

Dysphonia: the voice of change

Voice change is common with advancing age and its causes are frequently multifactorial. It can be disabling and/or an indication of serious disease that needs to be detected and appropriately managed through a team approach. **Nimesh Patel** discusses the causes of dysphonia, the physiological changes that can precipitate the condition and the care of the elderly patient suffering from it.

Voice change is common with advancing age; these changes can range from asymptomatic to profoundly disabling. Understanding some of the causes, and in particular the physiological voice changes that occur in ageing, can help identify those patients that need investigation and further treatment. A timely and team-based approach to voice care can deliver excellent results.

Production of voice

The vocal folds vibrate with expiration creating a source sound. This is modified by the remaining vocal tract (including the supraglottic larynx, the pharynx, tongue, lips, nose and paranasal sinuses) to create the voice heard by the listener. The production of a voice is a multisystem process that depends upon vibratory and acoustic properties of the vocal tract, neuromuscular co-ordination and respiratory control. The acoustic characteristics of the voice change with the physical changes in the vocal tract occurring in physiological ageing¹. The effect varies between people but is less noticeable in trained, professional voice users such as actors. In males there is a raising of pitch from middle age onwards, and in females a decrease². Features noted by listeners to be characteristic of an ageing voice are breathiness, weakness, tremulousness, roughness and hoarseness^{3,4}. Thus it may prove

difficult to distinguish between age-related changes and vocal pathology. Patients may complain of an inability to complete specific tasks, such as 'singing in the choir' or 'being heard in the presence of background noise'. Patients less commonly complain of the quality of voice or the change in pitch. There is often significant anxiety about the possibility of cancer.

Voice-related handicap

An impaired voice, as with other impairments, does not necessarily relate to significant handicap. Thus it is important to ascertain the vocal needs of the patient – some elderly patients do not place great demands upon their voices and therefore will accept age-related vocal changes without complaint. Others, for example singers, will be concerned about minimal changes in vocal quality. In palliative care, there is evidence that dysphonia secondary to vocal fold palsy from neoplasia (often lung or breast) is one of the most important negative effects on quality of life⁵. Accepting that there are vocal changes with ageing, when should one be concerned and arrange further assessment? Significant vocal handicap should prompt further investigation, as should persistent hoarseness, for a period greater than six weeks. Sudden change in voice, especially breathiness, can be a key symptom. Other 'red flag' symptoms are stridor,

difficult breathing, haemoptysis, persistent pain and (referred) otalgia.

Assessment of voice

When seen by the ear, nose and throat team, patients should undergo full history and examination. The latter demands thorough head, neck, ear, nose and throat examination with visualisation of the larynx. Endoscopic assessment of the larynx should be a minimum standard of care. This can be safely performed in almost all patients with little discomfort. This occurs in the outpatient department under local anaesthesia, if necessary. Videostroboscopy employs a flashing light to give the perception of slow motion allowing an even more detailed assessment of the larynx⁶. Further evaluation might include a voice-related quality of life assessment, acoustic analysis of voice and grading by a trained listener using standardised perceptual grading scales.

Causes of dysphonia

There are four main causes of voice disorder in the elderly, although in many patients dysphonia will be multifactorial⁷⁻⁹. The main causes are:

- > voice changes secondary to systemic disease;
- > presbyphonia;
- > laryngeal pathology; and
- > vocal misuse.

Voice changes and systemic disease

A multitude of systemic diseases have manifestations affecting the voice. Many of these conditions are more prevalent in the elderly. Respiratory disease affects the expiratory volumes and breathing co-ordination necessary for voice production. Chronic cough causes laryngeal trauma-inflammation. Optimal management of the underlying respiratory condition is essential. In addition, there is evidence steroid inhalers can cause vocal fold damage and contribute to dysphonia¹⁰. Use of spacer devices and gargling after steroid inhalers is recommended. Hypothyroidism can cause voice deepening and hoarseness. This results from vocal fold thickening due to submucosal mucopolysaccharide deposits. Early treatment with thyroxine can be effective in reversing these changes. Neurological disorders, such as Parkinson's disease and stroke, can result in dysphonia. In Parkinson's disease patients often have a weak breathy monotone, a delayed voice onset, and an increase in pitch and roughness.

Table 1. Good voice health (vocal hygiene)

Use your voice without effort:
> no shouting
> no whispering
> do not overuse your voice
Avoid irritants:
> do not smoke
> do not drink spirits
> avoid caffeine
> avoid very spicy foods
> avoid dusty and dry atmospheres
Maintain hydration
Avoid throat clearing

After Matheison (2001)⁴

Medical treatment of the systemic disorder will improve symptoms and therapy has a role to play¹¹. Surgical intervention has been advocated (eg, implant injections to bulk up the vocal folds) but these have been poorly controlled studies¹¹. Due to the complex interrelationship between phonation, voice/speech and language, stroke can result in complex disorders of communication. Dysphonia is likely to be under recognised¹² so the role of the speech and language therapist is central in assessment and treatment. Where unilateral vocal fold palsy exists early surgical intervention might reduce aspiration as well as improve the voice^{13,14}. Gastro-oesophageal reflux to beyond the upper oesophageal sphincter results in laryngopharyngeal inflammation secondary to acid and/or pepsin. This has been implicated in a wide range of laryngeal pathologies. The most effective treatment is full dose proton pump inhibitor (eg, omeprazole 40mg, once daily, per os) for six weeks¹⁵.

Presbyphonia

In the absence of other laryngeal disease, where there is a marked deterioration of voice function associated with age the term presbyphonia may be applied. As a cause of vocal disease in the elderly it is relatively uncommon and other pathological processes should be carefully excluded⁹. Once the diagnosis is established, speech therapy is the mainstay of treatment. Specific vocal exercises are advised, depending upon the particular features of the dysphonia and laryngeal appearances at endoscopy. Many of these are aimed at muscle strengthening as laryngeal muscular atrophy is a feature of the senile larynx. Vocal hygiene measures as in *Table 1* are advised.

Key points

- > Voice changes occur with advancing age and they can be disabling.
- > Causes include physical ageing of the vocal tract; changes secondary to other illness; vocal misuse due to compensatory behaviour; or laryngeal disease.
- > Where appropriate, assessment and management by a multidisciplinary approach can achieve excellent results.

Laryngeal pathology: neurological

One of the most frequent causes of dysphonia in the elderly is vocal fold palsy^{8,9}. This can be due to a number of causes. Investigation involves endoscopy and CT scanning from skull base to mediastinum to identify any lesions along the course of the recurrent laryngeal nerves. If the paralysed vocal fold rests in a lateralised position there will be a significant glottic gap and the contralateral vocal fold may not be able to close this. The voice is characteristically breathy and weak. There may be choking/aspiration and the cough may also be weak. Therapy can be helpful, but surgical medialisation of the paralysed vocal fold is very effective⁵. This can be performed endoscopically or externally; under local or general anaesthesia. Benign vocal fold lesions include polyps, oedema, nodules and cysts of multiple aetiologies, especially smoking and muscle tension. They often respond well to a combination of speech therapy and endoscopic microsurgery. Laryngeal cancer – the most common form of head and neck cancer – has an incidence of about 10 cases per 100,000 people per year. Squamous cell carcinomas are the most common. Patients invariably present with dysphonia as a cardinal symptom. With later presentation there may be pain, haemoptysis, stridor, referred otalgia, dysphagia and cervical lymphadenopathy. Management is necessarily multidisciplinary and may involve radiotherapy, chemotherapy, endoscopic laser resection or radical organ sacrificing surgery (laryngectomy). Outcomes in the elderly are good, but age is a negative independent prognostic factor¹⁶.

Vocal misuse (muscle tension dysphonia)

This is a hyperfunctional voice disorder that results

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from inappropriate vocal behaviour causing excessive strain on the vocal tract. There can be damage to the vocal folds from this strain resulting in vocal fold lesions such as nodules. There is generally multifactorial aetiology including psychosocial issues, occupational strain, and laryngeal irritation. Treatment is by speech therapy and vocal hygiene (*see Table 1, p64*).

Conclusion

There are increasing numbers of elderly patients presenting with voice complaints. This is in part due to the increase in the elderly population, and a healthy and more active elderly population places greater demands on their voice. An appreciation of voice changes due to ageing and also potential vocal pathology helps the clinician promote good vocal health and appropriately manage the elderly dysphonic patient.

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