

# Transmucosal diverticular myotomy for the treatment of oesophageal diverticula associated with spastic motility disorders

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## MESSAGE

Thoracic oesophageal diverticula are often associated with spastic motility disorders. Despite correction of the underlying motility disorder, in a subgroup of patients, symptoms persist, primarily regurgitation. Surgical diverticulectomy is then proposed; however, as the approach is thoracoscopic or via thoracotomy, it is associated with significant morbidity and cost. Descriptions of endoscopic techniques for the treatment of symptomatic midoesophageal diverticula are few. We propose the novel technique of diverticular myotomy (DM) to treat this disorder. In this case series, we describe two patients who successfully underwent DM with no adverse outcomes and excellent clinical results at 24-month follow-up.

## IN MORE DETAIL

Thoracic oesophageal (mid/epiphrenic) diverticula are thought to be related to either periesophageal inflammation with scarring (traction) or associated with oesophageal motility disorders such as achalasia (pulsion).<sup>1</sup> Treatment is indicated for patients with significant symptoms of dysphagia and regurgitation associated with weight loss or aspiration.<sup>2</sup> Endoscopic cricopharyngeal myotomy is established as a minimally invasive therapy to treat Zenker's diverticulum with comparable outcomes with surgery and less morbidity.<sup>3</sup> However, an optimal endoscopic technique for thoracic oesophageal diverticula is yet to be described. Herein we report a new technique of performing a transmucosal diverticular

myotomy (DM) for symptomatic patients with distal oesophageal diverticula in association with spastic oesophageal motility disorders after the failure of conventional therapy.

To perform DM, endoscopic assessment of the diverticular anatomy is initially undertaken using a standard gastroscope with a transparent distal 'tapered' cap with patient under general anaesthesia (figure 1, online supplementary video 1).

DM is then performed following a four-step process; 1) submucosal injection and incision, 2) identification of the muscular bridge/septum, 3) diverticular myotomy and 4) closure of mucosal incision (figure 2).

The first case is of a middle-aged woman, who was referred to our facility with a 2-year history of worsening dysphagia, chest pain and regurgitation of food. She had previously undergone a surgical diverticulectomy complicated by an oesophageal leak and the development of an oesophageal deformity at the surgical site. Endoscopic and radiological examinations confirmed the presence of a large distal oesophageal pulsion diverticulum (3 cm in length, 3 o'clock position). High-resolution manometry demonstrated spastic nutcracker oesophagus with distal contractile integral of 7149.2 mm Hg cms (normal range 500–5000). Initially, a per-oral endoscopic myotomy (POEM) was performed on the opposite (9 o'clock) side to the previous surgery. At 12 months, despite initial symptom improvement, her symptoms of dysphagia and regurgitation, although improved, continued to be disabling. At 18 months and after detailed

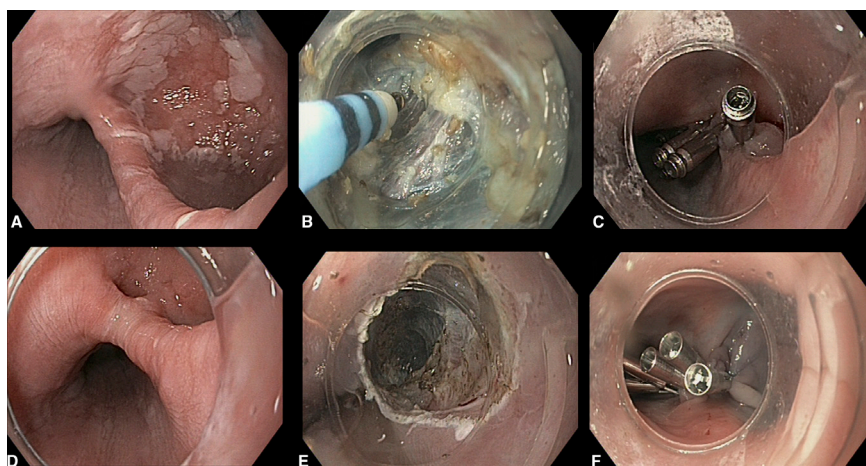
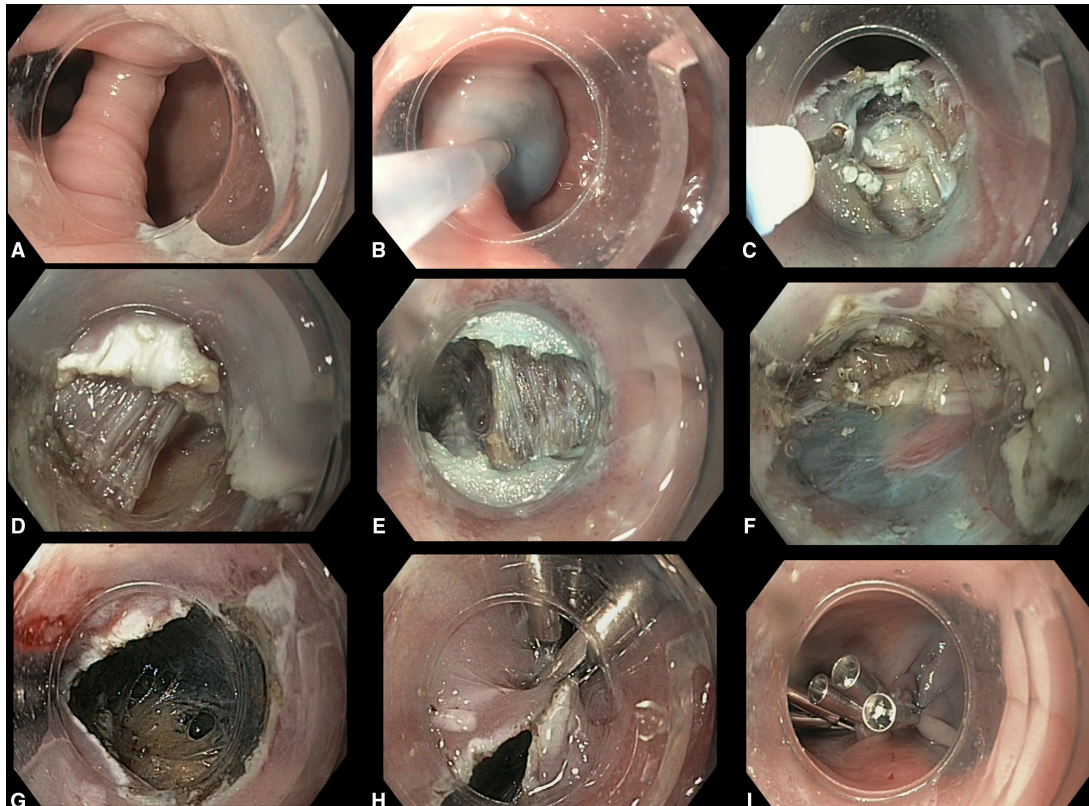


Figure 1 Examples of DM: Case 1: A-C, Case 2: D-F.



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**Figure 2** (A) Thoracic oesophageal diverticulum, (B) identification of the muscular bridge/septum and submucosal injection, (C) exposure of underlying muscular septum, (D–F) myotomy and (G–I) closure of mucosal defect.

informed consent, DM was then performed as described above. Total procedure time was 20 min. Her symptoms resolved, and she has been free of dysphagia and regurgitation for the ensuing 30 months.

The second case is a patient who presented with a 12-month history of chest pain and regurgitation. Barium swallow and gastroscopy demonstrated a large diverticulum arising from the distal oesophagus (5 cm from the gastro-oesophageal junction). Manometric assessment confirmed the diagnosis of diffuse oesophageal spasm. Initially, a POEM procedure was performed. Despite improvement in symptoms, the patient experienced persistent dysphagia and regurgitation. DM was performed 8 weeks later. The total procedure time was 15 min.

No adverse events were observed in either case. Both patients were discharged the following day after a water-soluble contrast swallow demonstrated no leak and smooth passage of contrast through the oesophagus without hold-up. No retention of contrast was seen within the diverticulum. Both patients had complete symptom resolution and are well, eating a full diet and maintaining a healthy weight at 24-month follow-up.

## COMMENTS

Thoracic oesophageal diverticula, in the Western population, are most commonly observed in patients with spastic oesophageal motility disorders.<sup>4</sup> The primary aim of treatment is to correct the underlying motility disorder. However, in a small subset of patients, symptoms persist. These patients have been traditionally referred for surgery which, due to the need for thoracotomy, carries a significant risk of morbidity and extended recovery.<sup>5</sup> Endoscopic options for these patients have to date been limited.

Endoscopic cricopharyngeal myotomy has become an established therapy for the treatment of Zenker's diverticulum

with excellent long-term outcomes.<sup>6</sup> By using these principles, techniques for endoscopic septotomy from within a submucosal tunnel such as diverticular per-oral endoscopic myotomy (D-POEM) have been described. A recently published case series<sup>7</sup> has reported on the use of D-POEM as an effective therapy for symptomatic oesophageal diverticula but with limited experience. Techniques such as D-POEM, however, require a steep learning curve and can be significantly resource and time intensive.

In comparison, our study is the first to report on the technique of oesophageal septotomy from within the lumen. DM is a novel technique for the treatment of symptomatic oesophageal diverticula in a setting of spastic oesophageal motility disorders. Our experience indicates that it is safe and effective. By not requiring the formation of a submucosal tunnel, we believe DM is technically less challenging and associated with a shortened procedure time as compared with other endoscopic septotomy methods. We understand our experience is limited to case reports, and long-term outcome data are lacking. We also appreciate that prospective multicentre experience is necessary to truly confirm its utility in this difficult to treat and uncommon entity. Despite these limitations, we believe this technique may become the standard of care for symptomatic oesophageal diverticula.

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