



Management of Zenker's diverticulum using flexible endoscopy

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Background and Aims: Zenker's diverticulum is a false diverticulum through Killian's dehiscence. Symptoms include halitosis, dysphagia, regurgitation, cough, and aspiration pneumonia. Treatment options include open transcervical cricopharyngeal myotomy, trans-oral rigid endoscopic stapling, and minimally invasive endoscopic myotomy. Although open surgical techniques have historically been the criterion standard for treatment, endoscopic options have become increasingly used. We propose the use of flexible endoscopy in the management of Zenker's diverticulum.

Methods: We present a retrospective case series of 9 patients undergoing endoscopic cricopharyngeal myotomy from 2014 to 2018 using our endoscopic technique.

Results: We demonstrate that endoscopic technique provided adequate symptomatic relief in 7 of 9 patients, with no operative adverse events.

Conclusions: Cricopharyngeal myotomy using flexible endoscopy is a safe and effective technique for the management of Zenker's diverticulum. Potential benefits of this approach include shorter operative times, shorter postoperative admissions, and earlier progression of diet. Initial treatment with endoscopic technique does not preclude future open repairs. (VideoGIE 2019;4:87-90.)

Zenker's diverticulum is a rare acquired herniation through the posterior pharyngoesophageal junction into the posterior pharyngeal wall through Killian's dehiscence, which is an area of weakness bounded by the oblique fibers of the lower inferior constrictor muscle and the transverse fibers of the cricopharyngeus muscle.¹ It is considered a false diverticulum and consists only of mucosa and submucosa, and it is believed to be caused by chronic increased pressure in the esophageal lumen.² The pathologic changes are most prevalent in the 6th and 7th decade and typically present with halitosis, dysphagia, regurgitation, cough, and aspiration pneumonia, with the criterion standard for diagnosis being a barium swallow and continuous fluoroscopy.¹

Treatment options include open transcervical cricopharyngeal myotomy, transoral rigid endoscopic stapling, and minimally invasive endoscopic myotomy.³ Although open surgical techniques have historically been the criterion standard for treatment, endoscopic options have become increasingly used.¹

Multiple studies have shown that minimally invasive endoscopic techniques are favored over open techniques in terms of lower perioperative morbidity and mortality, shorter operative times, shorter recovery times, and lower adverse event rates.⁴⁻⁶ Furthermore, endoscopic techniques demonstrate comparable results in terms

of resolution of dysphagia, regurgitation, cough, and aspiration.^{1,7}

Flexible endoscopy has been increasingly popular because of its suitability for patients who are otherwise unsuitable for rigid endoscopy, such as those with limited neck mobility or medical comorbidities.⁸ Flexible endoscopy can be performed with the patient under sedation or general anesthesia and has been shown to be comparable to rigid endoscopy and open techniques in terms of safety and effectiveness.⁹⁻¹²

The fundamental principle of a repair with the use of flexible endoscopy involves myotomy of the cricopharyngeus muscle to open up the diverticulum to the esophageal lumen. Various instruments including needle-knife, hook-knife, harmonic scalpels, lasers, hot biopsy forceps, bipolar forceps, and various other diathermy and electrocautery devices have been used.¹³

We present a retrospective case series of all patients undergoing endoscopic cricopharyngeal myotomy from 2014 to 2018 from a single upper-GI and endoscopic surgeon, and we include a video to demonstrate our technique (Video 1, available online at www.VideoGIE.org). A flexible endoscope with an EMR cap was used to visualize the Zenker's diverticulum. Patients had general anesthesia with endotracheal tube intubation. A cricopharyngeal myotomy was performed with use of a

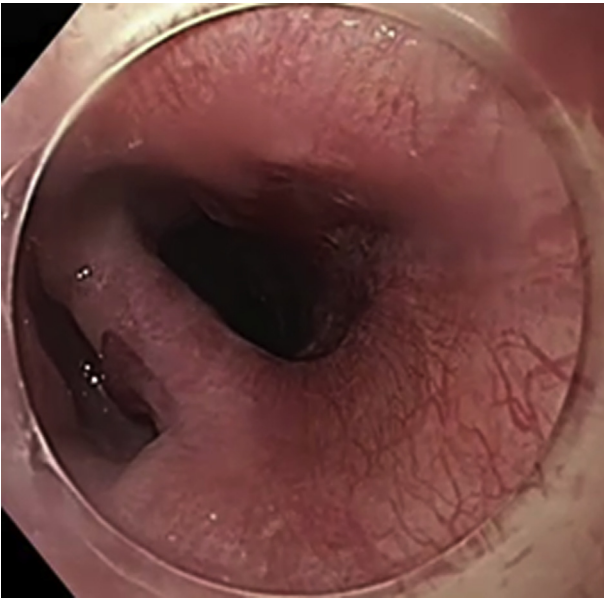


Figure 1. The Zenker's diverticulum is confirmed on endoscopy.

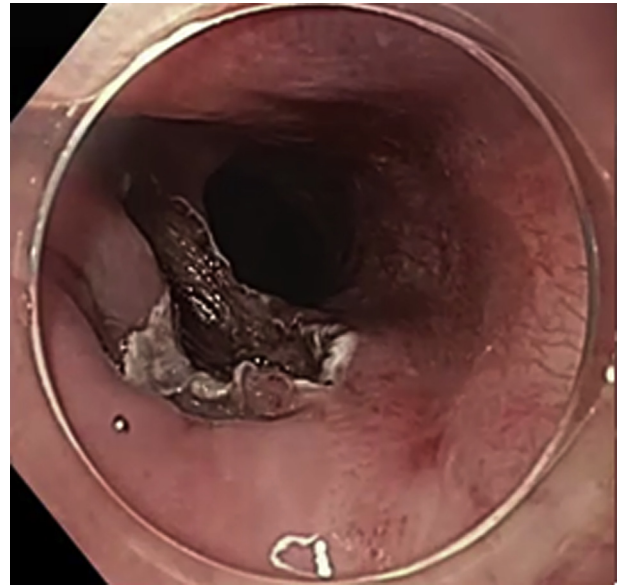


Figure 3. Adequate dissection is performed to allow the inferior aspect of the diverticulum to freely communicate with the esophagus.

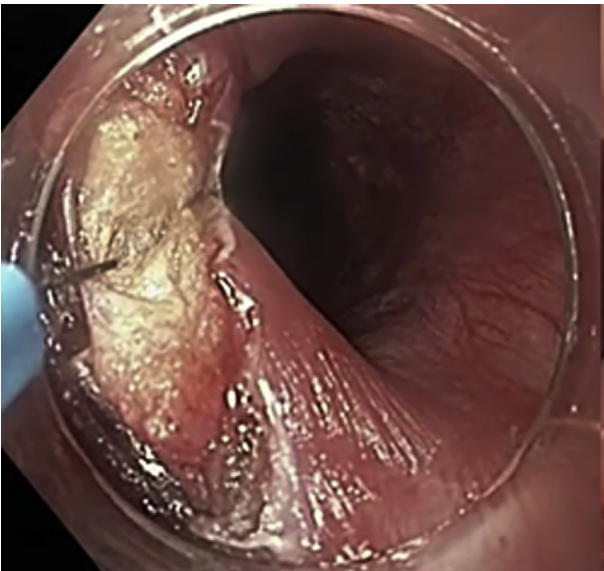


Figure 2. Cricopharyngotomy is performed with needle-knife.



Figure 4. Nasogastric tube inserted to guide the gastroscopy to the Zenker's diverticulum.

needle-knife (monopolar diathermy cut setting, 3; coagulation setting, 2) (Figs. 1-3). For patients in whom we faced difficulty in locating the diverticulum or maintaining position, a nasogastric tube was inserted for guidance (Fig. 4). For patients in whom we encountered an intraoperative bleed, submucosal clips were placed to achieve hemostasis. Postoperatively, all patients were given clear fluids the same day, free fluids the next day for 48 hours, and then pureed food for a week. The technical success of our procedures was demonstrated by preoperative and postoperative barium-swallow fluoros-

copy studies to show initial collection of contrast material in the diverticulum and subsequent flow of contrast material from the diverticulum into the esophagus (Figs. 5-8).

A total of 9 patients were treated for Zenker's diverticulum with flexible endoscopic myotomy. The patients consisted of 3 men and 6 women with a mean age of 77 years (range, 66-85 years) and a mean American Society of Anesthesiologists score of 2.22 (range, 1-3) (Table 1). These patients universally presented with dysphagia and reflux and received diagnoses of Zenker's diverticulum with endoscopy and barium swallow. The mean operative time was 36 minutes (range, 14-65 minutes). One patient required a nasogastric tube to guide the endoscopic procedure because of difficult access. The same patient required the application of 1 clip for hemostasis. There



Figure 5. Preoperative barium swallow image showing contrast material flowing down the esophagus.



Figure 6. Preoperative barium swallow image showing contrast material collecting in the Zenker's diverticulum.

were no intraoperative or postoperative adverse events. Our results build on the early international experience of this technique.¹⁴

Patients were given clear fluids on the same day without clinical issues, and the mean length of stay was 1.1 days (range, 1-2 days). The mean follow-up time was 11 weeks



Figure 7. Postoperative barium swallow image showing contrast material flowing down the esophagus.

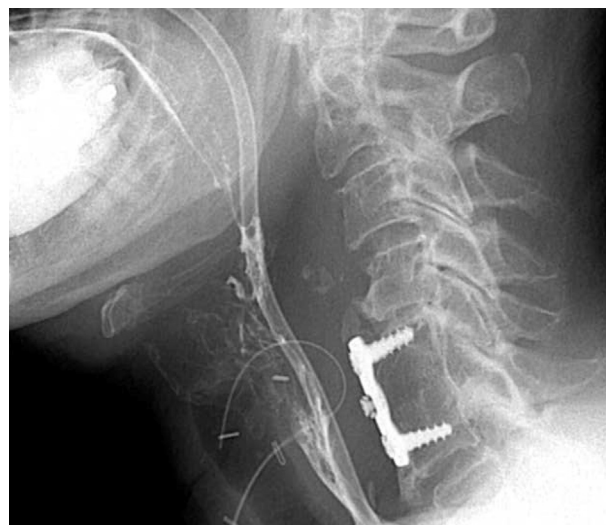


Figure 8. Preoperative barium swallow image showing no contrast material collecting in the Zenker's diverticulum.

(range, 2-46 weeks), and both dysphagia and reflux significantly improved in 7 of the 9 patients, of whom 1 patient had persistent reflux secondary to a hiatus hernia. Of the remaining 2 patients in whom symptoms persisted, both presented with dysphagia and reflux and underwent preoperative barium swallow. Both patients had a small residual diverticulum on follow-up endoscopy. One patient had persistent dysphagia, which was improved in comparison with preoperative symptoms, and did not wish for further intervention. The other patient had persistent dysphagia and reflux and subsequently underwent an open repair with satisfactory result.

Although it is difficult to identify predictive factors for failure in a small series, it is speculated that both these

TABLE 1. Patient demographics and operative details

Variable	Value
Number	9
Gender M:F	1:2
Mean ASA score	2.22 (1-3)
Mean operative time (minutes)	36 (14-65)
Postoperative adverse events	0
Mean length of stay (days)	1.1 (1-2)
Mean follow-up (weeks)	11 (2-46)

ASA, American Society of Anesthesiologists.

patients had larger diverticula, as reflected by the increased operative time (59-65 vs 36 minutes cohort mean). One patient required nasogastric tube guidance and application of a hemostatic clip at the completion of the procedure.

In conclusion, cricopharyngeal myotomy with the use of flexible endoscopy for the management of Zenker's diverticulum has potential benefits of shorter operative times, shorter postoperative admissions, and earlier progression of diet. Initial treatment with endoscopic technique does not preclude future open repairs.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

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