

How I Do It

Operative Adaptation for Endoscopic Identification of Zenker's Diverticulum

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INTRODUCTION

Zenker's diverticulum is classically defined as a herniation of the esophageal mucosa and submucosa through an area of weakness between the cricopharyngeal and inferior constrictor muscles.¹ In 1769, Ludlow² noted the first anatomical description of this pulsion diverticulum; however, it was not until 1878, when Friedrich Albert von Zenker³ reported 27 cases detailing the pathophysiology, that the condition began to bear his name.

Since then, various methods of management of Zenker's diverticulum have been developed starting with Wheeler's first excision attempt⁴ in 1885 to the introduction of an endoscopic technique by Mosher in 1917.⁵ Mosher's method was further refined and augmented over several decades, ultimately resulting in the introduction of an endoscopic stapling technique by Martin-Hirsch⁶ and Collard⁷ in 1993. In 1996, the endoscopic stapling method gained momentum with its official introduction in the United States by Scher and colleagues.⁸ More recently, endoscopic stapling for Zenker's diverticulum has been heralded as the treatment of choice, providing a safer alternative to external approaches with low complications rates, short operative time, rapid convalescence, and most importantly, excellent resolution of symptoms.^{9,10} What follows is an

account of our adaptations to the endoscopic stapling technique for a patient in whom access with the diverticuloscope was very difficult and the cricopharyngeus was very distal.

SURGICAL TECHNIQUE

A 68-year-old (6 foot 1 inch, 238 pound) male initially presented to us with a 10 to 15 year history of chronic dysphagia and regurgitation of food. More recently, the patient reported a rough quality to his voice, and barium esophagogram confirmed a large (5 cm × 4.5 cm × 3 cm) Zenker's diverticulum arising from the lower hypopharynx (Fig. 1). The patient elected to undergo endoscopic cricopharyngeal myotomy.

After induction of general orotracheal anesthesia, identification of the diverticulum was attempted transorally by introduction of a diverticuloscope (Karl Storz, Tuttlingen, Germany). However, due to the patient's anatomy, passage of the scope into the esophagus was very difficult, and it was not clear that the opening of the diverticulum versus the esophagus was identified. A smaller, rigid esophagoscope (Pilling, Fort Washington, PA) was introduced, and both the esophagus and diverticulum were identified. The distance from the upper incisors to the cricopharyngeus was measured with the esophagoscope and found to be approximately 24 cm, which was the full length of the diverticuloscope, revealing one reason why identification of the cricopharyngeus with the diverticuloscope had been difficult.

At this point, an Argyle Salem sump nasogastric (NG) tube (Sherwood Medical, St. Louis, MO) was passed through the esophagoscope into the esophagus (Fig. 2), and the esophagoscope was removed, leaving the tube in place. We were now able to properly reintroduce the diverticuloscope by following the NG tube, using the Seldinger technique with the tube in the lumen of the scope. This guided the anterior jaw of the scope into the esophagus, and with the scope inserted its full length, the intervening party wall of the diverticulum was identified upon opening and subsequently suspending the diverticuloscope (Fig. 3). Next, a Hopkins

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Fig. 1. Barium esophagogram of patient's Zenker's diverticulum.

rod (Karl Storz, Tuttlingen, Germany) was introduced into the esophagus to confirm proper placement of the scope and better examine the diverticulum. A 35-mm Endopath stapler (Ethicon Endo-Surgery Inc, Cincinnati, OH) was passed through the diverticuloscope with the staple cartridge in the esophagus and the anvil in the di-



Fig. 2. Salem sump tube entering esophagus.



Fig. 3. Party wall between esophagus and diverticulum after expansion of the diverticuloscope.

verticulum. After closing the stapler, the Hopkins rod was used to confirm appropriate placement. The stapler was then fired, thereby stapling and transecting the party wall and the cricopharyngeus (Fig. 4).

After removal of the stapler, the Hopkins rod was once again passed into the esophagus revealing the opening of the diverticulum and a residual shelf too small for further stapling.

DISCUSSION

In any operative procedure, proper exposure is imperative for success. In this case passage of the fairly large diverticuloscope was very difficult, and the diverticulum was very distal. The diverticuloscope was likely passing into the diverticulum and the esophagus, and the party wall could not be identified. In our technique, we used a smaller rigid esophagoscope to find the opening of the diverticulum and then passed a nasogastric tube through the esophagoscope into the esophagus. We then used a modification of the Seldinger technique by



Fig. 4. Party wall after division with stapler.

utilizing the NG tube to guide the anterior jaw of the diverticuloscope into the esophagus.

As in this case, often the most challenging part of a diverticulectomy is identifying the diverticulum. In 1998, Hecht and associates shared a technique of employing an ordinary Foley catheter to provide stiffness and stabilization for dissecting a small collapsed Zenker's diverticulum from surrounding cervical tissue in an open diverticulectomy.¹¹ Similarly, our use of a readily available nasogastric tube to direct the diverticuloscope is a simple modification that can allow rapid identification of the diverticulum in a case with difficult anatomy.

CONCLUSION

The current staple-assisted endoscopic management of Zenker's diverticulum is a modification of a technique initially developed in 1917. We employed an ordinary nasogastric tube to assist in the identification of a diverticulum that was otherwise difficult to identify by a diverticuloscope alone.

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