Exercise-Induced Dyspnea: Vocal Cord Dysfunction and Asthma

Lindsey E. Eberman, PhD, ATC, LAT, Report Editor

Athletic trainers and therapists (ATs) are generally well informed about respiratory impairments, including exercise-induced asthma (EIA). The National Institutes of Health\(^1\) publishes regular updates on asthma and National Athletic Trainers’ Association has a position statement on asthma management.\(^2\) With such education and guidance, ATs are well equipped to work with asthmatic athletes. In contrast, very little guidance has been provided for the evaluation and on-field management of exercise-induced vocal cord dysfunction (VCD).

VCD is an adduction of the vocal cords that most commonly impairs inspiratory lung volume, but can also affect expiratory lung volume. The condition is relatively uncommon; one study reported the prevalence of VCD to be approximately 5% in a sample of 570 athletes.\(^3\) A large proportion of those with VCD have previously been misdiagnosed as having EIA. VCD is similar to asthma in that certain patients may experience dyspnea (i.e., troubled-breathing) at rest, whereas others may only experience dyspnea and wheezing during exercise. VCD is a differential diagnosis for such symptoms, but it receives little attention in leading positions statements on asthma management. Thus, there is a need to increase AT awareness of this unique condition.

Like EIA, VCD may not be symptomatic unless provoked with physical activity. Physical exertion in a clinical setting may not replicate the conditions on the playing field that typically evoke VCD. Consequently, the AT is in a unique situation to observe, document, and properly refer athletes exhibiting symptoms of VCD for appropriate treatment. The purpose of this report is to increase awareness of VCD and to provide guidelines for the on-field assessment and management of exercise-induced VCD or coexisting VCD and EIA.

**Diagnosis of Vocal Cord Dysfunction**

Distinguishing VCD from EIA can be quite simple if the AT understands the causes for noisy breathing. In a resting state, noise is generally not perceived with vocal cord adduction unless the trachea is auscultated. Conversely, when an athlete is ventilating heavily during exercise, vocal cord adduction narrows the passageway for air at the level...
of the trachea. The result of this narrowing is airflow turbulence that presents as inspiratory stridor. When an athlete is experiencing VCD, he or she may complain of tightness in the throat or neck, shortness of breath, dyspnea, dry coughing, and dysphagia (i.e., difficulty swallowing or a sensation of a lump in the throat). The signs and symptoms of VCD are markedly different from those of EIA, which is characterized by expiratory chest wheezing, shortness of breath, dyspnea, and a wet cough.

Physicians often diagnose VCD by evaluating lung spirometry flow-volume curves before and after a provocation test that elicits heavy ventilation. Similar methods have been used for assessment of EIA, but the airway deficit for VCD is usually more pronounced on the inspiratory spirometry curve than the expiratory curve (Figure 1). Unfortunately, the provocation test for VCD is prone to false negative results, since breathing heavily is often an inadequate stressor. The gold-standard for diagnosis of exercise-induced VCD is provocation during a laryngoscopic evaluation.

To compensate for false negative clinical test results, and to identify when a laryngoscopic evaluation is warranted, an emerging approach for diagnosis of VCD is physician evaluation of video obtained when the patient was experiencing dyspnea. Davis et al. reported a case of an 11-year-old swimmer who experienced dyspnea during competition. The patient was initially diagnosed as having EIA and was prescribed bronchodilating medication, but the treatment was ineffective. The patient was later evaluated with a provocation test that also yielded a negative result. The proper diagnosis of VCD was not made until the treating physician examined video of the patient experiencing dyspnea during a swim meet. The hallmark characteristic of VCD is the appearance of tension in the anterior neck muscles (Figure 2).

The Speech Pathologist

Athletes diagnosed with VCD should be referred to a speech pathologist, preferably one who possesses an advanced degree. A speech pathologist has received specialized training for helping patients develop self-care techniques during VCD episodes. Athletes experiencing VCD are taught how to reduce spasm of the vocal cords with laryngeal-control exercises,