Laryngoceles – presentations and management

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Abstract

Introduction Laryngoceles usually present as cervical masses with or without hoarseness of voice. They are mostly unilateral and may be symptomatic or asymptomatic. They are classified as internal, external or combined. They have been described to be an occupational hazard among wind instrument players or glass blowers. They also occur in association with neoplasms of the larynx.

Materials and methods Here we report five patients with laryngoceles of whom two had bilateral laryngoceles, which are very rare. One patient had associated laryngeal malignancy for which total laryngectomy was performed. Two cases underwent excision via cervical approach. The rest were managed conservatively.

Conclusion Symptomatic cases have to be managed surgically while asymptomatic ones may be managed conservatively.

Keywords Laryngocele · Bilateral · Associated malignancy · Valsalva's maneuver

Introduction

Laryngoceles are rare lateral neck masses. The term, 'laryngocele' refers to the pathologic cystic dilatation and enlargement of the appendix or the sacculus of the laryngeal ventricle of Morgagni. They are most frequently encountered unilaterally among persons engaged in certain occupations such as professional glass blowers and wind instrument players and also in association with laryngeal neoplasm. Though individual cases have been mostly reported in literature, we present a series of five cases of laryngoceles and our experience in treating these conditions.

Materials and methods

We review five patients with laryngoceles who presented to the period between 1997 and 2007 to the department of Otolaryngology – Head and Neck Surgery, Kasturba Medical College Mangalore. All patients were males, the youngest being 16 years and the oldest, 78 years. All patients underwent a thorough clinical examination before arriving at a diagnosis. Apart from routine investigations, all patients were subjected to X-rays (with Valsalva maneuver) and CT scans. Treatment included conservative follow-up, surgical excision of laryngocele and total laryngectomy.

Results and observations

Here we discuss each case individually.

Case 1

A 78-year-old male manual laborer with history of chronic constipation presented with a swelling on the left side of the neck of one-year duration. He did not complain of any change in voice. On examination, there was a cystic swelling of 4cm diameter on the upper part of the left side of

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the neck anterior to the sternocleidomastoid, which was reducible and had a positive cough impulse. An X-ray soft tissue neck lateral view demonstrated a well-defined radiolucent area lateral to the thyrohyoid membrane, which increased in size with Valsalva's maneuver. CT scan with and without contrast confirmed the presence of an external laryngocele. The increase in dimensions of the swelling on Valsalva's maneuver was demonstrable on CT scan. Surgical intervention for the laryngocele per se was not considered in view of the patient's age. He underwent Lord's dilatation for a chronic fissure-in-ano, which was the cause for his constipation. He remains asymptomatic and is on regular follow -up.

Case 2

A 58-year-old male presented with hoarseness of voice and swelling on the right side of the neck of 3 months duration. Examination revealed a swelling of 3 cm diameter on the upper part of the neck, which was cystic, reducible and had a positive cough impulse. Endolarynx was normal on indirect laryngoscopy. An X-ray soft tissue neck lateral view and CT scan confirmed the presence of an external laryngocele. This patient refused surgery. Ten months later, the patient presented with further worsening of voice. Examination revealed an ulcero-proliferative growth in the larynx involving the anterior part of the right vocal cord extending over to the false cords. The external laryngocele was still present. Direct laryngoscope and biopsy was performed which confirmed our suspicion of malignancy. The patient underwent total laryngectomy with excision of the laryngocele. He was subsequently sent for post-operative radiotherapy.

Case 3

A 55-year-old male, wind instrument player by profession at a temple, presented with bilateral neck swelling and hoarseness of voice of six months duration. Examination revealed swelling of 5 cm diameter on the right and 4 cm on the left side of the neck, which were cystic, reducible, had positive cough impulse and increased in size with Valsalva's maneuver. Indirect laryngoscopy showed a sub-mucosal mass in the region of the right false cords and aryepiglottic folds. An X-ray and CT scan confirmed our diagnosis of right combined laryngocele and left external laryngoceles (Fig. 1). The patient underwent bilateral excision via transcervical approach. We did not deem it necessary to do a preliminary tracheostomy. Surgery was performed under GA. With a transverse incision on the neck passing over the swellings, we dissected the sac on the right side and freed it from the surrounding structures. The sac was traced to the thyrohyoid membrane and excised. The cut ends were transfixed. The sac on the left side was also freed from surrounding structures and excised.

Post -operatively, the patient improved well. His voice reverted to normalcy.

Case 4

A young boy aged 16 years presented with complaints of bilateral neck swelling. He was otherwise asymptomatic. Clinical examination demonstrated bilateral cystic neck swellings of 4 cm diameter, which were reducible and had a positive cough impulse. Soft tissue radiography showed the presence of bilateral external laryngoceles. This patient refused surgery and has been kept on follow-up. He continues to remain asymptomatic.

Case 5

A 57-year-old male presented with a swelling on the left side of the upper part of the neck of 6 months duration associated with hoarseness of voice of 4 months duration. The patient was a manual laborer and had been suffering from chronic constipation in the past. He had been operated for hemorrhoids 15 years ago and there was recurrence of symptoms over last 4 years. Physical examination revealed a swelling of 5cms diameter on the upper part of the left side of the neck which was cystic, reducible, had positive cough impulse and increased in size with Valsalva's maneuver (Fig. 2). An x-ray soft tissue neck-lateral showed bilateral combined types of laryngoceles with the larger one on the left. CT scan confirmed bilateral combined type of laryngoceles (Fig. 3). The laryngoceles were excised via a trans-cervical approach (Fig. 4). We did not do a preliminary tracheostomy in this case too. We excised only the left laryngocele. We did not operate upon the laryngocele on the right side owing to its small size and the hope that it could be conservatively man-

Fig. 1 Plain x-ray soft tissue neck - lateral view showing bilateral air filled sacs.

aged by control of predisposing factor. Post operatively his voice recovered very well almost immediately. The patient was referred to the surgery unit for management of hemorrhoids.

All the cases have been summarized in the table below (Table 1).

Fig. 2 Showing neck swelling of 5 cms diameter, which was cystic, reducible had positive cough impulse and increased in size with Valsalva's maneuver.

Fig. 3 CT scan showing the laryngoceles and their connections.

Discussion

Larrey, a surgeon in Napoleon's army first described an air-filled tumour of the neck in 1829. Virchow introduced the term laryngocele in 1887, to describe an air filled dilatation of the laryngeal sacculus, the pouch of the upper part of the laryngeal ventricle of Morgagni. A laryngocele is an air filled herniation of the sacculus which communicates with the lumen of the larynx. The diagnosis of a laryngocele is probable when a large sacculle becomes symptomatic and a swelling can be palpated, a swelling is observed at direct or indirect laryngoscopy or an air-filled sac is shown on a radiograph [1].

The etiology of laryngoceles has been much discussed. Negus believed that laryngoceles were an atavistic phenomenon inherited from some tree-climbing ancestor illustrating developmental changes of evolutionary degeneration [2]. Many investigators believe that a congenital weakness or defect predisposes to the formation of laryngoceles under the influence of acquired factors [3, 4]. Factors that increase intra-glottic pressure such as professional trumpet playing [3], glass blowing, singing, straining at stools, weight lifting [5] and carcinoma larynx [6] are said to foster development of laryngoceles. The two most common factors seem to be a prolonged or chronic increase in intra-glottic pressure and associated long sacculus [5]. Strenuous expiratory effort causes closure of false cords and prevents air from escaping; the sphincters being the thyroarytenoid, thyroepiglottic and aryepiglottic muscles. The true cords also close but with any additional increase in pressure air will escape through the true cords but not through the false cords. This causes increase in pressure in the ventricle and sacculus and formation of laryngocele in pre-dispositioned cases [5]. In our series, two patients were manual laborers with chronic constipation, one a professional wind instrument player and one patient had an associated endo-laryngeal malignancy, thus endorsing the predisposing factors discussed above. No predisposing factor was noted in the adolescent patient, thus

Fig. 4 Excision via trans-cervical approach.

Table 1 Clinical features

Case	Age	Sex	Unilateral / Bilateral	Occupation	Symptoms	Signs	Radiography	Treatment
Case 1	78	M	Unilateral	Manual Laborer	Neck mass left side No symptoms. History of chronic constipation	Cystic swelling pf 4cms diameter on left side of neck. Increased in size with Valsalva's maneuver	X-ray and CT scan suggested a laryngocele	No surgical intervention Underwent Lord's dilation.
Case 2	58	M	Unilateral	_____	Hoarseness of voice Right sided neck mass.	Initially endolarynx was normal. 10 months, later laryngeal growth seen. Biopsy confirmed malignancy.	X-ray and CT scan suggested a right external laryngocele	Total laryngectomy with excision of sac and post -operative Radiotherapy
Case 3	55	M	Bilateral	Wind Instrument Player	Bilateral neck masses Hoarseness of voice	Bilateral cystic neck masses. Indirect laryngoscopy-submucosal mass in the region of Right false cord and aryepiglottic folds.	X-ray and CT scan suggested Right combined laryngocele with Left External laryngocele.	Bilateral excision via transcervical approach
Case 4	16	M	Bilateral	_____	Bilateral neck swelling Asymptomatic.	Bilateral cystic neck masses.	X-ray suggested Bilateral external laryngoceles	-----
Case 5	57	M	Bilateral	Manual Laborer	Left sided neck mass, Hoarseness of voice, chronic constipation	Left Neck swelling	X-ray – Bilateral air filled sacs. Left>Right Increased with Valsalva's maneuver. CT scan-Bilateral combined Laryngoceles	Excision via transcervical approach.

supporting the congenital cause. Most authors have classified laryngoceles into three types – internal, which is confined to within the thyrohyoid membrane, external, which dissects superiorly through the thyrohyoid membrane into the subcutaneous tissues of the neck and the combined or mixed form containing both parts [3]. Hubbard [7] reviewed the cases in English language and found that the most common type was the mixed laryngocele (44%), 30% were internal and 26% external. Bilateral laryngoceles were found in 23%. Male to female ratio was 7:1. Age incidence is

reported to be the maximum in the 6th decade [8]. Macfie [3] claims that all external laryngoceles, of necessity must have an internal component. In our series of 5 cases, all were male patients in the age group of 55–80 years with the exception of one adolescent boy. We diagnosed unilateral laryngoceles in 2 cases and the rest were bilateral.

The two common presenting symptoms in case of laryngoceles are hoarseness of voice and swelling in the neck [8]. On clinical examination, swelling is palpable superior and lateral to the thyroid lamina in external

laryngoceles and increases in size with Valsalva's maneuver [5]. On compression the swelling becomes smaller and a hissing or gurgling noise is heard as air escapes endolaryngeally [5] called the Bryce's sign. Three of our patients presented with both these symptoms while others presented with neck swelling alone. Clinical examination findings were along expected lines in all our cases.

The diagnosis of laryngocele is essentially a clinical one. Plain radiographs of the soft tissue of the neck in anterior-posterior and lateral views are, on most occasions, of value, especially if the Valsalva maneuver is performed. Computed tomography is the most useful ancillary investigation in cases with suspicion of concomitant laryngeal pathology. It provides a definitive diagnosis of a laryngocele through cross sectional imaging and contrast resolution superior to that of plain radiography [9]. Magnetic resonance imaging, which provides high definition of soft tissues, offers detailed information on the boundaries of the air-filled sac and, in particular, on its relation to the thyrohyoid membrane, distinguishing the internal from the external or the mixed components of this cyst. On some occasion, the cyst is filled with mucous or has formed an abscess (laryngomucocoele or laryngopyocoele). In these situations it is difficult to obtain high resolution with CT; therefore, MRI is the imaging technique of choice and may distinguish obstructed mucous and inflammation from neoplastic disease [10]. Ultrasound characteristics of laryngoceles have been studied in detail. Internal laryngoceles have been described to be echo-free, well-defined structures inside the thyroid cartilage. Combined laryngoceles have an additional cystic mass outside the laryngeal skeleton, at the thyrohyoid membrane. Characteristically, this cystic mass has been described to be connected through the thyrohyoid membrane to the intra-laryngeal mass. The value of ultrasound examination in the diagnostic work-up of patients with laryngoceles has been appreciated and compared to the respective values of ENT examination, conventional tomography and CT [11]. X-ray soft tissue neck lateral view before and during Valsalva's maneuver and CT scans were the investigations employed to establish diagnosis in all our cases. The air filled sacs were found to increase in size after Valsalva's maneuver. CT scan confirmed the presence of laryngocele and ruled out any other laryngeal pathology apart from showing the precise extent and connections of the swelling with the laryngeal ventricle as well as its relationship with surrounding structures.

Surgical excision through external approach is described as the only effective treatment for symptomatic and complicated laryngoceles [3, 12–14]. Conservative management is recommended for the asymptomatic ones. The cervical approach employed for treatment of external laryngoceles can disrupt the normal function of the strap muscles that are important for tone generation and therefore surgery in asymptomatic young musicians is to

be deferred, as it would hamper the performer's musical career [15]. Surgical excision by means of LASER has been employed in centers where Laser equipment is available [9]. We performed bilateral excision of the laryngoceles via trans-cervical approach in the professional wind instrument player and the manual laborer both of who were symptomatic. We did not operate upon the asymptomatic manual laborer with a unilateral laryngocele. Since the main predisposing factor in both the manual laborers was chronic constipation, we referred the patients to the General Surgery unit for management of the same. Both these patients remain asymptomatic. In the case of the patient with concomitant laryngeal carcinoma, total laryngectomy was performed and patient was referred for post-operative radiotherapy. The adolescent boy is on regular follow-up and remains asymptomatic.

Conclusion

Detailed history taking including the occupational and personal history are the essential pre requisites for the diagnosis of a patient with a laryngocele. Though laryngoceles are frequently encountered in certain occupations they can also occur in a person suffering from chronic constipation or obstructive urinary tract disorder by a similar mechanism. A positive Bryce's sign and increase in size of the swelling with Valsalva's manoeuvre clinches the clinical diagnosis. X-ray soft tissue neck lateral view before and during Valsalva's maneuver constitutes a simple and cost effective method of confirming diagnosis. However CT scan is a more superior tool, which aids the management. MRI can be used to differentiate Laryngopyocoeles or laryngomucocoeles from plain laryngoceles. In case of combined laryngoceles, ultrasound has shown a characteristic connection between the intralaryngeal mass and the external mass through the thyrohyoid membrane and its benefits need to be proven further. Symptomatic cases have to be managed surgically while asymptomatic ones may be managed conservatively.

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