

Lateral saccular cysts of the larynx. Aetiology, diagnosis and management

M. HOSSAM THABET, M.D.^{*†}, HESHAM KOTOB, M.D.[†]

Abstract

Lateral saccular cysts have been diagnosed in 17 patients. Definitive diagnosis was made by computed tomography (CT) that showed a fluid-filled cystic swelling of the sacculus with no air fluid level in all patients. Fifty-three per cent of cysts were bulging through the thyrohyoid membrane. They were hugely enlarged in 18 per cent, moderately enlarged in 24 per cent, and slightly enlarged in 12 per cent of patients. One patient (six per cent) showed bilateral cysts. Lateral saccular cysts were primary in origin in 82 per cent of patients and secondary to prolonged intubation, hemilaryngectomy, and laryngoscleroma in 18 per cent of patients. Surgical excision via a lateral cervical approach was performed in eight patients, whereas endoscopic CO₂ laser vestibulectomy was performed in nine patients.

Endoscopic vestibulectomy with CO₂ laser proved to be an efficient and safe procedure for excision of small and medium-sized cysts with a diameter equal to or less than 3 cm in the greatest dimension. The external approach appears more efficient than laser vestibulectomy in excision of huge cysts, as 22 per cent of patients undergoing laser surgery showed a recurrence.

Key words: Larynx; Cysts; Tomograph Scanners, X-ray Computed

Introduction

The sacculus is a blind sac that extends upwards between the false vocal fold, the base of the epiglottis, and the thyroid cartilage. It usually lies posterolateral to the edge of the epiglottis. It contains mucous glands and it empties its secretions through an orifice in the anterior part of the roof of the ventricle. At this orifice is the ventriculo-saccular fold, an anterior crecentic fold of mucous membrane that probably serves to help store mucus and direct it postero-medially to lubricate the surface of the vocal fold.^{1–3} At one stage of sacculus development, the ventriculo-saccular opening is obliterated by mesenchyme, but it normally recanalizes.⁴ In the newborn, the sacculus is normally large relative to the size of the newborn larynx. A differential growth rate between the remaining larynx and sacculus can cause the latter to involute by the age of six years.³ The height of the laryngeal sacculus ranges from 5–9 mm.⁵ Two studies have found it to exceed 15 mm.^{2,5}

A saccular cyst is an abnormal mucous-filled dilatation of the laryngeal sacculus.^{1,6,7} De Santo *et al.*⁷ and Holinger *et al.*¹ differentiated saccular cysts from laryngoceles on the basis of communication with the laryngeal lumen. In a laryngocele, the sacculus is distended and filled only with air through

an orifice that remains patent, whereas a saccular cyst is a mucus-filled dilatation of the sacculus that does not communicate with the laryngeal lumen.^{1,7}

Patient and methods

This study was conducted on 17 patients suffering from lateral saccular cysts of the larynx who were admitted and treated in the Otolaryngology–Head and Neck Surgery Department of Alexandria University Hospital and the Fakhry and Al Mohawis Hospital in Al Khobar, Saudi Arabia in the period from 1992 to 1999. Patients were evaluated by clinical examination, flexible fibre-optic nasopharyngo-laryngoscopy, and computed tomography (CT). Diagnosis of a lateral saccular cyst was made if a cystic swelling involving the false vocal fold and/or the aryepiglottic fold was found by endoscopy, or an irreducible lateral cervical cystic swelling at the region of the thyrohyoid membrane was found by clinical examination. A definitive diagnosis was made by CT whenever there was a fluid-filled cyst with no air fluid level involving the false vocal fold and/or the aryepiglottic fold. Surgical excision via an external approach was performed in eight patients, whereas the other nine patients were treated by CO₂ laser vestibulectomy. A transverse skin incision at a skin crease at the superior margin of the upper

From the Departments of Otolaryngology – Head and Neck Surgery^{*} and Radiology[†] Faculty of Medicine, Alexandria University, Egypt and Fakhry and Al Mohawis Hospital, Alkhobar, Saudi Arabia.

Accepted for publication: 17 November 2000.

border of the thyroid cartilage was performed. After elevation of skin flaps, the sternohyoid and the thyrohyoid muscles were cut to expose the thyrohyoid membrane. The thyrohyoid membrane was incised just above the thyroid cartilage to expose the cyst without causing injury to the internal branch of the superior laryngeal nerve. The upper part of the thyroid cartilage was excised to allow complete excision of the cyst. Laser vestibulectomy was performed using a CO₂ laser beam of 15 watts to remove the roof of the cyst in the aryepiglottic fold and to remove the false vocal fold. Outside neck pressure was made to allow drainage of all the contents of the cysts. Histopathological examination of the cysts and its contents was made to exclude any underlying pathology.

Results

Lateral saccular cysts were found in 17 patients (Table I). Nine patients were males and eight were females. Complaints were mainly dysphonia or hoarseness, dyspnoea, cough, and neck swelling in some patients. Endoscopic examination showed submucosal cystic swellings involving the false vocal fold and aryepiglottic fold in all patients, however in two patients there was ballooning of the vallecula. Clinical examination revealed a palpable irreducible cystic swelling in the area of the thyrohyoid membrane in nine out of 17 (52.9 per cent) of patients. CT showed a fluid-filled cystic swelling with no air fluid level in all patients (Figures 1, 2, 3, 4(a)). Swellings were hugely enlarged with herniation through the thyrohyoid membrane in to the neck in three out of 17 (17.65 per cent) patients (Figures 1 and 2), moderately enlarged in four (23.53 per cent) patients, and slightly enlarged in two (11.76 per cent) patients (Table I), (Figures 3 and 4). Cysts were right sided in seven patients (41.18 per cent),

left-sided in nine (52.94 per cent) patients, and bilateral in one (5.88 per cent) patient (Figure 4).

In 14/17 (82.35 per cent) of patients, lateral saccular cysts were primary in origin with no evidence of any underlying pathology. However, in three out of 17 (17.65 per cent) of patients they were secondary to an underlying lesion. The first patient gave a history of prolonged endotracheal intubation in an intensive care unit due to coma resulting from head trauma. The second patient had been operated upon by left hemilaryngectomy for a T₁ glottic carcinoma six years earlier (Figures 3(a) and (b)). Both cases were treated by CO₂ laser vestibulectomy. Follow up of these two patients for 24 months revealed no recurrence. The third patient was a female suffering from rhinolaryngoscleroma affecting the nose and both subglottic an supraglottic larynx. This patient presented with bilateral lateral cervical cystic swellings at the region of the thyrohyoid membrane (Figure 4). This patient had undergone surgery in the form of repeated tracheotomy operations and laryngeal microsurgical procedures. CT showed bilateral lateral saccular cysts with herniation through the thyrohyoid membrane in the right side more than in the left side (Figure 4(a)). Both cysts were excised at the same time via an external approach (Figure 4(b)). Histopathological examination of both excised cysts confirmed the presence of laryngoscleroma, moreover culture of the cyst content revealed the presence of *Klebsiella rhinoscleromatis*. Follow-up of this patient for four years revealed no recurrence. Overall, there was no recurrence of the saccular cysts after surgical excision. Two out of nine (22 per cent) patients treated by CO₂ laser vestibulectomy developed recurrence of the cyst after 1.5 and two years. One patient needed a further CO₂ laser surgery, whereas the second patient was operated upon via

TABLE I
LATERAL SACCULAR CYSTS OF THE LARYNX

No.	Sex	Age	Side	Size	Duration	Type	Underlying cause	Neck ext.	Treatment	F.U (years)	Rec
1	Male	37	Left	3 × 4 × 5 cm	3 y	1 ry	—	+++	Surgical excision	3	—
2	Male	28	Right	4 × 5 × 6 cm	7 y	1 ry	—	++++	Surgical excision	4	—
3	Male	34	Right	2 × 2 × 3 cm	1 y	1 ry	—	—	Surgical excision	5	—
4	Female	38	Left	2 × 2 × 3 cm	1 y	1 ry	—	—	Surgical excision	2	—
5	Female	40	Left	2 × 2 × 3 cm	2 y	1 ry	—	—	Surgical excision	1.5	—
6	Female	33	Right	3 × 3 × 3 cm	1.5 y	1 ry	—	+	Surgical excision	1	—
7	Male	36	Right	1.5 × 2 × 2 cm	2 y	1 ry	—	—	Laser surgery	3	—
8	Male	40	Right	3 × 4 × 5 cm	3 y	1 ry	—	+++	Laser surgery	2	+
9	Male	45	Left	3 × 3.5 × 3 cm	4 y	1 ry	—	+	Laser surgery	3	—
10	Female	40	Right	1.5 × 2 × 2 cm	2 y	1 ry	—	—	Laser surgery	2	—
11	Female	37	Left	2 × 2 × 2 cm	1 y	1 ry	—	—	Laser surgery	1.5	—
12	Female	47	Right	3 × 3.5 × 4 cm	1.5 y	1 ry	—	++	Laser surgery	1.5	+
13	Male	43	Left	2 × 2 × 3 cm	1 y	1 ry	—	—	Laser surgery	2	—
14	Female	40	Left	2 × 3 × 3 cm	1.5 y	1 ry	—	—	Surgical excision	1	—
15	Male	24	Left	3 × 3 × 4 cm	1.5 y	2 nd ary	Prolonged intubation	++	Laser surgery	2	—
16	Male	57	Left	3 × 3 × 4 cm	1 y	2 nd ary	Hemilaryngectomy	++	Laser surgery	2	—
17	Female	35	Bilateral	2 × 3 × 4 cm 2 × 2 × 3 cm	3 y	2 nd ary	Laryngoscleroma	++	Surgical excision	4	—

N = Number; Neck Ext. = Neck extension; F.U = Follow-up; Rec = Recurrence; ry = primary

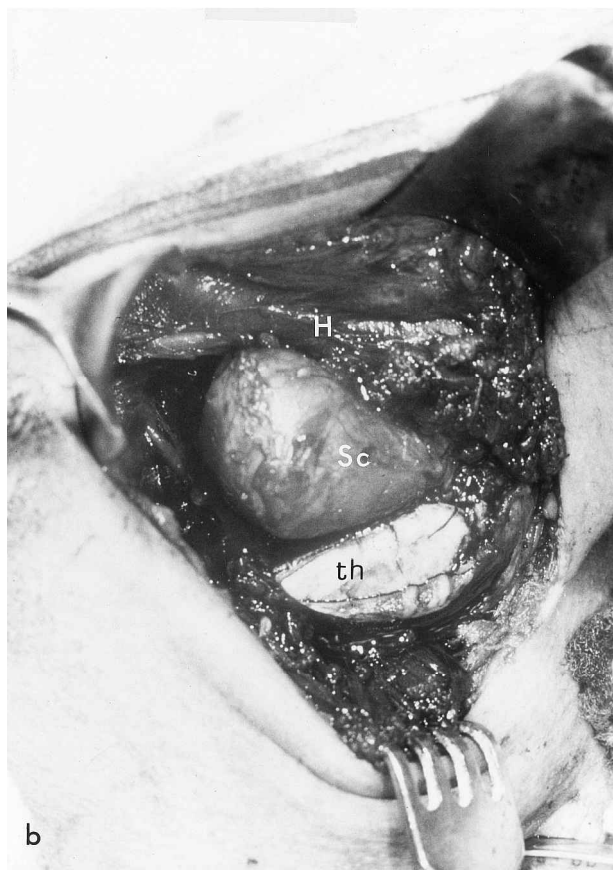


FIG. 1

(a) CT of a patient with large right lateral saccular cyst at the level of the hyoid bone (H) showing no air fluid level and herniation of the cyst into the neck through the thyrohyoid membrane (white arrows). (b) Operative view of the previous patient showing a dissected saccular cyst (Sc) bulging through the thyrohyoid membrane between the thyroid cartilage (th) and the hyoid bone (H).

an external approach to excise the residual external component of the cyst. Both patients are doing well with no more recurrences up until now.

Discussion

De Santo *et al.*⁷ classified laryngeal cysts into saccular and ductal cysts. The saccular cysts arise in

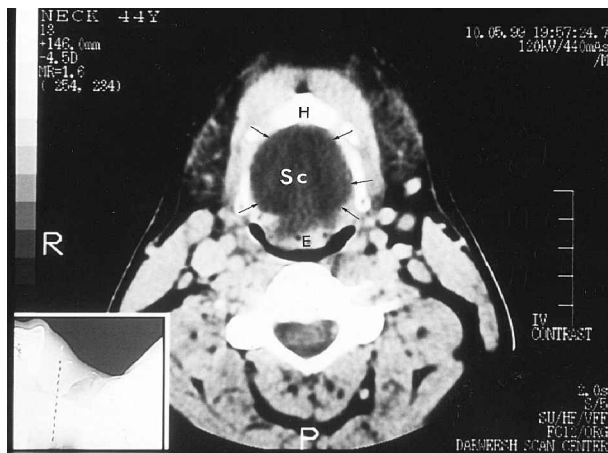


FIG. 2

CT of another patient with a huge lateral saccular cyst (Sc) at the level of the hyoid bone (H) showing an upward extension of the cyst into the pre-epiglottic space (black arrows) with posterior displacement of the epiglottis (E).

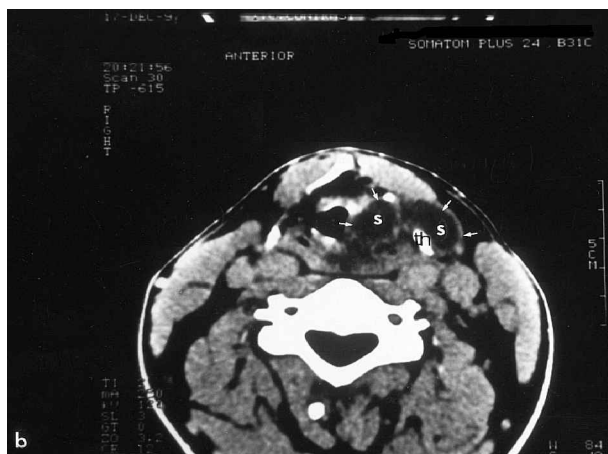


FIG. 3

(a) CT of a patient with previous left hemilaryngectomy at the level of the supraglottis showing a lateral saccular cyst (Sc and white arrows) involving the aryepiglottic fold and displacing the thyrohyoid membrane and strap muscles laterally. (b) CT of the same patient with left hemilaryngectomy at the level of the supraglottis showing a lateral saccular cyst (S and white arrows) involving the false vocal fold and crossing the defect in the thyroid cartilage (th).

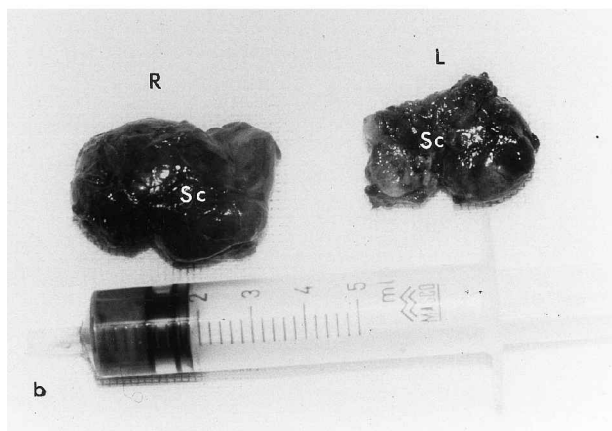


FIG. 4

(a) CT of a patient with rhinolaryngoscleroma and bilateral saccular cysts (S) at the supraglottic level. Both cysts are seen bulging into the neck through the thyrohyoid membrane (black arrows) with no air fluid level, Epiglottis; E. (b) A post-operative picture of the previous patient showing completely dissected right and left saccular cysts (Sc) with the aspirated fluid in the syringe (black arrow).

the sacculus of the ventricle as a result of atresia of the ventricular orifice. The ductal cysts, mostly situated in the vallecula, appear to arise from the submucous glands. Saccular cysts are further classified into anterior and lateral types. The anterior saccular cysts typically extend medially and posteriorly and therefore protrude into the laryngeal lumen between the true and false vocal folds. The lateral saccular cysts typically extend postero-superiorly and laterally into the false vocal fold and aryepiglottic fold. If they enlarge sufficiently, they can herniate through the thyrohyoid membrane as a laryngocele and appear in the neck.^{1,7}

Several mechanisms have been proposed to explain the formation of saccular cysts. They almost certainly result from developmental failure to maintain the patency of the saccular orifice.⁸ While saccular cysts are mostly congenital in origin, some may be acquired and result from inflammation, trauma, or tumours which may occlude the saccular orifice.^{1,7} Both anterior and lateral saccular cysts have been reported before in association with laryngeal cancer.^{1,7}

Although all our patients were adults, 82.35 per cent of the cysts were of primary origin. We had three cases of acquired (secondary) lateral saccular cysts. Development of anterior saccular cysts following long-term intubation have been reported before.⁹ We had only one case with a lateral saccular cyst formed as a result of long-term intubation in our study. The formation of a lateral saccular cyst following a hemilaryngectomy operation in one of our patients may be explained by the persistence of a part of a large sacculus in the soft tissue above the thyroid cartilage. The post-operative scarring might have caused this cyst formation. We failed to find any similar case in the literature. Chronic laryngitis might be a cause of saccular orifice occlusion. Holinger *et al.*¹ reported a case of tuberculous laryngitis presenting with lateral saccular cyst. We presented a patient in this study with bilateral saccular cysts complicating rhinolaryngoscleroma. The rare supraglottic involvement by scleroma as seen in our patient may be the cause of scarring and occlusion of the saccular orifice leading to cyst formation. To our knowledge, this is the only case reported of a saccular cyst due to laryngoscleroma. Although both anterior and lateral saccular cysts have been reported in association with laryngeal carcinoma,^{1,7} we did not find such association in our cases. Saccular cysts with both internal and external components are rare. Eleven cases have been reported in the literature.^{10,11} Fifty-three per cent of lateral saccular cysts in our study were herniating through the thyrohyoid membrane to a variable degree and could be palpated in the neck. However, in only three cases (17.65 per cent) did the cysts attain a huge size. The increased number of large cysts in our series can be explained by the late presentation of these patients due to negligence and poverty.

The management of saccular cysts in infants and children has been primarily endoscopic. Holinger *et al.*¹ supported aspiration and marsupialization as the initial treatment of these cysts. Endoscopic excision has been proposed in case of recurrence. These methods have frequently required multiple procedures, as well as concomitant tracheotomy.¹² Excision through a lateral cervical approach without disrupting the thyroid cartilage was recommended by some authors in case of recurrence after endoscopic excision.^{1,12,13} Treatment of lateral saccular cysts in adults is essentially surgical. However, small lateral and anterior saccular cysts can be treated adequately by endoscopic marsupialization.^{1,7} Large saccular cysts especially those with combined internal and external components are best treated surgically via a lateral cervical approach to the thyrohyoid membrane.^{1,7,10} The decision regarding an endoscopic or external approach depends on the classification and size of the cyst as well as on individual patient factors.¹¹ We used both approaches in treatment of small and large lateral saccular cysts in our patients. The external approach proved to be efficient in all patients. Endoscopic vestibulectomy with CO₂ laser proved to be an efficient and safe procedure for excision of small and medium-sized cysts with a diameter equal to or less

than 3 cm in the greatest dimension. The recurrence in two out of nine patients (22.22 per cent) treated by CO₂ laser vestibulectomy might be due to the large size of the cyst and presence of an external component with later occlusion of the communicating orifice. CO₂ laser vestibulectomy has been used before for the first time by Szwarc and Kashima¹⁴ in treatment of a case of a combined laryngocele 3 × 3 × 2 cm in diameter. We agree with the mentioned authors that vestibulectomy offers a definite advantage over both endoscopic marsupialization and the traditional external approach. Vestibulectomy reduces operative time, avoids superior laryngeal nerve and vascular damage, and speeds recovery with less morbidity.¹⁴ We recommend using this approach for cysts with a diameter equal to or less than 3 cm in the greatest dimension.

Conclusion

Lateral saccular cysts were either primary (82.35 per cent of patients) or secondary to an underlying pathology (17.65 per cent of patients). They herniated through the thyrohyoid membrane and were felt in the neck in 52.94 per cent of patients, and attained a huge size in 17.65 per cent of patients and moderate size in 23.53 per cent of patients. Secondary lateral saccular cysts may complicate laryngeal granulomas as laryngoscleroma or they can follow cicatrization from endolaryngeal trauma or laryngeal surgery. CT is essential for the diagnosis of lateral saccular cyst as it can differentiate them from laryngoceles. CO₂ laser vestibulectomy is an excellent method for treatment of small and medium-sized lateral saccular cysts of a diameter equal to or less than 3 cm. It avoids any external scars and any injury to the upper neurovascular bundle of the larynx. Surgical excision via an external approach proved to be superior to CO₂ laser for the treatment of huge lateral saccular cysts as the latter carries an incidence of recurrence of 22.22 per cent.

References

- 1 Holinger LD, Barnes DR, Smid LJ, Holinger PH. Laryngocele and saccular cysts. *Ann Otol Rhinol Laryngol* 1978;**87**:675–85
- 2 Broyles EN. Anatomical observation concerning the laryngeal appendix. *Ann Otol Rhinol Laryngol* 1959;**68**:461–70
- 3 Delahunty JE, Cherry J. The laryngeal saccul. *J Laryngol Otol* 1969;**83**:803–15
- 4 Tucker JA, O'Rahilly R. Observation of the embryology of the human larynx. *Ann Otol Rhinol Laryngol* 1972;**81**:520–3
- 5 Scott GBD. A morphometric study of the laryngeal sacculae and sinus. *Clin Otolaryngol* 1976;**1**:115–22
- 6 Close LG, Merkel M, Burnes DK, Deaton CM, Scharfer SD. Asymptomatic laryngocele: Incidence and association with laryngeal cancer. *Ann Otol Rhinol Laryngol* 1987;**96**:393–9
- 7 De Santo LW, Devine FD, Weiland LH. Cysts of the larynx: Classification. *Laryngoscope* 1970;**80**:145–76
- 8 Niparko JK, Moran ML, Baker SR. Laryngeal saccular cyst: an unusual clinical presentation. *Otolaryngol Head Neck Surg* 1987;**97**:576–9
- 9 Toriumi DM, Miller DR, Holinger LD. Acquired subglottic cysts in premature infants. *Int J Pediatr Otorhinolaryngol* 1987;**14**:151–60
- 10 Wansa SA, Jones NS, Watkinson J. Unusual laryngeal cyst. *J Laryngol Otol* 1990;**104**:145–7
- 11 Raveh E, Inbar E, Shvero J, Feinmesser R. Huge saccular cyst of the larynx: a case report. *J Laryngol Otol* 1995;**109**:635–56
- 12 Civantos FJ, Holinger LD. Laryngoceles and saccular cysts in infants and children. *Arch Otolaryngol Head Neck Surg* 1992;**118**:296–300
- 13 Ward RF, Jones J, Arnold J. Surgical management of congenital saccular cysts. *Ann Otol Rhinol Laryngol* 1995;**104**:707–10
- 14 Szwarc B, Kashima HK. Endoscopic management of a combined laryngocele. *Ann Otol Rhinol Laryngol* 1997;**106**:556–9

Address for correspondence:
Dr Hossam Thabet, M.D.,
Department of Otolaryngology,
Fakhry and Al Mohawis Hospital,
Al Khobar 31952,
P.O. Box 251,
Saudi Arabia.

Fax: 00966-3-8641107

Dr H Thabet takes responsibility for the integrity of the content of the paper.
Competing interests: None declared
