CASE REPORT

The trumpet player with a swelling in the neck

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SUMMARY

Bilateral neck swelling in patients following valsalva manouvers could lead to a diagnosis of either a pharyngocele or laryngocele. Distinguishing between them can be complicated but is vital given the possibility for an acute airway in patients with laryngoceles.

A 20-year-old trumpet player presents with a 5-year history of neck swelling. Clinical suspicion is that of a pharyngocele but imaging introduces some confusion with the diagnosis.

Both pharyngoceles and laryngoceles can occur as a result of prolonged positive pressure. Accurate assessment with fiberoptic examination and imaging is needed to confirm the diagnosis.

Pharyngoceles are often misdiagnosed as laryngoceles. Though treatment is similar between the two patient groups it is vital that a distinction is made to enable careful observation of the airway in patients with laryngoceles.

BACKGROUND

Neck swelling associated with positive pressure such as glass blowing or playing musical instruments may be as a result of a pharyngocele or laryngocele. Both are incredibly rare and differentiating between the two can be difficult. Despite being well described, pharyngoceles are often underdiagnosed or misdiagnosed as laryngoceles. While differences can often be subtle, correct diagnosis can be made confidently with targeted investigation and a high index of suspicion.

We present a case of bilateral neck swelling and discuss the differentiating features, investigations and treatment options of both laryngoceles and pharyngoceles.

CASE PRESENTATION

A 20-year-old male trumpet player was referred to our tertiary ear, nose and throat clinic with a 5-year history of bilateral neck swelling. This was only associated with playing the trumpet, with complete resolution between episodes. He was

otherwise fit and well with no difficulty breathing, dysphagia or dysphonia. Previous investigations, including imaging at the referring clinic had revealed no cause for the swelling. The patient was asked to attend clinic with the trumpet in order to reproduce the symptoms.

At rest, head and neck examination was grossly normal with no visible or palpable neck lumps or swellings. Interestingly, blowing the trumpet produced significant bilateral external neck swelling ([figure 1](#)). Videostobolaryngoscopy during trumpet blowing showed marked expansion of both piriform fossa confirming the diagnosis of a pharyngocele ([figure 2](#)). The remaining supraglottic structures were unremarkable with normal movement of the vocal cords bilaterally.

A CT scan was requested while trumpet playing to enable estimation of the size of the defect and to allow for surveillance and future comparison. This was initially reported as 'large bilateral gas filled laryngoceles' ([figure 3](#)), however following further review and identification of the grossly enlarged piriform fossa seen in [figure 3B](#) this was amended to a diagnosis of a pharyngocele.

Barium swallow performed subsequently (without positive pressure as it will be impossible to blow and swallow at the same time) to look for pockets or pouches of the hypopharynx was normal ([figure 4](#)).

Given the absence of symptoms, the patient was managed conservatively and advised regarding healthy oral hygiene and the use of scarf tying while playing.

DISCUSSION

A laryngocele can be defined as an 'abnormal dilation or herniation of the laryngeal saccul¹' which according to Holinger can be diagnosed if the sac is (1) symptomatic, (2) palpable, (3) observed internally or (4) observed through imaging or surgery.² Laryngoceles can be congenital or acquired, though the majority fall into the latter category. They occur as a result of increased intralaryngeal pressure such as

Figure 1 Inspection of the patient's neck (A) at rest (B) during trumpet playing.

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Figure 2 Fiberoptic examination of the supraglottic structures (A) at rest and (B) during trumpet playing revealing the grossly enlarged piriform fossa.

that in excessive coughing, playing blowing instruments or due to obstructing lesions within the larynx.³ They are described according to their relation to the parapharyngeal space as internal (confined within the parapharyngeal space), external (sacculle herniation through the thyrohyoid membrane) or mixed and can be both unilateral or bilateral.

Laryngoceles are usually asymptomatic and detected incidentally on imaging. However, they may present with symptoms ranging from simple neck swelling, hoarseness of voice to airway obstruction. Management options include conservative measures such as scarf wearing during times of high pressure to surgical excision of the sacculle itself through a cervical approach. Novel treatment options involving transoral robotic surgery and endoscopic repair have been described, eliminating the need for the cervical incisions.⁴

In contrast, a pharyngocele is a bulging of the lateral pharyngeal wall frequently arising from two areas of weakness; a superior area between the middle and superior constrictor muscle and the most common site; inferiorly between the middle and inferior constrictor muscle and the thyrohyoid membrane within the base of the piriform fossa.⁵ Figure 5 highlights the anatomical difference between the two entities.

True lateral pharyngeal diverticula (pharyngoceles) that penetrate through the thyrohyoid membrane are very rare with fewer than 60 cases reported in the literature over the past 126 years.^{6,7} Pharyngoceles are frequently misdiagnosed as laryngoceles and of all reported cases with neck swelling in woodwind or brass musicians pharyngoceles seem to be more common particularly in the younger age group.⁸ Like laryngoceles, pharyngoceles can either be congenital or more commonly acquired with the main risk factor being raised intrapharyngeal pressure. Congenital cases are thought to be due to a remnant of the brachial cleft. When symptomatic these may present with nocturnal coughing, regurgitation of food, pain and dysphagia.

Figure 3 (A) Axial slice from CT neck demonstrates large bilateral air spaces during trumpet playing, (B) Reformatted coronal slice from CT revealing extent of the pharyngocele.

Recommended diagnostic tools include fiberoptic laryngoscopy, as well as imaging, in particular CT neck and barium swallow during valsalva. CT reveals laryngoceles to be arising from the dilated laryngeal ventricle whereas in pharyngoceles imaging can clearly demonstrate the communication with the pouch and the piriform sinus (figure 3).⁹

Ideally such CT imaging should be performed while performing the valsalva to fully demarcate the size of the defect. Although the CT was performed with the patient supine, this did not affect the size of the pharyngocele significantly during trumpet blowing. This is because either way (supine or erect) the player has to create the same pressure to blow his trumpet. However, it is important to consider that the player may get

Figure 4 Still image from barium swallow revealing normal hypopharynx.

Figure 5 Diagram showing the difference between a pharyngocele (2) and a laryngocele (5); and (1) hyoid, (2) pharyngocele, (3) thyroid, (4) cricoid, (5) external laryngocele, (6) thyrohyoid membrane, (7) vestibular folds and (8) vocal folds.¹¹

Patient's perspective

- ▶ 'Just so you know a little about me and where I am at with playing the trumpet I am currently a competent amateur player. I got my grade 8 at the age of 15 and went into specialist music education where my principle studies were composition and trumpet for my first year but in my second year I dropped trumpet and decided I wasn't going to become a professional trumpet player—for many reasons. I currently have braces so my playing is a little on and off but I feel I will be able to carry on playing'.
- ▶ 'I haven't altered my playing in any way because of my neck swelling. It was once suggested that I should play less and stop playing at loud dynamics and in the high register (where the swelling is most prominent), but I was later informed that this may not be the case. My first recollection of knowing about the swelling was when people began to point it out at school, although I couldn't feel anything abnormal in my neck. When I got older it felt uncomfortable every so often, such as when the airflow feels more constricted which can happen if I'm not warmed up or am out of practice. When I was 16 I began a large embouchure change where I basically relearned how to play the trumpet. At the beginning of the process the neck swelling was more prominent but settled down to usual state as I got used to the new way of playing and I improved. I have never experimented with tying a scarf or similar object around my neck; although I believe that this may feel strangling in a similar way to a tight collar, which is why if I ever have to wear a bow tie on stage, I always wear it very loose'.
- ▶ The patient also explained that he had found a video online that he had found beneficial: 'Here is the video I mentioned where Wayne Bergeron (one of the top lead trumpet players) speaks about his neck swelling and what happened when he tied something around it. The story starts around 5 min in but I've sent the link to 1 min in as he speaks about his bad breathing when he was younger and says he thinks that's why he has the swelling. This could relate to me as I don't think I breathed and supported properly for years. <http://youtu.be/Jo1-xSD70rg?t=1m2s>'

exhausted quicker if playing in a position he is not used to for a prolonged time.

The presence of a normal barium swallow may be thought to make the diagnosis of laryngocele more likely however it is important that such a procedure is performed during valsalva or trumpet blowing to enable full assessment of the size of the defect and help in confirming diagnosis. This is highlighted in our case where the patient had multiple previous scans performed at rest which did not identify the cause of his symptoms.

The treatment options for both conditions depend on the associated symptoms. In asymptomatic patients, as in our case, conservative management is appropriate. The use of a truss or scarf has been documented in the literature to provide excellent symptomatic control of pharyngoceles and as such was advised for our patient while playing.¹⁰ Importance is also placed on good oral hygiene and healthy dietary habits to avoid bacterial overgrowth. Other conservative measures include adapting correct expiration techniques and posture and review by speech and language therapists for tailored exercises.⁸

Conclusions

Pharyngocele and laryngoceles are both very rare conditions. Both can present in musicians with asymptomatic neck swelling and can mimic each other closely. Imaging during valsalva can be used to confirm the diagnosis however a high index of suspicion is required to make a correct diagnosis. Many patients are often diagnosed with laryngoceles but close assessment on flexible nasendoscopy should be performed to visualise the origin of the sac. The importance in getting the correct diagnosis is illustrated by the potential for airway complications with laryngoceles. Asymptomatic patients can be managed conservatively with surgical options left for refractory cases or where patients remain symptomatic.

Learning points

- ▶ Pharyngoceles and laryngoceles can both be acquired during prolonged positive pressure such as playing blowing instruments.
- ▶ Distinguishing between them can be difficult but is important to enable formal airway assessment and monitoring.
- ▶ Asymptomatic patients can be managed conservatively with surgical options left for refractory or symptomatic cases.
- ▶ It may be that altering the way in which one plays or improving breathing technique will not only treat but also prevent this in trumpet players.
- ▶ Recognition in primary care with a high index of suspicion could help reduce the development of such conditions.

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