred just above the esophagogastric junction and was located at the left side of the esophagus and behind the heart. There was no organic disease, such as presence of malignancy and extrinsic compression. High-resolution manometry showed almost normal peristalsis. Barium esophagogram showed delay in the passage of barium and stasis of barium in the

diverticulum. The 24-hour pH monitoring revealed no evidence of GERD.

The patient was diagnosed with an epiphrenic diverticula with esophagogastric junction outflow obstruction. We suspected that direct reflux of food and saliva remaining in the diverticulum caused his reflux symptoms, in addition to the obstruction. Hence, we performed standard POEM and endoscopic esophageal diverticulum resection. This procedure was approved by the Showa University Research Ethics Committee.

ENDOSCOPIC METHOD

This procedure was carried out using a single-channel therapeutic endoscope (GIF-Q260J; Olympus Corp, Tokyo, Japan) with a super soft hood (Space Adjuster; TOP Corp, Tokyo, Japan) as a distal attachment. A mucosal incision was made on the oral side of the diverticulum using a triangle-tip knife with water jet function (Olympus Corp) to create a submucosal tunnel according to standard POEM technique.

The tunnel was created beyond the diverticulum to the gastric side, and endoscopic myotomy including the lower esophageal sphincter was performed. In the diverticulum, the muscle layer was deficient. The diverticulum was endoscopically dissected from the mediastinal pleura and was

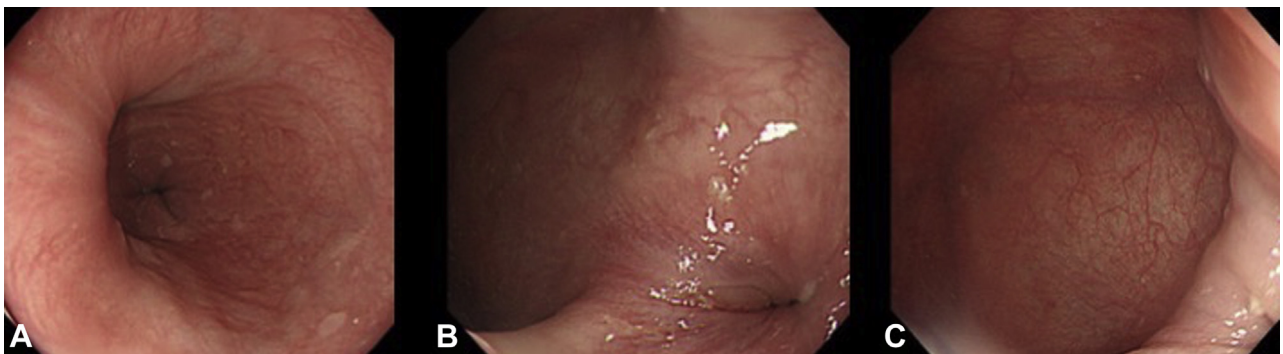


Figure 1. Preoperative endoscopic view. **A**, The esophagogastric junction. **B**, An epiphrenic diverticulum at 9 o'clock position. **C**, The observation inside the diverticulum.

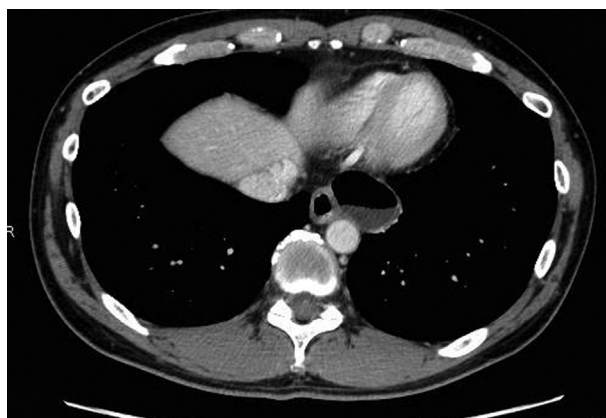


Figure 2. Preoperative CT scan view. The epiphrenic diverticulum was located on the left side of the esophagus and behind the heart, with no extrinsic compression. The maximum diameter was 40 mm.

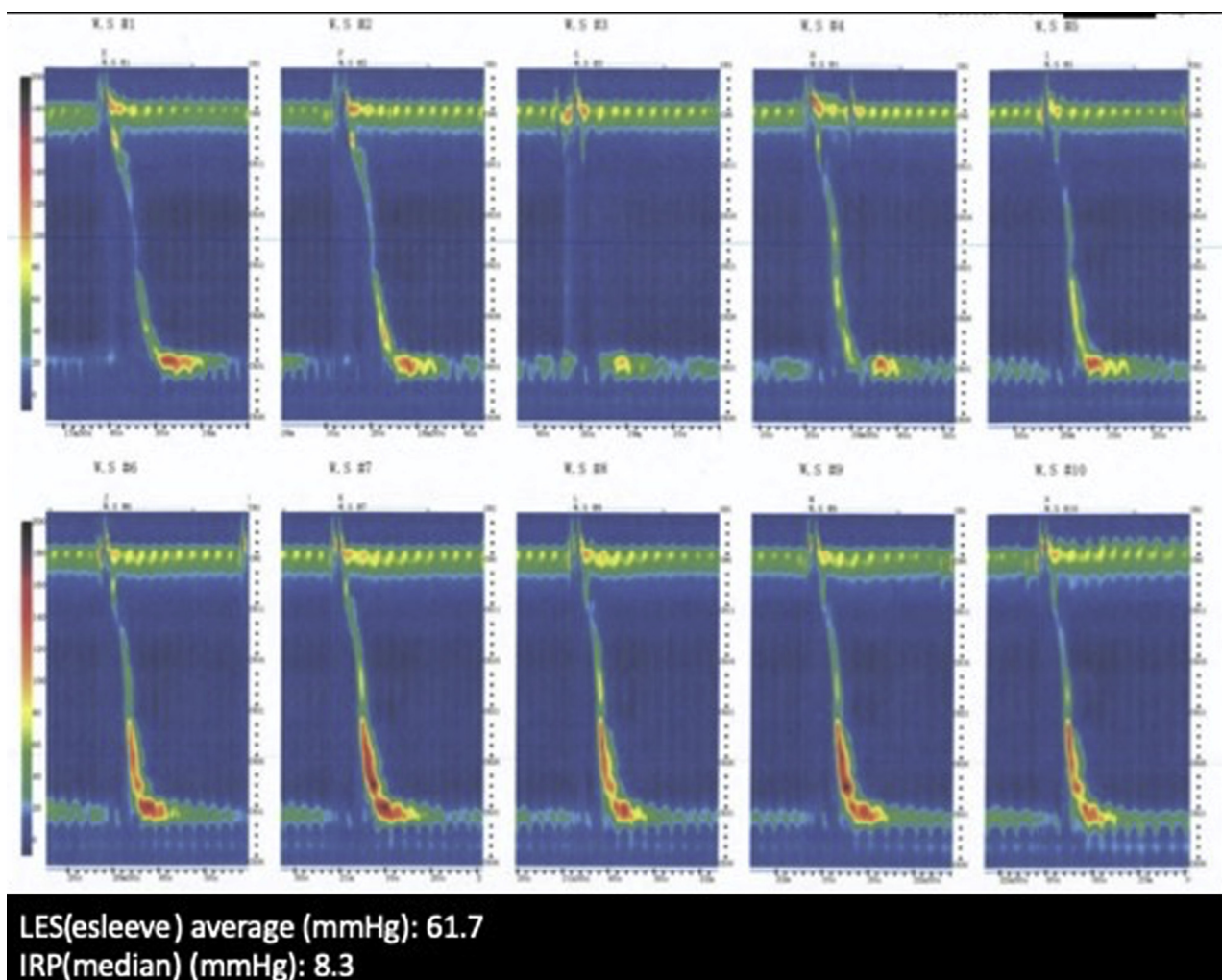


Figure 3. High-resolution manometry demonstrated almost normal peristalsis.

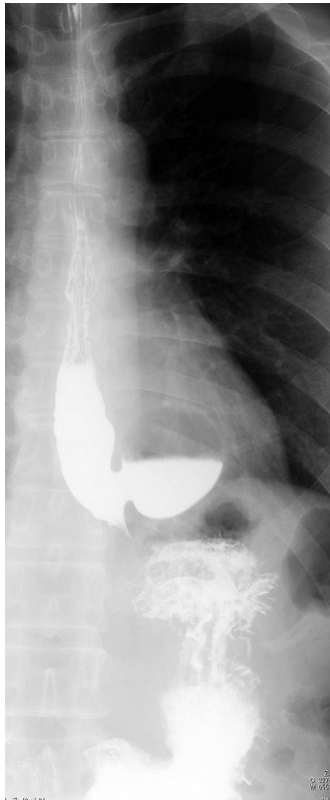


Figure 4. Barium esophagogram showed delay in the passage of barium at the edge of the diverticulum and stasis of barium in the diverticulum.

pulled to adduct into the esophageal lumen by the snare traction method (Fig. 5).

To close the deficient muscle layer in the diverticulum, the muscle layer at the entry of the diverticulum was stitched together by using the endoscopic suturing method using an endoscopic needle holder (E650007, prototype; Olympus Corp).⁴ We prepared a surgical suture needle (VLOCL0804;

Covidien, Mansfield, Mass, USA) with a self-made anchor made from a fragment of PLEDGET (commonly used in cardiovascular surgery) (Fig. 6). By pulling back the endoscope and the device, the suture was tightened. The inverted diverticulum was then removed using a snare, and the mucosal defect was closed with clips (Fig. 7).

PROGRESS

After the procedure, the patient started eating on the fourth day and was discharged on the seventh day. His reflux symptoms improved immediately. Two months after the procedure, barium esophagogram (Fig. 8) and EGD showed neither delayed barium outflow nor the recurrence of diverticulum.

CONCLUSION

In summary, we report a successful case of diverticulum resection for epiphrenic diverticulum, which was equivalent to surgical treatments.⁵ This procedure is an extension of POEM, POEM + fundoplication, and peroral endoscopic tumor resection⁶; hence, we were able to do this procedure in a minimally invasive and safe way (Video 1, available online at www.VideoGIE.org).

DISCLOSURE

Dr Inoue is an advisor for Olympus Corporation and Top Corporation and received educational grants from Olympus Corp. and Takeda Pharmaceutical Co. All authors disclosed no financial relationships.

Abbreviation: POEM, peroral endoscopic myotomy.

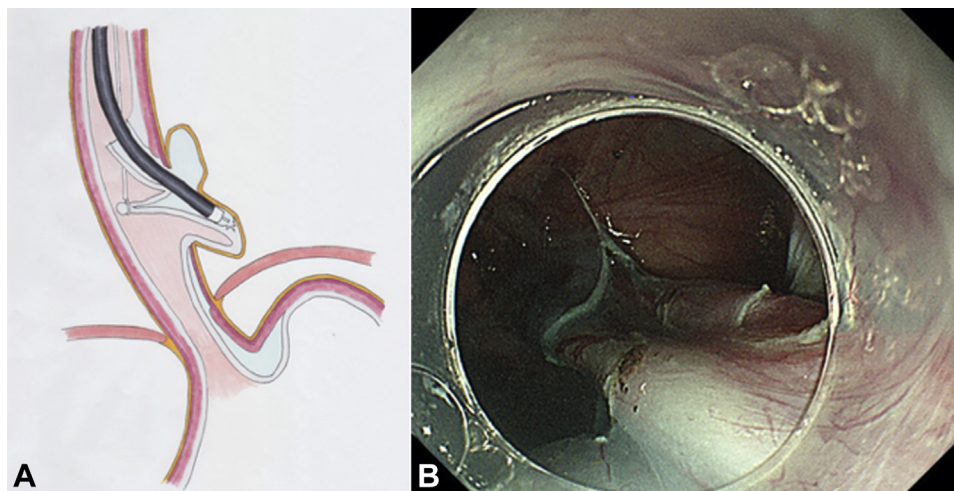


Figure 5. Peroral endoscopic myotomy with diverticulum resection. **A**, The diverticulum was endoscopically dissected from the mediastinal pleura by snare traction method. **B**, The muscle layer was deficient in the diverticulum.

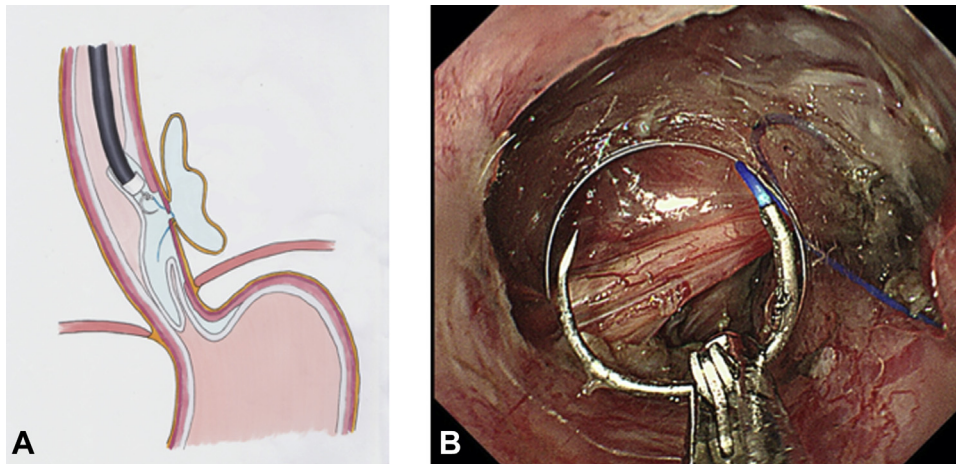


Figure 6. At the entry of the diverticulum, the deficient muscle layer was closed by stitching with the endoscopic suturing method (A) using a needle holder (B).

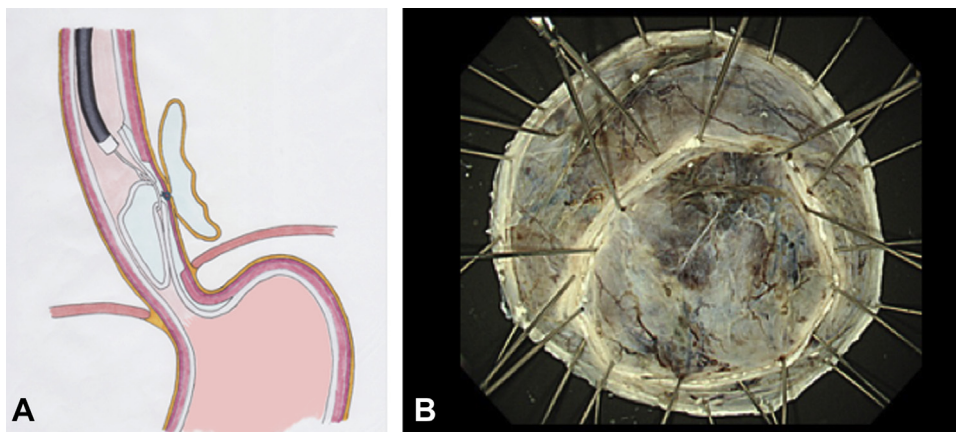


Figure 7. A, The inverted diverticulum was removed by a snare. B, Histopathologic results of the resected specimen showed epithelial hyperplasia with inflammation.

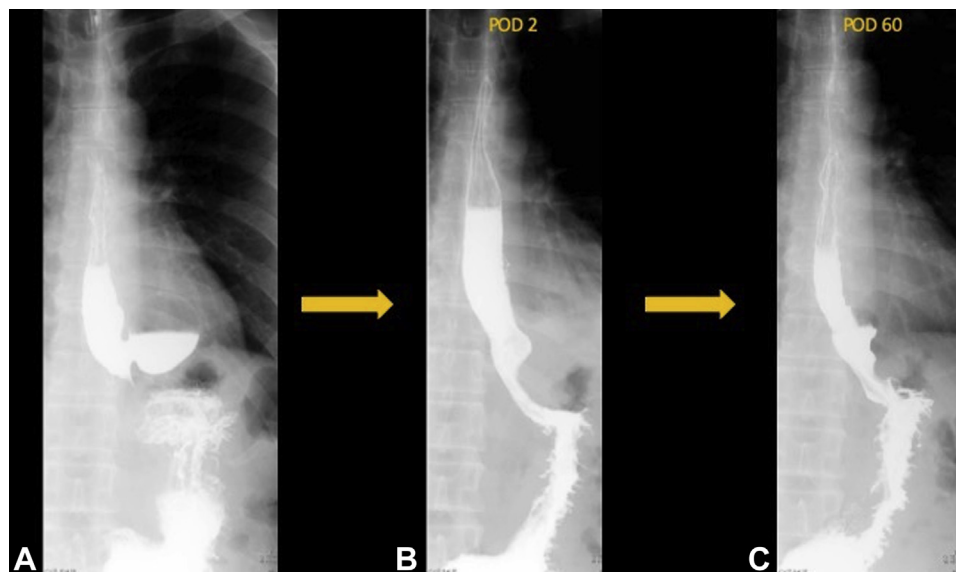


Figure 8. Barium esophagogram view before procedure (A), 2 days after the procedure (B), and 2 months after the procedure (C). It showed a marked improvement in the passage of barium.

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