

# Vocal cord dysfunction and dysfunctional breathing: an evolving clinical paradigm

BY RAVI THEVASAGAYAM

Patients frequently present to the ENT department with breathing difficulties. The entity of 'vocal cord dysfunction' (also known as paradoxical vocal cord movement, inducible laryngeal obstruction, and many other names) is increasingly well recognised. **Ravi Thevasagayam** gives us an overview.

**O**ur vocal cords and their movement are immensely complex. They abduct when we breathe in and close when we swallow or Valsalva. They close slightly when we expire and come together in a complex dance when we speak. When we cough, they close and then open explosively. Ultimately our vocal cord movements must mirror the phase of our respiratory muscles but, to complicate matters, both our vocal cords and muscles of respiration are under autonomic and voluntary control.

If the vocal cords are not completely abducted during inspiration then patients may experience dyspnoea or choking. Many terms are used to describe this phenomenon, including 'paradoxical vocal cord disorder' and 'exercise induced laryngeal obstruction' (EILO) but 'vocal cord dysfunction' (VCD) is a useful umbrella term that encompasses a number of clinical entities that, ultimately, are a manifestation of mobile vocal cords that impede airflow by being out of phase with respiration.

Vocal cord dysfunction may be thought to be a sub group of a wider group of conditions known as dysfunctional breathing. This is a group of conditions where alterations in the normal biochemical patterns of breathing cause inefficient movement of air, which may be structural or functional [1].

## Symptoms

Patients describe a sudden onset of breathlessness, which is typically inspiratory, and often point to their throat when describing the problem. If brought on by exercise then resting resolves the problem: it is often confused with exercise induced asthma. There may be an audible stridor. Whilst the symptoms are often short-lived, severe stridor can occur. Although the presentation can be very dramatic, objective

measure of hypoxemia may not be consistent with the clinical picture and repeated intubation and even tracheostomy are sometimes performed [2]. There appears to be a female preponderance [3].

## Associated conditions

### Asthma

Asthma may also be present, which may confuse the clinical picture and explain why asthma therapy may produce some improvement. Up to 75% of children with refractory asthma may have VCD [4]. That said, inhaler therapy may have an irritant effect on the larynx and worsen VCD.

### Reflux

There does appear to be an association between reflux and VCD but the strength of that association is complicated by a lack of consensus about what actually constitutes extra-oesophageal reflux.

### Nasal disease

Postnasal drip is also thought to be associated with VCD and this, like reflux, may cause vocal closure as a protective response to noxious stimuli. Nasal congestion may promote mouth breathing, which may exacerbate VCD.

## Psychological factors

These have long been known to play a role in VCD. The early descriptors such as 'Munchausen's stridor' and 'hysterical croup' attest to this. The original description involved women who were subject to abuse [5]. It had been thought that VCD was essentially a somatisation disorder: whilst there are multiple case reports like this, it seems likely that the majority of cases are not. That said, clinical experience seems to suggest that stress, anxiety and psychological wellbeing do play a role, the exact nature of which remains difficult to characterise.

**"Clinical experience seems to suggest that stress, anxiety and psychological wellbeing do play a role, the exact nature of which remains difficult to characterise."**

## “Awake flexible fiberoptic laryngoscopy is the most helpful investigation but a standardised evaluation of the findings has not been agreed upon.”

### Assessment

There is no gold standard. The history is crucial and an awareness of the potential diagnosis is helpful. Exclusion of a potential structural lesion is important. VCD is indicated by the paroxysmal and inconsistent nature of the symptoms. Awake flexible fiberoptic laryngoscopy is the most helpful investigation but a standardised evaluation of the findings has not been agreed upon. Certainly, erratic vocal cord movement, particularly with vocal cord closure on inspiration, is highly indicative. True ‘paradoxical’ cordal movement is, in my experience, not common. A variant of laryngomalacia is sometimes seen with indrawing of the epiglottis on inspiration. A normal flexible laryngoscopy does not exclude VCD. In cases where the symptoms are exercise-induced, it is useful to run the patient on a treadmill in order to provoke an attack, and then perform a laryngeal examination. It is helpful to get a respiratory physician to assess the patient. A provocation test with spirometry is often beneficial to try and determine if asthma is present.

If there is any suspicion of an

underlying structural airway lesion (particularly in children), then a microlaryngotracheobronchoscopy examination should be considered.

### Treatment

Explaining the diagnosis and reassuring the patient that they will not choke, has a powerful therapeutic effect. Asthma therapy should be optimised; conversely, inhalers should be stopped if the evidence for asthma is poor. It is often helpful to address reflux and rhinitis if present. Issues around psychological wellbeing are often worth exploring, and potential therapy from clinical psychologists, psychiatrists or counsellors sought, if appropriate.

The mainstay of treatment is breathing therapy or speech and language therapy to promote controlled diaphragmatic breathing and improve vocal ‘hygiene’. During acute attacks, nasal sniff inspiration techniques can be taught which are potent vocal cord abductors.

### Conclusion

Vocal cord dysfunction is an increasingly recognised disorder in ENT clinics. A high level of suspicion is important, especially as the laryngeal examination may be normal. There are often multiple factors at play, including reflux, nasal disease, anxiety and asthma, and the management must be tailored to the individual patient. Whilst making the diagnosis is potentially time consuming, especially if a provocation test is required, the potential for a good clinical result is excellent and a full return to normal function is the expected outcome of therapy.

### References

1. Barker N, Everad M. Getting to grips with ‘dysfunctional breathing’. *Paediatric Respiratory Reviews* 2015;**16**(1): 53-61.
2. Leo R, Konakanchi D. Psychogenic Respiratory Distress: A case of Paradoxical Vocal Cord Dysfunction and Literature Review. *Primary Care Companion J Clin Psychiatry* 1999;**1**:39-46.
3. Maturro S, Hill C, Bunting G, et al. Pediatric Paradoxical Vocal-Fold Motion: Presentation and Natural History. *Pediatrics* 2011;**128**(6):1443-49.
4. Brugman S. The many years of vocal cord dysfunction: What 36 years of literature tells us. *Am J Respir Crit Care Med* 2003;**167**:A588.
5. Christopher K, Wood R, Eckert R et al. Vocal-cord dysfunction presenting as asthma. *New Eng J Med* 1983;**308**:1566-70.



**Ravi Thevasagayam,**

Consultant ENT Surgeon, Clinical Lead, Department of ENT, Sheffield Children's Hospital, Sheffield, S10 2TH, UK.

E: [ravi.theva@sch.nhs.uk](mailto:ravi.theva@sch.nhs.uk)

Declaration of Competing Interests: None declared.

### ABOUT THE AUTHOR

Ravi Thevasagayam is a consultant ENT surgeon at Sheffield Children's Hospital and Sheffield Teaching Hospitals. He is an honorary lecturer at the University of Sheffield and is Phase 3B Otolaryngology Lead for the Sheffield Medical School. He has an interest in paediatric and adult airway surgery. He runs the Sheffield Vocal Cord Dysfunction Clinic as well as the Sheffield Multidisciplinary Aerodigestive Regional Team (SMART) which promotes joined up care for children with airways disease. He is also lead faculty for the Sheffield Paediatric Airway Registrar Course. He is council member for BAPO.