

EXTERNAL LARYNGOCELE: SONOGRAPHIC APPEARANCE – A CASE REPORT*

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Abstract Laryngoceles are fairly unusual diseases defined as anomalous saccular dilatation of the laryngeal ventricles. The usual classification divides laryngoceles into internal, external and mixed types. Internal laryngoceles are those located medially to the thyrohyoid membrane and usually compress the false vocal cords causing hoarseness or airway obstructive symptoms. External laryngoceles extend through the thyrohyoid membrane, presenting as cervical masses; and mixed laryngoceles present both the internal and external components with their respective symptoms. Diagnosis is usually defined by computed tomography and/or laryngoscopy. This is a report of a case of mixed laryngocele diagnosed by ultrasonography in a patient referred for investigation with a history of palpable cervical mass.

Keywords: Laryngocele; Cervical mass; Ultrasonography; Laryngoscopy.

Resumo *Laringocele: aspecto ultra-sonográfico – relato de caso.*

Laringocele são lesões relativamente raras definidas como dilatações anômalas dos sáculos dos ventrículos laríngeos. A classificação usual divide a laringocele em interna, externa e combinada ou mista. Laringocele internas são as que se localizam medialmente à cartilagem tireóidea e geralmente causam compressão nas bandas ventriculares levando a rouquidão e sintomas compressivos na via aérea. As externas se estendem através da membrana tireóidea, apresentando-se como massas cervicais, e as mistas são as que ocupam as duas regiões, podendo causar ambos os sintomas. O diagnóstico é geralmente feito por tomografia computadorizada e/ou laringoscopia. Apresentamos um caso de laringocele mista em que o diagnóstico foi sugerido no exame de ultra-sonografia, num paciente encaminhado com história de massa cervical.

Unitermos: Laringocele; Massa cervical; Ultra-sonografia; Laringoscopia.

INTRODUCTION

The laryngeal ventricles constitute a recess located between the false vocal cords above and the true vocal cords below.

The anterosuperior aspect of this recess ends in a blind pouch called laryngeal sacculum that extends upward through the paralaryngeal space, laterally limited by the thyrohyoid cartilage, and medially by the laryngeal wall⁽¹⁻³⁾. They vary in size (5–15 mm in length), and typically may be observed in up to 30% of the adult population on routine computed tomography (CT) studies⁽¹⁾.

Laryngocele can be defined as an abnormal dilatation or herniation of the laryngeal sacculum forming an air sac. When this cavity is filled with mucus or pus, it is called respectively laryngomucocele and laryngopyocele.

Laryngoceles are classified into internal, external and mixed or combined. Internal laryngocele is laterally limited by the thyrohyoid cartilage, and medially by the laryngeal wall⁽⁴⁾. When the hernial sac extends through the thyrohyoid membrane, proximal to the entry of the superior laryngeal vessels and nerves, it is classified as external laryngocele. In the mixed or combined laryngocele both the internal and

external components are present⁽⁴⁾. Some authors classify laryngoceles only into external and internal, considering the term “mixed” as redundant because external laryngoceles always present an associated internal component^(5,6). Etiopathogenesis of laryngoceles is considered as multifactorial, and is related to the increase in the transglottic pressure, a factor usually present in glassblowers or musicians who play wind instruments^(4,7). Typically, the incidence is higher in white, male individuals, and most frequently is unilateral and combined⁽⁴⁾.

Laryngoceles appearance at CT and magnetic resonance imaging (MRI) has been already well characterized in the literature^(1-3,8), however few reports have described their features at ultrasonography^(9,10). The present paper reports the case of a patient referred to the Department of Ultrasonography for cervical evaluation because of a palpable mass, the diagnosis of laryngocele being suggested with basis on sonographic findings.

* Study developed in the Division of Ultrasonography at Instituto de Radiologia do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (InRad/HC-FMUSP), São Paulo, SP, Brazil.

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CASE REPORT

A male, 53-year-old patient has been referred to the Department of Ultrasonography of Instituto de Radiologia do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, with a history of a painless, slow-growth cervical mass in the right submandibular region for one year. Additionally, the patient reported a progressive hoarseness developed during the same period. Symptoms like dyspnea or high dysphagia were absent. The mass was submitted to fine needle aspiration biopsy whose specimen was considered as unsatisfactory.

Clinically, the patient presented with a soft, painless, compressible mass in the right submandibular region (Figure 1). Also, hoarseness and low vocal intensity were observed.

The ultrasound study demonstrated a superficial mass, just below the subcutaneous plane, in the right submandibular paramedian region, medial to the carotid bulb (Figure 2).

The mentioned mass presented a surface with an intense sound reflection, and a large posterior reverberation artifact, so its measurement as well as characterization of its deep portion was difficult. The de-

scribed appearance suggested the presence of air within the lesion. Later in the study, an equally air-filled connection was found between the mass and the larynx at the same level, suggesting the hypothesis of laryngocele.

Plain posteroanterior and lateral radiographs have confirmed the hypothesis of external laryngocele at right (Figure 3).

Subsequently, the patient was submitted to laryngoscopy that demonstrated a bulging of the right ventricular recess, without identification of the isthmus communicating with the laryngocele (Figure 4).

A CT study was requested for surgical planning and investigation of mucous le-

sions in the larynx, and a large laryngocele was clearly characterized, with no evidence of an obstructive factor (Figure 5).

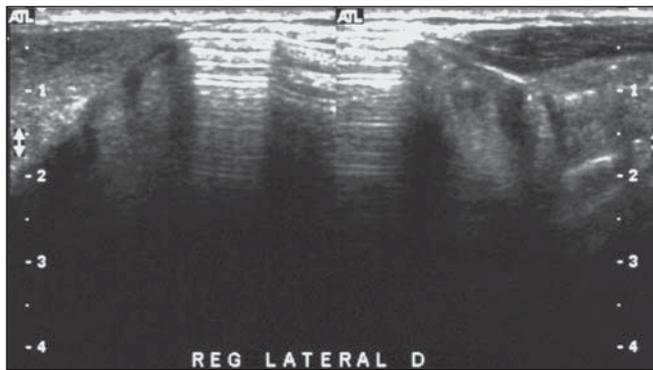
The patient was submitted to surgical intervention that confirmed the imaging findings (Figure 6).

DISCUSSION

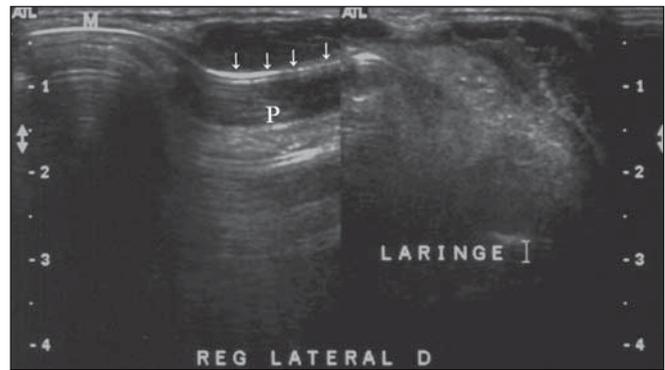
Laryngoceles etiopathogenesis is still to be determined. However, several theories try to explain the development of the disease, from congenital predisposition to a multifactorial nature. The congenital theory suggests that in some cases, during the normal development of the larynx, between the second and third gestational months, there is an abnormal growth of the saccule (long saccule), and this is a predisposing factor for the future development of laryngocele. Other authors suggest that the stress caused by a continuous increased intralaryngeal pressure leads to the saccule dilatation and herniation. This theory is supported by the fact that laryngoceles are most frequently found in musicians who play wind instruments and in patients with chronic respiratory diseases (“chronic coughers”). Although this is the most accepted theory, some authors postulate that there is an association between congenital



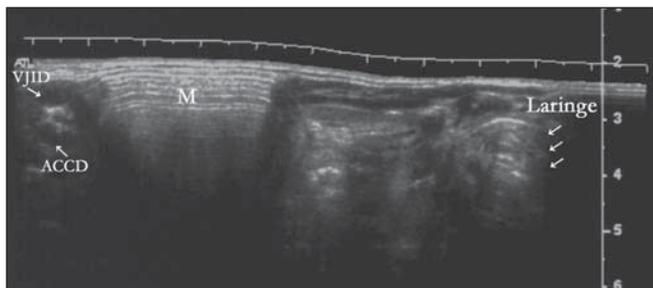
Figure 1. Photo of the patient showing a visible bulging in the right lateral cervical region.



A

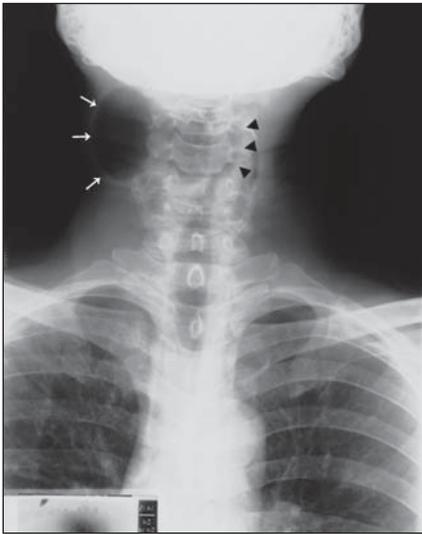


B

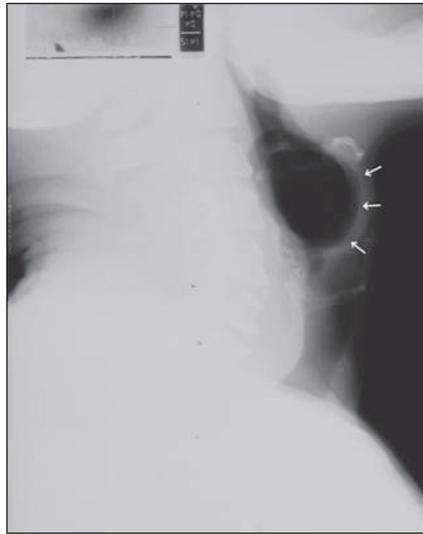


C

Figure 2. Sonographic images. **A:** Axial view of a palpable mass showing hypoechoic formation with an intense sound reverberation on its surface. **B:** As the transducer is medially moved, it is possible to observe that the mass (M, at left) communicates with the larynx by means of an isthmus (at right). **C:** Axial image with extended vision showing more clearly the mass topography, laterally to larynx and medially to the great cervical vessels (right internal jugular vein – VJID; right common carotid artery – ACCD).



A



B

Figure 3. Plain posteroanterior (A) and lateral (B) radiographs demonstrating an air-filled mass (white arrows) in the right, anterior, paramedian region laterally displacing and compressing the airway (black arrowheads).

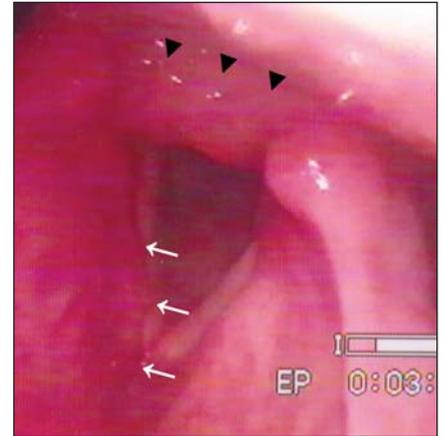
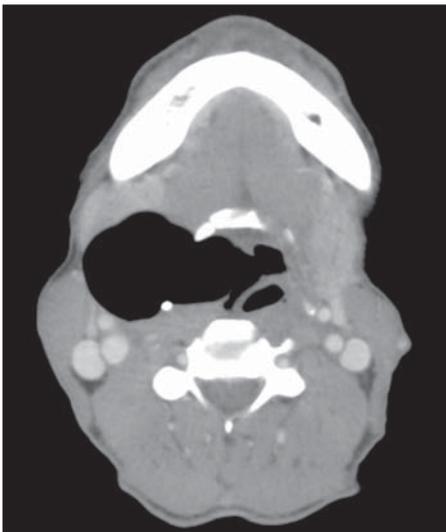


Figure 4. Laryngoscopy during inspiration. A little bulging of the vestibular region (white arrows) is noted. The isthmus communicating with the laryngocele could not be identified. The analysis of the laryngeal mucosa has not demonstrated neoplastic lesions; only an edema in the postcricoid region (arrowheads) is observed, constituting an indirect sign of the presence of gastroesophageal reflux disease in this patient.



A



B



C

Figure 5. Axial multidetector CT images (A) and coronal reconstruction (B) demonstrate air-filled saccular formation communicating with the airway. Three-dimensional reconstruction with volume rendering (C) demonstrates laryngoceles and its relation with the airway.

predisposition and prolonged exposure to high-pressure within the larynx.

The clinical features of this entity are highly variable and non-specific. Most frequently, it may be asymptomatic, and the diagnosis occurs incidentally during imaging studies for other reasons or clinical suspicion, for example, staging of laryngeal carcinomas^(8,11-13).

In summary, symptoms may be divided into compressive, caused by internal laryngoceles, and those symptoms related to

the mass effect, like in cases of external laryngoceles. Main complaints among patients are hoarseness and cough. On the other hand, some patients with external laryngoceles report a palpable cervical mass, and, less frequently, dysphagia and dyspnea, associated or not with a peculiar professional or pathological history. In patients who present with a palpable cervical mass associated with inflammation, laryngoceles constitute an important differential diagnosis.

Imaging studies play a significant role in the diagnosis of this lesion, and many authors suggest that CT is the golden standard, with MRI playing an adjuvant role in the diagnosis of laryngoceles.

Ultrasonography is generally utilized for initial evaluation of cervical masses, mainly for differentiating the nature of the lesion as well as defining its contents and location^(9,10).

In the present case, the location, the presence of sound reverberation in the le-

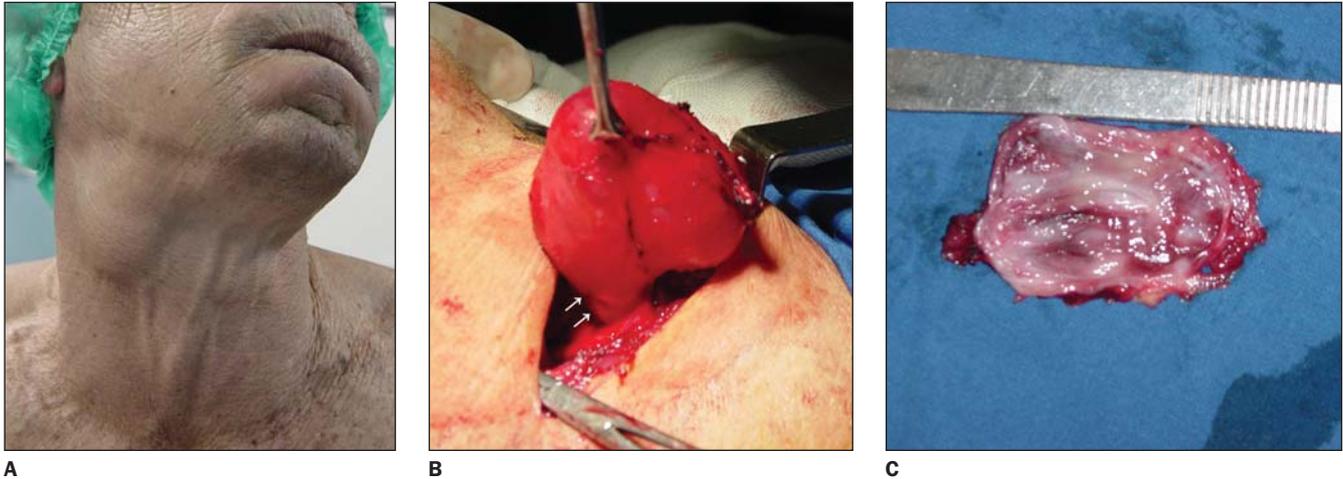


Figure 6. A: Intraoperative photo of the patient with Valsalva maneuver to show laryngocele. **B:** Laryngocele exposed after cervical incision. Note the isthmus communicating with the airway (arrows). **C:** The laryngocele is open for evaluation of the mucosa; signs of neoplastic lesion are absent.

sion, and the ventricular appendage extending toward the laryngeal wall have suggested the diagnosis.

CT, not only suggests the diagnosis, but also may classify the lesion, and directly affect the therapeutic choice. This imaging method allows the visualization of the dilated air-filled sacculus, as well as its limits and anatomical relations. In external laryngoceles, it may be observed that the hernial sac passes through the thyrohyoid membrane, extending superiorly into the paralaryngeal space. Sometimes, a causal factor, for example, a squamous-cell carcinoma located in the opening of the laryngeal ventricle, may be found (secondary laryngocele). In these cases, the tumor partially obstructs the communication between the sacculus and the larynx, creating a valve-like mechanism. Also, a cystic lesion with soft-tissue attenuation may be observed, suggesting a diagnosis of laryngomucocele or laryngopyocele, depending on the clinical context.

MRI is important, particularly in cases where laryngocele is associated with a larynx squamous-cell carcinoma. This imaging method is useful to corroborate the diagnosis, in staging the tumor, for evaluating the disease extent in soft-tissues, as well as to provide, by means of multiplanar acquisition, a better surgical timing planning by otolaryngologists and head and neck surgeons^(8,12,14,15).

Few reports describe possible appearance of laryngoceles at ultrasonography^(8,9). The commonest presentation is a mass with an intense sound reflection, determining a posterior reverberation artifact, suggesting the presence of air in the paramedian line. Sometimes, it is possible to demonstrate the isthmus between the mass and the larynx so as to raise the diagnostic hypothesis of laryngocele. Main differential diagnoses in these cases, would be Zenker's diverticulum or an air-filled abscess. Additionally, a mass presenting hypo- or non-echogenic contents and posterior acoustic shadowing may be characterized, defining the cystic nature of the lesion. Differential diagnoses of this mass range from thyroglossal duct cyst (median line) to dermoid cyst, cystic hygroma and abscess or lymphadenomegaly with liquefaction. Both the patient's clinical condition and age constitute significant factors when these hypotheses are considered.

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