

# ADVANCES IN GERD

Current Developments in the Management of Acid-Related GI Disorders

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## Esophageal Diverticula

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### G&H What are the various manifestations of esophageal diverticula?

**EA** Diverticula develop along the gastrointestinal tract and quite often are merely a curiosity posing no complications. This is no different in the esophagus. If the diverticula are symptomatic, they should be treated, but if they are completely asymptomatic, they can be left untreated. Diverticula occur in the esophagus quite rarely compared to other areas of the body; it is estimated that diverticula account for less than 1% of all barium gastrointestinal radiographs and likely less than 5% of all cases of dysphagia. Thus, esophageal diverticula are not a frequent problem. They can occur in all ages but are most prevalent in adults. In the elderly, there is a higher prevalence of Zenker diverticula than the other types of diverticula.

When differentiating among the various types of esophageal diverticula, the anatomic divisions of upper, middle, and lower esophagus are likely the most suitable. These three groups consist of diverticula that occur in the upper esophagus, typically Zenker diverticula; small diverticula that occur in the middle of the esophagus; and the so-called epiphrenic diverticula, which occur just above the lower esophageal sphincter. Technically, Zenker diverticula are pharyngeal, not esophageal, diverticula because they occur above the upper esophageal sphincter, but it is common practice to include them with esophageal diverticula.

### G&H Could you explain the current understanding of the pathophysiology of these diverticula?

**EA** In terms of pathophysiology, our best understanding is regarding Zenker diverticulum. As mentioned above,

Zenker diverticulum occurs above the esophagus, more specifically, at a point of weakness between the muscle fibers, where a bulge occurs, leading to the formation of a diverticulum. However, no one knows exactly why the defect occurs. The prevailing theory for years was that the bulge was due to an incoordination between the contraction of the pharynx and the relaxation of the upper sphincter, creating what was referred to as “cricopharyngeal achalasia.” However, more and more recent studies have not supported this theory, as there does not appear to be any incoordination. The best theory, though it does not have stellar evidence, is that the pharynx is contracting against a sphincter that does not open completely; thus, this decrease in the opening, or decrease in the compliance of the sphincter, eventually causes the pharynx to yield and create a pouch. This theory may explain why Zenker diverticulum is seen more often in the elderly, as their tissue has less elasticity and tends to collapse more easily.

As for the midesophagus, two types of diverticula have been traditionally noted: traction diverticula and pulsion diverticula. Traction diverticula supposedly occur because of scarring, adhesions, or fibrous tissue in the chest pulling on a section of the esophageal wall, which creates a small bulge. This was frequently seen in the past, when tuberculosis and other infections were more prevalent; thus, these diverticula are not as common currently. In contrast, pulsion diverticula, which are currently seen quite often, are little pouches in the middle of the esophagus caused by abnormal forces applied to a portion of the esophageal wall resulting in outpouching of mucosa through the muscular layer. However, it does not really matter whether a diverticulum is caused by traction or pulsion. From a practical standpoint, a diverticulum in the lower or middle esophagus is caused by a weakness in the wall and it is unclear why that weakness occurs. Some motility studies, though only a few, have demonstrated the presence of weakness in muscle contractions. The bottom line is that these diverticula are small and usually do not require any intervention.

In the lower esophagus, epiphrenic diverticula are typically considered to be pulsion diverticula. The esoph-

ageal wall is being pushed, and most of the time, these diverticula are the result of an incoordination between the lower esophagus and the lower sphincter. This is typically seen in achalasia; eventually, not only does the esophagus dilate but pouches also form.

Occasionally in the middle or lower esophagus, diverticula develop because of either a distal stricture (though these cases are quite rare) or an operation (eg, removal of a cyst from the esophagus) that weakens the area and eventually creates a bulge.

### **G&H** Does reflux disease play a role in the pathogenesis of Zenker diverticulum?

**EA** One of the popular theories is that Zenker diverticulum may be caused by reflux. However, there is absolutely no evidence to support this theory. Some patients with Zenker diverticulum who have been studied have evidence of reflux whereas others do not, and some have heartburn whereas others do not; there is no link between reflux disease and Zenker diverticulum even though I hear this misconception quite often. This supposed relationship is likely an extension of the concept that acid reflux can cause throat symptoms, so that it is not just cough and laryngitis but also sensation of fullness of the throat, Zenker diverticulum, and other related symptoms.

### **G&H** What is the relationship, if any, of Zenker diverticulum to cricopharyngeal bar?

**EA** Cricopharyngeal bar, a prominence of the upper esophageal sphincter seen on radiograph, is a related condition that is often mentioned in radiology reports. Most of the time, it does not cause any symptoms and if a patient does not have dysphagia or a diverticulum, the condition can be ignored. Cricopharyngeal bar is occasionally seen in patients who complain of dysphagia. In this scenario, the same abnormalities of decreased opening described above in regard to Zenker diverticulum appear to occur in patients with cricopharyngeal bar. However, I cannot say that the two conditions are necessarily related, as there are no major or frequent reports of patients developing cricopharyngeal bar and then a diverticulum. Nevertheless, both conditions do appear to be in the same area and appear to share the same abnormality.

### **G&H** What are the presenting symptoms of patients with diverticula of the esophagus?

**EA** Early on in the history of Zenker diverticula, patients may be asymptomatic, and we may occasionally see tiny diverticula on radiograph even though the patients report no complaints. Over time, patients can develop cough,

hypersalivation, a sensation of food sticking in the throat, and as the diverticulum becomes larger, food may become lodged there, causing patients to repeatedly clear their throat and regurgitate food that was ingested sometimes hours earlier. This last symptom is a helpful clinical tip-off for diagnosing diverticula.

In the midesophagus, most diverticula are asymptomatic and discovered on radiograph, in contrast to epiphrenic diverticula, which can be symptomatic in that food can become lodged there and regurgitation may result. However, the main symptom associated with these diverticula comes from the accompanying motility disorder, which most of the time is achalasia. Thus, when a patient has dysphagia, regurgitation, and a diverticulum, the patient also likely has a motor disorder.

### **G&H** Could you discuss the diagnostic methods used in these conditions?

**EA** The most effective method for detecting diverticula, whether Zenker, middle, or epiphrenic, is barium radiograph. Endoscopy can detect diverticula but can also miss them if the openings are small. However, endoscopy in these patients can be dangerous. In Zenker diverticulum, care is needed during endoscopy because the diverticulum is above the upper sphincter, where the endoscope is being pushed down with limited visibility. The endoscope can slip inside the pouch, and if you keep pushing, a perforation may occur. Perforation does not occur often, but it is possible and should be kept in mind when performing endoscopy. This does not mean that a person with a Zenker diverticulum cannot be scoped; they just have to be scoped with care. The same warning should be kept in mind for diverticula lower down the esophagus, though endoscopy is safer in these patients. Thus, endoscopy is not the most effective method for diagnosis. Motility studies are indicated only in epiphrenic diverticula to exclude possible motor disorders. These are the only relevant diagnostic methods in esophageal diverticula.

### **G&H** What are the most effective treatment options for the various types of diverticula?

**EA** As mentioned above, esophageal diverticula are often asymptomatic and thus do not require treatment; however, those few diverticula that are accompanied by symptoms should be pursued with diligence in order to detect the underlying cause and to apply appropriate treatment. There is no medical treatment for any type of diverticula. If the diverticulum is symptomatic, surgical or endoscopic treatment should be attempted (though, on occasion, it may not be possible to apply any treat-

ment). If the Zenker diverticulum is very small and asymptomatic, it can certainly be left untreated because it is unclear how quickly it will grow. A radiograph could be performed a year later and if the diverticulum has not grown, another radiograph could be performed another year later and so on, but there are no guidelines in this situation. If the Zenker diverticulum is symptomatic, the treatment is usually resection, traditionally performed surgically. With resection, the diverticulum is excised and a cricopharyngeal myotomy is simultaneously performed to reduce sphincter pressure and prevent the diverticulum from reforming in the future. Thus, if a diverticulectomy is performed, so must a cricopharyngeal myotomy.

Endoscopic treatments for esophageal diverticula are not very popular in the United States, but they are gaining some interest. In Europe, endoscopic treatments have begun to be performed by otolaryngologists, who insert a rigid endoscope across the diverticulum and, rather than remove the diverticulum, cut through the bridge between the diverticulum and the sphincter, creating communication between the diverticulum and the esophagus, and simultaneously performing a myotomy. This treatment can be performed with or without laser and is an accepted form of therapy as reported by many. However, most surgeons I know prefer to treat Zenker diverticula with the traditional method of surgery.

Diverticula of the midesophagus rarely require treatment, and epiphrenic diverticula rarely necessitate removal of the diverticula. More likely, treatment is needed for the accompanying motor disorder; for example, with achalasia, pneumatic dilation or surgical myotomy may be performed. It should be noted that

the presence of a diverticulum is not a contraindication to the treatment of achalasia even with a pneumatic dilator. Intuitively, this combination may appear to be dangerous, but there is no evidence suggesting that relationship. Certainly, with caution, one can apply appropriate treatment.

### G&H Are dietary restrictions helpful in these patients?

**EA** Dietary restrictions are no more helpful in these patients than they are in patients with achalasia who struggle with eating anyway. Patients with Zenker diverticula typically have some difficulty with solid foods, so food that becomes lodged in these patients will do so regardless of any special dietary recommendations.

### Suggested Reading

- Achkar E. Esophageal diverticula. In: Castell DO, Richter JE, eds. *The Esophagus*. 4th ed. Philadelphia, Pa: Lippincott, Williams and Wilkins; 2004.
- Ferreira LE, Simmons DT, Baron TH. Zenker diverticula: pathophysiology, clinical presentation, and flexible endoscopic management. *Dis Esophagus*. 2008;21:1-8.
- Palanivelu C, Rangarajan M, Maheshkumar GS, Senthilkumar R. Minimally invasive surgery combined with peroperative endoscopy for symptomatic middle and lower esophageal diverticula: a single institute's experience. *Surg Laparosc Endosc Percutan Tech*. 2008;18:133-138.
- Tedesco P, Fisichella PM, Way LW, Patti MG. Cause and treatment of epiphrenic diverticula. *Am J Surg*. 2005;190:891-894.
- Bonavina L, Bona D, Abraham M, Saino G, Abate E. Long-term results of endoscopic and open surgical approach for Zenker diverticulum. *World J Gastroenterol*. 2007;13:2586-2589.
- Baker ME, Zuccaro G Jr, Achkar E, Rice TW. Esophageal diverticula: patient assessment. *Semin Thorac Cardiovasc Surg*. 1999;11:326-336.
- Achkar E. Zenker diverticulum. *Dig Dis*. 1998;16:144-151.