Exercise-Related Syncope: Acute Management and Subsequent Evaluation

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SYCONE CAN BE defined as an event in which there is transient loss of consciousness and postural tone. Although syncope is generally a benign event in young adults (less than 40 years of age) and in many cases never reaches the attention of an athletic trainer or physician, it can be an early signal of sudden death.1-3 The athletic trainer is often the first person to evaluate an athlete with syncope, and he or she must be able to quickly assess the risk and determine which patients to appropriately refer to the team physician for further evaluation.

When evaluating exercise related syncope (ERS), several important questions come to light: Which athletes should be immediately sent to the hospital? Should the athlete be allowed to practice or compete during the evaluation process? What tests should be scheduled and in what order? When is further specialty work-up required and by whom? This report will review the etiology of ERS and outline a format for initial evaluation and management.

Discussion
ERS refers to syncope that occurs either during or immediately following exercise. Exercise-associated collapse is similar but a different entity, which describes athletes who are unable to stand or walk unaided at the completion of the event as a result of light-headedness, faintness, dizziness, or syncope in the absence of an orthopedic condition.4,5

Although there is not much published literature on ERS, several factors are commonly noted. Syncope does not typically occur with exertion; ERS represents only 3-20% of syncope cases.3,4 Although most of the cases of ERS are benign, young athletes who present with syncope during exertion are more likely to have a cardiac cause.6,7 If the collapse occurs before the finish of the event, it may represent an ominous finding.2-4

There are many distinct etiologies for exertional syncope. The purpose of this report is to provide a practical step-wise evaluation for the first responder, rather than to provide an in-depth discussion of pathophysiology. Table 1 lists many of the common causes of exertional syncope, associated signs and symptoms, and suggested follow-up diagnostic testing. Because neurocardiogenic syncope is the most common cause, we will provide a brief discussion about neurocardiogenic etiology.

Neurocardiogenic Etiology
Neurocardiogenic syncope is thought to be the most common cause of exertional syncope and is secondary to sudden reflex bradycardia or vasodilatation.6,8 This type of syncope is neurally-mediated, and it is believed to result from a brisk decrease in venous return to the heart. Compensatory vigorous ventricular contractions activate mechanoreceptors in the left ventricle, which increase afferent neural output.6,9 This produces reflex bradycardia and peripheral vasodilatation, resulting in decreased CNS perfusion and subsequent syncope.
This type of syncope in athletes is generally regarded as benign and has a favorable long-term prognosis.\textsuperscript{10} Other authors recognize increased resting vagal tone, secondary to endurance cardiovascular conditioning in the athlete, as another potential neurocardiogenic etiology for exertional syncope.\textsuperscript{11}

Neurocardiogenic exertional syncope symptoms may include, but are not necessarily limited to, light-headedness, fatigue, nausea, disorientation, warmth, heart palpitations, diaphoresis, and pallor, which lasts an average of 10-15 minutes and may occur up to 30 seconds before the syncope event.\textsuperscript{9,12}

\textbf{Work-Up}

Immediate life-threatening conditions should be addressed, such as cardiac arrest and airway compromise, with appropriate interventions initiated in the field. Given the proximity of the athletic trainer or team physician to athletes, these providers are commonly among the first to evaluate the post-syncope athlete. They must quickly address any potentially life-threatening findings, which can be done by using basic life support (BLS) algorithms and activating emergency medical services as needed.

\textbf{History}

The evaluating provider must determine if true syncope, involving loss of consciousness and presumably hemodynamic compromise, has occurred. The athlete who describes having been “unconscious” but is able to actively assist in his or her own evaluation is unlikely to be suffering from a “life-threatening” cause of collapse. A second critical determination is whether the syncope was exertional versus post-exertional.

Characteristics of the syncope episode should be elucidated, looking for preceding signs or symptoms,

\begin{table}[h]
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\textbf{Diagnosis} & \textbf{Clinical Clues} & \textbf{Electrocardiogram} & \textbf{Suggested Diagnostic Testing} \\
\hline
Neurocardiogenic Syncope & noxious stimulus, prolonged upright position & normal & exercise testing \\
& & & \\
Supraventricular tachyarrhythmias & palpitations, response to carotid sinus pressure & pre-excitation & electrophysiologic study and definitive therapy \\
& & & \\
Hypertrophic Cardiomyopathy & grade III/VI systolic murmur, louder with valsalva, when present & normal, pseudoinfarction pattern, left ventricular hypertrophy with strain & echocardiography with Doppler \\
& & & \\
Myocarditis & prior upper respiratory tract infection, pneumonia, shortness of breath, recreational drug use & simulating a myocardial infarction with ectopy & viral studies, echocardiogram, drug screening \\
& & & \\
Aortic Stenosis & exertional syncope, grade III/VI harsh systolic crescendo-decrescendo murmur & left ventricular hypertrophy & echocardiography with Doppler \\
& & & \\
Mitral Valve Prolapse & “thumping heart,” midsystolic click with or without a murmur & QT interval may be prolonged & echocardiography with Doppler \\
& & & \\
Prolonged QT Syndrome & recurrent syncope with family history of sudden death & Prolonged corrected QT interval (>0.44s) & family history, exercise stress test with ECG after exercise \\
& & & \\
Coronary Anomalies & usually asymptomatic, sudden death event & Normal rest electrocardiogram & coronary angiography, cardiac MRI \\
& & & \\
Acquired Coronary Artery Diseases & chest pain syndrome, family history & Ischemia, may be normal & exercise testing with or without perfusion or contractile imaging \\
& & & \\
Right Ventricular Dysplasia & asymptomatic until syncope, tachyarrhythmias & T wave inversion V1-V3 PVCs with LBBB configuration & echo/Doppler study, electrocardiography \\
& & & \\
\hline
\end{tabular}
\caption{Clinical Presentations Associated With Exertional Syncope}
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