Vocal Cord Dysfunction vs. Asthma

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Disclosure and Disclaimer

No relevant disclosures

Cases are "based on a true story"

Asthma

Complex chronic disorder of the airways

Characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and underlying inflammation

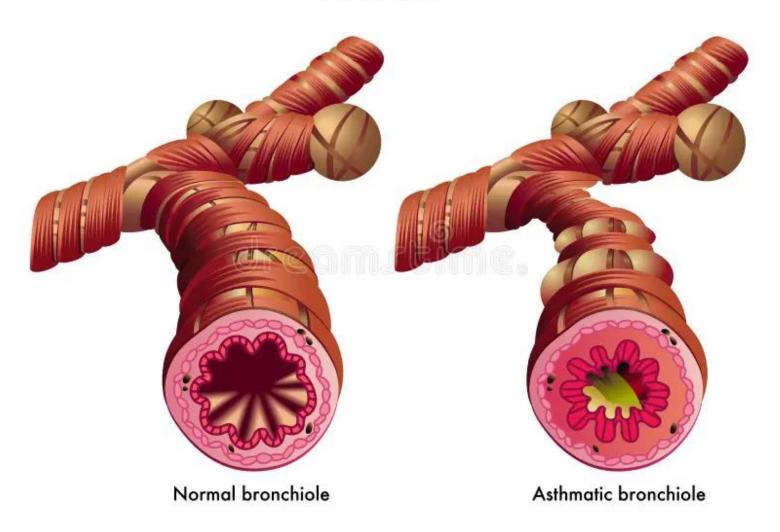
Respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity

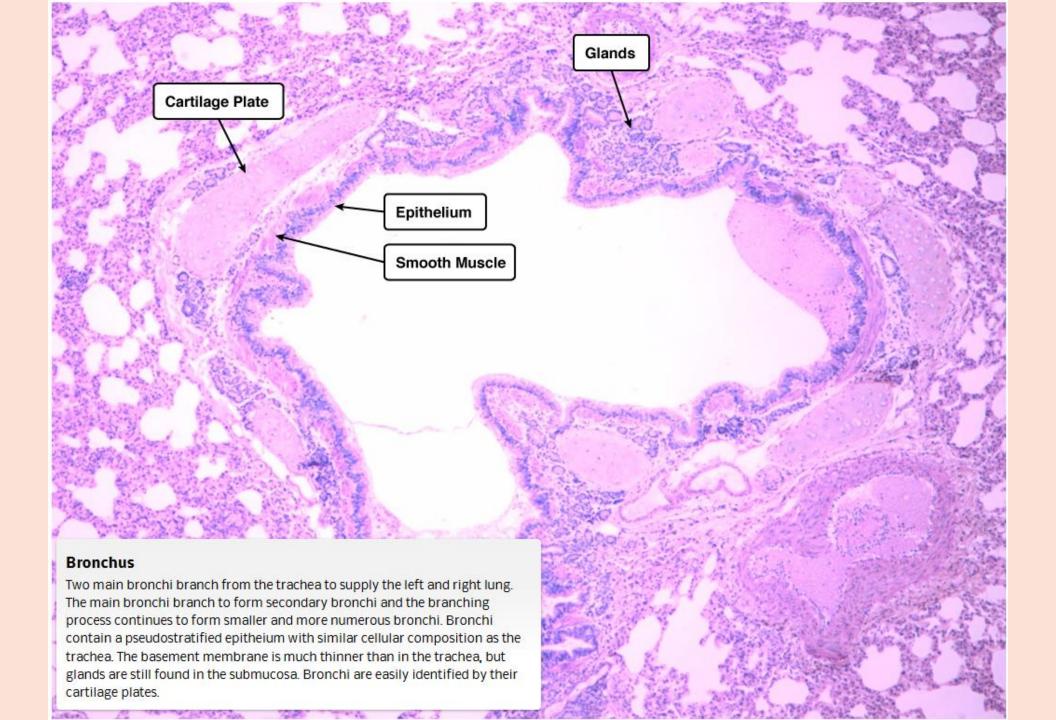
Variable expiratory airflow limitation

Can be triggered by exercise, cold air, and exposure to inhaled allergens

- National Heart, Lung, and Blood Institute. Guidelines for the Diagnosis and Management of Asthma 2007 (EPR-3). 2012. Available at: www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm (Accessed on August 31, 2021)
- Global Strategy for Asthma Management and Prevention. https://ginasthma.org/2025-gina-strategy-report/ (Accessed on June 12, 2025).

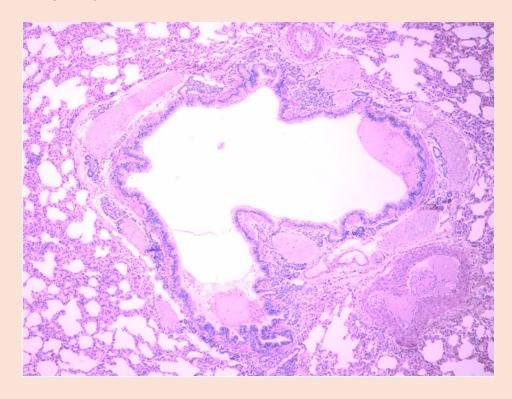
ASTHMA





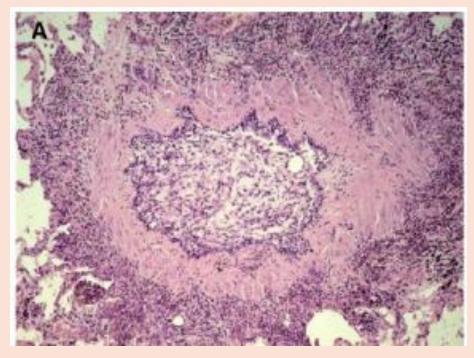
Asthma death: Mucus plugging

Normal



Medcell.org

Asthma death



Gaetano, T., European Heart Journal Supplements (2023) 25 (Supplement C), C118–C129

Asthma Diagnosis

Clinical history

- Symptoms
- Family history of asthma
- Personal/family history of allergic rhinitis, atopic dermatitis

Physical exam

- Wheezing
- Decreased breath sounds and/or excursion
- Prolonged expiratory phase

Spirometry

- Obstructive pattern for age based on FEV1/FVC ratio
- Reversibility after bronchodilator (unless remodeling or inflammatory component)

Asthma Treatment

Varies based on severity

- Short acting bronchodilators
- Inhaled corticosteroids
- Long acting bronchodilators
 - Long acting beta agonists (LABA)
 - Long acting muscarinic agents (LAMA)
- Addressing triggers (e.g., allergies, sinonasal, GERD, sleep apnea)
- Rule out ABPA, EGPA, if severe
- Biologics

NJ Case 1

- 42 yo W referred for chronic cough and further evaluation of asthma
 - No childhood asthma
 - SCIT as a teen with improvement in allergies
 - Never smoker
 - Diagnosed with asthma at 25 yo after the flu while in Atlanta
 - Sx = chest tightness, shortness of breath, cough
 - Started on propranolol around the same time for mitral valve prolapse and developed wheezing, so discontinued
 - Lived between Florida and Atlanta
 - Florida chest tightness, shortness of breath and cough with viral illnesses only
 - Atlanta chest tightness, wheezing, and a productive cough lasting 3 months

NJ Case 1 cont.

- Traveled to N. Carolina and had an exacerbation with chest tightness ("elephant on chest") and symptoms worsened resulted in ER visit
 - ultimately started on fluticasone and salmeterol
- Traveled back to N. Carolina and developed chest tightness and cough
 - montelukast added
- Symptoms persisted with paroxysmal coughing, occasionally productive of whitish sputum
 - Onset typically occurs between 4:00 8:00 pm
 - Patient reported c. 8 steroid bursts in the prior year
 - Symptoms accompanied by chest tightness and hoarseness

NJ Case 1 cont.

Reports a history of GERD and delayed gastric emptying diagnosed 10 years prior to presentation

 Notes an epigastric burning pain that radiates to her throat despite high dose PPI's

PMH: hypothyroidism, hyperlipidemia, anxiety, depression, MVP, GERD, delayed gastric emptying

NJ Case 1 cont.

- Two months prior to presentation, she developed intractable coughing while pH probe placement was attempted
- Coughing didn't respond to bronchodilators and she was sent to the ER, where she was intubated and admitted
 - Extubated 8 hours later and discharged the day after admission
- Our evaluation revealed:
 - Resting pulse oximetry 97%
 - No breath sounds on exam while patient asymptomatic
 - Normal spirometry with no change after bronchodilator
 - Negative methacholine challenge (CT showed air trapping/mild bronchial wall thickening)

What's Wrong with This Picture?



What's Wrong with This Picture?

 No breath sounds on exam when she was awake/alert and pulse oximetry showed 97% O2 sat

 Extubated after 8 hours and discharged that day

Methacholine challenge negative for asthma

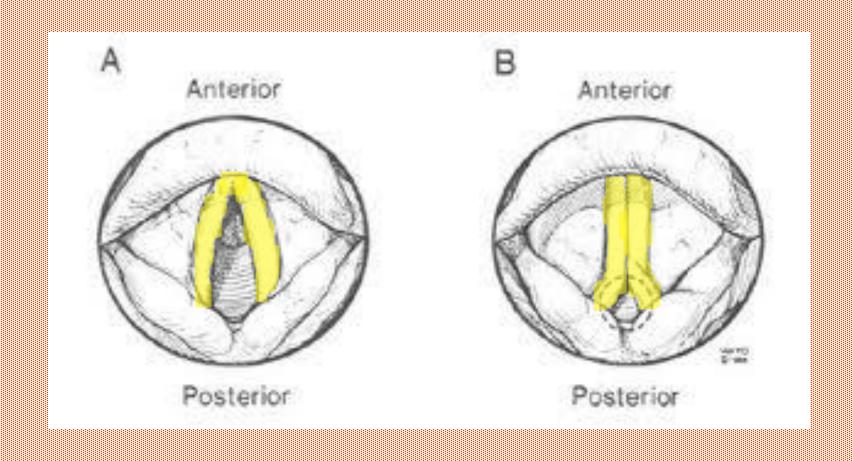


Vocal Cord Dysfunction (VCD)

Paradoxical Vocal Fold Motion (PVFM)

Inducible Laryngeal Obstruction (ILO)

Definition – adduction of the vocal cords while breathing



Vocal Cord Dysfunction

Symptoms can include

Shortness of breath

Cough

• "Wheezing"

NJ Case 2

25 yo W presents for further evaluation of asthma. Symptoms include sudden onset of shortness of breath, wheezing, and throat tightness that can lead to passing out, resulting in 911 calls. Symptoms usually resolve prior to transport to the ER.

Her friend, who accompanies her to the visit, witnessed one of the episodes where patient developed symptoms while walking back to a car. She managed to make it to the back seat, where she passed out. The wheezing stopped after she passed out and she regained consciousness a few minutes later and was fine.







NJ Case 3

58 yo W referred for difficult to control asthma. She was diagnosed with asthma c. 10 years ago, initially requiring infrequent albuterol. A few years ago, however, the patient started developing symptoms of coughing, shortness of breath and wheezing multiple times weekly, which persisted despite twice daily fluticasone and salmeterol, montelukast, and 60 mg of prednisone daily for over a year. Albuterol was not always helpful for symptoms.

PMH: GERD, osteoporosis, obstructive sleep apnea

NJ Case 3 cont.

Wt: 311lb P: 76 Ht: 5'4" BP 130/22 **RR: 18 Spirometry:** Pre Post 3.41 (73%) 4.66 (63%) FVC FEV1 1.76 (49%) 2.33 (66%) FEV1/FVC

68

60

Methacholine challenge with laryngoscopy revealed findings consistent with asthma and VCD

Further history obtained from the patient revealed that she gained c. 150 pounds after being on steroids and the osteoporosis, GERD and sleep apnea diagnoses were made after she was started on steroids.

Vocal Cord Dysfunction: History

Symptoms

- Shortness of breath
- Tightness in the throat/choking sensation
- Cough
- Hoarseness
- Trouble swallowing
- Hypersensitive to odors
- Onset of symptoms is sudden
 - "My breath just shuts off"

"One of these things is not like the other"









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"One of these things is not like the other"











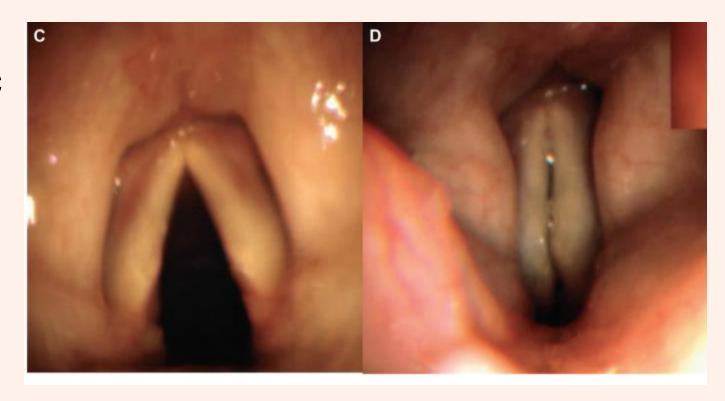
Vocal Cord Dysfunction: Physical exam

Physical Exam

- Stridor, "wheezing"
- Hoarseness
- Anxious
- O2 Sat normal or just slightly low, but overall good given the patient's level of distress

Vocal Cord Dysfuntion: Diagnosis

- Laryngoscopy
 - While pt is symptomatic
 - May need to try to induce
 - Methacholine challenge
 - Perfumes/odors
 - hyperventiliation



Gastroesophageal reflux disease, laryngopharyngeal reflux, and vocal cord dysfunction/inducible laryngeal obstruction—overlapping conditions that affect asthma Eapen, Amy A. et al.

Vocal Cord Dysfunction: Diagnosis

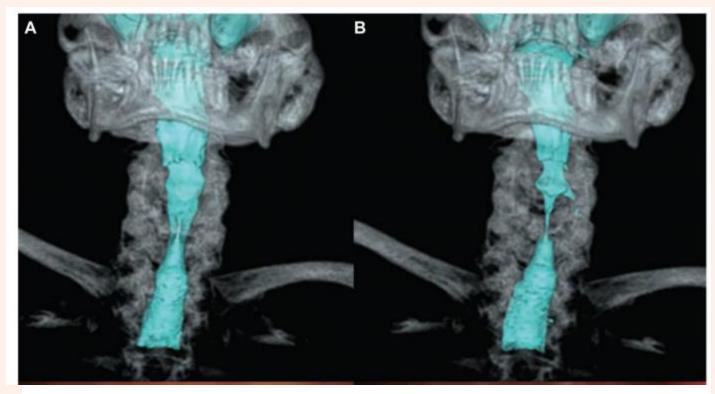
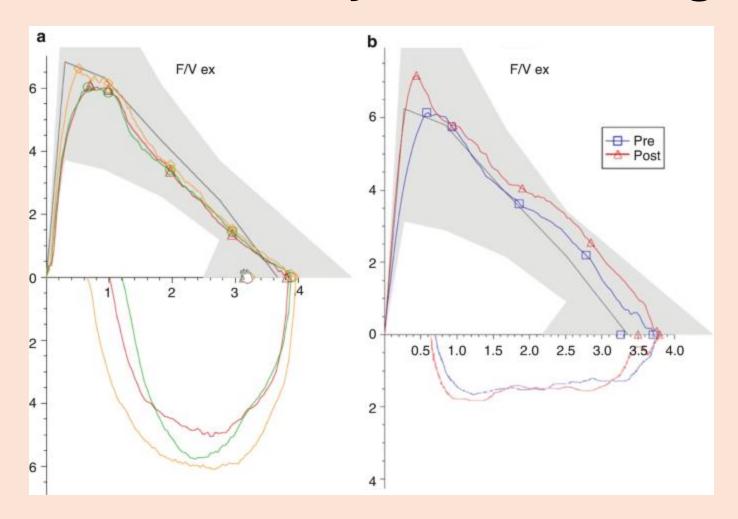


FIG 2. Dynamic CT of larynx showing coronal reconstruction during inspiration (A and B) and images obtained by laryngoscopy in the same patient (C and D). Matched images demonstrate normal function (A and C) in a patient without VCD/ILO and the presence of inspiratory closure of the vocal cords following a period of hyperventilation in a different patient with VCD/ILO (B and D).

Gastroesophageal reflux disease, laryngopharyngeal reflux, and vocal cord dysfunction/inducible laryngeal obstruction—overlapping conditions that affect asthma Eapen, Amy A. et al.

Journal of Allergy and Clinical Immunology, Volume 154, Issue 6, 1369 - 1377

Vocal Cord Dysfunction Diagnosis



Inspiratory Flow loop

Left = normal

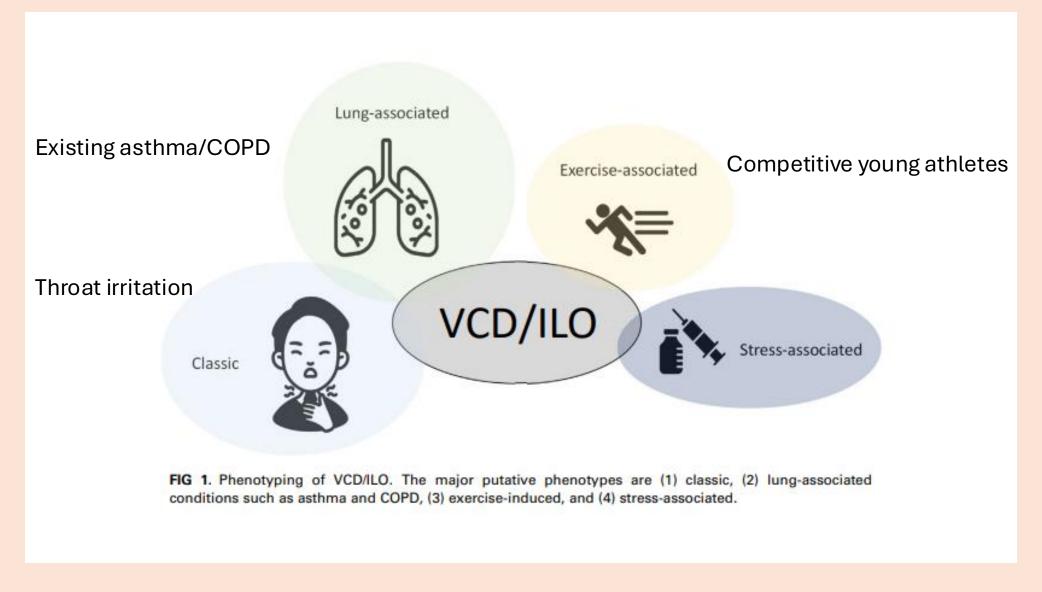
Right = flattened, could be consistent with vocal cord dysfunction

Sandage, M.J., Zhang, W., Ongkasuwan, J. (2020). Paradoxical Vocal Fold Motion. In: McMurray, J., Hoffman, M., Braden, M. (eds) Multidisciplinary Management of Pediatric Voice and Swallowing Disorders. Springer, Cham. https://doi.org/10.1007/978-3-030-26191-7_28

Vocal Cord Dysfunction Treatment

Treatment

- Treat triggers
 - Postnasal drainage
 - GERD/LERD
 - Anxiety
- Speech Therapist familiar with condition
 - Learn diaphragmatic breathing
 - Pursed lip breathing and other exercises to relax throat muscles
- Botulinum toxin



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Case 4

47 yo M presents with concern for food allergies. A few months ago, he developed throat tightness after eating chocolate and had a similar experience a week later, so he stopped chocolate. He subsequently had similar symptoms with lasagna and tomatoes, so started avoiding tomatoes. A week ago he ate fresh onions and developed the same symptoms. Since then he is getting frequent throat tightening. He denies other symptoms such as visible angioedema, hives, abdominal or respiratory symptoms. He wants to be tested to see if he is allergic to other foods. You should:

A: Do comprehensive food skin and blood tests

B: Do comprehensive food skin tests only

C. Do comprehensive food blood tests only

D. None of the above

Case 4 cont.

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Questions?