The Yale Larynx Laboratory

A Clinical Review

Zenker's Diverticulum

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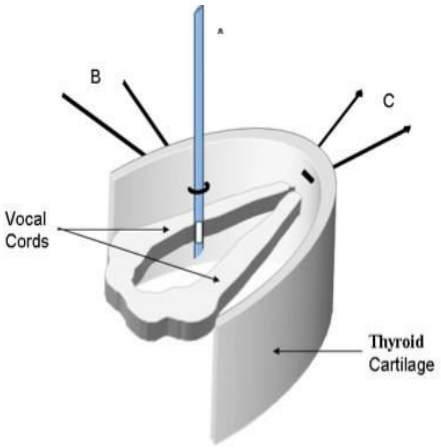

Laboratory Note

The purpose of this newsletter is to update our readers with the evidence-based management of certain Head & Neck disease presentations. In this issue we shall focus on endoscopic laser repair of Zenker's Diverticulum.

The Yale Larynx Laboratory was founded by John A. Kirchner in 1967. Since 1975 this laboratory has been in continuous operation under the direction of Clarence T. Sasaki, the Charles W. Ohse Professor and has been funded by the National Institutes of Health and by endowments of grateful patients.

Case Presentation

The patient is a 70 year old woman who presented with a history of dysphagia to solid food for one year. She complained of pills getting caught in her throat. On occasion the patient regurgitated undigested food. She denied weight loss. She did not have any episodes of pneumonia or bronchitis in the recent past.

Clinical Findings

Physical examination revealed a thin woman in no apparent distress. Her vocal quality was strong. Examination of the oral cavity was normal, and there was no trismus. Neck palpation revealed no masses. Fiberoptic laryngoscopy showed normal vocal cord motion bilaterally, however, there was ample pooling in the left piriform sinus. A barium esophagram was performed which revealed a 3cm diverticulum at the level of T1 (Fig 1). The remainder of the esophagus appeared normal.

Fig. I

Course

The patient was taken to the operating room for endoscopic laser repair of her Zenker's Diverticulum. A Storz diverticuloscope was used to expose the diverticulum, which was cleared of undigested food matter. The CO2 laser was used at 7 watts continuous to perform a vertical transmucosal division of the partition between the esophagus and diverticulum.

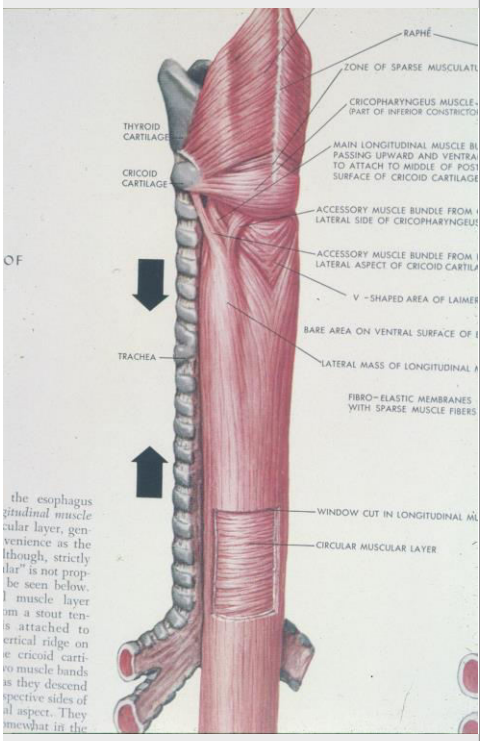

Fig. 2

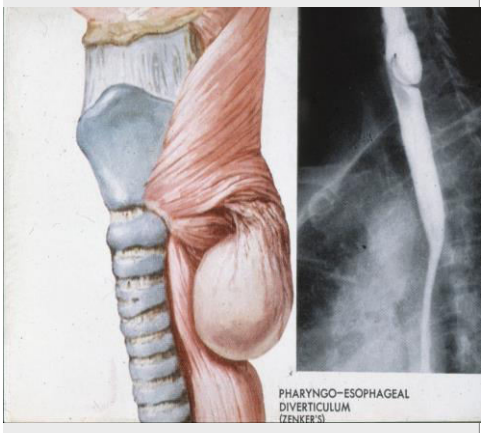

Fig. 3

All crossing fibers of the cricopharyngeus were divided, without injury to the alar fascia. Under direct visualization, an NGT was then inserted and secured without need to repair the mucosal incision. A fibrin clot is allowed to seal the incision over a 3 day period.

On POD3 her NGT was removed and she was able to tolerate clears and then a soft diet. She had no crepitus or shear tenderness of her neck. The patient was discharged home on POD3. Two weeks later the patient was on a regular diet without obstruction or regurgitation, and among the most grateful category of patients in a Head and Neck practice.

Discussion

Zenker's Diverticulum (ZD) occurs in up to 1:1,000 of our population.[1] This clinical entity was first named after the German pathologist, Zenker following his 1878 report of 27 cases.[2] Killian in 1907 described a dehiscence triangle between the cricopharyngeus and inferior constrictor muscle through which a Zenker's Diverticulum commonly occurs.[3] Diverticula are predisposed in hypertonic cricopharyngeus dysfunction with resultant increased intraluminal bolus pressures allowing for the herniation of the esophageal mucosa and submucosa through Killian's triangle at a level above the cricopharyngeus sphincter.

While there is a strong clinical association between gastroesophageal reflux and ZD, a cause and effect relationship between them has remained unclear. As noted, convincing evidence demonstrates that patients with ZD have increased resting tone of the cricopharyngeus muscle and that this may be an important initiating factor for the development of a Zenker's. Yet many patients with cricopharyngeus hypertonicity never develop ZD. It is possible that acid induced esophageal shortening may also be an important added co-factor suggesting that shortening due to progressive esophageal scarring pulls the cricopharyngeus away from the inferior constrictor (Fig. 2) which in turn weakens Killian's triangle and increases the risk for development of herniation between the two spatially related structures, leading to the development of a Zenker's Diverticulum (Fig 3).

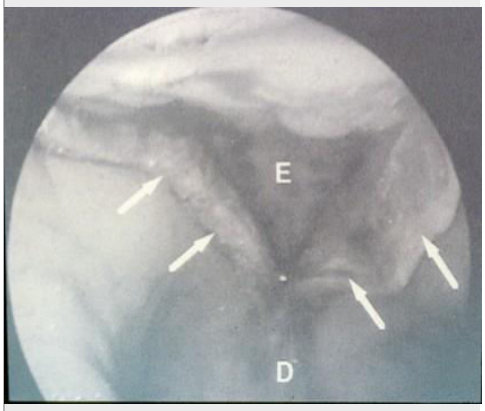

Fig. 4

E - esophagus

D - diverticulum

The open approach for ZD was the standard of care until 20 years ago. A variety of procedures have been used in the open approach including diverticulectomy and diverticulopexy with or without cricopharyngeus myotomy. However, high complication rates from mediastinitis, recurrent laryngeal nerve injury, pharyngocutaneous fistula and esophageal stricture coupled with the advent of more refined endoscopic methods with a greater safety margin have allowed endoscopic management to replace the external approach.[5]

Endoscopic ZD repair takes down the intervening septum between the diverticular sac and the esophagus to create a common lumen. (Fig. 4) This crucial strategy allows swallowed matter to enter the diverticulum but spill without obstruction into the cervical esophagus distally. Two techniques are currently employed to divide the cricopharyngeus partition between diverticulum and esophagus. In a recent review of 148 consecutive procedures, CO2 laser division resulted in greater improvement of recorded dysphagia and regurgitation scores over stapling procedures as current stapler design fails to provide complete division into the fundus of the diverticulum. Incomplete division often leaves an obstructing lip leading to a reservoir effect predisposing to incomplete emptying.[6] In cases of incomplete emptying, better symptom outcome was also observed with CO2 laser revision than with stapling devices.[7] There were no cases of mediastinitis in either patient cohort.

The immediate success of endoscopic repair again results in some of the most grateful category of patients in any Head and Neck practice. (Fig 5, 6).

Fig. 5 - Preop

Fig. 6 - Postop

References

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