

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

Section Editor: John Baillie, MB ChB, FRCP

## Endoscopic Management of Zenker Diverticula



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### G&H When should a Zenker diverticulum be treated?

**TB** Diagnosis and treatment of Zenker diverticula are symptom-driven, as they are uncommonly found incidentally. Treatment, therefore, is focused on treating symptoms. Mild, occasional dysphagia is not necessarily an indication for treatment. Alarm symptoms of coughing while eating, regurgitation of food and/or waking up with food in the mouth or on the pillow, and choking are signs that a patient is at high risk for developing pulmonary aspiration, and should prompt treatment. Additional symptoms to be aware of include documented aspiration pneumonia, overflow aspiration from the diverticulum detected by barium swallow, and a gurgling sensation in the neck. Elderly patients (60-80 years) may complain of reflux and be mistakenly diagnosed as having gastroesophageal reflux. However, if a patient experiences new-onset reflux symptoms at an older age, particularly if the refluxate contains food, and a history of coughing while swallowing is elicited, the clinician should consider that the patient is refluxing from a Zenker diverticulum.

### G&H How is a Zenker diverticulum traditionally treated?

**TB** Zenker diverticula were historically treated with an open-neck exploration and excision of the diverticulum. Over the years, treatment progressed to an open excision combined with cricopharyngeal myotomy. Further refinement then evolved to cricopharyngeal myotomy

performed by ear, nose, and throat (ENT) surgeons, which became standard of care. Currently, the standard treatment is for ENT surgeons to perform endoscopic cricopharyngeal myotomy by passing a stapling device through a long, rigid endoscope. The stapling device cuts the cricopharyngeal muscle and opens the diverticulum into the esophagus. This procedure allows the diverticulum to drain readily into the esophagus and decreases the cricopharyngeal high-pressure zone, which is the cause of the diverticulum. However, the rigid endoscope is not always the optimal choice, as patients need to be able to extend their head to straighten their neck in order to allow the rigid endoscope to pass. Older patients may experience difficulty in straightening their neck due to disease, osteophytes, or other disorders that limit the range of motion in the neck, or in opening their mouth wide enough to allow the endoscope to pass.

### G&H What alternative approach is available to manage this condition, and how is it performed?

**TB** The flexible endoscopic approach is performed to achieve the same result as the rigid endoscopic approach, namely to sever or cut the cricopharyngeal muscle and open the diverticulum into the esophagus. Because the flexible endoscope is smaller than the rigid endoscope, large stapling devices cannot be passed through the instrument channel. Therefore, endoscopists adapt electrocautery cutting tools (eg, needle knives and tools used for other endoscopic techniques, including endoscopic retrograde cholangiopancreatography and endoscopic

submucosal dissection) to cauterize and cut the cricopharyngeal muscle under direct endoscopic visualization.

**G&H** Can different cutting techniques be used in combination with other devices?

**TB** Yes. Personally, I almost always use a hook knife and a transparent cap fitted to the tip of the endoscope, and at the end of the procedure I apply standard through-the-scope clips at the base of the diverticulum to close any small defect between the esophagus and the diverticulum. Some clinicians believe that clip placement is unnecessary, whereas others feel it is vital to prevent clinically delayed perforation. In my personal experience, clip placement, when the anatomy is amenable, does decrease the risk of delayed perforation; however, this has not been proven in a randomized trial.

**G&H** Have any studies compared the clinical outcomes of these various cutting techniques?

**TB** I am not aware of any studies comparing cutting techniques within the field of flexible endoscopy, and there is a lack of direct, randomized trials comparing rigid endoscopy to flexible endoscopy. A retrospective review and several literature reviews suggest that the outcomes with flexible endoscopy are as good as the outcomes with rigid endoscopy. However, studies on this topic are difficult to conduct for several reasons. First, Zenker diverticula are relatively uncommon (although they are being seen more due to the increase in aging population), and in order to conduct meaningful comparative trials, a large number of patients needs to be enrolled. Second, the outcomes are operator-dependent. To allow scientific comparison of flexible endoscopy to rigid endoscopy, the operators need to be equally experienced in treating this patient population. Among endoscopists who perform flexible endoscopy, different nuances and approaches to the technique also influence outcomes. Finally, flexible endoscopic treatment for Zenker diverticula is not widely available. Technique and experience are extrapolated from other procedures; thus, management is experiential.

**G&H** How significant is the learning curve to perform endoscopic treatment for this condition?

**TB** The learning curve is significant. Endoscopists who have experience with endoscopic submucosal dissection, large polyp resection, or endoscopic retrograde cholangiopancreatography may be able to learn the technique quicker because the technical performance of flexible endoscopy for Zenker diverticula borrows from these

procedures. A reasonable amount of baseline endoscopic experience is necessary, as well as the ability to perform at least 20 procedures in order to get over the learning curve. The challenge is in seeing at least 20 patients with this condition in a short enough time to understand the technique. Animal models are available, such as the pig model, which has cricopharyngeal anatomy nearly identical to a human with a Zenker diverticulum. Several studies have noted the use of the pig as a learning model. I am not aware of any currently available courses specifically designed to teach endoscopic management of Zenker diverticulum. Furthermore, any such course would likely need to be industry-sponsored and have ample hands-on training, which may be difficult to coordinate. However, there are many video resources, either free online or through subscriptions to journals. In addition, I have been privileged to help create a learning video that is available through the American Society for Gastrointestinal Endoscopy.

**G&H** What are the advantages and disadvantages associated with endoscopic management compared to open surgery?

**TB** The main advantages of endoscopic management, whether rigid or flexible, are the shorter recovery times and lower risk of adverse events that accompany open surgery, such as wound infection, hematoma, injury to the laryngeal nerve, and vocal cord paralysis. Additionally, flexible endoscopy is not restricted by the size of the diverticulum. Smaller diverticula (1-2 cm) are more difficult to treat surgically, as advancing a stapling device into a smaller space can be technically challenging. In terms of advantages and disadvantages within rigid and flexible endoscopy, the rigid approach is slightly more standardized, with dedicated tools that are designed specifically for Zenker diverticulum therapy. However, rigid endoscopy has a definite failure rate in older patients who have limited jaw opening and neck extension. Within the field of flexible endoscopy, the current tools are good, but not perfect. There are a few through-the-scope cutting/cautery devices available outside of the United States that appear to have advantages, but are not approved by the US Food and Drug Administration and, therefore, cannot be used in the United States.

**G&H** Is anesthesia required for the management of Zenker diverticula?

**TB** Patients undergoing the open surgical or rigid endoscopic approach require general anesthesia. It is not required for patients undergoing flexible endoscopic therapy; however, I have changed my practice such that

all of my patients receive general anesthesia. This is done mainly for airway protection because the procedure is being performed in close proximity to the vocal cords and aspiration is a concern because there is often retained liquid, particulate matter, and/or pills within the diverticulum. Additionally, if bleeding occurs during the procedure, endotracheal intubation reduces the risk of aspiration. While general anesthesia is not required to complete the procedure, it is short-acting, safe, and likely significantly reduces the risk of aspiration.

### G&H What other adverse events are associated with endoscopic management?

**TB** The main concern with endoscopic management is perforation, which is usually recognized during the procedure and can usually be closed with through-the-scope clips. If the perforation cannot be adequately closed, nearly all perforations can be managed nonsurgically with administration of antibiotics and making the patient nil per os. Most delayed perforations can also be managed nonsurgically. Intraprocedural bleeding is another risk, although clinically severe bleeding is uncommon. Less severe adverse events include sore throat, which may range from mild to severe in intensity and last from 24 hours to a week; delayed neck abscess and aspiration during the procedure may also occur, with the latter not being recognized until several days later. In terms of diet, I recommend advancement as follows: clear liquids for the first 12 to 24 hours, followed by full liquids for 24 hours, mechanical soft foods for 1 to 2 days, and then a regular diet. Regarding follow-up, some physicians routinely obtain a barium swallow. I generally follow the patient's response and closely monitor for symptoms of aspiration. Some patients do not completely clinically improve following a single procedure and may need a second or, uncommonly, a third flexible endoscopic procedure to ensure a complete myotomy to achieve complete resolution of symptoms. In addition, some patients become completely asymptomatic after 1 procedure, only to have symptoms recur at a later date and require additional endoscopic therapy.

### G&H Are there any patients in whom these approaches are contraindicated?

**TB** Any patient who is not a candidate for sedation or who has a bleeding disorder that cannot be controlled should not undergo treatment.

### G&H Is endoscopic management likely to replace surgery as the primary treatment option?

**TB** Certainly outside of the United States, flexible endoscopic management has been accepted as primary therapy, and it is gaining traction as a primary option in the United States. Referrals from ENT surgeons to endoscopists who perform flexible endoscopic therapy because the patient is deemed a poor surgical candidate or because the patient has failed the rigid approach are more common than in the past, and I believe treatment will trend progressively in that direction. The movement toward the flexible approach likely also depends on how much emphasis is placed on training during ENT residency and whether flexible endoscopy is seen in such training institutions as a reasonable alternative to rigid endoscopy. It might be that there is less interest in performing rigid endoscopy for this condition than there is in other procedures within ENT, allowing treatment to naturally progress toward flexible endoscopy.

### G&H What are the priorities of research in this field?

**TB** Moving forward, it would be helpful to either try to standardize approaches or continue to refine the instruments for flexible endoscopic treatment. It would be ideal to have randomized, multicenter trials comparing rigid to flexible endoscopy, but based on the challenges I mentioned previously, such research may not be reasonable.

*Dr Baron serves as a consultant and speaker for Olympus and Cook Endoscopy.*

### Suggested Reading

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