VCD, CHRONIC COUGH AND IRRITABLE LARYNX

TREATMENT STRATEGIES

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VCD: A Brief Review

Terminology: Paradoxical Vocal Fold Motion (PVFM)
Paradoxical Vocal Cord Motion (PVCM)
Vocal Cord Dysfunction (VCD)
Munchausen’s Stridor
Fictitious asthma
VCD: A Brief Review

• Definition: VCD is characterized by paradoxical adduction of the vocal cords during inspiration and/or expiration resulting in symptoms which may include dyspnea, wheezing, cough, chest tightness, or stridor. Symptoms may range from mild to severe. VCD often mimics or confounds asthma.
VCD: A Brief Review

• Diagnosis may be suggested by a flow volume loop consistent with extra-thoracic airflow obstruction and confirmed through direct visualization of the larynx while the patient is symptomatic.
Lung Function Testing: Flow Volume Loops

- Normal
- Extra-thoracic obstruction
- Intra-thoracic obstruction
VCD verses Asthma

• Asthma symptoms usually most evident on exhalation.
• Asthma is a chronic inflammatory disease of the lungs.
• Asthma involves inflammation of the airway with constriction of smooth muscles of the airway and mucous secretion.
• Asthma symptoms include dyspnea, chest tightness, wheezing, cough.
VCD verses Asthma

• Asthma patients may awaken from sleep, often around 4:00 am with symptoms.
• Asthma triggers include: exercise, cold air, allergens, irritants, respiratory infections.
• Symptoms responsive within minutes to inhaled bronchodilators.
• Symptoms responsive within a day or two to oral corticosteroids (Prednisone) and symptoms well maintained with inhaled corticosteroids
VCD verses Asthma

• VCD symptoms differ from asthma by
  • Choking sensation/ tightness in the neck
  • Stridor
  • Symptoms most often on inhalation
  • Lack of improvement with albuterol
  • Lack of symptoms deep in the chest
  • Lack of sputum production
  • May report tingling in fingers, light headedness or dizziness
  • Rapid onset and/or rapid resolution of symptoms
VCD

- Patient populations
- OHSU clinic: 80% female
- 35% with a h/o depression and/or anxiety
- 13% sexually abused
- 50% seen in E.R. (this is reducing as understanding of VCD is increasing)
- Two distinct populations: Adolescent (74% female) and Adult (91% female)
VCD

• Of the adolescent population:
• 39% also had asthma
• 13% had a history of depression or anxiety
• 0% had a history of sexual abuse
• 87% had symptoms with exercise
• Many, but not all were type A personalities or overachievers
VCD

• Of the adult population:
  • 33% also had asthma
  • 57% had a history of anxiety or depression
  • 26% had a history of sexual abuse
  • 0% had symptoms specifically triggered by exercise
  • 39% had symptoms triggered by irritants
  • 39% were in the health profession
VCD Evaluation

Patient interview and History

Perceptual/Observational Assessment: Listen to the voice and watch how they breathe. Palpate for musculoskeletal tension

Visualization of the Larynx

Try to elicit VCD symptoms and scope the larynx again

Further voice work up if necessary
Patient History

Questions to Ask
PARADOXICAL VOCAL CORD DYSFUNCTION

History of the Problem:
Describe your symptoms?
When did you first notice these symptoms?
Are your symptoms worsening over time, getting better or staying the same?
Where do you feel the tightening? Your chest? Your throat?
Can you describe the feeling? Do you have more trouble breathing in or breathing out? or both?
Do you make noise (stridor) when you are symptomatic?
What triggers an attack? Environmental triggers? Stress triggers? Exercise triggers? Other triggers?
How long does an attack last?
What do you do to get out of an attack?
Patient History

**Medical History:**
Have you been diagnosed with asthma? Have you had a methacholine challenge? Spirometry?
Do you use inhalers? How often do you use your rescue medication? Does it help? What other medication do you take?
Do you ever awake with symptoms? What time?
Have you had to go to the emergency room with your symptoms? How often? How have they treated your symptoms? Did it help?
Do you have allergies or chronic nasal symptoms? How have these been treated?
Do you have reflux symptoms? Heartburn? Frequent coughing? Throat clearing? Lump in the throat sensation? Bad taste in your mouth upon awakening? Morning hoarseness?
How is your general health? Are you being treated for any other medical conditions?
Psycho/social history:

Do you have a history of anxiety or depression? Any history of emotional or physical abuse? Any history of eating disorders?

Have you had a significant increase in your stress level? Describe.

Are you in school? What grade? What kind of grades do you get? Do you tend to put a lot of pressure on yourself to do well?

Do you have brothers or sisters? What ages? Do they participate in the same sport you do?
Sports/Fitness history:
Do you participate in competitive sports? Which sports? Do your symptoms occur during competition? During practice? How often? Do you do any sports where it doesn’t happen? Do you get along with your coach? Do you enjoy the sport?

Tell me about your general fitness level.

Voice Symptoms:
Can you talk during an attack?
Do you experience hoarseness otherwise? How often? How severe?
Does your voice often feel tight or tired?
Do you tend to hold your breath when concentrating or when stressed?
Can you think of anything else you can tell me about your symptoms that I have not asked?
VCD Evaluation

• Physician may also perform or order:
  • Methacholine challenge/spirometry to rule out asthma
  • Physical Assessment
  • Allergy Assessment
  • Otolaryngology exam/consult
VCD

- Differential Diagnosis: Need to visualize the larynx
- VCD vs. VCD variant
- Laryngospasm
- Laryngeal edema
- Vocal cord paralysis
- Laryngomalacia
- Subglottic stenosis
- Asthma
VCD

• VCD Variants

• Classic: Vocal cords adduct on the inhale and abduct on exhale

• Arytenoid Variant: Arytenoid cartilages pull forward during the breathing cycle

• Laryngeal elevation Variant: Larynx remains open, but pulls upward during the breathing cycle

• Laryngeal tension on inhalation and exhalation
VCD

- Proximal intrathoracic airflow obstruction
- Neurologic
- Chronic tightness with significant dysphonia and VCD
- Treatment is similar for most of these variants.
VCD Treatment

• Medical treatment
• Treat asthma and discontinue inappropriate asthma medications
• Treat laryngopharyngeal reflux
• Treat any allergies or sinusitis
• Treat anxiety medically, if severe
• Treat any structural abnormalities
• Refer to psychotherapy, as appropriate
• Heliox (70% helium and 30% oxygen) available in some E.R.s
VCD treatment

• Behavioral Treatment
• Treatment Goals: To train breathing strategies (preventative and rescue strategies) to control and hopefully alleviate VCD symptoms
• Treatment typically takes from 2-6 sessions, possibly longer if there is a voice disorder as well
• If it is taking longer than that, then look into possible psychological issues, secondary gain issues, quality of your treatment, etc.
VCD Treatment

• Show patient results of laryngoscopic examination. If this is not available, you can find examples to show on the internet. Optimally, contrast symptomatic vs. asymptomatic
• Emphasize it is a non-organic problem and responds very well to behavioral treatment
• Discuss possible contributing factors
• Educate the patient regarding treatment goals and their role in treatment
VCD Treatment

• Preventative Strategies
• Efficient breathing at rest and throughout the day
• Exaggerated/warm up breathing techniques
• Decrease breath holding
• Stretching/Progressive relaxation
• Relaxation response/continuous breathing (if needed)
VCD Treatment

• Preventative Strategies Continued
• If there is a voicing component, reduce laryngeal tension during phonation and increase voicing efficiency
• Reduce laryngeal tension during the breathing cycle using biofeedback and negative practice
VCD Treatment

• EXERCISES FOR VCD
  By Karen Drake, M.A., C.C.C.

• PREVENTATIVE STRATEGIES:

• BREATHE EFFICIENTLY: Try to use efficient continuous abdominal breathing as often as possible throughout your day. This will help your body get used to efficient breathing and will help you to relax your throat during breathing.

• EXAGGERATED BREATHING EXERCISES TO RELAX THE THROAT:
  Practice each of the following two breathing exercises (5-10 breaths) every morning, evening and as a warm up before any sport practice or game.
  – Practice deep breathing by breathing deeply in through your nose and blowing the air out through pursed lips and cheeks (as if blowing out a candle).
  – Practice taking a deep breath while relaxing your throat by doing alternate nostril breathing. Use your thumb and middle fingers to plug your nostrils. Breathe in through one nostril and then out through the other. Your inhalation should be approximately 4 seconds and your exhalation will be approximately 6 seconds.

• MAKE YOUR BREATHING CONTINUOUS:
  Try not to hold your breath. Many people have a habit of unconsciously holding their breath periodically throughout their day. Try to keep your breathing cycle smooth, relaxed and continuous. Practice 3-5 minutes of continuous breathing.

• RELAX YOUR UPPER BODY: Try to maintain good posture. Keep your shoulders relaxed.
  – Stretch your neck and shoulder muscles with gentle head rolls, head tilt, shoulder rolls and chest stretch. Other helpful stretches may include the “ragdoll” stretch and jaw stretches.

• KEEP YOUR VOICE RELAXED: Your vocal cords tense with breathing if you have VCD. This is the same anatomy that produces voice. If you are tightening these muscles during speaking you are maintaining tension in the same anatomy that we are trying to relax for breathing. Using efficient vocal technique helps to relax these muscles.
VCD Treatment

• RESCUE STRATEGIES:
• For Symptoms at Rest:
  • Breathe in deeply through your nose and blow out through cheeks and pursed lips.
  • Drink water at the first sign of symptoms.
  • Tongue roll.
  • Alternate nostril breathing.
  • Breathe air in and out through a straw (or as if through a straw) with focus in the front of the mouth.
  • Inhale through the nose exhale on /s/ or /sh/ sound
VCD Treatment

• Evaluate which strategies work best for the patient and try to pick 1 or 2 maximum to use when symptomatic
• Practice in clinic when asymptomatic
• Optimally then try to elicit symptoms and use rescue strategies
• Recognize there are strategies to use at rest that can not be used during exercise. I.e. Typically need to breathe in and out through the mouth with exercise. Will not see abdominal motion with breathing as obviously.
VCD Treatment

• Rescue Strategies
• For Symptoms with sports:
  • Focus your air up in the front of your mouth. Image your throat as an open tube. As you breathe in, picture the air coming in over the roof of your mouth and out through your lips and cheeks. Do not focus your air in your throat.
  • If it is helpful, image blowing out candles on the exhalation.
  • Use a tongue roll as needed for 2-3 breaths and then resume front focused breathing.
VCD Treatment

• PRACTICE SUCCESS: Keep your breathing as relaxed as possible as often as possible. When doing sports, practice at a level that you can focus on your breathing and keep it relaxed. For example, if you are a runner, practice during an easy jog first. When your breathing is relaxed and open during the jog, then begin to increase your pace while keeping your breath relaxed and focused in the front of your mouth. Remember, you need to implement your breathing strategies to have a different result. At the first sign of your breathing getting tight, begin your rescue strategies. This should relieve the tightness fairly quickly. The further you go into an attack, the harder it is to alleviate your symptoms.
VCD Treatment

• Your explanations are critical. Explanations must be clear and relevant. They also must be motivating.

• For example: Review information regarding reasons to breathe correctly in general.
VCD Treatment

• Additional rescue strategies may be needed for some VCD variants. I.e., positional strategies for proximal intrathoracic airflow obstruction/bronchial collapse
• Other treatment considerations:
  • Improve baseline fitness for athletes. May give a workout. i.e. on a track, run the straight and jog or walk the corners
  • Implement basic fitness program for non-athletes. i.e. begin walking program
  • Teach reflux precautions and vocal hygiene to reduce laryngeal sensitivity
  • Refer to counseling if stress/emotional influence is high
VCD Treatment

- Case Example. Adult. Go through a treatment session
Case #1

- 15 year old girl
- 5 year history of asthma which had been well controlled with inhalers.
- 1 ½ year history of SOB where it felt like her throat was “closing up”.
- These episodes have become worse over the last 2 months with 4 trips to the ER in a 2 week period.
- Episodes are happening several times a day
- Unaware of specific triggers.
- Has had symptoms with exercise in the past, but not currently exercising due to a back injury
- Constant coughing and throat clearing
- Albuterol only somewhat helpful in alleviating symptoms
- Tightness can last up to 5 hours
- No problems during the summer. Started after school resumed
Case #1 continued

- Parents think anxiety may be playing a role. Patient unaware of this.
- Tianna is a high achiever and tends to put pressure on herself.
- Ambulance called her second day of school due to her breathing problems.
- Have cut back on her schedule to try to decrease stress
- Moderate dysphonia. Very tight. Patient unaware of tightness
- Shallow breather
- Normal laryngeal anatomy. Frequent breath holding. A-P squeeze with phonation
Case #1

- Worked on strategies for chronic cough/throat clear
- Reviewed preventative as well as rescue strategies for preventing and hopefully eliminating VCD
- Voice therapy to decrease tightness and improve vocal technique
- Discussion of psychological factors/influences
Case #2

- 34 year old male
- 10 month history of voice and breathing problems following a toxic gasoline exposure
- Voice low pitched, hoarse and effortful
- Severe Shortness of Breath
- Frequent throat clearing
- Night sweats, tachycardia, anxiety and depression
- Drinks very little water, ½ pot of coffee, 2-4 glasses of alcohol per day, smokes 1 ppd for the past 18 years
- Laryngeal exam: left sacular cyst, severe A-P squeeze, laryngeal tension during breathing
Case #2

- Goals: To train preventative and rescue strategies for controlling and hopefully eliminating VCD
- Train optimal vocal technique
- Needed a lot of training for more relaxed, abdominal breathing
- Needed stretching, laryngeal massage and recommendation of professional massage for severe neck, shoulder and jaw tension
- Only rescue strategy that initially worked was breathing in and out through a straw.
- Worked on moving the straw away from the mouth and maintaining a relaxed throat
Case #3

- 14 y/o female
- History of breathing problems “her whole life”
- Treated for asthma and allergies without relief in her symptoms
- Had noisy breathing as a child
- Has had sinus surgery to correct sinus problems
- Recent pulmonology evaluation ruled out asthma and VCD was questioned
- Reports mild hoarseness
- Reports mild cough and throat clear
- Voice hygiene was good/ minimal irritant exposure
- Tends to have some anxiety/”worrying”
Case #3

- Tends to have breathing symptoms during exercise and training for cheerleading
- Mild dysphonia characterized by a rough vocal quality with intermittent glottal fry.
- Laryngeal examination: mild edema, mild-mod A-P squeeze
- Imitation of symptoms: Vocal cords partially adduct with the corniculate cartilages pulling forward.
- Very stimuable for improved breathing using strategies
Case #3

- Treatment goals similar to previous cases.
- Trained VCD preventative and rescue strategies
- Applied strategies during exercise
- Worked on improving vocal technique including projection for cheerleading
- Breathing completely better after 3 sessions. Voicing improved, but not yet normal
VCD Outcomes
Treatment Works!

• Outcome data from OHSU (adult and adolescent populations; 50 patients)
• 72% of patients reported their health was generally better.
• 81% report their symptoms are better
• 81% had a significant decrease in anxiety related to VCD
• 73% had a significant decrease in VCD related helplessness
• 73% feel in control of their VCD
• 88% know their rescue strategies
VCD

• Problemsolving
• Questions and Audience input regarding techniques
Irritable Larynx

- Studies have shown that laryngeal irritants may contribute to VCD as well as chronic cough. Morrison et al 1999 described irritable larynx syndrome (ILS) defined as hyperkinetic laryngeal dysfunction resulting from exposure to some kind of irritant.

- Hyperkinetic laryngeal function can be in the form of muscle tension dysphonia, episodic laryngospasm, chronic cough, throat clearing, globus or VCD
Irritable Larynx

• Irritants to the larynx may include, but are not limited to, GERD or LPR, Bronchodilators, smoke, perfumes, air pollutants, chemicals, allergens, etc.
Irritable Larynx

• Treatment of ILS involves becoming aware of irritants. A daily journal could help to note triggering situations and emotional factors.
• Try to reduce irritant exposure whenever possible.
• Have irritants such as GERD worked up and treated.
• In situations where there must be some exposure, practice relaxed breathing while increasing exposure (desensitization). Increase awareness of early symptoms or warning signs to reduce incidence of attacks
Chronic Cough

- Medical causes of cough
- Allergic Rhinitis/ PND
- GERD/LPR
- Cough variant asthma
- ACE inhibitor medications
- Pertussis (whooping cough)
- Neurogenic
- Traumatic vagal injury
- Post URI neuropathy
- Psychogenic
- Chronic aspiration
- Zenker’s diverticulum
- Foreign body
Chronic Cough

- Medical causes continued
- Chronic bronchitis
- Bronchiectasis
- Lung carcinoma
- Subglottic stenosis
- Tacheomalacia
- Tracheoesophageal fistula
- Tuberculosis
- Sarcoidosis
- Congestive heart failure
- Upper respiratory infection
Chronic Cough

- Chronic cough or “habit cough” which can be treated behaviorally is a diagnosis of exclusion
- Many patients have had one or a combination of some of these causes which have been treated, but the cough persists.
- Chronic cough may be related to laryngeal hypersensitivity/irritable larynx syndrome or may be psychogenic in nature
Chronic Cough

• Cough can be very disturbing
• Kuzniar et al. (2007)
• 43% frustration, irritability, anger
• 41% frequent physician visits/testing
• 38% sleep disturbance
• 38% interference with lifestyle
• 28% anxiety
Chronic Cough

• Behavioral treatment of habit cough was first described by Florence Blager, Martha Gay and Raymond Wood at the National Jewish Center in Denver, CO. They applied traditional voice techniques to treat patients with chronic habit cough.
Chronic Cough

- Patients typically get referred to SLP after all other medical causes have been ruled out by PCP, Pulmonologist, ENT, and/or Allergy/Asthma specialist.
Chronic cough

Evaluating cough in the voice clinic
ENT and SLP joint evaluation
Physical examination
History
Observation
Laryngoscopy with biofeedback if possible
Patient self rating the cough
Triggering cough in the clinic
Stimulability for change (physically and emotionally)
Allergies vs irritants
Chronic Cough

- Rating scale 1-10 (0 = no cough; 10 = most severe cough)
- Cough counts or frequency of cough
- Quality of life measures related to cough
- Chronic cough impact questionnaire (CCIQ)
- Leicester Cough Questionnaire (LCQ)
- Cough-Specific Quality of Life Questionnaire (CQLQ)
Chronic Cough

• Treatment Goal: Eliminate cough
• If the patient is willing to give up the cough and “buys into” the idea of behavioral intervention, the cough typically resolves fairly quickly.
• Even people who have coughed for over 20 years have had success in behavioral therapy.
Patient Education

• There may truly be a sensation to cough, but the need to cough is not real.

• Review laryngoscopy to show patient that there is nothing in the airway.

• Control the cough so that it does not control you.

• There is hope of getting your quality of life back.
Treatment

- Identify Triggers
- What sensations precipitate cough
- What situations trigger cough
- Interrupt the sensations that have been triggering the cough
- “Get to know the cough”
TREATMENT
Techniques from Dr. Florence Blager

• First signs of cough:
  – Abdominal or diaphragmatic breathing with relaxed throat (similar to VCD technique)
  – Relaxation techniques as needed
  – Sip water at the first sensation of the cough
  – Focus airflow at the lips
Treatment

• Interrupt breakthrough cough
  – Focus air through tight lips
  – Can hold finger to lips to ensure airflow
  – Create a sphincter at the lips by tightly pursing them on inhalation and exhalation
  – Strong thrust of air moves through larynx giving sensation of blowing out what is felt to be in the airway.
Practice

• Deep breath may trigger cough
• Explore different patterns of breathing
  – Short inhale, long exhale
  – Short inhale, short exhale
  – Relaxed verses pursed lips
    • Practice 5 breaths 5 times per day when asymptomatic
    • Use when sensations that precipitate cough are present to stave off the cough before it happens. May use relaxed throat breathing or gentle pursed lip breathing.
    • Interrupt the cough- “use everything you have to interrupt the cough”
Treatment

• Use gentle pursed lip breathing in “high risk” situations that could trigger cough
  – Department stores
  – Chemical isle in garden shop
  – In the car with AC on
  – Smoky area
  – Gas station
  – At work
  – Etc.
Treatment

• If patient is asymptomatic in the clinic, have them simulate a cough and use pursed lip breathing to interrupt it. Practice this so when a real cough occurs, the patient feels comfortable with the technique.

• Once the cough is under control at rest, at home, in clinic – then you can slowly introduce irritants if cleared by their physician. They can be exposed to irritants, but not allergens.
Treatment

• Gradually increase exposure to “high risk” situations
  – Use pursed lip breathing near the irritant, but not close enough to smell it (i.e. outside of a store that sells perfume)
  – Use pursed lip breathing technique while nearing the irritant enough to smell it (i.e. walking into the store near the perfume area). Stay in this area while using cough suppression techniques to stave off the cough.
  – Gradually move closer to the irritant while using techniques while cough is under control.
  – If cough feels as if it is coming on at any point and the pursed lip breathing is not controlling it then move away from the irritant. Practice success! You want to have them gain confidence, not lose confidence.
Talking as a trigger to cough

• Most likely related to MTD
• Supraglottic constriction acts as an irritant and results in throat clearing or cough. MTD often makes it feel as if there is something in the throat.
• Cough often subsides when MTD is resolved.
• Treat the MTD
  – Breath support
  – Coordination of breath and sound
  – Front voice resonance
  – Eliminate breath holding
  – Sip water at the first sign of irritation or cough
VCD as a trigger for Cough

• During a VCD attack, the vocal cords are constricting the airway. A cough is triggered to open the airway.

• Treat the VCD and the cough typically subsides – i.e. if you treat the VCD during exercise, the cough will likely also be eliminated without any direct cough therapy.
Considerations for VCD and Cough

- Deep breathing used as treatment for VCD may trigger a cough and need to be modified.
- May need to make relaxed throat breathing exercises more shallow at first to prevent triggering the cough.
- Sometimes it is necessary to make the pursed lip breathing more relaxed in order to prevent triggering VCD.
Treating the multifatorial cough

• These patients may have many reasons to cough, but the cough is out of control. Medical treatments are being used to treat the cough, but are not adequate.

• GOAL: Reducing the frequency and severity of the cough
  – Wok closely with the physician/communicate any concerns
  – Psychological referral if necessary
  – Use of cough suppressants can be useful during therapy
  – The system is vulnerable and the patient may need to return to these strategies at the onset of URI in the future—even if the cough is eliminated in therapy
Case Study

• 50 y/o female
• Referred for chronic cough, possible VCD and voice
• 10 year history of cough worsened over past 3 years
• Has taken multiple medications for cough with little improvement
• Reports her throat has been sore for “years”
• Describes cough as “barking”
• Hoarse in the morning and after coughing
• Has allergic rhinitis. Other medical causes of cough have been ruled out
Case Study

• Cough triggered by allergens, scents, chemicals, irritants, smoke, talking, or singing
• She notes some SOB after coughing with constriction in her throat.
• She reports she coughs all the time, but that her symptoms can “flare up” every month with her symptoms more severe
• She has found moisture, heat, hot tea and steam to be helpful
• Methacholine challenge was negative for asthma
• Patient has a history of depression and GERD
• Patient rated cough as an 8 on a scale of 1-10 (0 = no cough and 10 being severe cough)
Case Study

• Leicester Cough Questionnaire yielded a score of 71 (the lower the score, the more severe the cough. Lowest possible score = 19 and highest possible score = 133)
• Cough treatment initiated with the goal of decreasing cough
• Awareness of when cough occurs
• Cough interruption strategies
• Gradual exposure to irritants with continued strategies
• Breathing strategies to keep the vocal cords open and relaxed
• Voice hygiene and voice treatment strategies