Giant mid-esophageal diverticulum treated with diverticular peroral endoscopic myotomy: a case report

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Case report

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Abstract

Background

Esophageal diverticulum is rare and usually requires surgical treatment. Diverticular peroral endoscopic myotomy(D-POEM) is considered to be a novel technique that can be effectively used for septotomy in patients with esophageal diverticulum.

Case presentation:

A 73-year-old male patient was admitted to our hospital, complaining of recurrent dysphagia for more than 8 years and aggravated dysphagia for 2 months. Esophagogram revealed a sac in the anterior esophageal region and gastroscopy showed a giant diverticulum in the mid-esophagus. He was treated with D-POEM and had good clinical outcome. The patient was discharged 6 days after operation and has been doing well, and no recurrence was observed.

Conclusion

D-POEM is an effective and minimally invasive method for esophageal diverticulum, but long-term efficacy remains to be proved by more studies.

Background

Esophageal diverticulum is rare, accounting for less than 5% of all cases of with dysphagia^[1]. It can be divided into pharyngeal esophageal diverticulum (Zenker diverticulum), mid-esophageal diverticulum and supradiaphragmatic diverticulum according to the location of the disease. The diverticulum in the middle esophagus is also called the tractive diverticulum, which is the true diverticulum^[2]. Mid-esophageal diverticulum is usually asymptomatic, and symptomatic diverticulum often requires treatment^[3]. In the treatment of symptomatic esophageal diverticula, surgical resection has been considered the only curative option. In recent years, endoscopy has become an effective treatment for esophageal diverticulum. However most reports have focused on the treatment of Zenker diverticulum, and there are fewer reports on mid-diverticulum treatment. We here report a case of esophageal diverticulum in a male patient with dysphagia, who was admitted to the Binzhou Medical University Hospital, and treated with D-POEM and had good clinical outcome.

Case Presentation

A 73-year-old male patient was admitted to our hospital complaining of recurrent dysphagia for more than 8 years and aggravated dysphagia for 2 months. Eight years prior to admission, the patient

experienced swallowing discomfort without obvious inducement, and it felt as if food was lodged in the esophagus after meal, accompanied by nausea and vomiting. He had no medical history or medication.

Physical examination and laboratory findings were unremarkable. Esophagogram revealed a sac in the anterior esophageal region at T7 level (Fig. 1). The gastroscopy showed a giant diverticulum in the esophagus 28-30cm from the incisors (Fig. 2). Endoscopic ultrasonography (20 MHz, Olympus, Japan) revealed that the diverticulum septum division thickness was 5.7 mm and the diverticulum wall thickness was 1.3 mm (Fig. 3). After completing the relevant examinations and signing an informed consent, the patient underwent D-POEM under general anesthesia.

Submucosal incision was made, 3 cm above the diverticular septum, and a tunnel was established. The mucosal layer at both sides of the septum was isolated and fully exposed. Under direct endoscopic view, the whole layer of the diverticular septum muscle was cut with Dual-knife (2.0 mm, Olympus, Japan), and the wound was treated with hot biopsy forceps. Finally, the mucosal incision was closed by four clips (ROCC-D-26-195, Micro-Tech, Nanjing, China) (Fig. 4). Diets were resumed at Post - op (POD) day 2, the symptoms were relieved and the patient was discharged at POD 6. At 3-month follow-up, there were no reported adverse events or symptom recurrences and barium swallow confirmed that the diverticulum was significantly smaller (Fig. 5).

Discussion And Conclusions

Mid-esophageal diverticulum is caused by altered motility which results in abnormal intraluminal pressure and the pushing of the esophageal mucosa through focal weaknesses of the muscular wall. Mid-esophageal diverticulum is usually asymptomatic^[4], and symptoms, such as dysphagia, regurgitation, heartburn, halitosis and weight loss, result from underlying motility disorders. The treatment methods for esophageal diverticulum include surgery, and thoracoscopic, and diverticular peroral endoscopic myotomy.

D-POEM is a reproducible technique which utilizes a tunnel under the esophageal mucosa to cut the ridge between the diverticulum and preserve the esophageal mucosa. The unique feature of this technique in the treatment of esophageal diverticulum is that it can fully expose the diverticulum diaphragm, making it possible to open the diaphragm completely under endoscopic vision, thus reducing recurrence rate^[5]. Yang *et al*^[5] reported that the technical success of D-POEM was 85.70% for Zenker's diverticulum, 100% for mid-esophageal esophageal diverticulum, and 100% for epiphrenic esophageal diverticulum. In our case, the patient suffered from dysphagia for eight years. The symptoms disappeared after D-POEM surgery, and no postoperative complications such as bleeding, infection, and subcutaneous emphysema occurred. The advantages of D-POEM in treating esophageal diverticulum include: 1. being able to close the entrance using the clip to preserve the complete mucosa to prevent perforation, which can effectively avoid the occurrence of esophageal fistula, pneumothorax, and empyema; and 2. Complete incision of the diverticulum diaphragm can reduce the recurrence rate of esophageal diverticulum to some extent.

In summary, D-POEM may be a safe and effective treatment for esophageal diverticulum, and has significant short-term efficacy. Follow-up and additional case studies are required to validate the long-term efficacy.

Declarations

Ethics approval and consent to participate

Ethics approval was not required for this case report.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

QN and FL: manuscript writing, and literature research. XYC, NS, KW and YML: management of the case, and editing the manuscript. CXL: manuscript writing, management of case and final approval of manuscript. All authors have read and approved the manuscript.

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Not applicable.

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Figures

(A) Hyphal growth of *B. bassiana* isolates

(B) Conidial production

Figure 1

Esophagogram shows a sac in the anterior esophageal region at T7 level.

(A) Virulence against western flower thrips

(B) Mycosis of infected thrips (5 days after treatment)

Isolate	LC ₅₀ (conidia/ml) (3 days after treatment)	LT ₅₀ (day) at a dose			
		1 × 10 ⁵ conidia/ml	1 × 10 ⁶ conidia/ml	1 × 10 ⁷ conidia/ml	1 × 10 ⁸ conidia/ml
JEF-007	7.9 × 10 ⁶ (1.8 × 10 ⁵ ~ 3.4 × 10 ⁸)	3.68 (3.48 ~ 3.93)	3.33 (2.59 ~ 4.95)	3.04 (2.41 ~ 3.91)	2.78 (2.09 ~ 3.54)
ERL836	2.2 × 10 ⁷ (3.6 × 10 ⁶ ~ 1.4 × 10 ⁸)	3.49 (3.13 ~ 3.97)	3.32 (2.76 ~ 4.10)	2.87 (1.92 ~ 4.30)	2.47 (2.10 ~ 2.95)

Figure 2

Gastroscope showed a giant diverticulum in the esophagus 28-30cm from the incisors.

(A) Alignment of *B. bassiana* genomes (B) Pathway analysis of *B. bassiana* genomes (C) Comparison of orthologs from *B. bassiana* genomes

Figure 3

Endoscopic ultrasonography image. Thick arrow→diverticulum septum division. Thin arrow: diverticulum wall.

Figure 4

Upper gastrointestinal endoscopy findings. (a) Diverticulum before D-POEM. (b) Creation of submucosal tunnel and exposure of the muscle fibers of septum inside the tunnel. (c) Completion of myotomy. (d) Diverticulum after D-POEM.

Figure 5

The 3-month follow-up barium swallow confirmed that the diverticulum was significantly smaller.