ABCs of VCD

National Jewish Health

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Outline

- Definition
- Demographics
- Diagnosis
- "Phenotypes"
- Pathophysiology
- Treatment

DEFINITION

Vocal cord dysfunction is:

- **Spectrum of non-organic disorders involves larynx and/or periglottic structures.**
- **Acute UAWO caused by vocal cords closing paradoxically on inspiration (+/- expiration)**

or

- **Supraglottic structures prolapse or constrict.**

VCD TERMINOLOGY

(A sample of 76 terms)

- Paroxysmal vocal cord motion
- Laryngoneurosis
- Psychosomatic wheezing
- Functional upper airway obstruction
- Hysteric croup
- Pseudoasthma
- Upper airway dysfct syndrome
- Fictitious asthma
- Adult spasmodic croup
- Episodic paroxysmal laryngospasm
- Irritable larynx syndrome obstruction
- Munchausen's stridor
- Paroxysmal VC dysfunction

VCD: Early Reports

1974 Downing et al: "Factitious Asthma"

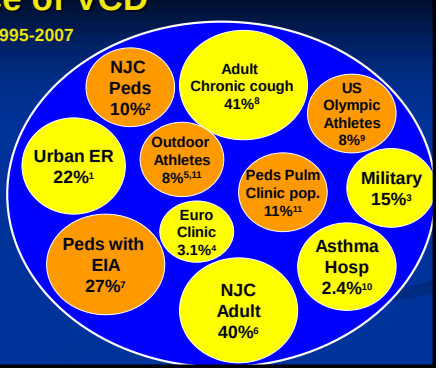
1982 Patterson et al: "Munchhausen's Stridor"

1983 Christopher et al: "Vocal-cord Dysfunction"

- 5 patients (4 female)
- all had refractory wheezing/dyspnea
- none had BHR
- adduction of glottis with "posterior chink"
- responsive to speech therapy

Incidence of VCD

Review 1995-2007



VCD: National Jewish Series

Newman et al
AJRCCM 152:1382 1995

- All VCD patients from 1984 to 1991 (95)
  - 42 VCD alone
  - 53 VCD + asthma
  - 42 control subjects with severe asthma

VCD: National Jewish Series

Newman, et al
AJRCCM 152:1382 1995

	VCD	VCD + Asthma	Asthma
Duration of Sx	4.8 +/- 5.2	14.1 +/- 13.9	15.7 +/- 13.8
Prednisone dose	29.2 +/- 28.7	21.31 +/- 23.6	25.5 +/- 25.3
Years of prednisone	4.3 +/- 10.9	4.0 +/- 4.1	3.3 +/- 5.4
ER visits in previous yr	9.7 +/- 7.9	5.5 +/- 6.2	4.5 +/- 4.8
Admits in previous yr	5.9 +/- 6.1	6.7 +/- 11.9	3.1 +/- 4.7
Intubated	12	12	12

DIAGNOSIS of VCD

History
PFT's
Measures of Oxygenation
Laryngoscopy

HISTORY

QUESTIONS TO TEASE OUT VCD

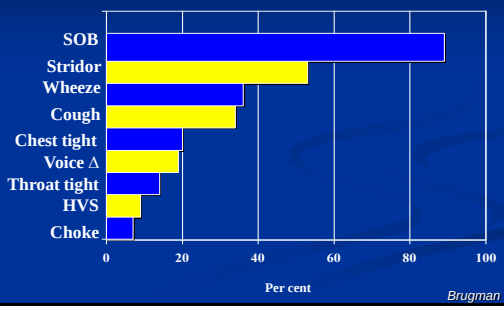
- Where do you feel your tightness?
- Do you have more trouble breathing in than breathing out?
- Do you make a breathing in noise (stridor) or a breathing out noise (wheezing)?
- Do the sx come on & resolve rapidly?
- What triggers your symptoms?

QUESTIONS TO TEASE OUT VCD (cont'd)

- Do asthma meds help?
- Do you get hoarse or lose your voice?
- Do you have a "lump in my throat" feeling?
- Do you feel like you're choking or suffocating?
- Do you get numbness or tingling of fingers or toes or around your mouth?
- Do you feel heartburn?
- Do you feel postnasal drip?

Symptoms in VCD

Review 1966-2007 (n=894)



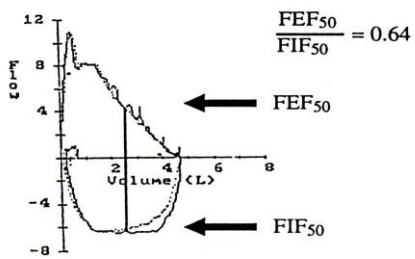
Brugman S

OTHER SYMPTOMS of VCD

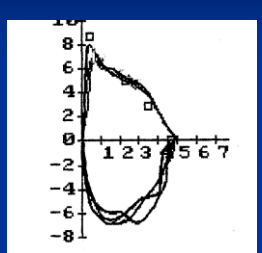
- Throat "beating together"
- Gasping, choking
- Facial flushing
- Breathing through a pinhole
- Voice fatigue
- Post-tussive syncope, incontinence
- Feeling of drowning
- "Catch" or sensation of obstruction in throat
- Globus sensation
- Burning in throat

PFT's

RATIO OF EXPIRATORY TO INSPIRATORY FLOWS AT 50% OF THE VITAL CAPACITY

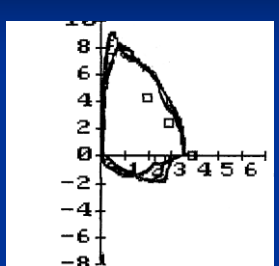


Spirometry: Normal Flow Volume Loop



FEV_1	4.36 (100%)
FVC	5.04 (108%)
FEV_1 / FVC	.86
FEF_{25-75}	4.77 (108%)
FEF_{50} / FIF_{50}	0.84

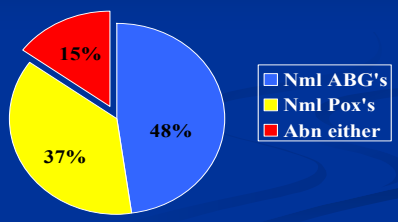
Extra-thoracic Airflow Obstruction



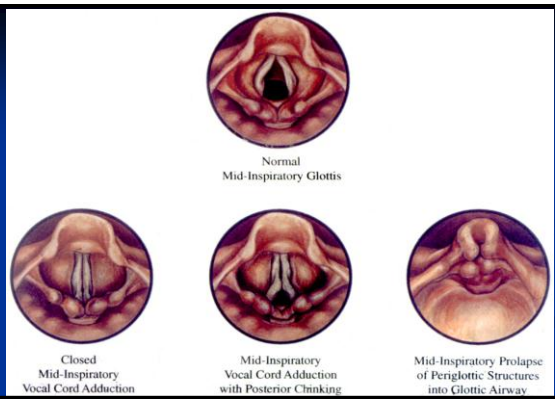
FEV_1	3.65 (99%)
FVC	3.71 (96%)
FEV_1 / FVC	.98
FEF_{25-75}	6.15 (155%)
FEF_{50} / FIF_{50}	4.33

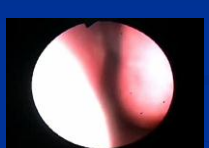
MEASURES of OXYGENATION

Measurements of Oxygenation During VCD attacks
1996-2007 (n=207)



LARYNGOSCOPY





EXERCISE VCD SEEN IN MANY SPORTS

Baseball	Cross-country skiing	Biathalon
Softball	Downhill skiing	Boxing
Football	Track	Tae Kwan Do
Soccer	Cross country	Wrestling
Racquetball	Distance running	Weight lifting
Volleyball	Cheerleading	Figure skating
Lacrosse	Rock climbing	Bicycling
Swimming	Basketball	Crew
Jogging	Irish step dancing	

VCD "Phenotypes"

- VCD and Asthma
- Occupational VCD
- VCD and Exercise
- Psychobiologic VCD
- VCD and Post-Nasal Drip
- VCD and GERD
- VCD and Chronic Cough
- Post-operative VCD

VCD TREATMENT

Reasonable Approaches When VCD Suspected

1. Empiric speech therapy
   - Must be wary of atypical asthma, anaphylaxis, or other dangerous Dx
   - Speech pathologist must be familiar with VCD
   - Must follow-up in timely fashion – if symptoms persist then must have laryngoscopy
2. Methacholine challenge
   - Should only be performed if suspected not to have asthma or if attempting to provoke symptoms for laryngoscopy
   - If methacholine challenge negative, refer for speech therapy
   - Must follow-up in timely fashion – if symptoms persist then must have laryngoscopy

Reasonable Approaches When VCD Suspected

3. Baseline laryngoscopy or refer for laryngoscopy before speech therapy
   - Will confirm the absence of anatomic deformity, tumor, etc.
   - Can identify indirect signs of chronic laryngopharyngeal acid reflux
   - Must be sure that otolaryngologist has knowledge of non-organic laryngeal syndromes such as VCD
4. Provocation with spirometry, laryngoscopy
   - Methacholine, exercise, irritant
   - Advantage: minimizes guesswork; high patient and referring MD satisfaction
   - Disadvatage: expensive; limited availability

COMPREHENSIVE & INTEGRATIVE APPROACH TO TREATMENT of VCD

- Sympathetic approach to disclosure of dx
- Breathing retraining
- Discontinuation of unnecessary meds
- Breathing retraining (speech therapy)
- Biofeedback
- Hypnosis
- Psychotherapy +/- psychotropic drugs
- ?Inspiratory muscle training device
- Follow-up

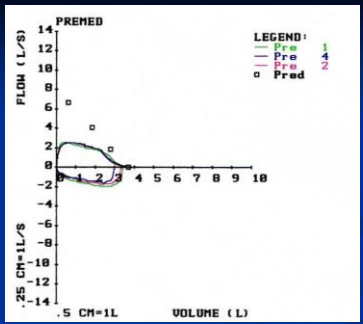
SPEECH THERAPY TECHNIQUES

- Place hand on abdomen
- Inhale with relaxed throat
  - Tongue on floor of mouth
  - Breathe in through nose with lips closed
  - Jaw gently released
- Exhale through mouth making soft "s" sound
- Observe abdomen expand =inhale, contracts=exhale
- Prevent shoulders from lifting/falling and keep neck relaxed
- Practice 5 breaths seated or standing 1x/hour

IF NOT VCD, THEN WHAT?

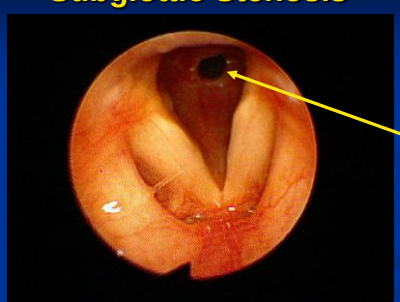
- Atypical asthma
- Tracheomalacia
- Airway/pulmonary anatomic pathology
- Hyperventilation syndrome ("disproportionate breathlessness")
- Breathing pattern disorder
- Physiologic exertional dyspnea
- Orthostatic intolerance
- Rare

Weinberger M, et al. Pediatrics 2007;120(4):855.



Fixed obstruction - spirometry technique acceptable given multiple nearly identical flow volume loops

Subglottic Stenosis



Airway significantly compromised due to membranous stenosis

Tilles S, et al JACI 2009 124:277