

Feasibility and Outcome of Endoscopic Staple-Assisted Esophagodiverticulostomy for Zenker's Diverticulum

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Objectives/Hypothesis: Endoscopic staple-assisted esophagodiverticulostomy (ESED) is a newly described method of surgically correcting Zenker's diverticulum. Initial reports on the ease and success of the surgery have been quite enthusiastic, making it seem the procedure of choice. We initiated the procedure in an algorithm of treatment of Zenker's diverticulum, to further explore the feasibility and outcome of this new technique. **Study Design:** This is a case series of 23 patients with Zenker's diverticulum who have undergone surgical repair. For each patient, an attempt at ESED was made. If unsuccessful, an open approach was then taken. **Results:** Seven of 23 patients (30%) were unable to be treated with ESED because of inability to expose the diverticulum or unfavorable anatomy of the diverticulum itself. Of the remaining 16 patients, ESED was successful in resolving the symptoms of diverticulum in 14 (87%). Two patients (13%) were somewhat improved but had persistent dysphagia. No significant complications occurred. All patients resumed oral diet within the first 24 hours after surgery. **Conclusion:** Esophagodiverticulostomy is an excellent method of surgically correcting Zenker's diverticulum in many patients, but anatomical considerations may prevent its use, making open approaches of continued importance in a surgeon's armamentarium. **Key Words:** Zenker's diverticulum, endoscopy, esophagoscopy, endostapler.

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INTRODUCTION

Surgical management of Zenker's diverticulum (ZD) underwent a slow evolution over the 20th century, from more to less invasive. Diverticulectomy was the favored

procedure in the first part of the 20th century. Diverticulectomy came into common use more recently, with some reports of improvement in morbidity and mortality while maintaining efficacy.¹ Dohlman and Mattson² introduced the concept of an endoscopic form of surgical management of ZD in 1960, using a specially designed endoscope to simultaneously visualize the diverticulum and esophagus. The party wall of the diverticulum and esophagus, as well as the cricopharyngeal sphincter, were divided with electrosurgical technique. More recently, laser rather than electrosurgical devices, has been used as a method of endoscopic surgical management of ZD.³

In 1996, Scher and Richtsmeier⁴ introduced the concept of an endoscopic staple-assisted esophagodiverticulostomy (ESED) for ZD, in which an endosurgical stapler was used to divide the party wall between the diverticulum and esophagus. The advantage to this technique over prior endoscopic attempts was that the stapling device sealed cut mucosal edges, thus preventing salivary leakage.⁴ This study and subsequent studies revealed enthusiastic results with negligible complications.⁵⁻⁸ We reviewed our surgical management of ZD to further assess the use of ESED and the success of our results.

MATERIALS AND METHODS

Between March 1998 and January 2001, 23 patients were surgically treated for ZD at the University of Pennsylvania Hospital (Philadelphia, PA). All patients were treated according to the following algorithm. Patients were given the option of an endoscopic approach (ESED) as a first attempt at treating the diverticulum. If this method of treatment was not possible, an open approach would be offered as a second method of handling the ZD. Some surgeons offered this at the same setting; others staged the open procedure, if necessary, at a second sitting. Patients could refuse the endoscopic option and undergo the open approach as a first-line treatment modality. All patients chose an endoscopic approach as a first attempt.

Esophagodiverticulostomy has been described previously in detail, in the method of Scher.⁴ In brief, the Weerda bivalved diverticuloscope (Karl Storz, Culver City, CA) was used for simultaneous visualization of the ZD and esophagus. A 0° urological endoscope was used to visualize the placement of endosurgical devices. Temporary retention sutures of 2-0 silk or 2-0 Vicryl were placed into the party wall between the esophagus and diverticu-

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lum with an Endostitch autosuture device (U.S. Surgical Corp., Norwalk, CT) for the purpose of retraction. The ESED was made with an Endo-GIA 30 endosurgical stapler (U.S. Surgical Corp.) (Fig. 1).

All patients were kept on nothing-by-mouth status for at least 12 hours after the procedure. A soft diet was initiated after this time period if there was no evidence of complication, such as tachycardia, fever, or complaint of chest pain. Acetaminophen was not administered as a component of any postoperative analgesic.

Patients were seen in follow-up within the first month after surgery. Symptom relief was graded as complete or near complete (little or no residual symptoms), partial (only partial resolution of symptoms), or no change. Follow-up ranged from 1 month to 24 months.

RESULTS

Twenty-three patients were surgically treated for ZD from March 1998 to January 2001, including 8 women and 15 men. Ages ranged from 38 to 84 years, with an average age of 69 years. All patients had a preoperative barium esophagram. Preoperative symptoms included regurgitation, dysphagia, chronic cough with swallowing, laryngospasm during sleep, and aspiration pneumonia. The ZD ranged in size from 2 to 10 cm.

Of the 23 patients on whom ESED was attempted, the surgery was successful in 16 (70%). Lack of completion of the procedure was, in all but one case, attributable to an inability to properly expose the diverticulum and esophagus contemporaneously. This typically was a result of unfavorable patient anatomy: prominent front teeth, a particularly long neck, or a retrognathic condition in a patient with a relatively anterior larynx and esophagus. In one patient, the diverticulum itself was complex. Although there was clearly a posterior component to it, the mouth of the diverticulum was angled more laterally than

is typical, and the endosurgical instruments could not be safely placed, even with reasonable exposure.

None of the 16 patients who successfully underwent ESED had a surgical complication. All patients resumed an oral diet within the first 24 hours after surgery. Of these 16 patients, all reported complete or near-complete resolution of symptoms on early follow-up. Two of the 16 (13%) patients seen in follow-up more than 1 year later reported either partial or complete recurrence of their initial symptoms. Both patients had follow-up barium esophagrams showing persistence of the ZD, although this finding is not surprising because the ESED does not actually remove the diverticulum. In one of these patients, a second ESED was performed with good early results but subsequent return of symptoms.

DISCUSSION

The results of this study confirm that ESED is a safe and effective method of surgically treating ZD. Albeit with early follow-up, the success rate of 87% in resolving symptoms is comparable to the studies of Scher and Richtsmeier⁶ and others using an endoscopic technique.^{5,7,8} The fact that there was essentially no perioperative morbidity and very limited recovery time is especially compelling in an elderly population of patients.

Several aspects of our outcomes diverge from most earlier reports. First, our ability to perform the procedure was less frequently successful. It should be emphasized that this circumstance occurred even with the use of the longest available Weerda laryngoscope. Although there may be a learning curve associated with the technique, all surgeons in this study are experienced endoscopists, and because initial exposure was the problem, rather than technical manipulation of the endosurgical tools, it ap-

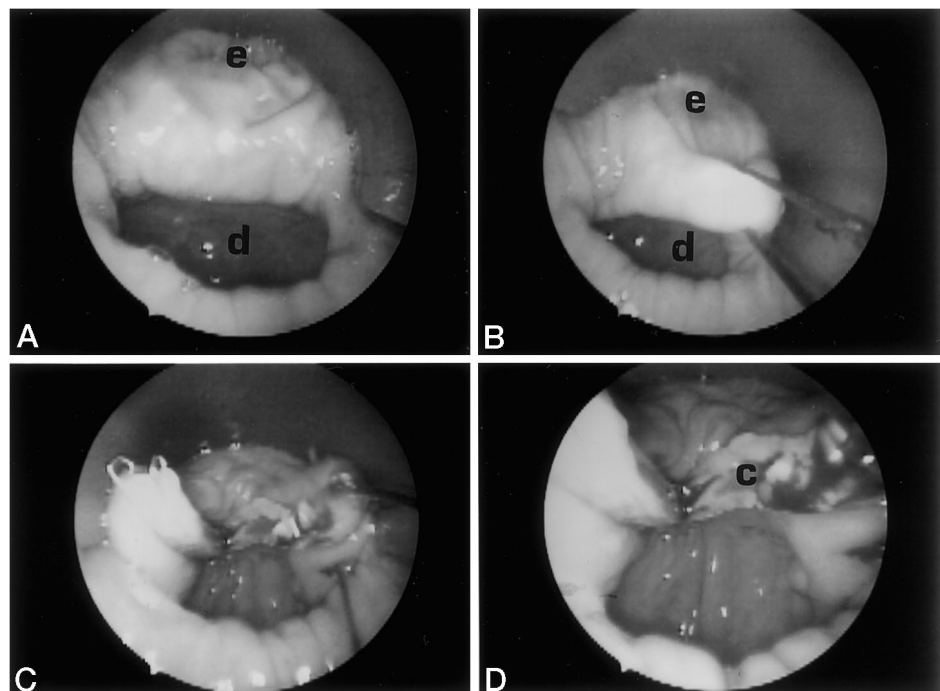


Fig. 1. (A) Diverticuloscope in position showing esophagus (e) and diverticulum (d). (B) Endostitch device in position in party wall between esophagus (e) and diverticulum (d). (C) Party wall after cut with endostapling device. (D) Closer view of cut, which shows the cricopharyngeus (c) sectioned along with the rest of the party wall.

pears likely that there is a real, and perhaps previously understated, potential exposure problem in some patients. Whether it might be possible to determine this preoperatively (e.g., with a lateral neck radiograph) remains to be determined.

Second, whereas all patients initially reported substantial or complete improvement, two patients did eventually regress after longer follow-up. The results presented in the current study are mostly of short-term follow-up. This raises concern about the relapse rate over long-term follow-up. Although it is possible to revise the procedure at a second sitting, one would hope not to have to perform revision. Further, if the patient is uninterested in undergoing a follow-up ESED, an open procedure may be more difficult secondary to scarring in the region of the prior endoscopic attempt. As a point of comparison, revision rates between 1.2% and 13% for open approaches have been reported on long-term follow-up.⁹

CONCLUSION

The results of this study suggest that ESED is a safe and effective method of surgically correcting ZD. Because anatomical considerations may prevent its use, patients must be carefully counseled before the procedure about the potential need for an open approach. Further, and especially until longer-term follow-up data are accumulated, patients should be informed of the possible need for

revision and potential difficulties in pursuing a later open approach to treating the diverticulum.

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