

## How could sudden cardiac deaths on the athletic fields be prevented?

### *Spor sahalarında ani kalp ölümleri nasıl önlenbilir?*

Dear Editor,

In the last decade and nowadays, numbers of subjects participating in sportive activity gradually increase in our country, like the trend in the world. Although regular exercise is beneficial for cardiovascular health, lack of pre-participation evaluation may be responsible for development of unexpected cardiac events. Such unanticipated deaths sometimes occur in dramatic circumstances and often involve medical and legal problems (1). The primary efforts of cardiologists and other related physicians are to detect any potential risk in subjects with heart disease before recreational and competitive sports (1-4).

The main cardiac reasons of disqualification from competitive activity should be reminded (2,3):

- Hypertrophic cardiomyopathy
- Arrhythmogenic right ventricular dysplasia
- Coronary artery disease
- Marfan's syndrome with dilated aorta
- Congenital anomalies of the coronary arteries
- Uncontrolled ventricular arrhythmias
- Severe valvular disease
- Cyanotic congenital heart disease
- Brugada syndrome
- Myocarditis
- Uncontrolled hypertension

The primary mechanisms of sudden cardiac death (SCD) involve the development of a fatal arrhythmia, presumably ventricular fibrillation or asystole (3). The structurally normal and physiologically competent cardiovascular system meets increased demands through an increase in coronary blood flow and myocardial oxygen. Furthermore, there is a marked increase in serum catecholamine levels. In patients with structural cardiovascular disorders, however, these normal responses with major adaptive significance may result in exercise-related cardiac rhythm problems (3).

The important approach for preventing SCD in athletes is that basic evaluation should include a general medical history and physical examination, and electrocardiography (4). A general medical history, previous medical illnesses including rheumatic fever, hypertension, cardiovascular disorders, and diabetes mellitus must be addressed, is crucial (1,2,4). Specific questions regarding chest discomfort on exertion, dyspnea, palpitations, syncope, and near syncope should be asked with insistence (1,2,4).

In addition, an appropriate physical examination includes attention to the general body habitus that may suggest a syndrome associated with cardiovascular disease such as Marfan's syndrome. Blood pressure and pulse should be measured and evaluated. Careful auscultation of the heart is necessary for basic evaluation (2-4). Moreover, exercise testing should be also performed to athletes who participate in competitive sport activity (1,2).

On the other hand, although different new methods were proposed, detecting of high risk athletes is still an unresolved trouble. One of the methods, measurement of the QT interval during exercise testing may distinguish physiologic and pathologic hypertrophy in athletes. The measurement of QT during a maximal-effort test could provide a simple and inexpensive screening method for athletes (1).

Importantly, echocardiography, another important tool, also should be performed for identifying cardiovascular pathology in subjects with symptoms and positive findings detected by other methods. It may be more beneficial in differentiation of physiologic and pathologic hypertrophy, which sometimes may be difficult. Not uncommonly, echocardiography plays a key role in determining the presence or absence of cardiac disease in athletes in order to prevent exercise-related sudden cardiac death (5). Recently, tissue Doppler imaging exhibit regional myocardial function and facilitate differentiation of physiologic and pathologic hypertrophy (1).

Moreover, in case of any cardiac event, team physician and paramedics should be skilled in urgent application of cardiopulmonary resuscitation. Importantly, equipments (especially portable defibrillator, transportation tools) for effective and successful resuscitation should be available and presence of important parts must be checked before sports activity.

Some cases of cardiac deaths in athletes may not be preventable by current practical means; however, the first step of main strategies must be to separate the high-risk athletes who have previous symptoms, a family history of SCD at a young age and clinical or electrocardiographic abnormalities. Finally, if there is found any suspicious finding, it should be verified by advanced methods for disqualification decision.

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