

# Hoarseness of voice: a case report on three different underlying causes

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## SUMMARY

**Hoarseness of voice is the alteration in the normal voice quality which may be due to structural or functional causes. It is a common condition, and it is mostly benign and self-limiting e.g., in post viral upper respiratory tract infections. However, persistent or progressive dysphonia needs to be evaluated to identify the underlying cause. Persistent hoarseness of voice is commonly feared to be due to malignancy. In this case report, we describe three patients with persistent hoarseness of voice who were investigated and found to have malignant and non-malignant aetiologies.**

## INTRODUCTION

Hoarseness of voice or dysphonia is a common condition that affects all age groups. Hoarseness is the symptom of altered voice reported by patients while dysphonia is the term used by the physician to describe altered voice.<sup>1</sup> The altered voice is often described as rough, weak or strained affecting the pitch, quality, loudness or effort of speech. There are many aetiologies for hoarseness of voice such as voice overuse, laryngitis of any cause, inhaled corticosteroid, hypothyroidism, vocal cord lesion or malignancy.<sup>1</sup>

Laryngopharyngeal reflux (LPR) and allergic rhinitis (AR) are some of the common non-malignant causes of hoarseness of voice. The symptoms of both these conditions often overlap. AR commonly presents with frequent sneezing, blocked nose, itchy red eyes, cough and hoarseness of voice while LPR mainly presents with hoarseness of voice, lump in the throat sensation, chronic cough, sore throat, postnasal drip (the need to frequently clear the throat) and difficulty in swallowing. The incidence of dysphonia in AR is about 44% while almost 100% of people with LPR will experience dysphonia.<sup>2</sup> Both these conditions occur due to inflammation of the upper aerodigestive tract and larynx. The inflammation of the larynx in AR is IgE mediated while in LPR, it is due to gastric acid reflux.<sup>3</sup>

Laryngeal carcinoma is a common malignant cause for hoarseness of voice. It is responsible for almost one third of the malignancies occurring in the head and neck region and accounts for about 1 to 5% of malignancies in Malaysia. People with history of tobacco use, alcohol consumption and oncogenic human papilloma virus (HPV) infection are at risk to develop laryngeal carcinoma.<sup>4</sup> Early detection of laryngeal carcinoma is vital as the 5-year survival for early-stage disease is about 60 to 80% and reduces to 40 to 50% for late-stage presentations.

Among the functional causes of voice hoarseness, puberphonia is a rare disorder which occurs in about 1 in 900,000 cases where the pubertal voice changes or voice break fails to occur resulting in a persistently high pitch voice despite adequate vocal cord growth.<sup>5</sup> Patients commonly complain of high-pitched voice beyond puberty which may be associated with intermittent hoarseness, unable to shout, experience vocal strain or fatigue. Other causes of puberphonia are non-fusion of the thyroid cartilage, increased laryngeal muscle tension, emotional stress, psychogenic factors and delayed puberty.

Since there are many causes for persistent hoarseness of voice, a sound knowledge of this condition is important as it can guide physicians towards a more systematic approach to the underlying aetiology and advocate appropriate management for these patients. We describe three patients of different age groups, who presented with different causes of dysphonia, how they were diagnosed and managed by a multidisciplinary team of experts.

## CASE PRESENTATION

### Case 1

A 45-year-old housewife presented with first episode of hoarseness of voice, associated with frequent sneezing and blocked nose for 8 weeks after an episode of upper respiratory tract infection (URTI). She also complained of a lump-like sensation on swallowing and frequently cleared her throat. Other symptoms such as reflux, cough, sore throat, dysphagia, difficulty in breathing, hearing loss, ear pain, discharge or vertigo were all absent. Past medical history revealed that she had frequent episodes of sneezing and nasal congestion since childhood. She had no other medical illness or allergies. She was a non-smoker and did not consume alcohol.

Clinically her voice was noted to be rough. The oropharyngeal examination showed mild congestion of pharynx. Neck and lung examination were unremarkable. She was referred to otolaryngologist for laryngoscopy examination to exclude any laryngeal pathology as a cause for prolonged hoarseness of voice. A flexible nasopharyngoscopy showed bilateral inferior turbinate hypertrophy with clear post-nasal discharge, cobblestoned posterior pharyngeal wall with diffuse laryngeal oedema, post commissure hypertrophy, oedematous arytenoids and thick endo-laryngeal mucus. With these findings, she was diagnosed to have chronic laryngitis secondary to AR and

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LPR. She was advised on lifestyle modifications to prevent acid reflux and was prescribed with loratadine 10 mg daily and mometasone nasal spray two puffs daily for AR. Esomeprazole 40 mg twice daily was prescribed for LPR. She was also referred to the speech and language pathologist (SLP) for advice on vocal hygiene. Her symptoms improved gradually after 8 weeks of treatment.

#### Case 2:

A 55-year-old retired man presented with a 6 month history of persistent hoarseness of voice after an episode of URTI. The URTI symptoms cleared after 2 weeks of treatment however the hoarseness of voice persisted. Other symptoms such as dysphagia, odynophagia, difficulty in breathing, neck swelling, haemoptysis, hearing loss, reflux symptoms and symptoms of hypothyroidism were all absent. Appetite and weight were normal. He had diabetes, hypertension and dyslipidaemia, for which he was on medication for the past 10 years. He did not consume alcohol but had a 30 pack-year history of smoking.

On examination, his vital signs were stable. His voice was notably deep. The oropharyngeal, neck and respiratory system examination were all unremarkable. He was referred to the otolaryngologist for evaluation of persistent hoarseness of voice. A flexible laryngoscopy revealed an infiltrative lesion on the right true and false vocal folds extending to the right piriform sinus suggesting malignancy. Contrast enhanced computed tomography (CECT) of the neck and thorax showed stage 4 glottic carcinoma (T4aNOMO). Biopsy of the lesion confirmed a moderately differentiated squamous cell carcinoma. He underwent surgery for total laryngectomy with bilateral neck lymph nodes dissection. Patient was scheduled for post-surgery radiotherapy however, he succumbed to the disease three months later.

#### Case 3:

A 19-year-old student complained of intermittent high and low-pitched (hoarseness) voice for 3 years. He was unable to control his voice fluctuations and it embarrassed him. There were no other symptoms such as cough, breathing difficulties, throat pain, difficulty in swallowing, reflux symptoms, voice strain or any ear related symptoms. Family history for malignancy, voice or laryngeal disorders were all absent. He was a non-smoker and did not consume alcohol.

On examination, his vital signs and oropharyngeal examination were all normal. He was referred to the otolaryngologist to rule out any pathology of the larynx. A flexible nasolaryngoscopy examination revealed a normal laryngeal anatomy and vocal cord mobility. With the history of persistent high pitch voice and intermittent hoarseness beyond 2 years from the onset of pubertal voice change, in the absence of laryngeal pathology suggested a functional cause leading to the diagnosis of puberphonia. He was then referred to the SLP team where he underwent biweekly voice training. After 4 months of therapy, there was some improvement with the voice pitch and control.

## DISCUSSION

Hoarseness of voice which fails to resolve or improve within 4 weeks warrants laryngeal examination. A patient can be referred for laryngeal examination earlier if a serious underlying pathology is suspected.<sup>1</sup> Having alarm features such as history of smoking, haemoptysis, fever, night sweats, ear pain (otalgia), noisy breathing (stridor), painful swallowing (odynophagia), difficulty in swallowing (dysphagia), neck mass, loss of appetite and weight require urgent assessment by the otolaryngologist.<sup>1,6</sup> Details of the underlying causes for persistent hoarseness of voice in the three cases described above are discussed in detail.

### Allergic Rhinitis and Laryngopharyngeal Reflux

AR is associated with inflammation (IgE mediated) of the larynx resulting in symptoms such as increased mucus secretion, hoarseness of voice, nasal congestion or obstruction. LPR on the other hand, occurs when gastric acid comes in contact with the laryngeal mucosa which may be due to dysfunction of the oesophageal sphincters (lower or upper), oesophageal peristalsis or resistance factors.<sup>1</sup> The acid, causes damage to the laryngeal mucosa resulting in symptoms such as hoarseness of voice, a sensation of lump in the throat, chronic cough, sore throat, postnasal drip and difficulty swallowing. A mention of gastroesophageal reflux disease (GERD) here, is also important as some of its symptoms and risk factors such as, consumption of coffee, alcohol, acidic or fatty food, large meal, smoking and obesity may overlap with LPR leading to possible misdiagnosis of this condition. However, hoarseness of voice is mostly absent in GERD.<sup>3</sup> The reflux symptom index (RSI) by Belafsky et al, is a simple questionnaire tool which can be used help to identify, assess severity and response to treatment in patients with LPR.<sup>3</sup>

Further, on assessment using the laryngoscope examination, a person with AR would show cobblestone appearance of the posterior pharyngeal wall, while those with LPR would most commonly (85%) show posterior laryngeal hypertrophy, granulomatous appearance, erythema, oedema of the vocal cords and thick laryngeal mucus.<sup>7</sup>

The mainstay of AR management includes oral antihistamine and intranasal corticosteroid. Management of GERD and LPR is almost similar which involves the initial lifestyle modifications such as low-fat diet, low acidic diet, small meals, refraining from lying down within 3 hours after meals, elevating the head end of the bed, reducing, or avoiding alcohol intake, stop smoking and weight reduction if patient is obese. Voice rest is a useful supportive measure, which includes abstaining from talking, whispering or singing. Vocal hygiene, which involves refraining from excessive throat clearing, avoid heavy lifting, straining at stool, avoiding irritants such as smoking, caffeine and alcohol is also advised.

The current clinical practice guideline on hoarseness (dysphonia) does not advocate the use of anti-reflux medication for clinically diagnosed LPR. However, there is a suggestion that, in the absence of alarm symptoms or voice abuse, a non-resolving dysphonia after 4 weeks of conservative measures based on education and preventive

strategies warrants a laryngoscopy evaluation for diagnosis and treatment.<sup>1</sup> The main medical management for GERD and LPR is similar, which is with a proton pump inhibitor (PPI). However, LPR requires more aggressive and longer treatment with PPI compared to GERD because the laryngeal structures are more vulnerable to damage even at a higher pH compared to the oesophagus. This is because the larynx lacks the protective acid diluting effect of the saliva in this region. Hence, it may take 3 to 6 months of treatment before laryngeal symptoms to resolve.<sup>8</sup> If LPR symptoms resolve within 6 to 8 weeks of therapy, then PPI can be titrated down and stopped. Other medications such as H2-receptor antagonists and alginates may also be used to treat LPR. Surgical intervention may be considered in cases where lifestyle modification and medical therapy have failed.<sup>8</sup>

### Laryngeal Carcinoma

Laryngeal carcinoma can be classified anatomically as supraglottic, glottic and subglottic types. Squamous cell carcinoma is the commonest cell type. Patients with localised lesions classically present with hoarseness of voice, pain on swallowing (odynophagia) and ear pain (referred otalgia).<sup>4</sup> Those with advanced lesions, may present with cervical lymphadenopathy and airway compromise. Treatment modalities for laryngeal carcinoma include single-modality radiotherapy or transoral laser microsurgery (TLM) for early-stage tumour or total laryngectomy with neck dissection followed by chemotherapy for disseminated metastasis.<sup>4</sup> Our patient in case two, presented late, after 6 months of persistent change in voice and had developed advanced laryngeal carcinoma (stage 4) which has a poorer prognosis. Those who undergo treatment with surgery or radiotherapy may experience a negative impact on their speech, swallowing or airway patency hence, they must be informed (informed consent) regarding the possible functional sequelae of treatment and followed up with post treatment rehabilitation with a SLP.

### Puberphonia

“Voice break” is the change in voice during puberty. It is the transition from the high pitch voice during childhood to a lower pitch to form the deep voice of adulthood. This change is more pronounced in males compared to females. Normally pubertal voice change occurs between the ages of 12 to 16 years in boys and between the ages 10 to 14 years in girls.

Pubertal voice development would normally complete within 2 years of onset in voice change. Adolescent males presenting with a persistently high-pitched prepubertal voice beyond 2 years of onset in voice change, warrants an otolaryngology review to rule out structural abnormalities of the vocal cords. In the absence of a structural pathology, referral to a SLP is required for voice assessment and therapy. Voice therapy is a conservative approach designed to eliminate harmful vocal behaviour and assist in vocal cord healing and control. The objective of voice training is to achieve laryngeal relaxation and voice pitch control. This is done by using techniques such as reading aloud and singing. Findings from a retrospective study show improvement in voice pitch by 78.9% and voice quality by 35.2% over one to ten months of voice therapy. However, successful voice therapy takes a long time and requires the combined effort of a motivated patient and a dedicated therapist.<sup>8</sup> Failing conservative approach,

suitability of a surgical approach may be considered after discussion with an otolaryngologist.

### CONCLUSION

Hoarseness of voice occurs most commonly due to laryngitis secondary to upper respiratory tract infection, in which case it usually recovers spontaneously within 1 to 2 weeks. Patients with persistent hoarseness of voice, not resolving within 4 weeks or with any red flag signs such as being a smoker, difficult or painful swallowing, noisy breathing, ear pain, haemoptysis, neck mass or constitutional symptoms warrant early referral to otolaryngologist for further evaluation and to rule out any underlying malignant pathology. Other non-malignant causes such as allergic rhinitis and puberphonia should be considered among people presenting with hoarseness of voice, based on the presence of other medical conditions and the time of onset of this condition e.g. at puberty. Hence, a detailed history is pertinent. The multidisciplinary team approach with an otolaryngologist and speech and language pathologist is essential to be able to identify the underlying causes of hoarseness of voice and to be able to manage as shown in the case report to help patient attain their normal voice.

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### DECLARATION

The authors declare no actual or potential conflict of interest in relation to this article

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