Asthma and Vocal Cord Dysfunction
Not All that Wheezes is Asthma

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Disclosures

• All-American Allergy Alternatives, LLC, President, Majority shareholder.
Objectives of VCD Lecture

- Review the definition of vocal cord dysfunction (VCD)
- Review the history and variability of the terminology
- Understand common presentations of VCD
- Understand the keys to diagnosis of VCD
- Understand accepted treatment approaches for VCD
- Review closely related symptoms and conditions that can provoke or be associated with VCD
Outline of VCD

- Introduction
- History
- Common presentations
- Diagnosis
- Treatment
Introduction

• Vocal Cord Dysfunction (VCD) is a condition where the larynx exhibits paradoxical vocal cord adduction during inspiration, resulting in any number of symptoms that would be expected from extra thoracic airway obstruction.

• The diagnosis of VCD is being made with increased frequency as physicians are becoming more aware of its prevalence.

• Many patients with VCD have carried the diagnosis of refractory asthma and have been treated with common management treatment plans, including steroids, bronchodilators and with acute exacerbations have even received intubation or tracheotomy.

Murray, Lawler. All that Wheezes is Not Asthma, Anesthesia, 1998; 53:1006-1010
History of VCD

- Intermittent vocal cord dysfunction presenting as asthma was first recognized in a medical textbook in 1842 where Dunglison[1] described disorders of the laryngeal muscles brought on by “hysteria”.
- In 1869, Mackenzie[2] actually visualized the vocal cords in hysteric adults with stridor and saw them paradoxically close during inspiration. He elicited this closure as the cause of the stridor.
- William Osler[3] later defined this condition in 1902 by describing patients with “Spasms of laryngeal muscles” occurring during inspiration and times of great distress. Osler described patients as presenting with “extraordinary inspiratory or expiratory cries”, and often with cyanosis. During this period the cause for PVCM was considered purely psychogenic, as it was only described in patients presenting with hysteria or during times of great stress.

History of VCD

• Downing et al in 1974 first described VCD as “Factitious Asthma”
• Munchhausen’s Stridor was introduced in 1982 by Patterson et al
• Because of the lack of a known organic etiology, PVCM was a topic confined to the psychiatric literature; literature that published virtually nothing on the topic until the 1980’s when the first case reports and case series began to emerge.
• 1983 Christopher et al, NEJM present a case study of 5 patients that had VCD that presented as asthma and had adduction of the glottis with “posterior chink”.
• In 1983, a group of patients who were said to have “uncontrolled asthma”, were seen at National Jewish Health for evaluation. A multidisciplinary team of medical professionals including pulmonologists, otolaryngologists, and speech language pathologists were able to accurately identify the condition and provided treatment for what we now know as VCD.
• 1996 a proposed VCD Diagnostic criteria was proposed by Wood and Morgan in JACI
• 2007 Guidelines for the Diagnosis and Management of Asthma from the NHLBI NAEPP EPR 3 report that VCD should be considered
• 2010 Morris and Christopher, Chest; 138:1213 proposed the term Periodic Occurrences of Laryngeal Obstruction, “POLO” to replace the term VCD.
Terminology

- Pseudo asthma
- Nonorganic airway obstruction
- Functional upper airway obstruction
- Spasmodic croup
- Emotional laryngeal wheezing
- Episodic laryngeal dyskinesia
- Episodic laryngeal obstruction
- Munchhausen’s Stridor
- Vocal Cord Dysfunction

- Episodic paroxysmal laryngospasm
- Irritable larynx syndrome
- Paradoxical vocal cord motion
- Factitious asthma
- Psychogenic upper airway obstruction
- Psychogenic stridor
- Paroxysmal vocal cord dysfunction (PSVD)
VCD Symptoms

- Shortness of breath
- Chest tightness
- Throat tightness
- Chronic cough
- Frequent throat clearing
- Intermittent hoarseness
- Wheezing
- Stridor
- Difficulty with inhalation/exhalation
- Feeling of “breathing through a straw”
Differential Diagnosis

- Anaphylaxis
- Angioedema
- Asthma
- Epiglottis
- Hypoparathyroidism
- Laryngomalacia
- Foreign Body
- Tracheal stenosis
- Vocal cord paralysis
- Vocal cord tumors
2007 Guidelines for the Diagnosis and Management of Asthma from the NHLBI NAEPP EPR 3

- VCD can mimic asthma, but is a distinct disorder
- Asthma medications typically do little, if anything, to relieve VCD symptoms
- VCD may coexist with asthma
- Variable flattening of the inspiratory flow volume loop on incentive spirometry is strongly suggestive of VCD
- Diagnosis of VCD is from indirect or direct vocal cord visualization during an episode, during which abnormal adduction of the vocal cords can be documented
- VCD should be considered in patients with difficult to treat, atypical asthma and in elite athletes who have exercise related breathlessness unresponsive to asthma medication
VCD Diagnosis

- Laryngoscopy
- Spirometry
- Clinical evaluation

- Based on the symptoms of VCD, patients may be misdiagnosed and treated for asthma alone.
- It is important to note that asthma and VCD may co-exist.
- Some patients with VCD will NOT have asthma.
VCD Diagnosis

• VCD is a syndrome in which inappropriate vocal cord motion produces partial airway obstruction, leading to subjective respiratory distress.

• When a person breathes normally, the vocal cords move away from the midline during inspiration and only slightly toward the midline during expiration.

• However, in patients with vocal cord dysfunction, the vocal cords move toward the midline during inspiration or expiration, which creates varying degrees of obstruction.
Laryngoscopy

- Normal abduction
- Normal phonation
- VCD

Medscape: Source American College Nurse Practioners 2010 Elsevier INC.
### Medscape

#### Best Pre vs. Post BD Test Results

<table>
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<tr>
<th>Expiratory Results:</th>
<th>Pred</th>
<th>BEST PRE% Pred</th>
<th>BEST POST% Pred</th>
<th>%Chg</th>
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<tr>
<td>FEV3/FVC</td>
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<td>PEFR (L/s)</td>
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<tr>
<td>Qc Exp time (s)</td>
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<tr>
<td>Qc Vext (%)</td>
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<td>3.00</td>
<td>2.5%</td>
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</tbody>
</table>

#### Test comments (Pre):
- Bronchodilator: 2 PUFFS PROAIR

#### Test comments (Post):
- Bronchodilator: 2 PUFFS PROAIR

#### FVC Flow vs. Volume, Best Pre vs Post BD

#### FVC Volume vs. Time, Best Pre vs Post BD

### Interpretation:
NORMAL SPIROMETRIC VALUES indicate the absence of any significant degree of obstructive pulmonary impairment and/or restrictive ventilatory defect. Bronchodilator therapy was administered followed by repeat spirometric testing. Post-bronchodilator testing failed to demonstrate a significant change in FVC, FEV1, or FEF 25-75. This indicates that this patient may not benefit from continued bronchodilator therapy.

Source: American College of Nurse Practitioners © 2010 Elsevier Inc.
VCD Presenting as Asthma

http://www.youtube.com/watch?v=kCAUoc-3QZQ
Common Precipitating Factors

- Upper respiratory infections
- Exposure to airborne irritants (e.g. pollution, chemical, allergens)
- Rhinosinusitis
- Post-nasal drainage
- Gastroesophageal reflux (GERD)
- Laryngopharyngeal reflux (LPR)
- Strong odors
- Cigarette smoke
- Fire smoke
- Chronic cough
- Frequent throat clearing
- Stroke
- Brain tumor
- Head injury
- Exercise
- Exertion
- Singing
- Laughing
- Environmental changes (e.g. cold air, humidity changes, temperature changes)
- Heightened emotions
- Stress
- Anxiety
- Muscle tension (chest, shoulder and neck especially with exercise)
- Vocal cord paralysis
- Medications (Thorazine and Mellaril) with extrapyramidial signs
VCD Medical Treatment

• Gastroesophageal reflux
• Laryngopharyngeal reflux
• Allergies
• Sinusitis
• Asthma
VCD Behavioral Treatment

- Speech therapy is the cornerstone treatment for VCD.
  - Important that the Speech Pathologist has specific training in the management of VCD.

- Individualized exercises and techniques are taught to help one:
  - Increase awareness of breathing and remediation of maladaptive breathing patterns
  - Increase awareness of body posture and encourage relaxation of throat muscles
  - Learn and feel comfortable with a variety of VCD release breathing techniques
  - Control VCD while exercising
  - Utilize chronic cough suppression techniques
  - Utilize throat clearing elimination techniques
  - Maximize vocal hygiene

Adapted from the National Jewish Health website on VCD
VCD Behavioral Treatment

• Techniques and exercises can be extremely helpful:
  – In eliminating abnormal vocal cord movement
  – Increasing control of vocal cords
  – Improving airflow into and out of the lungs

• Goals of therapy:
  – Prevent and eliminate VCD
  – Prevent and eliminate chronic coughing
  – Prevent and eliminate frequent throat clearing

Adapted from the National Jewish Health website on VCD
VCD Counseling Management

- Counseling and supportive management can be critical to management control.
- Majority of patients have found counseling to be beneficial.
- Allows patients to develop coping skills for prevention and exacerbations.
- Counseling can help adjust to a new diagnosis.
- Helps to identify and treat underlying potential exacerbating triggers:
  - Psychiatric
  - Anxiety
  - Stress
  - Muscle tension

Adapted from the National Jewish Health website on VCD
VCD Lifestyle Management

- Speech-language Pathologist can provide the support and treatment needed for VCD patients.
- Assist in the identification of triggers
- Provide education on the anatomy of the larynx
- Provide education on techniques to prevent and eliminate VCD
- Provide techniques to minimize abusive behaviors (e.g. throat clearing or coughing)
- Provide support and encouragement for consistent application of techniques
- Assist with “de-escalation” techniques and warm-up strategies for exercise induced triggers

Adapted from the National Jewish Health website on VCD
Acute Management

• Eliminate the provoking activity

• Remove unnecessary people from the area

• Prompt for EASY BREATHING

• Breathing against pressure (hand on abdomen)
  – Resistance and focus

• Elicit controlled breathing
  – Slight panting
    • Relax the jaw
    • Tongue on floor of mouth behind the bottom teeth
    • Shoulders relaxed
Acute Management

• If symptoms don’t relieve with breathing technique
• Use of progressive relaxation with guided imagery
• Explore the patient’s visual concept of their disorder and attempt to alter perception
  – Breathing thru a straw to breathing thru a snorkel
• Heliox
  – Administered by paramedics or ER
• Sedatives and psychotropic meds
  – Calming effect
  – Minimizes laryngeal muscular tension/constriction
Quick Sniff Technique

• Sniff then blow
  – Quick nasal sniff then blow out as if you are blowing out a candle.

• Sniff in with focal emphasis on the tip of the nose
  – Sniff encourages Abduction of VC

• Exhale with pursed lips
  – “sssssss”
  – “shhhhh”
  – “ffffff”
  – “whhhhh”

• Goal of exhalation technique is to increase respiratory back pressure
Increased Back Pressure Breathing

- Nasal Quick Sniff
- Prolonged exhalation w/f/sh/s
- Shoulder relaxed
- Throat open
Respiratory Training

• Low “diaphragmatic” breathing vs “high” clavicular breathing

• Rhythmic and cyclic respiratory cycles

• Use of resistance exhale (draw attention away from the larynx and extend the exhalation)

• Prevention and coping strategies during episodes
Patient Counseling

- Description of laryngeal events
- Viewing of laryngeal recording
- Identification of triggers
- Effective management of medical triggers
- Biofeedback with sensory and respiratory techniques
- Divert attention away from the larynx
- Develop coping mechanisms to overcome the feeling of helplessness and fear
- Goal is develop mastery of breathing techniques
Athlete Counseling

- Frequently can occur with weight lifting
- Frequently occurs in competitive athletes in all sports
- Goal is prevention of provoking factors and limiting symptoms once VCD occurs.
Conclusions

• Today VCD is a well-defined phenomenon with many known possible etiologies, the history has been reviewed and the variability of the terminology discussed.
• In addition to etiologic categorization, VCD now has a well-accepted method for diagnosis.
• Treatment protocols with varying success rates have been rendered based upon the specific cause of the dysfunction.