



Modified Zenker's peroral endoscopic myotomy: a novel technique to improve access and depth of muscular dissection

Edward Young, MBBS,^{1,2} Rajvinder Singh, MBBS, MPhil, FRACP, AM, FRCP, FJGES^{1,2}



Figure 1. CT scan demonstrating Zenker's diverticulum (yellow arrows).

A 73-year-old man presented with dysphagia and painless regurgitation of food contents, with a Dysphagia, Regurgitation, and Complications score of 7.¹ A CT of the neck was performed (because of limited access to oral contrast during the SARS-CoV-2 pandemic), demonstrating a large Zenker's diverticulum (Fig. 1). After extensive discussion, the patient preferred endoscopic treatment of his diverticulum because of his medical comorbidities.

A Zenker's peroral endoscopic myotomy (Z-POEM) was performed in a modified fashion. Rather than making an incision more proximally, near to the upper esophageal sphincter, a submucosal injection and then mucosal incision were made directly over the cricopharyngeal muscle at the diverticular septum (Figs. 2 and 3). Two submucosal tunnels were then created on either side of the cricopharyngeal muscle, allowing excellent access to the muscle for dissection (Fig. 3). The full depth of the cricopharyngeal muscle was dissected, after which the mucosal incision was closed with 5 clips (Fig. 4). The patient was admitted to the hospital overnight, commenced on oral fluids, and discharged home the following day. After a week, he had returned to eating a normal diet and had complete resolution of his symptoms with a postoperative Dysphagia, Regurgitation, and Complications score of 0. The patient had mild subcutaneous emphysema in his neck immediately after the procedure, which had resolved the following morning, with no other adverse events.

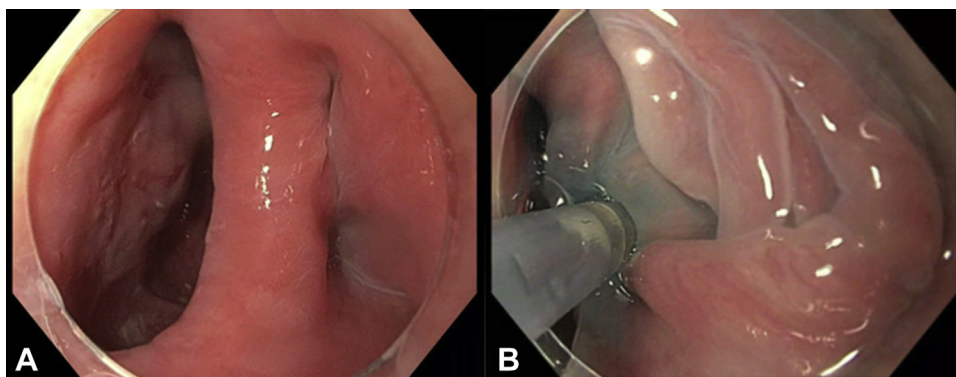


Figure 2. A, Large Zenker's diverticulum seen endoscopically. B, Submucosal injection directly over the septum.

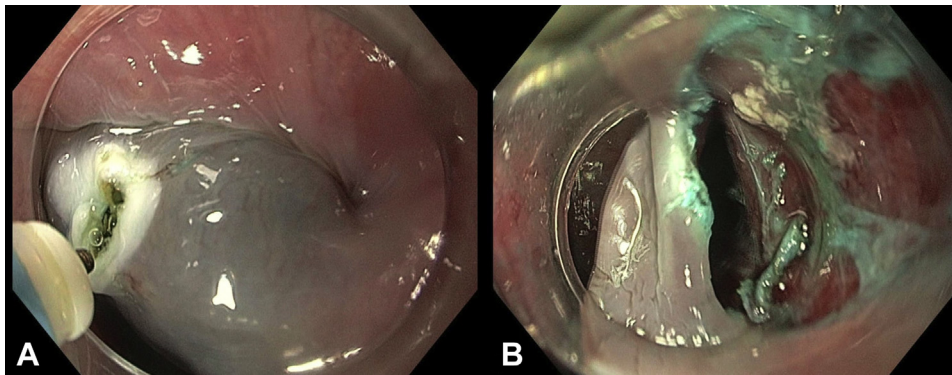


Figure 3. **A**, Mucosotomy made directly over the septum. **B**, Submucosal dissection plane between the diverticulum (left) and the cricopharyngeal muscle (right).

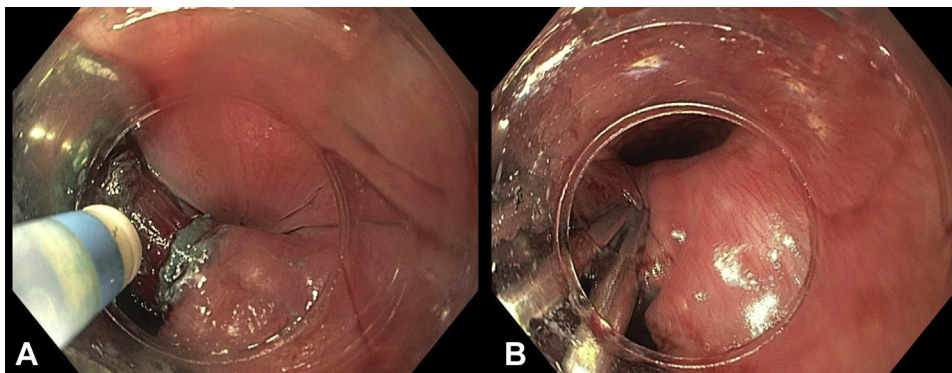


Figure 4. **A**, Transection of the cricopharyngeal muscle, which is clearly exposed after submucosal dissection on either side of the septum. **B**, Improved working space for mucosotomy closure compared to traditional Zenker's peroral endoscopic myotomy.

Z-POEM has been established as an effective intervention for the treatment of Zenker's diverticula. The largest study on this intervention, published in 2020 by Yang et al, demonstrated a technical success rate of 97.3% out of 75 patients, with clinical success in 92%.² This was further supported in 2021 by Elkholy et al, who demonstrated 100% technical success and 95.8% clinical success.³ However, possible limitations of Z-POEM include limited access to the submucosal tunnel because of the proximity of the upper esophageal sphincter, as well as the requirement for submucosal tunneling, which can lead to inability to locate the cricopharyngeal muscle.² Endoscopic Zenker's diverticulotomy maximizes access to the field of dissection but limits depth of muscle transection.⁴ Alternatively, the Z-POEM technique can be modified by placing the mucosotomy directly over the septum, using either a parallel or perpendicular incision as has been described by Mavrogenis et al and Repici et al (but previously in the context of a short diverticular septum).^{5,6} In this case, a perpendicular incision was made to maximize access for submucosal dissection on either side of the septum; however, in the context of a smaller diverticulum with a narrow septum,

a parallel incision may reduce the risk of complications. This modified Z-POEM technique can be used to treat large diverticula ([Video 1](#), available online at www.giejournal.org), maximizing access to the field of dissection and allowing closure of the mucosal defect to be completed safely and carefully. In addition, submucosal tunnels on each side of the cricopharyngeal muscle facilitate accurate and deep muscular transection, which may lead to improved clinical efficacy.

Although formal studies are required to compare the efficacy and safety of this modified approach in comparison to both traditional Z-POEM and Zenker's diverticulotomy, in this case it led to a highly successful clinical outcome with excellent access to the field of dissection and careful closure of the mucosal incision.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviation: Z-POEM, Zenker's peroral endoscopic myotomy.

REFERENCES

1. Ishaq S, Siau K, Lee M, et al. Zenker's diverticulum: can protocolised measurements with barium SWALLOW predict severity and treatment outcomes? The "Zen-Rad" Study. *Dysphagia* 2021;36:393-401.
2. Yang J, Novak S, Ujiki M, et al. An international study on the use of peroral endoscopic myotomy in the management of Zenker's diverticulum. *Gastrointest Endosc* 2020;91:163-8.
3. Elkholy S, El-Sherbiny M, Delano-Alonso R, et al. Peroral endoscopic myotomy as treatment for Zenker's diverticulum (Z-POEM): a multi-center international study. *Esophagus* 2021;18:693-9.
4. Tieu AH, Kumbhari V, Saxena P, et al. Flexible endoscopic Zenker's diverticulotomy. *Gastrointest Endosc* 2015;81:1477.
5. Mavrogenis G, Tsevgas I, Zachariadis D, et al. Mucosotomy at the top of the septum facilitates tunneling and clipping during peroral endoscopic myotomy for Zenker's diverticulum (Z-POEM). *Ann Gastroenterol* 2020;33:101.
6. Repici A, Spadaccini M, Belletrutti PJ, et al. Peroral endoscopic septotomy for short-septum Zenker's diverticulum. *Endoscopy* 2020;52:563-8.

Department of Gastroenterology, Lyell McEwin Hospital, Adelaide, South Australia (1), University of Adelaide, Faculty of Health and Medical Sciences, Adelaide, South Australia (2).

If you would like to chat with an author of this article, you may contact Dr Young at edward.young@sa.gov.au.

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