Factors Affecting Correct Diagnosis of Paradoxical Vocal Fold Motion

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Abstract

Paradoxical Vocal Fold Motion is a laryngeal disorder where sudden, inappropriate adduction of the true vocal folds during inspiration causes dyspnea. Due to the respiratory distress found with this disorder, it is often misdiagnosed for asthma and a correct diagnosis is often not made until after the patient has undergone costly office visits, procedures, and pharmaceutical interventions (Ibrahim et. al, 2007). It may take years of inappropriate treatment with no benefit to receive a correct diagnosis for this disorder. Though the exact cause of PVFM is idiopathic, four main pathogenetic mechanisms have been suggested in the literature: laryngeal hypersensitivity, altered autonomic balance, direct stimulation of the sensory nerve endings in the upper or lower respiratory tract, and hyperventilation (Patel et. al, 2015). The aim of this poster presentation is to provide education on how to identify traits of PVFM differentially from asthma, to learn the triggers and causes of this disorder, and how to manage the symptoms of PVFM.

Asthma vs. PVFM Symptoms

Asthma	PVFM
Chest tightness	Throat tightness
No inspiratory stridor	Inspiratory stridor
Trouble on exhale	Trouble on inhale
Sputum production	Sputum production rare
Awaking from sleep	No symptoms when asleep
Good response to bronchodilators	No response to bronchodilators
Hypoxemia	Hypoxemia rare
Normal laryngoscopy	Abnormal laryngoscopy (inspiratory adduction)

Etiology

The exact cause of PVFM is idiopathic; however, four pathogenetic mechanisms have been suggested in the literature (Ibrahim et. al, 2007):

- Laryngeal hyper-responsiveness
    - Excursion
    - Strong smells
    - Postural changes
    - Temperature changes (hot to cold food or air/cold to hot food or air)
- Altered autonomic balance
    - The medulla, midbrain, and the prefrontal cortex are polysynaptically linked to the larynx
    - Both true and false vocal folds receive motor innervation from the CN X but sensory information is derived from M3 muscarinic receptors in the laryngeal mucosa via CN X to the medulla
- Direct stimulation of the sensory nerve endings in the upper or lower respiratory tract
- Hyperventilation

A study done by Ayers and Gabbott described that the most plausible hypothesis regarding pathogenesis of PVFM may be caused by laryngeal hyper-responsiveness initiated by an initial inflammatory insult and resulting in altered autonomic balance. If persistent, subsequent stimuli (such as psychological stresses or cold air) will induce local presynaptic reflexes causing airway narrowing, either at the glottic level or in patients with asthma in the lower airways (Ayers and Gabbot, 2002).

References

Treatment

Treatment for PVFM often requires a multidisciplinary approach and the management of associated factors such as reflux, allergies, sinusitis, asthma, and anxiety. Direct voice treatment is focused on maintaining an adequate airway opening during respiration and indirect treatment is focused on modifying behaviors that affect the voice.

Direct Treatments:

- Relaxed Breathing Exercises (Patel et. al, 2015):
    - One of the following combinations to be performed 10 times each, 3-5 times per day:
        - In through nose, out through pursed lips.
        - In through nose, out on /sh/.
        - In through pursed lips, out on /sh/.
        - Double sniff through nose, out through pursed lips
- Exercise-induced Laryngeal Obstruction Biphasic Inspiratory (EILOBI) (Johnston & Olin et. al, 2018):
    - Two phases of the inspiratory cycle:
        1. Breath in through an /f/ shape for first half of inspiration
        2. Open wide in an /a/ shape for second half of inspiration.
    - Perform this exercise during exertion-induced episodes once per several breathing cycles to force vocal folds open for proper inhalation.

Indirect Treatments:

- Patient education
- Relaxation
- Reassurance
- Vocal hygiene recommendations

Conclusion

PVFM is a multi-faceted disorder that requires a multidisciplinary team approach to diagnose and treat. Considering the similarity between clinical presentations of asthma, PVFM, and other upper airway conditions, speech-language pathologists must be aware of the common complaints, symptoms, clinical presentations, and patient profiles of both children and adults with PVFM and should make appropriate referrals of suspected cases for additional assessment (Patel et. al, 2015).

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