Treatment of Recurrent Mixed Infected Laryngocele with Extramucosal Thyrotomy Around Theurepatic Dilemma

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Abstract: Laryngopyocele is a fairly rare disease which is a complication of laryngocele. It is a emergency situation so it needs fast differential diagnosis and treatment. Management of laryngopyoceles include observation, endoscopic resection and resection *via* an external approach. An external approach is indicated for large or external laryngoceles. The incidence of association between laryngocele and laryngeal carcinoma varies from 1% to 10%. Extramucosal thyrotomy to thyroid cartilage lamina provides adequate visibility of the laryngocele sac.

Keywords*:* Laryngocele, thyrohyoid membrane, tracheotomy.

INTRODUCTION

Laryngocele is a congenital or acquired anomalous dilatation of the laryngeal saccule that may extend internally into the airway or externally through the thyrohyoid membrane. A laryngopyocele forms when a laryngocele, as a dilatation of the laryngeal ventricle, becomes infected and fills with mucopus. Laryngopyoceles are rare, as only few cases have been previously reported in the literature [1, 2].

In this case, we report a rare cause of obstruction of laryngeal opening which is laryngopyocele that could be diagnosed by endoscopic examination and its histopathological features. Etiology of laryngocele is not known well and its usually asymptomatic [2]. According to their relationship with the thyrohyoid membrane, laryngoceles are classified as internal, external, and mixed (combined) types. If dilated sac does not extend through the thyrohyoid membrane it remains within the larynx and forms internal laryngocele. When this sac extend through the thyrohyoid membrane to the neck it forms an external laryngocele. A laryngocele which exists both medial and lateral to the thyrohyoid membrane, is called combined or mixed laryngocele [3, 4]. The case is interesting for its treatment courses, and especially for its controversial therapeutic aspects. In this case, we came across a dilemma in the treatment approach of large mixed laryngopyelosel, and furthermore, we discussed the timing and necessity of external approach.

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CASE REPORT

A 51-year-old man had been suffering from hoarseness for approximately 2 years and presented with a 2-month history of progressive hoarseness, dyspnea, chronic cough. He had approximately 50-pack/year smoking history and 10 cl alcohol per day.

On physical examination, a painful solid mass was found at the right side of the neck, around middle servical area about 4-5 cm in size under a normal skin. The size of solid mass was increasing with valsalva maneuver and was not reducing by palpation. Indirect laryngoscopy revealed a supraglottic mass which obstructed right priform sinus and pushed the epiglottis to the left side (Figure **1**). Patient's vocal cords were seen normal and mobile. A computed tomography (CT) scan showed a large internal sac which extends through thyrohyoid membrane towards posterior border of digastric muscle that forms large external laryngopyocele (Figure **2**).

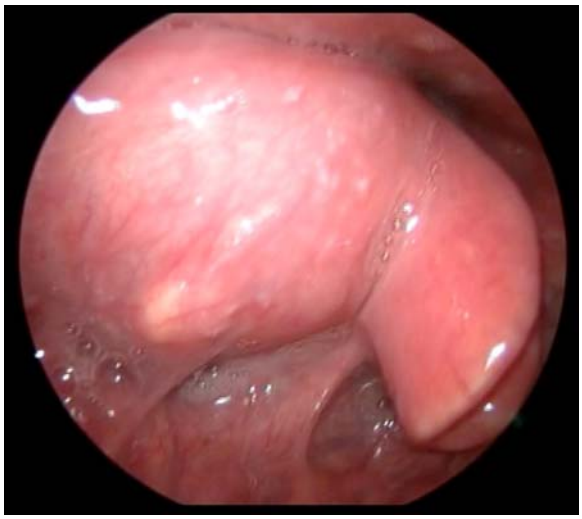

Figure 1: The supraglottic mass partially filling the the right priform sinus and pushing the epiglottis to the left side.

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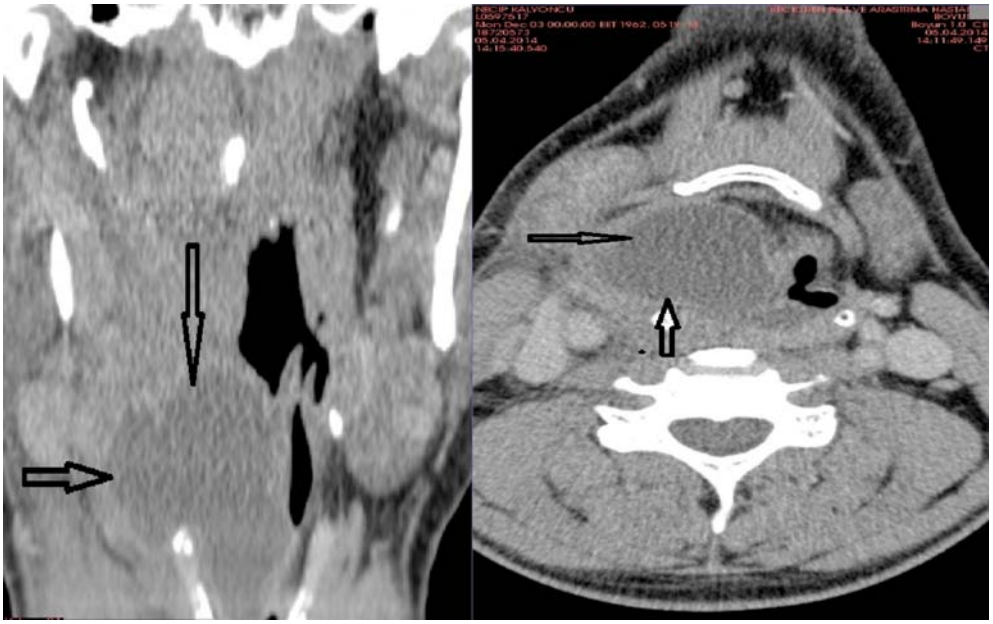

Figure 2: A (CT) scan revealed a mixed large sac.

Because of airway obstruction we opened tracheotomy at emergency room than under direct laryngoscopy laryngocele sac was observed and evaluated about its size and internal purulent secretion. Epiglottis was pushed to the left side by the sac and obstruct the airway preoperatively. In the first instance, we only suctioned laryngocele sac under direct laryngoscopy without totally excision.

After aspiration and drainage of the sac, epiglottis came to midline and airway became clear. In the first three days of operation the clinical symptoms of patient were improved but towards the first week of operation complaints were repeated. About 1 week later patient was admitted to our clinic with impaired general condition, hoarseness and dyspnea.

Second operation was performed both internal, under direct laryngoscopy and external approach through the soft tisuues of neck. Neck incision was given over the upper border of cricoid cartilage extending laterally up to the anterior border of the sternocleidomastoid muscle. Skin flaps including the platysma were elevated up to the hyoid bone superiorly and down to the upper border of the cricoid cartilage. Than, soft tissues, sternohyoid and sternothyroid muscles over thyroid cartilage were dissected and right lamina of thyroid cartilage was revealed. Pericondrium of right thyroid lamina was dissected and protected inferolaterally (Figure **3a**). An inferiorly based flap was created from the outer perichondrium by incising at the superior border of the right thyroid lamina and using a freer elevator for dissection. A rectangular section of

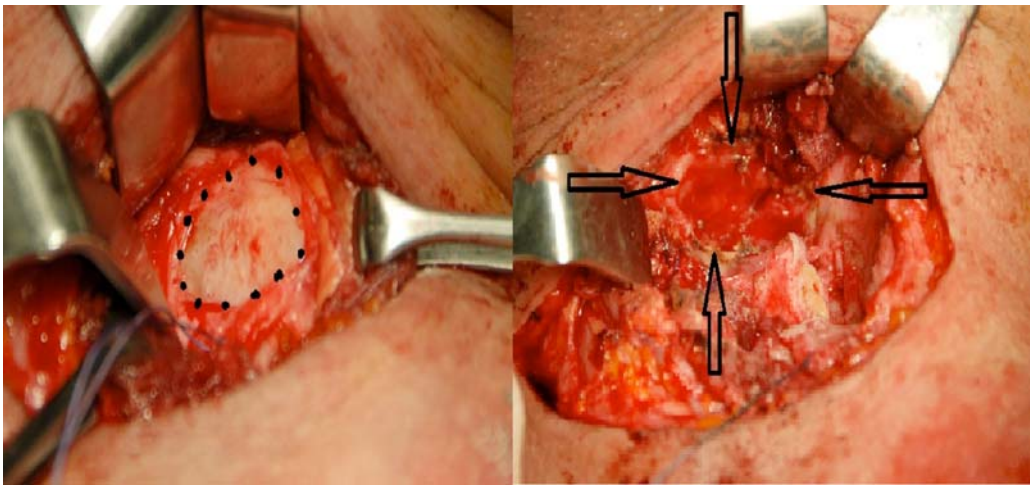

Figure 3: Removal window Right lamina of thyroid cartilage.

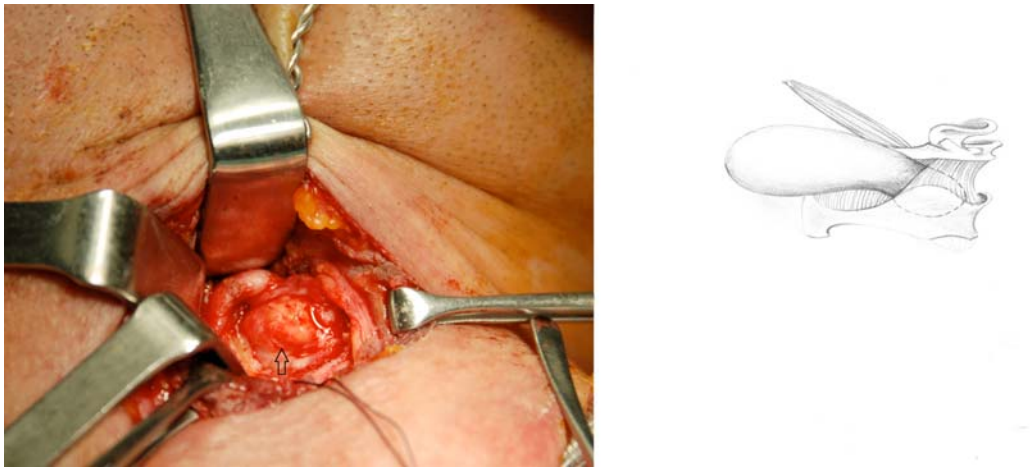

Figure 4: Arrow and illustration show borders of laryngopyocele.

the thyroid lamina is put out. Approximetely 2x1, 5 cm window was opened to the right lamina of thyroid cartilage with reserving the perichondrium and mucosa of the thyroid cartilage that is called extramucosal thyrotomy (Figure **3b**). When we looked from opened tyrotomy window, submucosal infected laryngocele sac was viewed which was sitting on the medial portion of thyroid lamina, extending to the base of the ventricle inferiorly, adjacent to the posterior part of digastric muscle and submandibular gland superiorly that caused infected soft tissues and fibrosis. The laryngocele sac was removed by following all of the borders. A fairly large gap about 2x3 cm occurred in the medial portion of thyroid lamina and in the submandibular area after removal of the sac (Figure **4**). For this reason drain was placed before closing. Lamina window was covered by protected pericondrium. Strap muscles were sutured and the skin was closed.

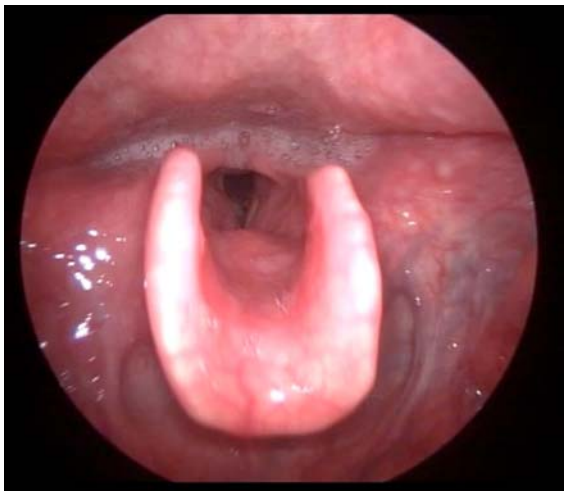

Figure 5: Laryngoscopic view 2nd day after the extramucosal tyrotomy.

Postoperatively 2nd day, epiglottis came to midline and airway became clear (Figure **5**). Patient's symptoms had completely recovered at 2nd and 3rd days of the operation. Tracheostomy was closed after 4 days of surgery. The patient was discharged in a stable condition. The final histological diagnosis of the specimen was benign inflammatory laryngocele mass.

DISCUSSION

Ventricle appendix or saccule is located at the base of the ventricle. An abnormal dilatation of the saccule is defined as laryngocele and if it is filled with purulent secretion then laryngopyocele is used to describe the lesion [1]. Laryngoceles are usually acquired rather than congenital. High intra-glottic pressure, that is caused by excessive coughing, performing valsalva maneuvre or using ventricular phonation during speech is the major predisposing factor at formation of laryngoceles [5]. There is much controversy regarding the etiology of laryngoceles. Its origins involve congenital factors, such as laryngoceles in neonates; and also acquired factors. In adults, a congenital defect or an anatomical variation of the sacculus may be the cause, as are acquired factors such are the cases of pharyngeal or laryngeal carcinomas. Laryngocele is a rare benign laryngeal disease which is generally asymptomatic. The main symptoms of layngopyoceles at presentation of patient are; airway obstruction, stridor, hoarseness, sore throat, cough, fever, weakness, snoring and painfull palpable mass in the neck [4, 6]. After the initial evaluation of patients, endoscopic examination is done. CT scan is the most accurate imaging method for defining the relations between the laryngocele sac, laryngeal structures and extra-laryngeal soft tissues. CT scan is also successful to differentiate the laryngocele from other cystic lesions

or laryngeal malignancies [7]. Interestingly, our case's CT scan did not show solid mass, although the laryngocele sac had a huge size. The CT imaging has to exclude the possibility of an underlying malignancies.

Management of laryngoceles include observation, endoscopic resection and resection *via* an external approach. In a case of laryngopyocele, surgery is the first choice for treatment with parenteral antibiotic. The laryngopyocele must be treated with antibiotics and cortisone, accompanied by regular aspiration of the purulent material in order to reduce the risk of inhalation [8]. According to the clinical emergency of airway, tracheotomy may be needed. In our case, at both two application, patient had respiratory distress and hoarseness which had to cause tracheotomy.

Endoscopic marsupialization with CO_2 laser is frequently used to remove small internal laryngoceles [9]. Lesser operation time and minimal damage to the endolarynx and vocal folds are main advantages of CO2 laser and the quality of voice and swallowing functions can be preserved [10]. But in this case, as in cases of large external dissemination, this approach remains disabled.

The definitive management of symptomatic laryngocele and laryngopyocele is surgical excision. An external approach is indicated for large or external laryngoceles [11]. For this case, in the first instance, we only suctioned laryngocele sac under direct laryngoscopy without totally excision (Figure **3**). In our case, initially we thought that internal approach would be enough. Small external sac growed within a short time and became huge size. However, patient's heavy alcohol consumption and smoking that we suspect in the etiology continued after the operation. After the recurrence of laryngocele sac, second operation was performed both internal approach under direct laryngoscopy and external approach through the soft tissues of neck. Mixed laryngocele treatment is still controversial. Several authors prefer an external approach [8], but a combined approach or internal approaches are more favourable [12, 13]. In our case, laryngocele was very large and the etiologic factors was continued, so that has forced us to external approach. In our experience, we have seen that the external approach are necessary for the such cases which have tendency for recurrence.

In the literature only one article, Idigora A *et al*. in 1997, that described extramucosal tyrotomy [14]. As distinct from this article, in our case, we have demonstrated the necessity of external approach while explain extramucosal tyrotomy surgical steps and provided information about effectiveness of the surgery with peroperative images.

The incidence of laryngoceles in patients with laryngeal carcinoma is variable in literaure. Supraglottic carcinoma is the most common laryngeal carcinoma reported to be associated with laryngocele [15]. Our patient's specimen was large enough to close airway and infected enough to spread soft tissues although histopatological results are not associated with laryngeal malignancy interestingly but it is important to pay attention and to consider the possibility of this association.

In our own case, we have observed that internal and external combined approach is necessary for treatment of mixed laryngopyocele. We recognize that main router for treatment of mixed laryngocele is etiology (alcohol consumption and smoking) and the size of sac.

CONCLUSION

Laryngopyocele is a rare disease but probably more frequent than indicated in literature. When we encounter laryngeal dyspnea, hoarseness and fever, it is important to rule out the presence of a laryngopyocele which is life threatening and needs emergency response like tracheotomy.

Most of authors agree that surgery is required for the three types of symptomatic laryngocele cases. An external cervical approach and extramucosal thyrotomy to thyroid cartilage lamina gave adequate approaching of the laryngocele. Extramucosal tyrotomy reduces morbidity and recurrens for the huge mixed laryngoceles.

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