Vocal Cord Dysfunction (VCD) Paradoxical Vocal Fold Motion

What is it?

Assessment

Differential Diagnosis

Management

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What is VCD?

- **Paradoxical vocal fold motion (PVFM)** or **vocal cord dysfunction (VCD)** is a laryngeal disorder that is characterized by adduction of the vocal folds during inhalation and/or exhalation, resulting in restricted airway and respiratory distress.
- Functional disorder often mimicking asthma
- Demographic patterns identified in the literature include
  - High female predominance
  - School age children and adolescents often high-achieving
  - Competitive athletes

Dunn, et. al. (2015); Patel, et. al. (2015)

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History of VCD/PVFM

- PVFM dates back to 1842 when referred to as a dysfunction of the laryngeal muscles sometimes seen in “hysterical women”
- PVFM was first visualized during laryngoscopy in 1869 by MacKenzie
- More than 70 terms have been used to describe abnormal movement of true vocal folds during respiration, including Munchausen’s stridor, psychogenic stridor, functional airway obstruction, fake asthma, transient laryngeal dyskinesia, and spasmodic croup
- Today, paradoxical vocal fold motion and vocal cord dysfunction are the most common terms in describing this condition, and will be used interchangeably during this presentation

Dunn, et. al. (2015); Patel, et. al. (2015)

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What do I look for?

- Clinical presentation:
  - Mild to severe episodes of dyspnea, without pulmonary disease
  - Stridor typically upon inspiration, but occasionally upon expiration or both
  - Accompanied laryngeal symptoms, i.e. cough, hyperfunction during phonation
  - Reports of triggers
- Patients complaints: air hunger (increased difficulty getting air in), choking sensation/tight feeling in throat, chest tightness, difficulty swallowing, globus sensation, intermittent aphonia or dysphonia, fatigue and throat clearing.
- Onset of symptoms may elicit fear, panic, and anxiety increasing respiratory distress

Dunn, et. al. (2015)

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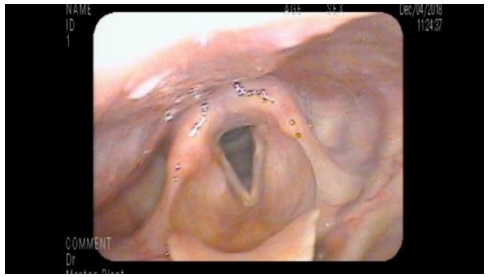
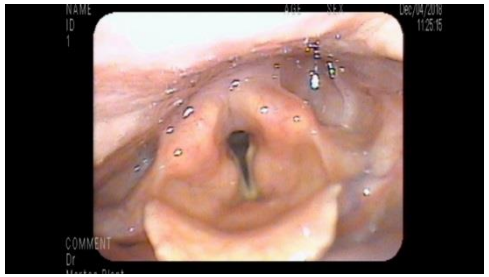
Assessment of VCD/PFVM

- Gold standard is endoscopic evaluation with direct visualization of the vocal fold during acute attack or following bronchoprovocation challenge with methacholine
- Exertion or noxious stimuli are commonly employed to increase likelihood of capturing an episode

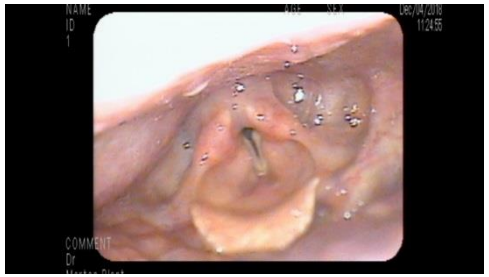
Reitz et. al. (2014)



Abduction



Paradoxical vocal fold motion

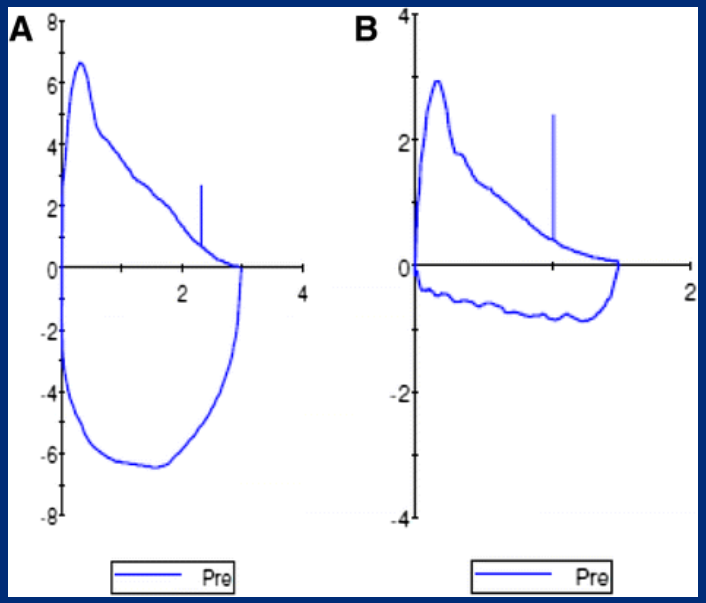


Paradoxical vocal fold motion following exertion

Assessment of VCD/PFVM

Pulmonary function testing

a Normal flow volume loop in asymptomatic patient. **b** Example of flattening, early truncation and saw-tooth pattern of inspiratory limb of flow volume loop in a patient with vocal cord dysfunction



Dunn, Katial, and Hoyte 2015

Assessment of VCD/PFVM

- Assessment of symptoms:
  - Good history – ask the right questions
  - VCD-Q by Fowler and colleagues
    - 12-item questionnaire as a tool for assessment and symptom monitoring during and after treatment
  - Pittsburgh Vocal Cord Dysfunction Index by Traister and colleagues
    - A scoring system to distinguish VCD from asthma
    - Cutoff score of greater than or equal to 4 to distinguish VCD from asthma and other causes of stridor
    - Found to have a high predicative value for the presence of VCD
    - High false negatives noted in study

Russell, et. al. (2013)

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Speech Therapy Assessment

Complete voice evaluation

- CAPE-V – see attached
- Examination of the oral mechanism
- Thyrohyoid space _____, Pain R ____, Pain L _____.
- Mean fundamental frequency on sustained /a/
- Pitch range
- Average phonation time for /a/
- The s/z ratio was (norm less than or equal to1.0)
- Respiration is supportive/not adequate for voice
- Rate of speech, Vocal intensity, and vocal resonance were-
- General body posture and head and neck tone – tight/tense or relaxed

See attached for voice norms

Additional information pertaining to VCD

- Ask pertinent questions
- Identify symptoms
- Identify triggers
- Identify responses – that relieve or exacerbate the problem

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Triggers

- Normally the vocal cords abduct widely during inhalation
- VCD likely due to laryngeal hyperresponsiveness with increased sensitivity of the laryngeal sensory receptors and heightened response of the glottic closure and cough reflexes the a number of triggers.

Dunn, et. al. (2015)

Common Triggers

- Exercise
- Emotional stressor
- Upper respiratory infection
- Occupatio nal exposures
- Talking
- Laughing
- Singing
- Acid reflux
- Cough
- Food
- Post nasal drip
- Weather changes

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Differential Diagnosis

If it looks like a duck, and sounds like a duck…..isn't it a duck??

Not Necessarily!

Use a team approach…..

- Otolaryngologists
- Pulmonologists
- Cardiologists
- Gastroenterologists
- Allergy/immunologists
- Psychologists
- Speech-Language Pathologists

Reitz, et. al. (2014)

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Differential diagnosis of laryngeal movement disorders

- Subglottal narrowing
- Vocal cord paresis/paralysis
- Laryngospasm
- Infectious- i.e. laryngitis, epiglottis, bronchiolitis, RSV, laryngotraceobronchitis
- Rheumatologic
- Neoplastic- head and neck malignancy, papilloma
- Endocrine – thyroid goiter
- Traumatic injury
- Allergic - anaphylaxis
- Neurological, i.e. brainstem compression, UMN injury, LMN injury, MS, postpolio, multiple system atrophy, myasthenia gravis, Parkinson's disease, adductor laryngeal breathing dystonia
- Pulmonary – i.e. asthma, COPD, foreign body aspiration
- Congenital – i.e. laryngomalacia, laryngeal cleft, subglottic stenosis, laryngeal web
- Occupational – inhalation injury
- Exercised induced laryngomalacia
- Paradoxical arytenoid movement
- Supraglottic tissue collapse

Dunn et. al. (2015); Murry et. al. (2016)

Don’t forget…..many of these diagnoses can overlap and co-occur

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Characterization, localization, and common causes of stridor

- **Inspiratory Stridor (typically laryngeal)**
  - Bilateral (medial position) vocal fold paralysis
  - Swelling/edema due to fungal, bacterial, or viral infection
  - Obstructing benign growths (i.e. papillomas, cysts, granulomas)
  - Obstructing (supraglottic, glottic, or infraglottic) laryngeal cancer
  - Glottic stenosis (i.e. subglottic stenosis, webbing)
  - Paradoxical vocal fold movement (PVFM)
- **Inspiratory and Expiratory (biphasic) stridor (typically tracheal)**
  - Extrinsic compression (i.e. neck masses such as thyroid carcinoma)
  - Mediastinal compression (i.e. thymic tumors, esophageal or lung cancer)
  - Laryngeal obstruction without tracheal involvement
  - PVFM with asthma
- **Expiratory Stridor (wheezing; typically intrathoracic)**
  - Asthma
  - Chronic obstructive pulmonary disease (COPD)
  - Benign and malignant tumors at or near the thoracic inlet

Koufman, Block (2008)

Management of VCD

- Requires establishment of correct diagnosis
- Once the diagnosis is confirmed – first step is to reassure patient the condition is benign and self limited
- Often a multidisciplinary approach involving:
  - Physicians
  - speech therapists
  - psychologist/psychiatrist
  - athletic trainers

Dunn et. al. (2015)

Speech therapy treatment

- Patient education
  - Educate patient on disorder
  - Allow patient to view laryngoscopy findings
  - Provide supportive counseling
- Educate regarding suppression of laryngeal abusive behaviors, i.e. coughing/throat clearing; reflux
- Voice therapy if warranted (i.e. relaxation/resonance)
- Respiratory retraining
- Desensitization to specific irritants
  - Relaxed breathing with exposure to noxious odors
  - Relaxed breathing with physical exertion
- Respiratory retraining/ modified breathing techniques
  - Pursed lip breathing with abdominal support with focus on relaxation
    - Slow inhalation through the nose; slow exhalation via rounded and pursed lips
    - Inhalation and exhalation through pursed lips (straw sip); exhalation can be done with /s/ or /sh/ or /f/
    - See attached patient education handout
  - Per Hicks et. al. (2008) practice five repetitions 20 times per day
  - Relaxed throat breathing
  - Panting
  - Vocal hygiene
  - Biofeedback

Reitz, et. al. (2014); Blager (1995)

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In Summary

- VCD is manageable in both inpatient and outpatient settings
- Work collaboratively with physicians to obtain accurate diagnosis
- Don’t be afraid to trial management strategies during evaluation to gain information
- Ensuring confidence in patient’s ability to gain control of breathing may help to keep them out of the ER
- Refer to ENT on an outpatient basis and to speech therapy (outpatient) when discharging from inpatient setting

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