Paradoxical Vocal Fold Movement in a Female Volleyball Player

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Abstract

Background: A 20-year-old female volleyball player (Ht=178 cm; body mass = 72.7 kg) reported asthmatic symptoms as an adolescent. Her symptoms diminished and did not recur until her sophomore year of high school, where she reinitiated treatment and used asthma medications. She discontinued treatment when symptoms of infection subsided. She continued treatment with inhaled bronchodilators when symptoms did not diminish. She was treated with albuterol inhaler for exercise induced asthma. During her sophomore year she reported wheezing, shortness of breath, difficulty inhaling, fatigue, and occasional loss of breath during practice and games. Initial examination revealed asthmatic symptoms, and the athlete was diagnosed and treated for exercise-induced asthma (EIA) by the team physician and a family practice physician. However, the athlete’s condition worsened and she was referred to a pulmonologist and ear, nose, and throat (ENT) specialist. Both physicians diagnosed her with paradoxical vocal fold motion (PVFM), an upper airway obstruction associated with the adduction or closure of the vocal folds primarily during inhalation. The athlete was referred to a speech therapist for PVFM therapy.

Differential Diagnosis

- Exercise Induced Asthma
- Upper Respiratory Tract Infection

Diagnosis and Treatment

Family Practice Doctor:
- Spirometry Test Results 1:
  - FVC = 89% of predicted, FEV1 = 63%, FEV1% = 70%, and FEF 25-75% = 50%
- Spirometry Test Results 2:
  - FVC = 91%, FEV1 = 62%, FEV1% = 68%, and FEF 25-75% = 44%
- Results indicated mild obstruction. The athlete was diagnosed with asthma and treated with prescription drugs Albuterol, Advair, and Singular.

Pulmonologist:
- Spirometry Test Results 3:
  - FEV1 was 78% of predicted with slightly decreased flows.
- No Bronchodilator response. Flow volume loop was shortened during the inspiratory limb, suggestive of a variable extrathoracic upper airway obstruction.
- Laryngoscopy is performed.
- Paradoxical vocal fold motion (PVFM) was confirmed.

Speech Therapist:
- Voice Handicap Index score was 79.
- Results indicated glottal dysfunction or laryngeal pathology, due to inefficient glottal regulation of the airstream.

Speech Therapy:
- Maximum Phonation Time (MPT):
  - MPT = 5.93 s, and S/Z ratio = 1.46
- Results indicated glottal dysfunction, due to inefficient glottal regulation of the airstream.
- Voice Handicap Index score was 79.
- Paradoxical Vocal Fold Movement diagnosis was confirmed.

Treatment:
- Speech therapy twice weekly until PVFM symptoms were controlled and vocal quality improved. Speech therapy included controlled breathing, relaxation exercises, and vocal hygiene program.

References


Uniqueness

- PVFM is often misdiagnosed as asthma and treated ineffectively with asthma medications.
- There is a higher incidence in females than males 2:1.
- Proposed etiologies: psychological conditions, upper airway sensitivity to laryngeal irritants and laryngeal dystonia.
- Accurate diagnosis can only be made after a Laryngoscopy is performed.
- Speech Therapy is considered the gold standard for treatment of PVFM.

Clinical Significance

- Athletic trainers must be cognizant that not all athletes with complaints of wheezing, shortness of breath, and difficulty breathing during exercise have asthma.
- Proper recognition of the signs and symptoms of PVFM is vital to avoid abuse of asthma medications.

Conclusions

- PVFM is a challenging disorder to diagnose and a multidisciplinary approach is often needed for diagnosis.
- Individuals who present with symptoms of asthma that do not respond to traditional treatment should be evaluated for PVFM.