

Case Report

The laryngocele; case presentation

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Abstract

Laryngocele is a rare pathology, but because of their clinical evolution and the symptoms they generate, they should always be considered as a differential diagnosis when investigating neck masses. A laryngocele is basically a herniation of the mucosa of the laryngeal ventricle (Morgagni's ventricle) arising usually from the saccular region. This herniation may remain confined to the larynx - in which case the laryngocele is internal- or expand through the thyro-hyoid membrane into the structures of the neck - thus being called an external laryngocele. Usually the laryngocele has both an internal and external component thus being a mixed laryngocele. Diagnosis of laryngoceles still relies heavily on clinical signs such as tympanism, easily depressible neck mass, indirect laryngoscopy, but is now simplified by imagistic investigations (ultrasound, CT and MRI). However, the treatment of this condition is exclusively surgical and consists of total excision of the laryngocele, as well as proper identification of the point of origin from the saccule and also the final suture of the breach in order to prevent recurrence. Investigation of possible causes of obstruction of the laryngeal ventricle should always be performed (because of the possibility of an underlying malignancy) as well as a follow-up protocol of the patient, given the risk of relapse. We present a recently diagnosed case of a 32 year old man with mixed laryngocele, which we have operated in our clinic.

Keywords: laryngocele; laryngeal saccule; neck dissection



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Introduction

Laryngocele is a pathological condition in which a dilatation filled with air arises from the saccule of the laryngeal ventricle (the ventricle of Morgagni). The laryngeal ventricle is practically a slit between the vestibular and vocal folds. It opens into a fusiform recess on each side of the larynx that extends cranially into the laryngeal wall, lateral to the vestibular fold, called the saccule.

The saccule is a pouch which ascends forwards from the ventricle, between the vestibular fold and the thyroid cartilage, and occasionally reaches the upper border of the cartilage. It is conical and curves slightly backwards and it contains 60 to 70 mucous glands sited in the submucosa. The orifice of the saccule is guarded by a delicate fold of mucosa, the ventriculo-saccular fold. The saccule has a fibrous capsule that is continuous below with the vestibular ligament. It is covered medially by a few muscular fasciculi from the apex of the arytenoid cartilage, which pass forwards between the saccule and vestibular mucosa into the aryepiglottic fold. Laterally it is separated from the thyroid cartilage by the thyro-epiglottic muscle, which compresses the saccule, expressing its secretion onto the true vocal folds (which lack glands) (1).

We owe the first written description of laryngoceles to Baron Dr. Dominique Jean Larrey (1766-1842) who during Napoleon's campaign in Egypt observed the condition, that he then called a „gaseous tumor”, in some of the muslims working as muezzins at local mosques, who were responsible for calling the muslims to prayer by shouting from atop the mosque's towers. Baron Larrey was Napoleon's chief surgeon and is regarded as one of the pioneers of war medicine as well as an excellent surgeon (2).

Pathology

Laryngoceles are air-filled enlargements of the saccule - a herniation of the saccular mucosa. Both congenital and acquired forms have been described. The etiology is still uncertain, but it has been

demonstrated that it is related to the chronic increase of trans-glottal pressure as found in the classic case of muezzins or other professional categories: glass-blowers, musicians, etc., as well as in underlying pathologies - especially chronic constipation and even cancer arising from the ventricle. The increased pressure leads to the hypertrophy of the false vocal folds (vestibular folds) which helps in the sound modulation, but may also generate a valve-mechanism that can lead to herniation of the saccular mucosa in the paraglottic space (2).

Growth of a laryngocele is constrained by the surrounding structures, so it expands upwards into the paraglottic space anterior to the piriform fossa, and superiorly to the ary-epiglottic fold and may even reach the vallecula (internal laryngocele). It can extend through the thyrohyoid membrane (external or mixed laryngocele) and develop as a palpable neck mass (1). Laryngoceles may fill with liquid (mucolaryngocele) that may become infected (piolaryngocele).

Signs and symptoms

Laryngoceles (as well as laryngeal cysts) can go undiagnosed since sometimes they may be asymptomatic. However patients often describe either dysphonia (with a higher pitch voice or a rough lower pitch voice) or odynophagia and in some rare cases laryngoceles grow so large as to cause dyspnea (3).

When performing indirect laryngoscopy we may observe (in cases of internal or even mixed laryngoceles) a round pseudo-tumor, with a smooth surface, with normal overlying mucosa, extending strictly to a hemilarynx (often the ventricular fold, the ary-epiglottic fold, or the vallecula) and, not always but pathognomonically, appearing only during phonation, without impairment of the mobility of the arytenoid or the vocal fold, Figure 1, (2).

In case of a large mixed laryngocele, on palpation we may observe a soft lateral neck mass, with sonority on percussion (tympanism). It is depressible, generating a specific sound when reduced and

reappears after the patient is asked to perform a Valsalva maneuver.



Figure 1. Laryngoscopic image of a pseudo-tumor situated in the right vallecula which (characteristically) expands in phonation and Valsalva maneuver

Differential diagnosis

Internal laryngoceles must be differentiated from schwannomas (4) and congenital cysts and external and mixed laryngoceles should be differentiated from congenital cysts (branchial cysts, thymic cysts (5)). It is very important to take into consideration when diagnosing a laryngocele the possibility of a jugular vein aneurysm, which can mimic the clinical findings to perfection (soft, depressible neck mass that reforms with Valsalva maneuver) but has a different surgical treatment is and should be approached carefully even by experienced ENT surgeons (2). Imagistic findings can easily diagnose a laryngocele. The difficulty of the radiological diagnosis comes in the case of a laryngomucocele or a laryngopiocele, because of the liquid content that makes it hard to distinguish from other cervical cysts.

Treatment

The current standard treatment aims at removing the whole laryngocele as well as dissecting its pedicle (specifically its point of origin from the laryngeal saccule) and ligating it right in the laryngeal cavity. For this purpose, a lateral cervical horizontal incision is usually made. Dissection of the laryngeal strap muscles is performed and the sternocleidomastoid muscle is retracted laterally for the best exposure of

the lateral cervical area as well as of the larynx. Dissection of the laryngeal strap muscles will interfere with the quality of the voice (the pitch) and so the need for the procedure itself should be reexamined in cases of young professionals with asymptomatic laryngoceles (6). Once exposed, the laryngocele itself is carefully dissected so as not to rupture the delicate mucosa, because if ruptured, the dissection and correct identification of the limits of the hernial sac will be more difficult. Exposure of the thyro-hyoid membrane is necessary, but without damaging the superior laryngeal pedicle. Usually a lateral L-shape laryngotomy is preferred so as to obtain the best exposure of the ventricle and its saccule. Once dissected, ligation of the pedicle of origin from the laryngeal ventricle is performed and the laryngocele can be excised. Closure of the defect is performed with regard to respecting the anatomy, with standard techniques.

Case Report

A 32-year old man, from an urban environment, working as a commercial sales officer, with a history of smoking (approximately half a pack of cigarettes a day for the last 13 years), presents himself after referral from his general physician accusing dysphonia and a right cervical tumefaction. After more detailed history taking, we discovered that the dysphonia has been installed already for almost 3 years, but the neck mass was just recently (almost 4 months) observed. And very important for our diagnosis, he uses his voice at high intensity, constantly having to raise his voice at work.

On clinical examination we discovered a lateral cervical tumefaction on the right side, in the submandibular region, soft and depressible, which seemed to expand when the patient was asked to cough. Laryngoscopy showed a normal laryngeal inlet, but with a certain asymmetry between the right and left side of the valleculas. Also the right vestibular fold

was larger than the left one, and the vocal folds had a hypertrophic chronic laryngitis aspect. When the patient was asked to phonate, a large tumor-like formation appeared like a balloon in the right vallecula, exerting a mass effect on the epiglottis and laryngeal structures (Figure 1). We performed a CT scan, which showed a pneumatised structure with clear limits arising from the larynx and expanding through the thyro-hyoid membrane into the lateral region of the neck (Figures 2 and 3).



Figure 2: Ct topogram showing a right cervical pneumatisation



Figure 3: CT image in coronal plane at the level of the base of tongue showing the laryngocele breaking through the thyro-hyoid membrane just under the hyoid bone, and gently displacing the bone and neck structures.

After correlating the clinical findings with the imagistic investigations, we established the diagnosis of mixed laryngocele. After explaining to the patient the aim of the intervention, the risks and benefits, and after obtaining a written consent, we performed surgery under general anesthesia to remove the laryngocele. A horizontal lateral cervical incision was made, 4 cm under the border of the mandible, and after dissecting the platysma and superficial fascial layer, the lateral pole of the laryngocele was visible (Figure 4).



Figure 4: Lateral pole of the laryngocele

After careful dissection, the whole laryngocele was exposed and with it the origin from the thyro-hyoid membrane. The membrane was dissected and we entered the paraglottic space following the laryngocele just to the laryngeal ventricle, where we ligated the pedicle. The excision was complete (Figure 5). We also performed a direct laryngoscopy which did not reveal other significant lesions in the larynx. Evolution was good, follow-up at 1 month was good. Follow-up visits were scheduled every 6 months after surgery, and phoniatic treatment was recommended as well as smoking cessation.

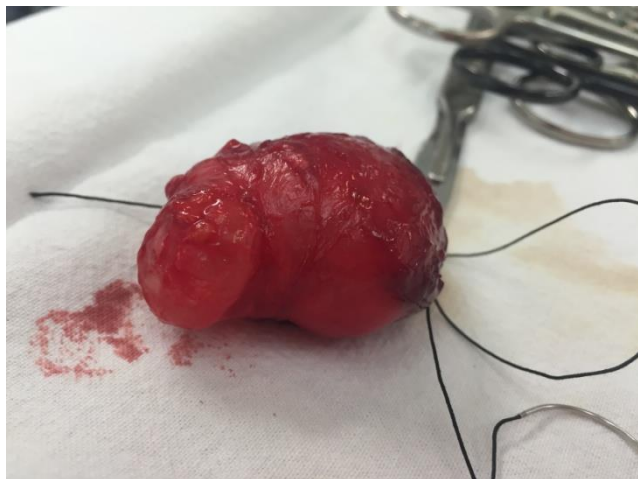


Figure 5. Intact excised laryngocele

Discussion

The mechanisms of herniation which lead to laryngocele formation are understood and are actually quite frequent. The exact reasons for why some patients develop such large laryngoceles and others do not are still unclear. But studies show that laryngoceles are more frequent than we thought (albeit being asymptomatic makes them hard to diagnose). Tucker and Smith in 1962 for example found asymptomatic enlargement of the saccule in more than 30% of samples (7). The judicious examination, consisting of direct laryngoscopy with inspection of the ventricular fold and ventricle and biopsy, as well as the follow-up of these patients, is so important because of the association between laryngoceles and laryngeal cancer (2). Indication for surgery should be honestly discussed with the patient especially in cases of musicians or vocal professionals because of the risk of losing vocal performance.

Conclusions

Laryngoceles are a pathology which has been encountered more and more frequently. The proper diagnosis still relies on clinical examination (especially indirect laryngoscopy) and the correct

treatment requires accurate knowledge of techniques for neck dissection.

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