



EDITORIAL COMMENT

Exercise-induced syncope: A real red flag!

Síncope induzida pelo exercício: um verdadeiro sinal de alerta!

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All athletes with exercise-induced symptoms should be evaluated!

Syncope during exercise could be the first clinical manifestation of several conditions associated with sudden cardiac death (SCD) in athletes (e.g., cardiomyopathies and primary arrhythmic diseases) and should be considered a red flag, leading to additional investigations. Otherwise, syncope at rest or after exercise is usually benign and less frequently associated with a life-threatening cardiac condition.

In this paper, Oliveira et al.¹ report a case of an athlete with recurrent syncope during exercise, palpitations and dizziness. The electrocardiogram (ECG) showed regular wide complex tachycardia and abnormal repolarization changes at sinus rhythm (T wave inversion in V1–V5). Further investigations – transthoracic echocardiogram, cardiac magnetic resonance (CMR) and genetic test, established the diagnosis of arrhythmogenic right ventricular cardiomyopathy (ARVC). Since both syncope and ventricular tachycardia are established risk factors for SCD in ARVC, a subcutaneous cardioverter was promptly implanted.

Arrhythmogenic right ventricular cardiomyopathy is associated with malignant ventricular arrhythmias triggered by exercise and is a frequent cause of SCD in young athletes, while exercise training itself may accelerate phenotypic expression of this cardiomyopathy. More specifically, high-

intensity and high-volume exercise are associated with unfavorable outcomes in ARVC patients, but high-intensity exercise is a stronger marker of ventricular arrhythmias.² Additionally, competitive sport is associated with a two-fold increased risk of ventricular arrhythmias or SCD and earlier symptoms in ARVC, compared with sedentary individuals and recreational athletes. In this setting, the management of athletes with suspected cardiac disease is frequently challenging.

The first problem is the overlap between physiological cardiac adaptations and pathological findings. Physiological right ventricular remodeling is common in endurance athletes and can overlap with ARVC; a comprehensive approach is essential, requiring clinical data and several additional investigations from the ECG to advanced cardiac imaging, especially CMR. Assessment of the severity of ventricular involvement, affecting both ventricles in many cases, in terms of structural changes and systolic dysfunction, is vital for diagnosis and risk stratification, because the more extensive the disease the higher the arrhythmic risk. In this setting, CMR is more useful than echocardiography to evaluate wall motion abnormalities and myocardial fat infiltration and/or scarring.³

The second problem is the sport's eligibility. ARVC, recommendations are clear: participation in high-intensity recreational exercise or any competitive sports is not recommended, including those who are gene positive but phenotype negative.⁴ In addition, specific sports such as those highly dynamic and stop-and-go activities (e.g.,

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basketball, handball and football), young age at presentation and male gender are associated with a higher risk. Participation in 150 min of low-intensity exercise per week should be considered for all individuals, but further research is needed to explore its safety and prognostic impact.

It is well recognized that exercise is one of the most powerful tools to improve cardiovascular health and the more recent recommendations for exercise in the presence of cardiovascular diseases are less restrictive. However, early detection of high-risk conditions, such as ARVC, in which exercise-induced syncope represents a concerning symptom, is essential to decrease the risk of SCD in athletes.

Conflicts of interest

The author has no conflicts of interest to declare.

References

1. Oliveira CC, Vieira C, Braga CG, et al. Syncope in the athlete – minor alterations, major diagnosis! *Rev Port Cardiol.* 2023;42.
2. Lie ØH, Dejgaard LA, Saberniak J, et al. Harmful effects of exercise intensity and exercise duration in patients with arrhythmogenic cardiomyopathy. *JACC Clin Electrophysiol.* 2018;4:744–53.
3. D’Ascenzi F, Solari M, Corrado D, et al. Diagnostic differentiation between arrhythmogenic cardiomyopathy and athlete’s heart by using imaging. *J Am Coll Cardiol Img.* 2018;11:1327–39.
4. Pelliccia A, Sharma S, Gati S, et al. 2020 ESC Guidelines on Sports Cardiology and exercise in patients with cardiovascular disease. *Eur Heart J.* 2021;42:17–96.