



Mucosa-preserving Zenker's diverticulotomy

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Zenker's diverticulum (ZD) is a rare condition, with prevalence ranging between 0.01% to 0.11%.¹ The mainstay of treatment is cricopharyngeal myotomy. Recently, flexible endoscopic cricopharyngeal myotomy (FECM) (Fig. 1) has become increasingly popular as a safe and effective alternative to open surgery and the rigid endoscopic approach. However, reported recurrence rates range from 0% to 32%,² likely owing to a lack of procedure standardization and difficulty in performing adequate myotomy for fear of perforation, given the absence of mucosa preservation. In addition, there is no standardized tool to gauge clinical response. This has led to techniques such as intraprocedural distensibility measurements to gauge myotomy adequacy³ and the evolution of peroral endoscopic

myotomy (POEM), originally developed for achalasia, to Zenker-POEM (Z-POEM).

In the Z-POEM procedure (Fig. 2), a mucosal incision is created a few centimeters proximal to the septum in the hypopharynx. Submucosal tunneling then is performed to expose the cricopharyngeal muscle before transecting it. Theoretically this should reduce recurrence by allowing complete myotomy and reduce perforation risk owing to the preservation of the overlying mucosa. Current literature has been supportive of this, at least in short-term follow-up.⁴ Notably, small ZDs (<2 cm)⁵ can cause significant symptoms and represent a therapeutic challenge. During FECM, it is difficult to stabilize the diverticuloscope in the short pouch. Similarly, in the case of Z-POEM, it becomes technically challenging to create

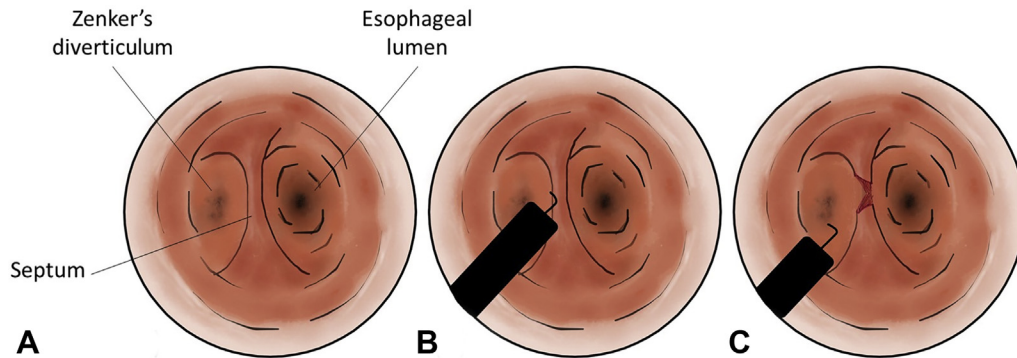


Figure 1. Traditional flexible endoscopic cricopharyngeal myotomy. **A**, The septum (*middle*) separates the Zenker's diverticulum (*left*) and the esophageal lumen (*right*). **B**, Instrument is introduced directly to the septum. **C**, Cricopharyngeal myotomy is performed.

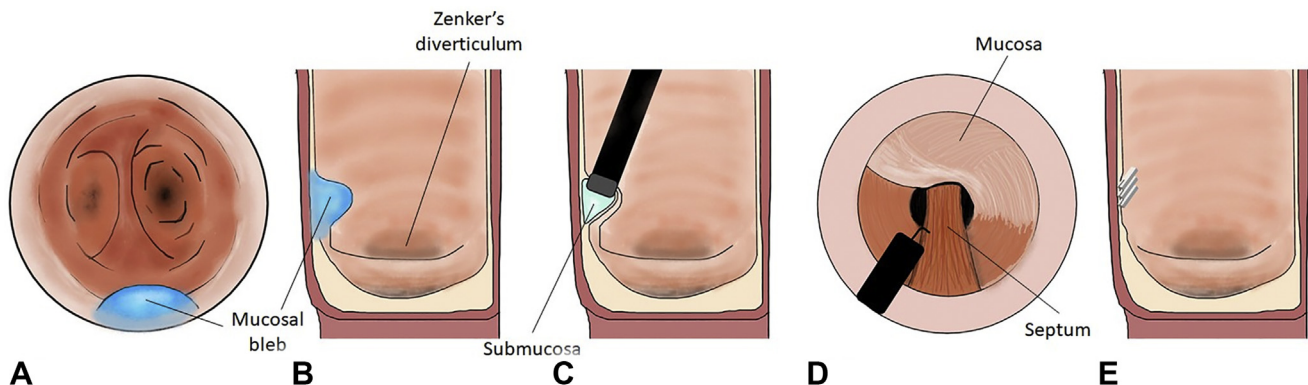


Figure 2. Zenker's peroral endoscopic myotomy. **A**, Craniocaudal view and **(B)** lateral view of submucosal injection 1 to 2 cm proximal to the septum, creating a mucosal bleb. **C**, The endoscope enters the submucosal space to perform submucosal tunneling. **D**, Tunneling is continued until the muscular septum is exposed, and myotomy is performed. **E**, Mucosal closure is performed using through-the-scope clips.

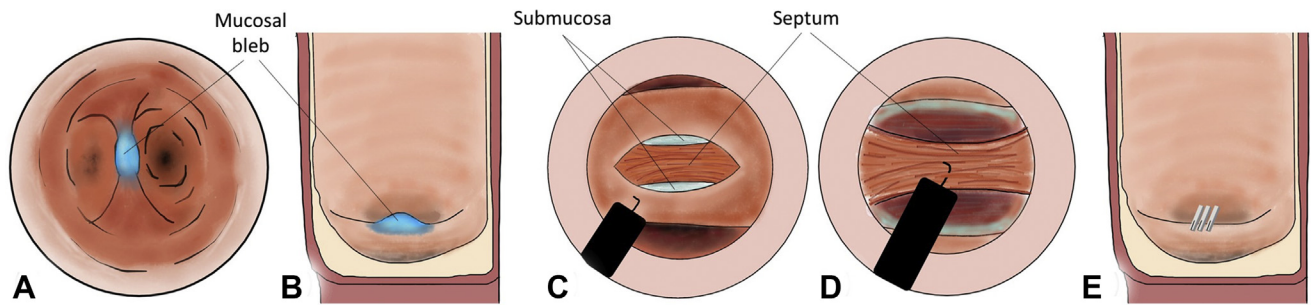


Figure 3. Mucosa-preserving Zenker's diverticulotomy. **A**, Craniocaudal view and **(B)** lateral view of submucosal injection at the level of the septum to create a mucosal bleb. **C**, A mucosal incision is performed at the level of the septum, and submucosal dissection is then performed on both sides of the muscular septum. **D**, Submucosal dissection is performed until the cricopharyngeal muscle is completely exposed, followed by a complete myotomy. **E**, Mucosal closure is performed using through-the-scope clips.

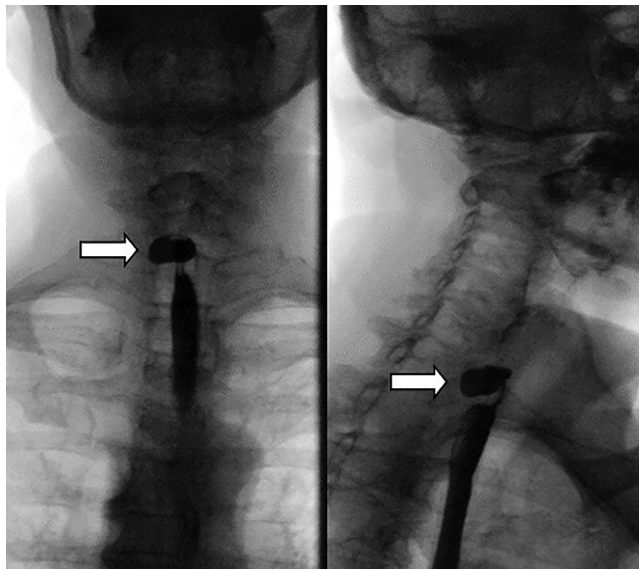


Figure 4. Preprocedure barium swallow demonstrating contrast hold within a 2-cm Zenker's diverticulum (*white arrow*).

the tunnel from 1 to 2 cm proximal to the septum and to close the mucosal defect (due to tight working space in the hypopharynx). Recent case reports propose a mucosa-preserving diverticulotomy, which allows direct access to the cricopharyngeal muscle without the need for a submucosal tunnel (Fig. 3).^{6,7} A case series of 20 patients treated using this method⁷ reported 100% technical success with no adverse events, 95% clinical success, and no recurrence at a mean follow-up of 12 months. We present a case to demonstrate this technique (Video 1, available online at www.VideoGIE.org).

A 78-year-old woman presented with a 1-year history of dysphagia and intermittent regurgitation. A 2-cm ZD was confirmed on a barium swallow study (Fig. 4) and upper endoscopy (Fig. 5A). With the patient under general anesthesia, a standard high-definition gastroscope (Olympus HQ190; Olympus, Center Valley, Penn, USA) was interchangeably fitted with either a short-type hood (Fujifilm, Valhalla, NY, USA) or soft distal attachment to

improve visualization and equipment positioning. A submucosal injection was performed at the septum using a premixed solution of normal saline and methylene blue. A total of 5 mL was used to create a mucosal bleb (Fig. 5B). A 1.5-cm mucosal incision was performed using the HookKnife on EndoCut I (ERBE, Marietta, Ga, USA) (Fig. 5C). The HookKnife was then used for submucosal dissection (force coagulation: Effect 2, 50W) along both sides of the muscular septum (Fig. 5D) and for myotomy once the cricopharyngeal muscle was exposed (Fig. 5E). The myotomy was extended to include 1-cm of esophageal muscle, ensuring complete transection of the septum. Mucosal closure was achieved with five 11-mm SureClip (Microtech, Ann Arbor, Mich, USA) through-the-scope clips (Fig. 5F).

The postoperative course was uneventful, and the patient reported immediate symptomatic response. Peri-procedural antibiotics (ampicillin/sulbactam) were given intravenously until a barium swallow study the following day demonstrated no leak or contrast hold-up at the level of the ZD (Fig. 6). The patient began a clear fluid diet and transitioned to oral antibiotics to complete a total 5-day course. The patient was discharged on day 1 with instructions to remain on a soft diet for 1 week before upgrading to a regular diet. At 6-week follow-up, the patient was well, tolerating a full diet with no residual dysphagia.

The creation of a mucosal entry directly above the Zenker's septum allows direct access to the cricopharyngeal muscle. This hybrid technique incorporates the traditional FECM and the novel Z-POEM, allowing complete myotomy. Our preference is to use the HookKnife because we find the upward cutting motion beneficial; however, other options include the triangular tip knife, insulated tip knife, and the dual knife (all Olympus). These have been successfully used in submucosal esophageal endoscopy, and therefore choice should be based on the endoscopist's experience and preference. We believe this technique may reduce recurrence when compared with traditional FECM, and may reduce procedural time when compared with Z-POEM, although this is yet to be confirmed by prospective comparative studies.

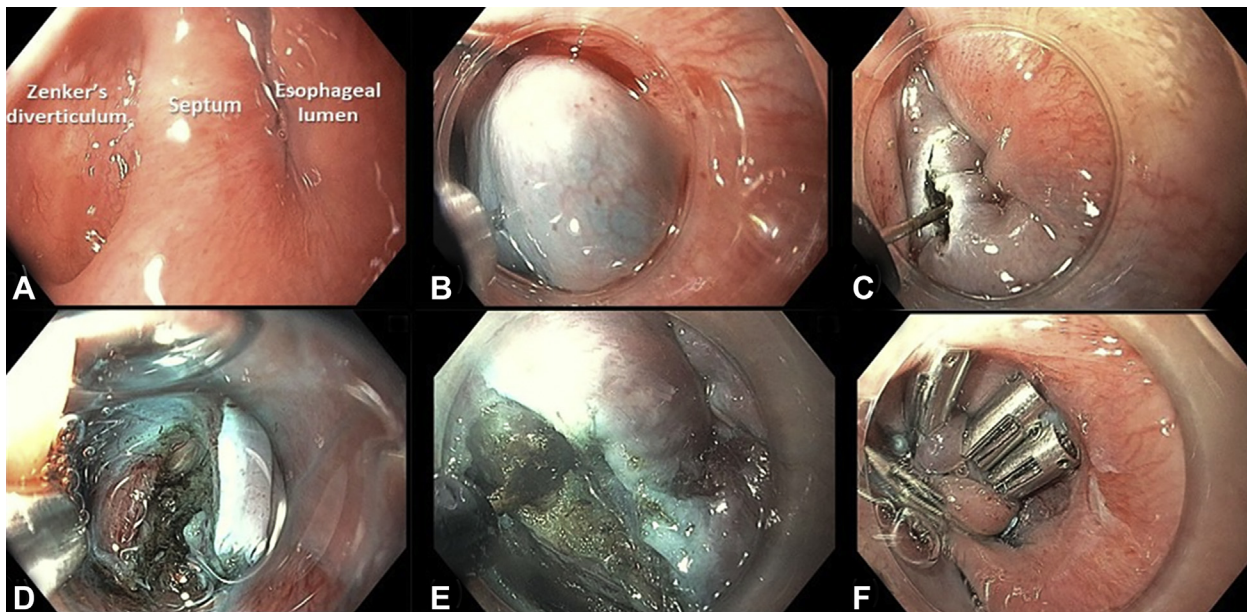


Figure 5. Mucosa-preserving Zenker's diverticulotomy, endoscopic views. **A**, Zenker's diverticulum (*left*), septum (*middle*), and esophageal lumen (*right*). **B**, Submucosal injection at the septum. **C**, Mucosal incision. **D**, Dissection to expose the underlying muscular septum. **E**, Myotomy. **F**, Closure of mucosal defect.

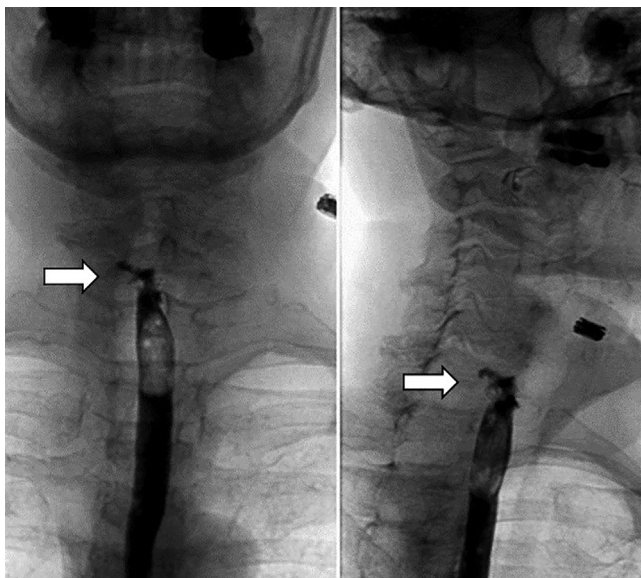


Figure 6. Postprocedure barium swallow demonstrating absence of contrast hold at the level of the previous Zenker's diverticulum (*white arrow*).

DISCLOSURE

Dr Ngamruengphong is a consultant for Boston Scientific. All other authors disclosed no financial relationships.

Abbreviations: FECM, flexible endoscopic cricopharyngeal myotomy; POEM, peroral endoscopic myotomy; ZD, Zenker's diverticulum.

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