

# World Journal of *Clinical Cases*

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## Peroral endoscopic myotomy assisted with an elastic ring for achalasia with obvious submucosal fibrosis: A case report

Bai-Hui Wang, Ru-Yuan Li

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### Abstract

#### BACKGROUND

Peroral endoscopic myotomy (POEM) is an established treatment option for esophageal achalasia. However, technical challenges and failures exist. Submucosal fibrosis is a rare cause of aborted POEM procedures.

#### CASE SUMMARY

We performed POEM with an elastic ring for achalasia with obvious submucosal fibrosis. The short-term outcome was excellent, surgery time was significantly shorter, and success rate was higher with POEM for achalasia with obvious submucosal fibrosis.

#### CONCLUSION

POEM performed with an elastic ring is a feasible and effective endoscopic treatment modality for achalasia with obvious submucosal fibrosis.

**Key Words:** Peroral endoscopic myotomy; Elastic ring; Achalasia; Submucosal fibrosis; Case report

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**Core Tip:** Peroral endoscopic myotomy performed with an elastic ring is a feasible and effective endoscopic treatment modality for achalasia with obvious submucosal fibrosis.

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## INTRODUCTION

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Submucosal fibrosis in achalasia patients is a rare cause of aborted peroral endoscopic myotomy (POEM) procedures. Implementation of new technology in achalasia is a challenge for endoscopic treatment when it comes to complex achalasia, because the dilated and tortuous esophageal lumen may make subsequent endoscopic dissection and separation of tissue planes difficult. Werner *et al*[1] reported peroral endoscopic dual myotomy (D-POEM) for achalasia with severe esophageal dilatation. Besides, he also reported open POEM (O-POEM) for achalasia with a sigmoid-shaped esophagus and achalasia with failed Heller myotomy. Wu *et al*[2] developed a modified version using a “Push and Pull” technique which reduced complications and accelerated wound recovery (Figure 1A).

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## CASE PRESENTATION

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### **Chief complaints**

A 54-year-old man who was unable to eat and drink for 1 wk presented at our hospital (Figure 1B).

### **History of present illness**

The patient had choking sensation for 30 years (Figure 1C).

### **History of past illness**

The patient had a history of ankylosing spondylitis. Physical examination on admission revealed malnutrition with a body mass index of 15.9. He had an Eckardt score of 12. A timed barium esophagram revealed that his esophagus was dilated and its lower end was narrow like a bird’s beak (Figure 1D). The contrast agent was not discharged after 10 min of observation. Preoperative gastroscopy revealed significant esophageal dilation and a large amount of food residue (Figure 1E). Esophageal stenosis was observed 38 cm away from the incisors, and the cardia was 52 cm away from them. Chest computed tomography ruled out external compression. This patient had never undergone any prior endoscopic intervention (Figure 1F).

### **Personal and family history**

The patient’s personal and family history was not remarkable.

### **Physical examination**

The patient was thin. Abdominal examination was normal (Figure 1G).

### **Laboratory examinations**

Laboratory examinations showed no abnormality.

### **Imaging examinations**

A timed barium esophagram revealed that the patient’s esophagus was dilated and its lower end was narrow like a bird’s beak. The contrast agent was not discharged after 10 min of observation (Figure 1H). Preoperative gastroscopy revealed significant esophageal dilation and a large amount of food residue. Esophageal stenosis was observed 38 cm away from the incisors, and the cardia was 52 cm away from them. Chest computed tomography ruled out external compression (Figure 1I).

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## FINAL DIAGNOSIS

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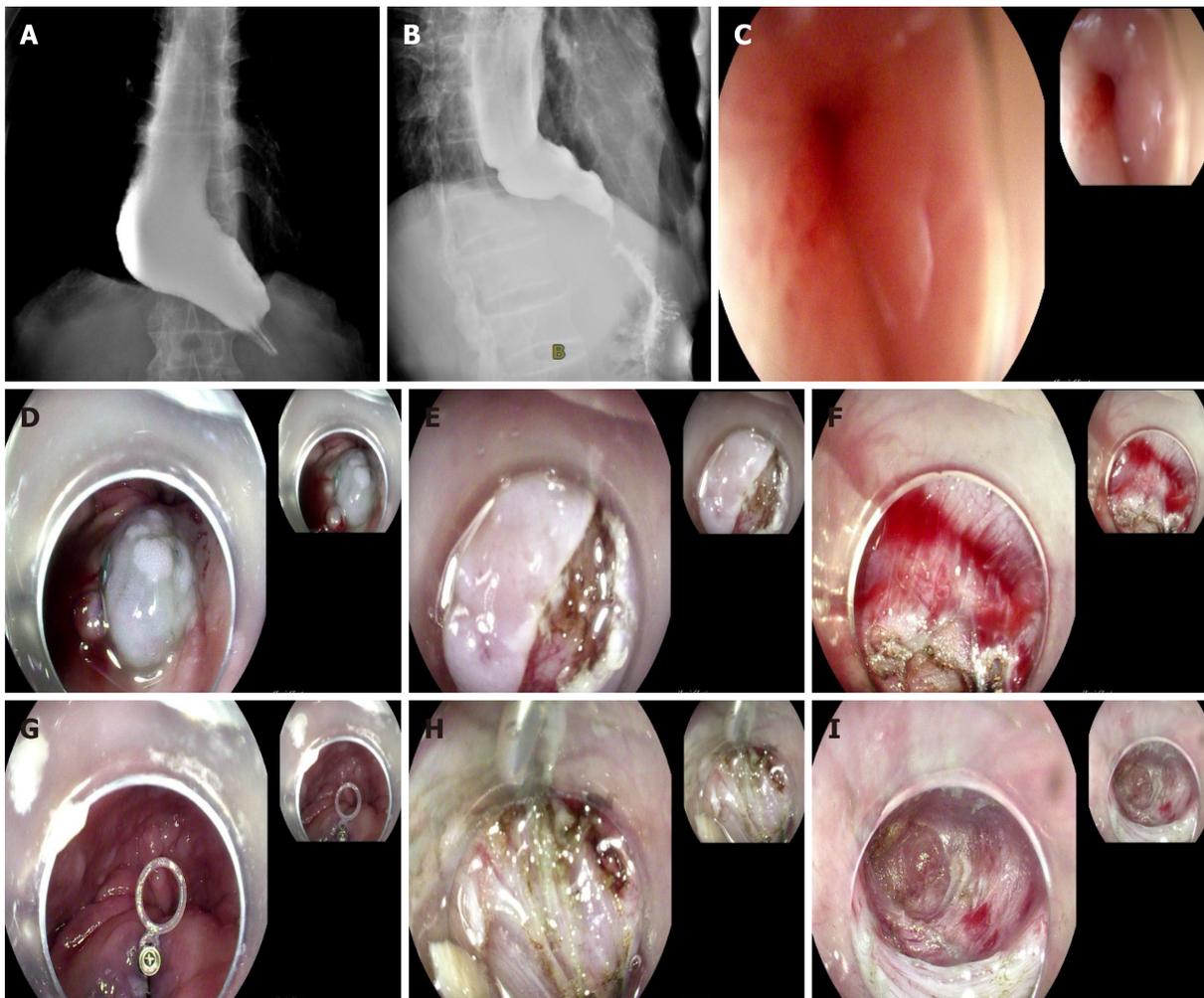
The patient was diagnosed with achalasia.

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## TREATMENT

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Esophageal distortion was obvious in this patient, and the opening position of the tunnel was more suitable for the establishment of a complete tunnel. We used the endoscopic hood Olympus D201, and the dual knife had no water-jet function. Intraoperative submucosal injections were administered 10 cm above the cardia, resulting in a poor lift. There was obvious submucosal fibrosis. A 2-cm-long incision was made in the mucosa using the dual knife and submucosal adhesion was obvious. An elastic traction ring (patent number: ZL 2020 2 0016729.9) was used to tract the mucosa at the opening of the tunnel to the opposite side, and part of the circular muscle was cut to establish the submucosal tunnel. The elastic ring was deployed through the working channel. A clip was placed on the small ring at the initial incision site and a second clip was placed on the big ring attached to the opposing esophageal wall to



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**Figure 1 Preoperative esophagography.** A: Preoperative esophagography revealed severe esophageal dilatation and no obvious passage of barium; B: Postoperative esophagography demonstrated a rapid passage of barium from the esophagus into the stomach; C: The lamina was closed preoperatively; D: Mucosal uplift was poor after submucosal injection of 20-mL epinephrine meilan saline; E: Submucosal lift was poor after mucosal myotomy; F: Submucosal adhesion was obvious, and submucosal tunnel could not be established; G: The elastic traction ring was fixed at the tunnel opening; H: A second clip was placed to attach the ring to the opposing esophageal wall to create tension. The submucosa was exposed by means of traction of the elastic traction ring, and submucosal adhesion was obvious; I: Submucosal tunnel was established.

create tension. The tunnel was built to 2 cm below the cardia. The muscle was incised 2 cm below the tunnel opening, and full-thickness myotomy was performed from 3 cm above the cardia to 2 cm below the cardia. Lastly, we removed the titanium clip holding the traction ring opposite the tunnel opening using a pair of biopsy forceps. The operation lasted 53 min.

Postoperatively, the cardia was obviously relaxed. The patient underwent gastrointestinal decompression for 48 h and fasted for 72 h. The timed barium esophagram was repeated 4 d after the operation, and the contrast agent passed through the cardia smoothly.

## OUTCOME AND FOLLOW-UP

The symptoms of dysphagia were significantly relieved 3 wk after the operation, the Eckardt score was 2, and the patient's weight gain was 5 kg.

## DISCUSSION

Submucosal fibrosis in patients with achalasia is a rare cause of aborted POEM procedures. Over 5000 POEMs have been performed worldwide, with limited numbers of aborted procedures formally reported[1]. Zhou reported that 13 (0.77%) of 1693 POEMs (0.77%) were aborted, 12 (92.3%) of which

were due to severe submucosal fibrosis that precluded tunneling[2,3]. The implementation of new technology in achalasia is a challenge for endoscopic treatment when it comes to complex achalasia, because the dilated and tortuous esophageal lumen may render subsequent endoscopic dissection and separation of tissue planes difficult. Werner *et al*[1] reported D-POEM for achalasia with severe esophageal dilatation. Besides, he also reported O-POEM for achalasia with a sigmoid-shaped esophagus and achalasia with failed Heller myotomy. Wu *et al*[2] developed a modified version using a "Push and Pull" technique which reduced complications and accelerated wound recovery. POEM with an elastic ring helps to clarify exposure levels and facilitate tunnel construction[4].

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## CONCLUSION

POEM with an elastic ring may be a feasible and effective endoscopic treatment modality for achalasia with obvious submucosal fibrosis[5-7]. We observed that the short-term outcome was excellent. This technique significantly shortened the operation time and improved the success rate of POEM for achalasia with obvious submucosal fibrosis.

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## FOOTNOTES

**Author contributions:** Wang BH designed the research; Li RY performed the research.

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