Exercise Induced Vocal Cord Dysfunction

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Vocal Cord Dysfunction (VCD)

VCD is an adduction of the vocal cords during inspiration which produces airway obstruction at the laryngeal level

- Complex aetiology
- Complex expression
videos

• 1) laryngoscopy

• 2) VC function

• 3) 17 yr old with a history of sudden difficulty breathing difficulty with exertion
symptoms

- Episodic and recurrent symptoms
- Vocal folds adduct during inspiration
- Difficulty inhaling (like breathing through a straw)
- Respiratory distress
- Tightness in the throat area
- Stridor often present
- Dysphonia and globus sometimes present
- Symptoms may be observed with laryngoscopy during inspiratory phase
history

- Symptoms usually present during physical exertion
- Background of high achievement and worry about performance, but not always
- Treated for asthma with no or little improvement in the symptoms
- Multiple admissions to ED with or without extensive investigations for Cardiac, ENT, Respiratory and Allergy conditions
aetiology - one model
Irritable larynx Syndrome (ILS)

The ILS model is based on the assumption that the larynx becomes hyper-responsive with overexposure to exogenous or endogenous irritants, causing long-lasting “neuroplastic” changes in the brain, and resulting in laryngeal muscle “misuse”
Athletes

• All ages
• All sports
• Achievement and competitiveness are highly valued by the individual
• Often occurs when stepping up to next level
• Triggers only manifest at high intensity exercise
• 5% - 7% prevalence in Olympians

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The experience of VCD results in loss of confidence, brings deconditioning and it is stressful.
Assessment

Lack of clear clinical criteria for diagnosis means that the diagnosis is often by exclusion (cardiac, respiratory, allergic and neurologic conditions)

At the laryngeal level, exclude:

Laryngomalacia (which may only present during peak physical exertion)
laryngeal edema/lesions
laryngeal dystonia
Other considerations

– Determine if there is habitual mouth breathing due to nasal congestion, large adenoids or habitual open mouth posture

– ? reflux
Lung Function Test

Aknowledgement - Liam Welsh, Respiratory Scientist
Differential Diagnosis

• Asthma
• Panic
• Extrathoracic obstruction
• Laryngeal obstruction or oedema secondary to allergy
• Adductor laryngeal breathing dystonia
• Exercise Induced Dysautonomia *(Dyspnea O2 desaturation to low 70%, Increased heart rate, No appreciable change in blood pressure)*
• Psychiatric/Psychological disorder
Significant implication

misdiagnosis

- Quality of life
- Physical health
- Prolonged periods of inhaled corticosteroids
- Erroneous procedures such as intubation
- “all in the head”
  - Psychological repercussions, increased anxiety, altered self concept, self blame
special considerations for assessment

• **respiratory assessments** (lung function studies should be sport specific where possible)

• **sporting demands** (whole body exercise such as rowing is different to running or swimming)

• **environmental irritants** (e.g. pool chlorine)

• **Performance considerations** (spring, middle, long distance)
Swimmers

- Horizontal position – pulmonary ventilation/perfusion may differ from upright position
- Breathing against water pressure – forced vital capacity may differ significantly
- How are they exhaling? Slowly as they race, are they holding breath and then suddenly exhaling just before turning head for breath? Exhaling and inhaling during single turn?

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Intervention

Team Team

• Usually long sessions (~90min)
• Learn about the person
• observe the ‘load’ on the larynx during speaking and breathing at rest
Intervention

• Teach body / breath awareness
• Abdominal – deep slow breaths

• A quick sharp ‘sniff’ opens the vocal cords
• Learn to ‘unload’ the larynx (teach feeling of open relaxed larynx during breathing and speaking. Learn a new habit)
• Improvement can be quick when you PLAY
• Invest in a spirometer
Swimmers intervention

- Focus breathing recovery exercise in the pool while swimming – specificity (can’t really allow them to stop or slow down…..)

- Start off at slow pace to integrate breathing recovery with stroke

- Time the start of the breathing recovery exercise

- End the recovery method when no longer needed

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Treatment

• Formal psychological support may be required

• Keep the team informed
outcomes

Good evidence that speech pathology intervention is efficacious
Good Referrals

- Indiscriminate referrals are not the best

- Be suspicious when the person does not report throat tightness or difficulty inhaling

keep an open mind to the possibility of VCD in individuals who tell you that they find it hard to breathe when there is nothing else wrong.
Thank you
references

Breathing symptoms
PVFM Screening questionnaire  (Yinnie Ye et al 2016)

- When I am having breathing problems, I feel like I am breathing through a straw.
- When I am having breathing problems, I have trouble getting the air in.
- When I am having breathing problems, albuterol spray makes me feel better.
- When I am having breathing problems, albuterol nebulizations make me feel better.
- When I am having breathing problems, stress makes my breathing worse.
- If I relax, my shortness of breath goes away
- Strong smells (perfumes, cleaning supplies, others) cause my throat to close or tighten.
- Strong smells (perfumes, cleaning supplies, others) make me feel out of breath.
- Cold air makes me feel out of breath.
Psychological factors
Newer differential diagnosis

EXERCISE INDUCED DYSAUTONOMIA

Dyspnea

$O_2$ desaturation to low 70%

Increased heart rate

No appreciable change in blood pressure
Performance considerations

• Different muscle energy generating mechanisms are used depending on how long and how powerful the exercise must be
  – Sprint power < 30 sec
  – Middle distance – lasts > 30 sec and < 2 min
  – Long distance – lasts longer than 2 min
Schematic representation of *Irritable larynx syndrome* (ILS) model
Schematic representation of *Dichotomous triggers* model

*Described in Introduction section, but not directly visualized on laryngoscopy*
Periodic Occurrence of Laryngeal Obstruction (POLO)

Vocal Cord Dysfunction (VCD)

Paradoxical Vocal Fold Motion Disorder (PVFMD)

Intermittent Arytenoid Region Prolapse (IARP)

Glottic

Supraglottic

Psychogenic

Irritant

Exertional

Concomitants:
- Anxiety
- Stress
- Depression
- Conversion
- Somatoform
- Psychiatric Tx
- History of Sexual Abuse
- Mass Psychogenic Illness

Intrinsic

Extrinsic

Rhinitis

Sinusitis

PNL

GERD

LPR

Chemical Olfactory Stimuli

Visual Stimuli

General Exercise

Maximum Exercise

Athletic Competition
Anticipating an episode

- Do you know when you are about to have an ‘attack’
- In the first 100 mt
- When I get overheated
- When the game is really close