

# A Subtle Subacute Myocarditis in a Middle-aged Amateur Athlete

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## Abstract

Acute and subacute myocarditis represents the cause of sudden cardiac death in 5-25% of athletes. Making a diagnosis of myocarditis is always challenging due to its heterogeneous clinical presentation, especially in athletes with minimal and equivocal symptoms. The clinical onset of myocarditis can occur in many ways because patients may complain of different symptoms such as chest pain, or dyspnea from exercise, fatigue, heart failure or even imitate the signs of a myocardial infarction. Athletes are different from sedentary individuals with respect to their perception of clinical symptoms which are often underestimated. Herewith the author describes a case of subacute myocarditis that was diagnosed in an asymptomatic athlete who underwent sports pre-participation screening.

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Citation: Bolognesi M (2019) A Subtle Subacute Myocarditis in a Middle-aged Amateur Athlete. *Int Interv Cardio*, Volume 1:1. 102.

Received: June 20, 2019; Accepted: July 14, 2019; Published: July 22, 2019

## Introduction

Myocarditis is a typical inflammatory disease of the myocardium that can cause some cardiac dysfunctions and in particular uncommon arrhythmias [1]. Myocarditis represents a high percentage of sudden cardiac death events in predominantly young athletes, ranging between 5 and 22% according to some research [2,3]. Much of such evidence is from autopsy data which have determined the cause. For example, research by Swedish authors revealed that myocarditis was the most frequent autopsy diagnosis and occurred in relation to exercise [4]. The same thing was highlighted in another observational study in which myocarditis was discovered on histopathological examination in 22% of cases of athletic people [5]. This evidence should be taken into careful consideration by athletes for who exercise and competitive sport is a major component of their lifestyle [6]. In the case here described, subacute myocarditis was diagnosed in an asymptomatic athlete after considerable thought and interpretation of all the non invasive cardiovascular imaging, i.e. sequentially Electro Cardiogram (ECG), then Echocardiography and finally CRM which led to the certainty of the diagnosis.

## Case report

An otherwise healthy 50-year-old male amateur athlete who practices mountain biking races came to our center for sports cardiology to undergo pre-participation screening. He is an athlete who has relied on our medical evaluation since 2010. He has always been suitable for competitive sports. His family history was negative for cardiac disease and the physical examination was unremarkable. The athlete did not report any clinical problems and trained daily. Both the resting ECG and the post-exercise ECG were abnormal; in particular

both showed uncommon Premature ventricular contractions (PVCs) (i.e. with RBBB and upper axis) and QRS low voltage in the peripheral leads (Figure 1). The following two-dimensional transthoracic echocardiogram showed a severely dilated left ventricle with reduced global contractility and low systolic function with 40% ejection fraction but normal stroke volume (Figure 2). Morphology and function of the right chambers was normal. Consequently, cardiac magnetic resonance imaging was requested and it showed the typical findings of diffuse subacute myocarditis due to the presence of sub epicardial linear gingival erythema (Epicardial LGE) (i.e. non-ischaemic pattern) in the inferolateral and anterior wall (Figure 3). The athlete was therefore blocked from sports activity. Yet, we have planned a follow up in 6 months time after adequate anti-inflammatory therapy.

## Discussion

Acute and subacute myocarditis represents the cause of sudden cardiac death in 5-25% of athletes [7]. Making diagnosis of myocarditis is always a challenge due to its heterogeneous clinical presentation, especially in athletes with minimal and equivocal symptoms. The clinical presentation may be highly variable because patients can present essentially with chest pain, exertional dyspnea and fatigue, heart failure, or even simulate myocardial infarction [8]. However, athletes are different from sedentary individuals with respect to their perception of clinical symptoms which are often underestimated. Indeed athletes may present non-specific symptoms, such as fatigue during effort which may elude the diagnosis. Serum cardiac biomarkers for inflammation are often elevated and should be measured in suspected cases, but they may not be detected if the disease is subacute. ECG may show different findings including ST segment deviations, conduction abnormalities, non-sustained arrhythmias and low voltages. 2D Transthoracic

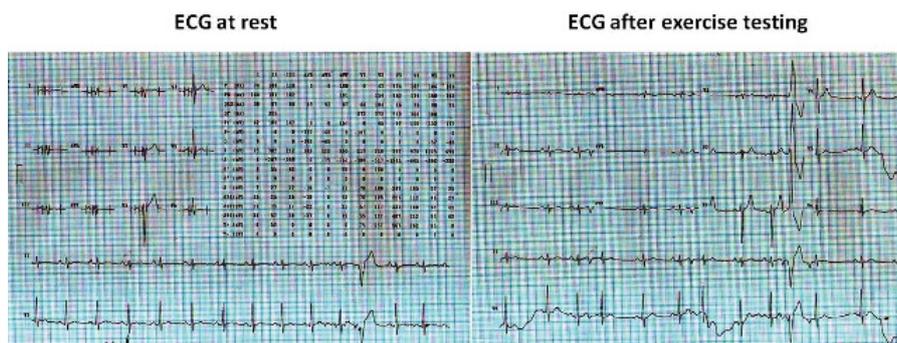


Figure 1: ECGs at rest and after exercise testing showed both uncommon PVCs (i.e., with RBBB and upper axis) and QRS low voltage in the peripheral leads.



Figure 2: 2D Transthoracic Echocardiography showed a severely dilated left ventricle with reduced global contractility and low systolic function with 40% ejection fraction but normal LV stroke volume.

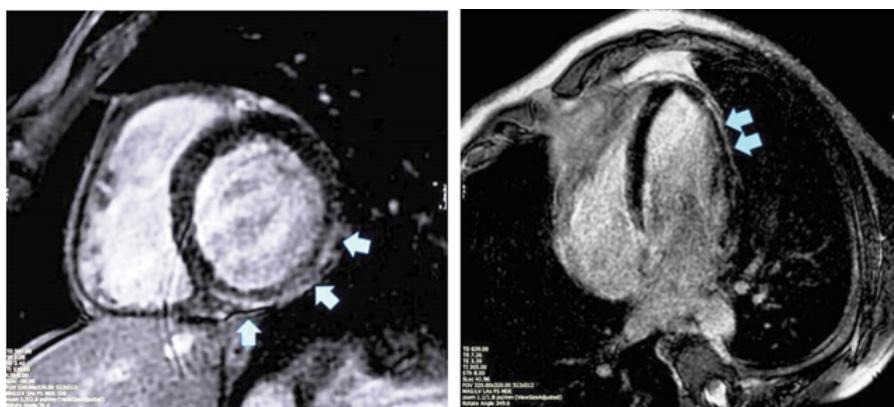


Figure 3: CMR of both a horizontal long axis and a short axis view showed normal null myocardium (black) and sub-epicardial delayed gadolinium enhancement (white) of the infero-lateral and anterior wall of the left ventricle (arrows).

echocardiography may show global left ventricular dysfunction and, sometimes, segmental wall motion abnormalities with pericardial effusion. The gold standard to make a precise diagnosis of myocarditis is endomyocardial biopsy, but this test is limited by inherent risk and low sensitivity as the inflammatory process often occurs in a patchy distribution [9]. So, in order to make a correct diagnosis it is necessary to catch features of non-ischemic pattern of DGE on CMR [10,11]. In the end, it seems there are several important takeaways. This case is original because the presentation of myocarditis was subclinical and went unnoticed by the athlete. So, only thanks to the PPS, the author was able to suspect the subtle myocardial disease. The abnormal characteristics of both the ECG and the echocardiogram led to the request for cardiac magnetic resonance imaging, which confirmed subacute myocarditis. This case teaches how good knowledge of ECG

and the use of echocardiogram in sports medicine settings are fundamental in diagnosing underlying pathologies of athletes that can also cause sudden death. It is therefore absolutely necessary for sports physicians to acquire these skills and abilities to ensure full safety for athletes and have the ability to properly assess the physical fitness for competition.

### Conclusion

Considering that the diagnosis of myocarditis in athletes is often autoptic and accounts for a certain percentage of sudden cardiac deaths, in cases like this the disease should be suspected first and be at the top of a clinical work-up list for athletes.

### Conflict of Interest

The author declares that there is no conflict of interest.



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