

VIEWPOINT

Sudden Cardiac Death in Sports: Not a Fatality!

Nabil Ghorayeb,^{1,3} Clea Simone Sabino de Souza Colombo,^{2,3} Ricardo Contesini Francisco,^{1,3} Thiago Ghorayeb Garcia^{1,3}

Instituto Dante Pazzanese de Cardiologia,¹ SP - Brazil

Cuore dello Sport,² Valinhos, SP - Brazil

HCoR - Hospital do Coração,³ SP - Brazil

Abstract

Sudden cardiac death in sports is still controversial. Despite being a rare event, the death of an apparently healthy young athlete causes a major impact on the media. On the other hand, for being a rare event, it is clearly undervalued. Sports preparticipation cardiological assessment is one of the most effective preventive medical actions for professional and amateur endurance athletes. The regular and supervised practice of physical exercise does not kill. We believe that deaths are triggered by excessive physical training and use of drugs, in individuals with not diagnosed or undervalued heart diseases. It is necessary to make health professionals and athletes aware of the athletes' physiological limits, in addition to preparing the athletes properly when they try to overcome human limits.

Introduction

Sudden death in sports is still a controversial topic among those who consider the death of an apparently healthy young individual a severe fact, with a strong media repercussion, and those who consider it a less relevant fact from the epidemiological viewpoint. That discussion is common among physicians and even among other health professionals.

We consider the sudden death of a young athlete a paradox: the symbol of health and physical vitality, experienced in a certain sports modality, suffers a cardiac arrest followed by sudden death when is not recovered.¹

Keywords

Sports; Endurance Exercise; Risk Assessment; Sudden Death; Cardiac Arrest.

We cannot agree that it is a mere fatality, a condition mainly dependent on environmental factors such as accidents, lightening and floods, not on diseases.

In 2006, the International Olympic Committee, in Lausanne, Switzerland, reported data about sudden cardiac death in young athletes (< 35 years) from 1966 to 2004: 1,101 deaths were officially recorded worldwide, an incidence average of 29 athletes per year.²

At the beginning of 2018, the incidence of sudden death in professional and amateur athletes increased, taking everyone by surprise. Thirteen deaths were confirmed and 9 occurred in Brazil, including those of a 15-year-old soccer player and of a 37-year-old triathlete.

Among these deaths, only 3 had a definitive diagnosis after postmortem examination and DNA gene profile testing: 1 arrhythmogenic death syndrome (probable Brugada syndrome), 1 obstructive hypertrophic cardiomyopathy and 1 early coronary atherosclerotic disease. The other cases evidenced no macroscopic findings, but microscopy and laboratory tests to define the diagnosis are still pending. Some hypotheses are being analyzed and myocardial fibrosis due to high intensity and volume training leading to malignant arrhythmias may be a possible cause of death.

In order to prevent sudden cardiac death in athletes, in the 1970s-1980s the Medical Section of Sports Cardiology of the Instituto Dante Pazzanese de Cardiologia (IDPC-USP) initiated pre-participation evaluation of professional and amateur athletes of the major teams in São Paulo such as soccer, basketball and volleyball players, street runners and martial arts fighters, following a routine that is currently part of the Brazilian guidelines of Sports Cardiology for competitive athletes: personal and family history, physical examination, blood tests, exercise test and echocardiography.³ Some Brazilian athletes resist

Mailing Address: Nabil Ghorayeb

Rua Castro Alves, 815, apto: 91. Postal Code: 01532-001, Aclimação, São Paulo, SP - Brazil.

E-mail: ghorayeb@cardiol.br, nghorayeb@cardioesporte.com.br

undergoing that assessment because they are concerned about being excluded from sports competition.

The world scenario has changed after the tragic death of the African soccer player Foé, in June 2003 in Lyon, France, witnessed during the Confederations Cup, secondary to hypertrophic cardiomyopathy. In the following months, other deaths of soccer players occurred, such as the Polish player Fehér in January 2004 in Portugal, secondary to pulmonary thromboembolism, and the Brazilian player Serginho, of the São Paulo State premier league team, in October 2004, also secondary to hypertrophic cardiomyopathy. Because of such tragedies, the leaders began to investigate what should be done to prevent these events, in addition to enforcing the availability of emergency medical support with portable defibrillators in sports events in Brazil and worldwide.

Professional and amateur athletes of competitive sports should undergo preparticipation cardiovascular screening, an effective preventative strategy to avoid sudden death in sports, an event considered paradoxical because it occurs in a trained individual, a symbol of health, an example to the entire society. To corroborate our statement, we have statistical data from our Service of Sports Cardiology of the IDPC with approximately 14,000 athletes and ex-athletes cared for in the past 40 years, in addition to those from the Sports Medicine Clinic (ex-Sport Check-up HCor) of the Hospital do Coração (HCor), with approximately 1,000 athletes assessed in 10 years, mainly from 4 São Paulo State premier league teams.⁴

Sports cardiology of the IDPC and HCor

1. Assessment of children and adolescents ("Soccer Sieve": a gateway for young individuals to play for a major league team):

Diagnostic results in 180 adolescents:

- A. cleared for sports practice: 139 (77.3%)
- B. comorbidities (anemia, asthma, type 1 diabetes mellitus, athlete's identified proteinuria syndrome): 9 (5%), 1 (0.5%) disqualified for sports competition
- C. heart diseases: 32 (17.7%):
 - disqualified for sports competition: 19 (10.5%), 1 death due to early coronary artery disease
 - treated or recommended to change sports modality: 13 (7.2%)
- D. Reason of the assessment:
 - 110 (61%): preparticipation evaluation
 - 70 (39%): presence of symptoms or abnormal tests

2. Preparticipation evaluation of Brazilian Olympic athletes

Diagnosis of 126 Brazilian Olympic athletes:

- A. Normal results: 7.6%
- B. Athlete's heart: 51%
- C. Physiological arrhythmias: 2%
- D. Mitral valve prolapse: 10%
- E. Dyslipidemia: 25%

3. Assessment of 5,000 athletes by the IDPC

Cardiac abnormalities and / or heart diseases:

- A. From 7 to 14 years of age: 21%
- B. From 15 to 17 years of age: 17.7%
- C. From 18 to 35 years of age: 8.2%

Sports practice is not a primary cause of sudden cardiac death. However, we believe that overtraining, use of licit (anabolic steroids, GH, amphetamines) and illicit drugs, and undiagnosed or undervalued heart diseases are the major causes of cardiac arrest and, consequently, sudden cardiac death.

Most of the common causes of sudden cardiac death can be identified by preparticipation evaluation of athletes performed by experienced doctors. Fatality is a death caused by an accident or a situation we couldn't avoid. Sudden cardiac death in athletes is a preventable event.

A recent study reported interesting data about triathlon competition, an endurance and high-intensity sport: "Deaths and cardiac arrests during triathlon are not rare as imagined, most of them occurring in middle-aged men and those older than 60 years". Most of the deaths occurred during swimming, a modality with difficult visual control of the possible events. The most important and surprising finding was the high incidence of silent cardiac abnormalities, particularly atherosclerotic coronary artery disease.⁵

In Brazil, sudden death in sports usually occurs in athletes who never underwent a preparticipation evaluation, mainly amateurs and those participating in intense physical activities at fitness centers. Many individuals presented arrhythmias, mostly secondary to viral myocarditis, the major cause of cardiac events in sports in Brazil.

References

1. Gorayeb N, Cruz FE, Dioguardi G. Sudden death. New Fact ? Arq Bras Cardiol. 2007;167(8):529-35.
2. Billea K, Figueiras D, Schamasch P, Kappenberger L, Brenner JL, Meijboom FJ, et al. Sudden cardiac death in athletes: the Lausanne Recommendations. Eur J Cardiovasc Prev Rehabil. 2006;13(6):859-75.
3. Ghorayeb N, Costa RVC, Castro I, Daher DJ, Oliveira Filho JA, Oliveira MAB, et al.; Sociedade Brasileira de Cardiologia, Sociedade Brasileira de Medicina do Esporte. Diretriz em cardiologia do esporte e do exercício. Arq Bras Cardiol. 2013;100(1Supl.2):1-41.
4. Banco de Dados da Seção de Cardiologia do Esporte do Instituto "Dante Oazzanese" de Cardiologia do Estado de São Paulo / Medicina do Esporte do Hospital do Coração (HCor-ASS). São Paulo;2017.
5. Harris KV, Creswell LL, Hass TS, Taylor T, Tung M, Erin I, et al. Death and cardiac arrest in US. Triathlon Participants, 1985 to 2016. Ann Intern Med. 2017;167(8):529-35.

