



Pharyngoceles: a photo-anatomic study and novel management

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Introduction

A true pharyngocele is a herniation of the pharyngeal mucosa through the thyrohyoid membrane. Though often noted as incidental, asymptomatic findings on fluoroscopic swallowing studies, pharyngoceles may also be markedly symptomatic; for example, they can present with regurgitation of food, cough, dysphagia, globus sensation, hoarseness, or lateral neck masses with gurgling on palpation. Open surgical repair has been the mainstay of treatment for pharyngoceles that are symptomatic.

Although several reports in the literature make reference to “pharyngoceles”, this term has been misapplied to other entities. Conversely, reports describing true pharyngoceles have also used alternative terminology, such as “lateral pharyngeal diverticula” or “lateral pharyngeal pouch”. Adding to the confusion, precise descriptions of the anatomy are frequently lacking, and endoscopic anatomy has not been thoroughly addressed.

Prompted by two patients presenting with bilateral symptomatic pharyngoceles to our clinic, we conducted a systematic review of the literature to identify all reported cases of pharyngoceles that included discussion of the treatment used and description of the anatomy. During treatment of our patients, *in vivo* examination of their anatomy lead to a greater understanding of the disease process and potential advantages and pitfalls of existing treatment strategies. A novel endoscopic approach was developed for one of these patients and was used to successfully address her pharyngoceles. Herein, we present full photographic documentation of the external and endoscopic anatomy of pharyngoceles in our patients and detail our technique of endoscopic suture-pharyngoplasty.

Methods

We searched the terms “pharyngocele”, “pharyngoceles” and “lateral pharyngeal diverticula” on PubMed in December of 2011. The original search yielded 49 references. For our review, we required the references be original articles, available in English, describing cases of true pharyngoceles and their treatment; we excluded pharyngoceles caused by trauma or congenital defects. From the 49 references, 12 articles met these criteria. We then gathered all the references cited in these 12 papers, producing 93 more sources; these sources were then subject to the same requirements, leaving us with a total of 23 papers to review (including the original 12). These papers were then examined for anatomical descriptions.

In these 23 papers, there were 55 cases of pharyngoceles described. Of those that were symptomatic, all were treated with open surgical repair, save two reports of endoscopic stapling which lacked detailed description.

To this data, we add we add two cases of bilateral symptomatic pharyngoceles. One patient is a 79 year-old male who presented with chronic productive cough and regurgitation of food. Our other patient is a 25 year-old female who presented with dysphagia and regurgitation of food. Both of these patients had videofluoroscopic swallowing studies as part of their work-up; these studies revealed the bilateral pharyngoceles. The 79 year-old male patient also demonstrated occult aspiration during the swallowing study.

Author	Year	Cases
Pocaro-Salles et al.	2011	3
Lee and Lee	2010	1
Katsinelos et al.	2008	1
Pinto et al.	2008	1
Fakhouri and Arda	2004	1
Chevallier et al.	1999	1
Huang and Scher	1999	1
Van de Ven and Schutte	1995	3
Mantoni and Ostri	1987	1
Obana and Fee	1987	1
Komisar	1983	1
Schwartz et al.	1981	3
Norris	1979	24
Giovanniello et al.	1970	2
Bachman et al.	1968	2
Ettman and Ramey	1967	3
Ward et al.	1963	2
Folwer WG	1962	1
Atkinson	1952	1
Hankins	1944	1
Godlee and Bucknall	1901	1

Table. Twenty-three papers were identified in a systematic review of the literature, reporting a total of 55 cases of pharyngoceles in the last 126 years. The majority of papers were case reports with little discussion of the anatomy. The largest series is by Norris in 1979, reporting almost half of the cases in the literature. Only 7 cases have been reported in the last 10 years.

Relationship of Pharyngoceles to the Superior Laryngeal Nerve

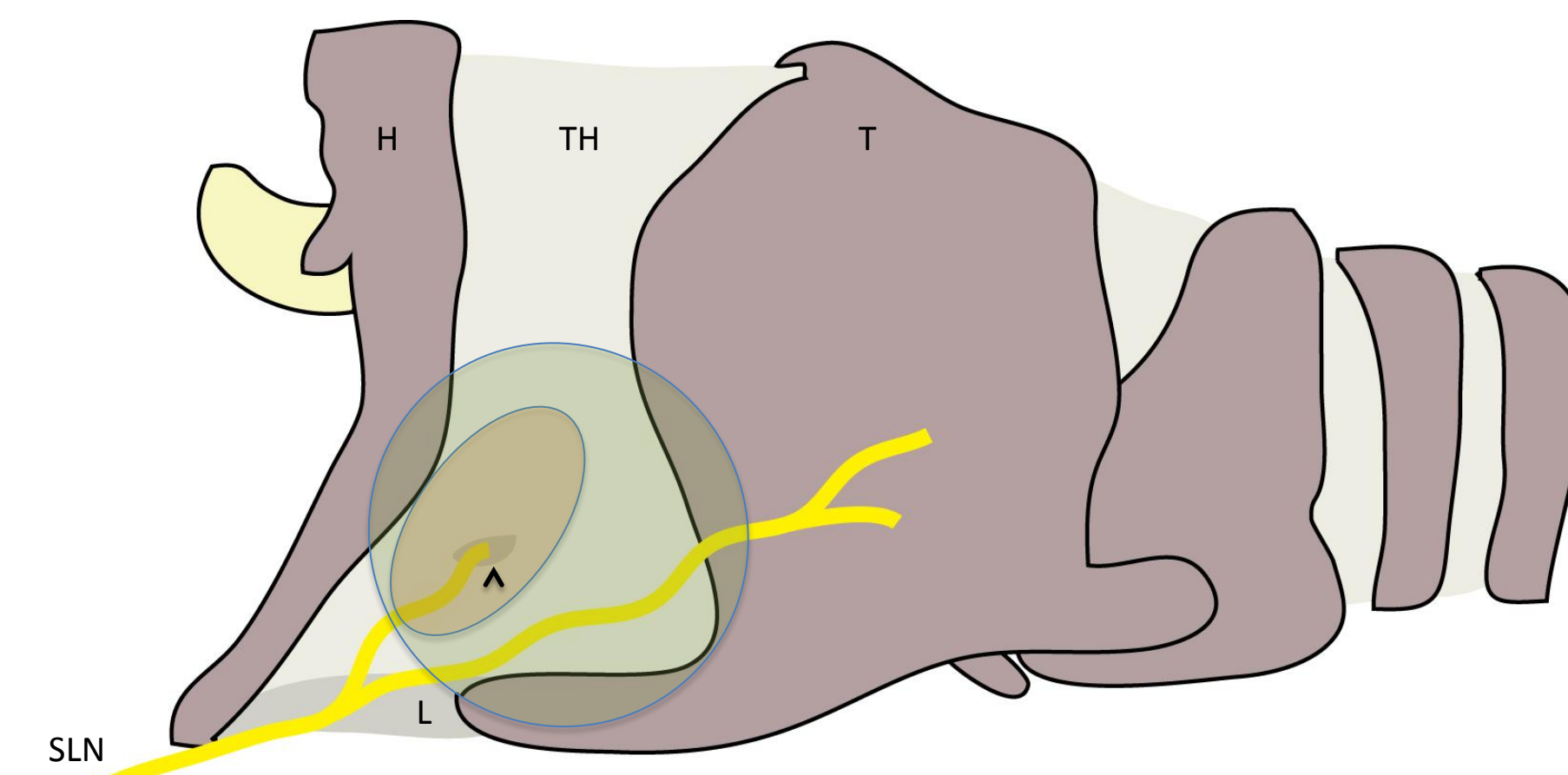
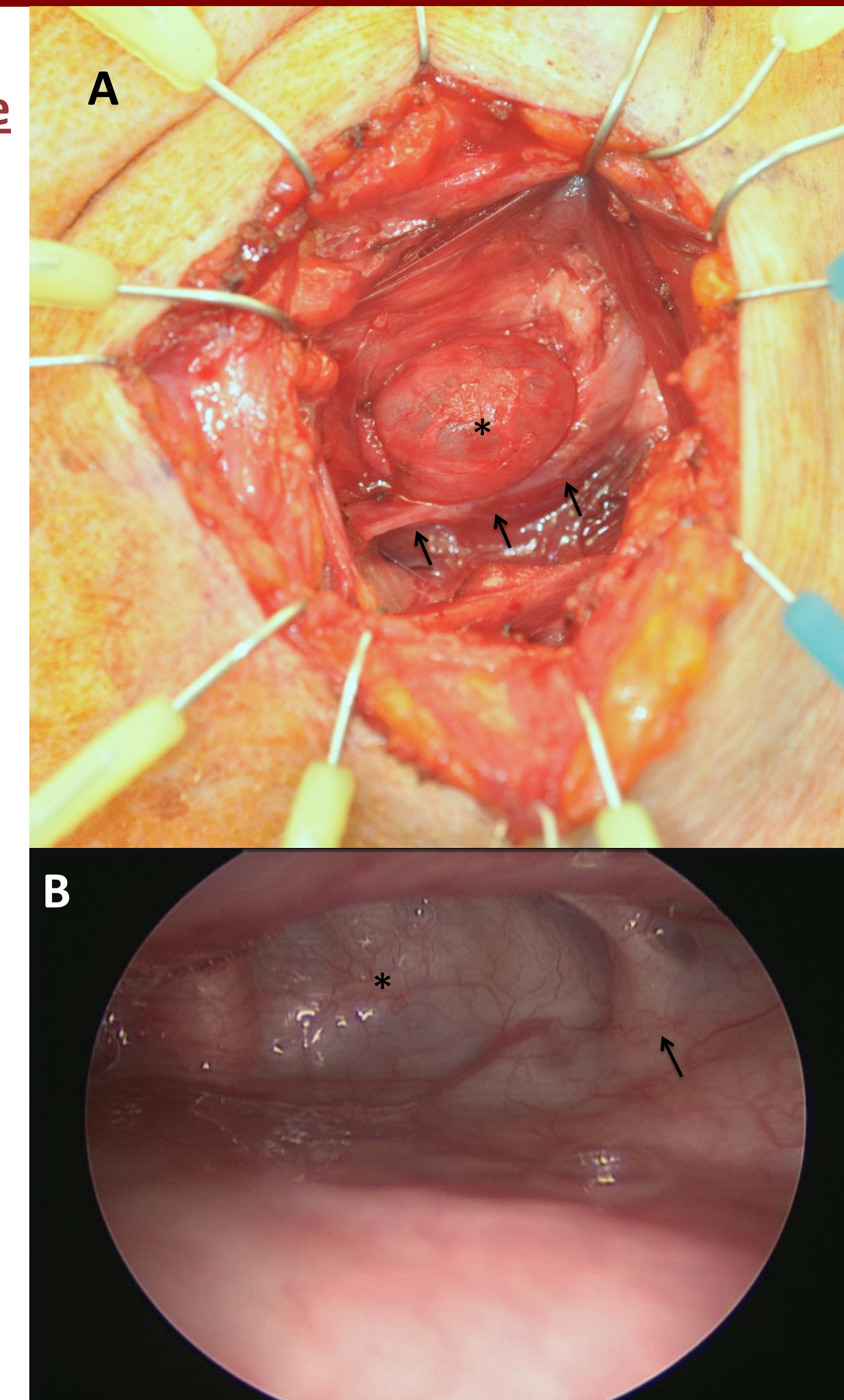


Figure 1. Pharyngoceles typically emerge near or through the dehiscence (arrowhead) in the thyrohyoid membrane (TH) that allows passage of the internal branch of the superior laryngeal nerve (SLN). The small oval represents the area of emergence, but wide-necked pharyngoceles can take up the whole area depicted by the circle. The pharyngocele may be found protruding above or below the superior laryngeal nerve. The pharyngocele space (circle) is bounded superiorly by the hyoid bone (H), inferiorly by the superior margin of the thyroid cartilage (T), anteriorly by the infrahyoid epiglottis, and posteriorly by the thyrohyoid ligament (L). Photo A shows the patient in the same orientation as the diagram with a right pharyngocele. Endoscopic view of a different patient with a right pharyngocele demonstrates a pouch herniating below the superior laryngeal nerve (Photo B). In the photos, arrows designate the superior laryngeal nerve and asterisk designates the pharyngocele. The proximity to the superior laryngeal nerve mandates delicate technique when excising pharyngoceles.



Endoscopic Anatomy of Pharyngoceles

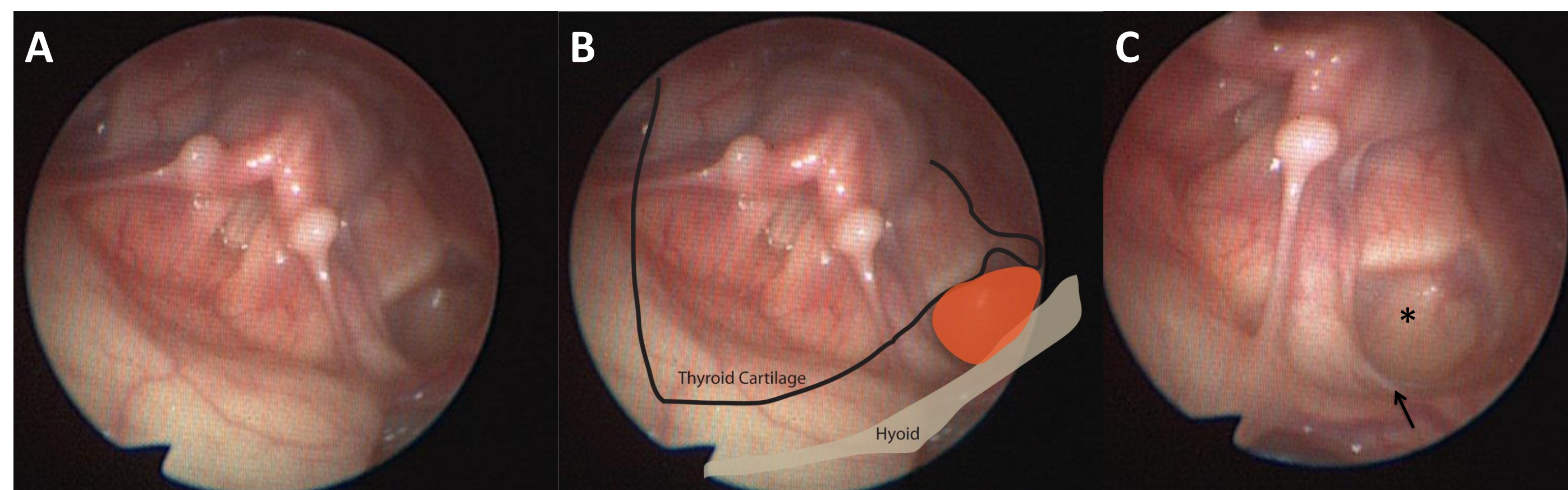


Figure 2. Endoscopic view of patient with bilateral pharyngoceles obtained during Valsalva (A). The airway cartilages are beautifully shown in relief. Overlay (B) demonstrates the relationship of the pharyngocele (orange) to the thyroid cartilage and hyoid bone. Close up view (C) demonstrates this pharyngocele below the superior laryngeal nerve (arrow) and above the top edge of the thyroid cartilage.

Endoscopic Suture Pharyngoplasty of Pharyngoceles

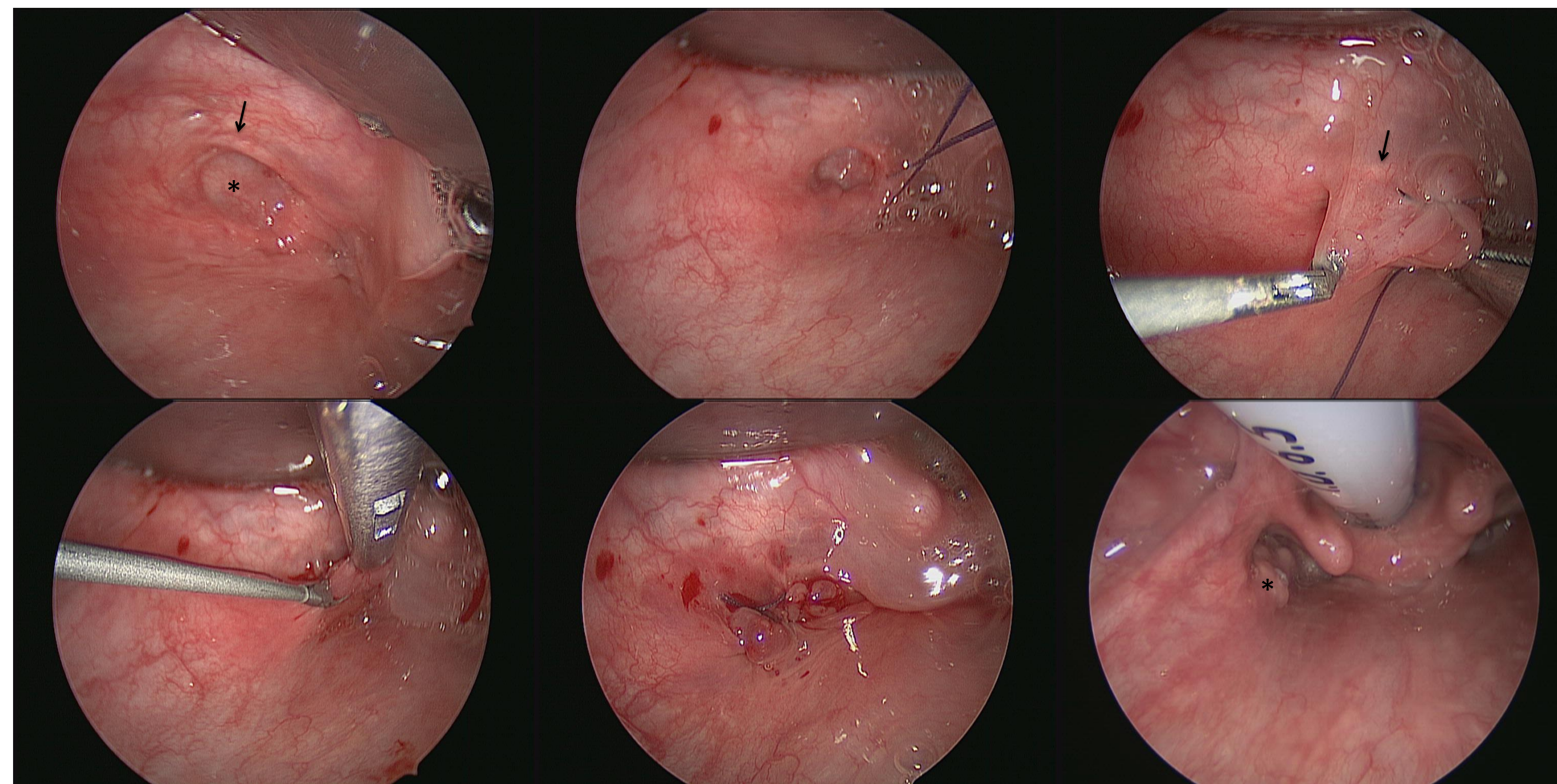


Figure 3. A left pharyngocele (*) is shown in the anatomic position with the patient supine. Note the proximity of the superior laryngeal nerve (arrow). A key stitch is placed at the inferiormost aspect of the pharyngocele. The mucosa is pulled inward and additional stitches are placed which catch deep fascia but avoid the superior laryngeal pedicle. The excess mucosa is then trimmed away and the last stitches are placed. The last photo depicts a 1 month follow-up examination with some scarring but no recurrence of the pharyngocele.

Results

Our systemic literature review showed a dearth of papers labeled as pharyngoceles that actually referred to the correct anatomic defect (Zenker’s diverticulum was a common mistaken entity); we also discovered several papers that referred to the correct anatomic defect by other terms (“lateral pharyngeal diverticula” or “lateral pharyngeal pouch”). Only 23 of the 142 papers yielded by the search were pertinent to pharyngoceles. Additionally, there were relatively few cases throughout the literature, and only 7 cases reported since 2000. Of the 23 papers examined, anatomic description appeared only to quote earlier papers, and few recent papers provide a comprehensive description of the anatomic area. We have since provided a clear description from both the lateral and endoscopic view in an attempt to solidify a definition for clinicians in the future.

For our two patients with bilateral pharyngoceles, we managed our first patient with a traditional bilateral open approach and the second by a novel endoscopic repair. The endoscopic technique was developed based on careful study the open anatomy during the first case. Although there have been two previous claims of endoscopic repair that borrow the stapling technique used for repair of Zenker’s diverticula, division of the common wall (Huang and Scher 1999, Lee and Lee 2010). Given the known proximity of these diverticula to the superior laryngeal nerve, and our observations that this nerve can form the superior border of the “common wall” (see **Figure 1, photo A**), this stapling technique appeared ill-advised. Our second patient wished an attempt at endoscopic repair, and after an appropriate discussion of the anatomic basis but untested nature of this technique, we performed bilateral suture pharyngoplasty under high-resolution endoscopic vision (**Figure 3**).

The pharyngoceles were successfully repaired bilaterally in both patients (**Figure 4**). The first patient, repaired using the traditional open approach, demonstrated severe aspiration on his postoperative swallowing study and was maintained NPO and required tube feeding for three months. His aspiration slowly resolved and he tolerated a full diet with no aspiration on swallowing study by five months postoperatively. The second patient, managed endoscopically, had transient odynophagia but was able to tolerate a full diet by three weeks.

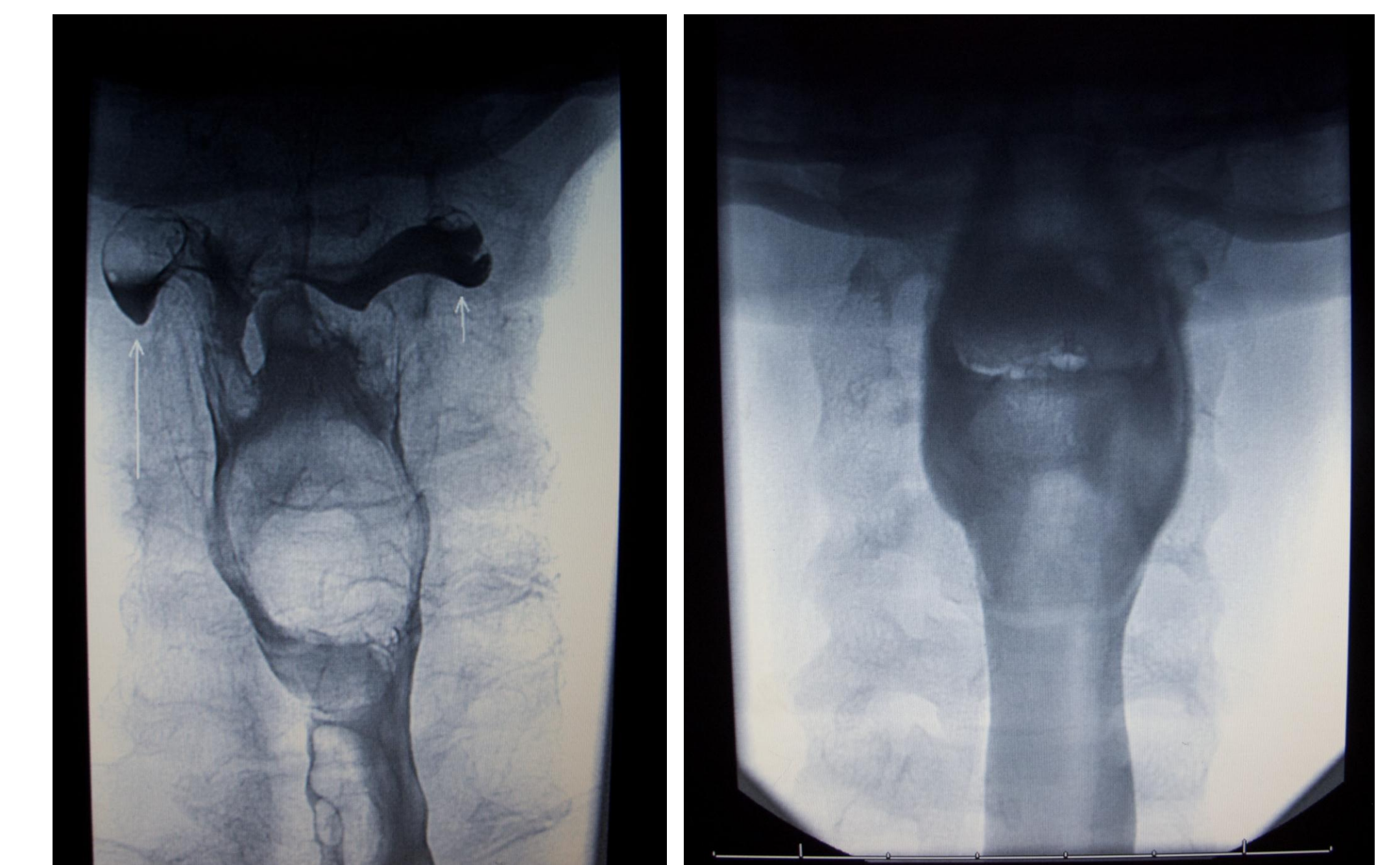


Figure 4. Pre (left) and postoperative (right) videofluoroscopic views of bilateral pharyngoceles. As can be seen in the panel on the left, pharyngoceles are identified by the lateral areas of retained barium seen just above the level of the glottis.

Conclusions

Throughout the literature, there has been a lack of detailed description of the anatomy of pharyngoceles; this likely lead to confusion of anatomic boundaries and contributed to the misuse of the term “pharyngocele”.

Recent case reports demonstrate a growing interest in these often asymptomatic anatomic defects. Through photo-documentation and explanation of anatomic boundaries and endoscopic anatomy using our two additional cases of patients with bilateral pharyngoceles, we hope to have elucidated the margins of this anomaly and to have provided clear examples from which other practitioners may benefit.

Finally, our novel endoscopic management of a pharyngocele offers a less invasive, but no less effective, option for treatment of patients with symptomatic pharyngoceles in the future.