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**ACUTE HEART FAILURE IN ATHLETE****Abstract**

**Introduction:** Due to the excessive workload in training or competition, or if there is a large association of physical and emotional-psychological overuse, there may be an acute disorder and disintegration functions. Signs of acute disorders can occur during a training effort, immediately after its completion or ½ to 3 hours after the activity. One of the best known disorder is acute heart failure, which can occur during extreme sports overuse or after him. Disorders of the compliance function of organ systems, which is caused by the combined physical and emotional and mental overtraining, may have a negative effect on the heart function. The favorable effect of continuous physical activity on the function of the cardiovascular system, as well as primary and secondary prevention of cardiovascular disease is well studied and confirmed numerous epidemiological studies. Athletes are considered the healthiest members of our society, so their sudden death during training or competition attracts public attention. Sudden cardiac death (SCD) is the most common cause of death in athletes. **Objective:** The object of this work lies in the fact that the problem of acute heart failure in the simplest way closer to the population to be interested in this disorder. That is, the goal of this paper is to get closer to the essence of acute heart failure, and to describe the causes of acute disorders of the heart, to quote the most frequent consequences, and to propose measures for prevention of this phenomenon. And if you need to specify the type of therapy that accompany this disorder. **Methods:** In this study descriptive method will try to describe in detail the etiology, pathogenesis, prevention, treatment needed and being able or not able to become involved in sport after this disorder. **Results:** Acute heart failure after a major body burden or immediately after it is manifested by the following symptoms: an abrupt weakness, paleness, dizziness, dark before my eyes, unsteady gait, nausea and sometimes vomiting. There may be a semiconscious state or rarely unconsciousness. There are also chest tightness and pain in the heart, rapid pulse and aritmičan, who often can barely touch, shortness of breath and turning blue expressed. A medical examination shall be established very weakened heart sounds, and rarely, acute resulting enlargement of the heart, which is particularly dangerous. **Conclusion:** Based on the above said we can conclude the following: that the heart in athletes "weak point" in the system that is sensitive to the diverse and sometimes banal on external etiological factors. The heart can not hurt, and not able to thus signals the emergence of the

*virus in their own muscle as if an early start with the training may complicate acute heart failure (failure). Sudden cardiac death in athletes is an extremely rare event, whose incidence ranges from 0.5 to 1.6 per 100,000 athletes. It occurs nine times more often in men, and the most common cause of death was HCM. The disturbing fact that the majority of athletes who died of ISS had no previous history of heart disease or prodromal symptoms pre death, a difficult task physicians to detect persons with increased rizikom. Moje opinion dabi all active athletes should require by law to undergo pre-competitive pregleduu certain, licensed clinics and institutions. The review should be standardized and disable the "overlooked". For elite athletes it is necessary to annually perform ultrasound (US) examination of the heart.*

**Key words:** acute heart failure, athletes, active people, heart

## 1. INTRODUCTION

The beneficial impact of continuous physical activity on the function of the cardiovascular system, as well as primary and secondary prevention of cardiovascular disease is well studied and confirmed by numerous epidemiological studies. (Leon et al., 1987; Paffenbarger et al., 1993).. Athletes are considered the healthiest members of our society, so their sudden death during training or competition attracts public attention. Sudden cardiac death (SCD) is the most common cause of death in athletes (Drezner et al., 2007; Maron et al., 1996). Due to the excessive workload in training or competition, or if there is a large association of physical and emotional-psychological overuse, may cause acute disorder and disintegration functions. Signs of acute disorders can occur during a training effort, immediately after its completion or ½ to 3 hours after the activity. One of the best known disorder is acute heart failure, which can occur during extreme sports overuse or after him. Disorders compliance function of organ systems, which is caused by the combined physical and emotional and mental overtraining, may have a negative effect on the heart function. Death outcomes in athletes have been known since 490 BC when the Greek soldier Phidippides after the run so the distance from Marathon to Athens conveying the news of the Greek victory over Persia army died of sudden failure of the heart muscle. For the last 20 years, special attention attracted the sudden death of top athletes in the field. Volleyball player Flo Hyman, 1986, basketball players Hank Gathers in 1990, Reggie Lewis in 1993, skater Sergei Grinkov and footballer Marc Vivien Foe in 2003. Sudden death is defined as a non violent natural death that occurs as a result of cardiac arrest, not expected within one hour when previously healthy people. The mechanism of sudden cardiac death occurred during intense physical activity is not yet fully known. It is believed that the joint action of various factors (increased need for oxygen, reduced duration of diastole, reducing coronary perfusion, changes in sympathetic and parasympathetic tone of the release of thromboxane A2-potent vasoconstrictor, increasing koagulnobilnosti blood, lactic acidosis, increased body temperature, changes in concentration intracelurarnih and ekstrakelurarnih the concentration of ions) can lead to sudden cardiac death during intense physical exertion. Most cases of sudden cardiac death is registered in the afternoon and early evening, because then mostly held trainings and sports competitions. In young athletes, to 35 years of age more than 90% of cases of sudden death occurs during or immediately after (1 hour) intensive physical activity (training, competitions). More than 90% of these cases are, however,

in athletes with cardiovascular disease, the most common inborn and not previously diagnosed. One of the most common causes of death in young athletes is hypertrophic cardiomyopathy, followed by congenital anomalies of the coronary arteries and then idiopathic left ventricular hypertrophy. Less than 5% of sudden death make other diseases. Some diseases have a higher prevalence in certain countries (eg. Arrhythmogenic right ventricular dysplasia is the leading cause of sudden cardiac death in young athletes in Italy, but not in other European countries and the USA).

Sudden cardiac death in women was 9 times lower than for men. Reasons to this data are given a small number of active women athletes, better adaptation of the cardiovascular system, less stressful demands in the competition as well as less frequent diagnosis of hypertrophic cardiomyopathy in women in the general population.

In our country began to sudden death of our national team Trajko Rajkovic.

## **2. MATERIAL AND METHODS**

### **2.1. Case problem and research**

Case problem and research objective of this paper is that the problem of acute heart failure in the simplest way closer to the population to be interested in this disorder. That is, the goal of this paper is to get closer to the essence of acute heart failure, and to describe the causes of this acute cardiac disorder, indicate the most frequent, and to propose measures for prevention of this phenomenon.

### **2.2 Method**

The methodology of this study is expressed through an analysis of official literature, treated the world and our experiences. In this paper, descriptive method will attempt to describe in detail the etiology, pathogenesis, prevention and possibility or impossibility of playing sports after this disorder.

## **3. RESULTS AND DISCUSSION**

### **3.1. Acute heart failure**

#### **3.1.1 The etiology**

Acute cardiac disorders due to overuse sports are often conditioned by insufficient preparedness competitors. Also the performance of various competitors preparedness and different abilities in the same competition. Disorders also occur in athletes who have had chickenpox (immediately before the competition) an acute disease, but not enough to recover and prepare for greater physical effort. They are more common for people who are at a latent cardiovascular disease.

In some cases, significant pathological reactions to physical overstrain at sportsmen with latent heart diseases, especially after the first uncomplicated influenza or inflammation of the tonsils. In such cases, a moderate load is not disturbed funkcicija balance in the body,

but the physical overstraining could lead to pathological changes of the heart. In this category are found the greatest number of cases of acute heart failure, who had a lethal outcome.

Also it is important to mention the other non cardiovascular causes such as nepe-  
neprantne chest injuries, bronchial asthma, heat stroke, drug abuse, trauma and others.

It happens that in the healthy heart of an athlete, even when I feel great and when you are well prepared coming to the occurrence of pathological changes under the influence of excessive physical stress associated with certain infections or distort the sport mode of life (smoking, weight reduction is not physiological actions, etc.).

One of the most common pathogenic mechanisms takes place through the hypothalamus and pituitary adenoma which are most sensitive to overstrain.

The hypothalamus responds by increasing the secretion of its exculpatory factor which leads to the adenohipophysis increases the secretion of hormones such as ACTH and TSH (thyroid-stimulating hormone and adenokortikotropni) acting on the target tissues, in this case the core of the adrenal, thyroid glands. This leads to the secretion of adrenaline from the adrenal marrow and increasing the basal metabolism of the cells and the mobilization of glycogen depots. If you exceed the allowed zone adaptation, the sequence of events continues to effect new dose of adrenaline in the blood vessels (now instead of running a wider system narrows, acts contrary), which enormously increases the resistance to blood flow through them and requires increased efforts of the heart muscle. I'm thyroxine when found in increased levels in the blood has a toxic effect on the heart muscle, increasing heart rate and in combination with hypoglycemia and hypoxia can cause *acute relaxation of the heart muscle* that can finish and a fatal outcome.

### ➤ **Dystrophy Myocardial**

Dystrophy myocardial infarction dystrophy, overall, is a rare disease that is a phenomenon which is usually can meet with athletes. Very often in the initial stages can not be distinguished from changes that we face as followers of adaptive mechanisms and not infrequently a good part of cardiologists disagreed about the early signs of the disease. This insidious disease that is at an early stage and no different from sports dilatation and hypertrophy of the heart, can manifest suddenly with a dramatic picture characterized by acute fatigue, malaise, frequently a headache, muscle weakness accompanied by muscle pain and hypotension accompanied by paleness. It is not uncommon, and the pain and weight in the region of the heart, and rhythm disturbance and of course acutely give the heart muscle. This condition causes the patient to the doctor when quite easily (unfortunately late) diagnosis of myocardial dystrophy (*cardiomiopathia*). Weather in relation to further sports experience is highly unpredictable and usually not favorable. In the pathogenesis of the disease, are isolated muscle necrosis occurring despite the complete preservation of the coronary vessels. They are called "*metabolic necrosis*", caused by acute overstretching of the heart muscle that insidiously leads to gradual kardioskleroze that suddenly appears as an acute dramatic relaxation of the heart muscle with heart failure, and sudden death in the field.

Acute heart failure can be caused by weakness of the left, right or both ventricles simultaneously. The weakness and acute left ventricular relaxation causes shortness of breath, coughing and X-rays and ECG recording register its enormous increase.

In severe cases develops into a "*cardiac asthma*" with harsh sibilance of breathing, blood congestion in the lungs due to the non efficiency of the left ventricle and its inability to expel whole blood from themselves. This leads to transmission delays through the pulmonary

veins into the pulmonary circulation, and further, pulmonary parenchyma, which hinders gas exchange. Patients are characterized by changing the color of the skin and mucous membranes that are blue, bluish, dyspnoea, sometimes pain behind the breastbone and collapsing state.

Insufficiency of the right ventricle is characterized by "lack of air" pulsation of neck vessels that become visible and pallor skin and mucous membranes. On the X-ray and ECG are typical signs of enlargement of the right ventricle. Most often, acute cardiac insufficiency either the left or right ventricle undergoing therapy yarn in chronic heart failure with enlargement of the liver due to the track a lot of blood in the abdominal veins and hepatic veins and swollen legs and abdomen (*ascites*).

This situation is of course no luck in the sport and are clinically clearly specified entity that is not interesting for this work. More often encountered in a recreation medicine in people with hidden or poorly pronounced weakness of the heart that without the control of doctors, avoiding ordinarily therapy, exercise on their own initiative. Once created acute heart failure represents an absolute indication for fine with active sports but not with a workout program that at certain stages of the disease can be complementary therapeutic methods.

### ➤ Myocardial infarction

Myocardial infarction is very rare among athletes because it implies the existence of obstructive coronary blood vessels that are pre detect in active sports, but when a person is burdened, so one can react in time. Unlike athletes myocardial usually subject if their recreational activity not conducted regularly, without good methodical plan of completed training and without the control of the doctor.

Myocardial infarction is known as a disease of civilization and represents a milestone in the life of athletes athletic career must be replaced recreation. For the purpose of early diagnosis of diseases of the coronary vessels are designed stress tests was to ergobiciklu treadmill or who are tasked to provoke myocardial hypoxia in strenuous physical work and that such a state register on the ECG. These tests are carried out in well-equipped clinical laboratories, and the method is called *STRESS TEST ELECTROCARDIOGRAPHY*.

As mentioned myocardial infarction is the beginning of recreational career or termination of a professional. But moderate and well-programmed exercise has a favorable effect on the labor, psychological and social rehabilitation of patients and irreplaceable in the so called. prolonged rehabilitation program.

The classic attack is accompanied by pain behind the breastbone that does not pass administration of a tablet of nitroglycerin. Suddenly overstressing compromise until then balanced relationship opportunities blood flow through the coronary vessels and myocardial blood and oxygen leads to relative and absolute hypoxic state of the myocardium and consequently necrotic changes in the most vulnerable part of the heart muscle at the time.

### ➤ Isolated hemorrhage in cardiac muscle coronary not origin

Very common in athletes (athletes, swimmers, water polo players... sometimes in sports games), are not the regularity of the heart rate and blocks of individual branches bundle. The occurrence of ventricular (coronary) beats (up to 8% of the sports population) usually speaks in favor of:

- Heart dystrophy and existence of hidden necrosis caused by spasm of the coronary arteries due to repeated odd.

- Existence of stress due to the fact the infectious agent in the myocardium or its membranes, means a condition that requires a complete clinical and diagnostic treatment
- Chronic overtraining athletes
- Hidden condition after commotio cordis

Rule that applies in such cases, is that at a load of athletes with ventricular arrhythmias their number must be reduced (mandatory monitoring) while their appearance in recovery allowed. If it is diagnosed by testing a new high VO<sub>2</sub>max. and reduction or loss of ventricular premature beats during exertion, athletes can temporarily enable a three-month training with a new monitoring during follow-up examination. Then the occurrence of premature ventricular beats ranks among the phenomena that give sport vagotonia and is considered a physiological disorder that does not interfere with their competition careers. If the number of premature ventricular beats is reduced during the test or increase, it is necessary to prohibit the further athletes competition or training, and perform complex clinical (ultrasound) and biochemical investigations (detection of antibodies to viruses that have caused myocarditis). The most common viruses that are hazardous to the myocardium are Adeno viruses and Coxaki while banal rhinovirus infection are less dangerous. Sometimes, a few weeks after cold-like, can be detected ventricular premature beats that after a period evaporates and leaves no traces on the functional capacity of the heart.

#### ➤ **Congenital anomalies of the coronary arteries (KAKA)**

During physical load increased myocardial oxygen demand. In people with congenital malformations of the coronary arteries leads to myocardial hypoperfusion during physical exertion, due to the inability of the coronary arteries to adapt and ensure adequate oxygenation infarction (Basso et al., 2000). The most common anomalies were the main left coronary artery that comes out of the right Valsalva sinus acute angle, and passes between the mouth of the aorta and pulmonary artery. During the exercise, when the dilated aorta, comes to compression aberrant arteries and decrease blood flow, resulting in myocardial ischemia and fatal cardiac arrhythmias (Epstein 1986; Lorvidhaya et al., 2003; Maron, 2003).

The symptoms of myocardial ischemia, chest pain, dyspnea and sudden syncope. They occur in only one of the three athletes, and are more common in people with anomalies of the right coronary artery (Pelliccia, 2001). The study Basso et al. (2000), states that the value of all cardiovascular tests, including ECG in mid athletes with prodromal symptoms of ischemia tested in the course of life, were within normal limits.

#### ➤ **Arrhythmogenic right ventricular cardiomyopathy (AKDK)**

Arrhythmogenic right ventricular cardiomyopathy is a heart disease of unknown etiology that is characterized by progressive loss of cardiomyocytes and their replacement with fatty and fibrous tissue. Fatty infiltration leads to a thickening (pseudohypertrofije) infarction, while the thinner zones of fibrosis, causing a doformiranja aneurysm wall infarction (Indyk, 2003; Sharma et al., 1997; Thiene et al., 2007). The process is usually localized in the right ventricle, but in some individuals can affect the interventricular septum and the left ventricle. The disease is most likely genetically determined and can have two forms: autosomal dominant and autosomal recessive (heavier) (Thiene et al., 2007). Mapping gene mutations identified several genetic loci for protein synthesis which mechanically connect the cardiomyocytes. Structural changes in the heart muscle is clinically manifested as ventricular arrhythmias and hemody-

namic disorders due to dysfunction of Commerce. The first symptoms usually manifest between fifteen and thirty-five years, and may vary from the feeling of irregular rapid heart rate (palpitations), through weakness, fatigue, shortness of breath (dyspnea), brief loss of consciousness (syncope), sudden cardiac arrest (Sharma et al. 1997; Thiene et al., 2007). Even though it is a great physical strain is one of the most important factors for the occurrence of fatal cardiac arrhythmias, suffering from AKDK usually well tolerated physical activity, because the function of the left ventricle is preserved (Sharma et al., 1997).

### ➤ **Myocarditis**

Myocarditis is an inflammatory heart disease associated with cardiac dysfunction. The most common viral etiology (coxsackie B virus in more than half of the cases from, Adeno virus, Herpes viruses), whereas bacterial and fungal infections is rarely a cause of myocarditis (Lorvidhaya et al., 2003; Futterman, 1998). Myocardial inflammation with infiltration of lymphocytes and focal necrosis of tissue, found during the autopsy histo-pathological examination, proved to be a significant cause of the electrical instability of the heart and the occurrence of arrhythmias, especially during heavy physical exertion (Sharma et al., 1997; Coskun et al. 2006). Myocarditis in most people does not give symptoms and sudden cardiac weakness often represents the only manifestation of the disease (Koester, 2001, Futterman, 1998). Some of the early symptoms that can arouse suspicion of the disease are signs of loosening of cardiac function (fatigue during physical activity, palpitation, dyspnea and orthopnoea), combined with signs of viral infection (headache, vomiting, increased body temperature program, muscle aches) (Ng et al., 2007). Coaching during the acute phase of the disease leads to an increase in virus replication, creasing of myocardial necrosis, and thereby increasing the risk of sudden cardiac death (Martin et al., 1994). Therefore, athletes are advised sick leave and the prohibition of physical activity or at least six months (Lorvidhaya et al., 2003).

### ➤ **Earthquake heart or commotio CORDIS (CC)**

Commotio cordis is a syndrome that is manifested by arrhythmias or sudden cardiac death, and the result is dull, nepenetrantnog impact of a projectile in the chest or the collision of two bodies of athletes, without violating the ribs, sternum, or heart. Wind energy is small (with the exception of hockey puck), and to rise to the ventricular arrhythmias has to happen in the period of ventricular repolarization immediately prior to the T wave in takozvanom "vulnerabilnom" period of the cardiac cycle, which is only 10ms. Mechanical energy is transferred to the projectile upon impact on the myocardium and transformed into an electrical impulse that is sufficient to initiate the formation of a fatal ventricular fibrillation. Sem time for the occurrence of ventricular fibrillation significant localized impact, the force and speed of impact, as well as changes at the molecular level of Na<sup>+</sup> and K<sup>+</sup>ATP-dependent channels (Madias et al., 2007; McCrory, 2002). Unlike previous causes of sudden cardiac death in athletes, victims of cardiac death in healthy individuals who have no previous history of heart disease or other heart diseases (Madias et al., 2007; Futterman, 1998). Although cardiac death is very rare event in the sport, its significance is huge because almost sudden death, a mortality rate of over 90% (McCrory 2002). A small number of surviving thanks to the rapid measures cardiopulmonary resuscitation with the use of automatic external defibrillators. Prevention of sudden cardiac death in the "cc" is possible in two ways. First, wearing adequate protective equipment that meets the highest standards. A disturbing fact that 38% of athletes who died of "cc" had some form of protection, says that the protective equipment should be adapted to each individual. Another way to change the competition rules and techniques of training (McCrory 2002).

### **3.1.2. The pathogenesis**

Acute heart failure after a major body burden or immediately after it is manifested by the following symptoms: an abrupt weakness, paleness, dizziness, dark before my eyes, unsteady gait, nausea and sometimes vomiting. There may be a semiconscious state or rarely unconsciousness. There are also chest tightness and pain in the heart, rapid pulse and aritmičan, who often can barely touch, shortness of breath and turning blue expressed. A medical examination shall be established by a weakened heart sounds, and rarely, acute caused enlargement of the heart, which is particularly dangerous. Blood pressure is lowered, and can appear and excessive cardiac contraction (systole extra). In cases of acute heart failure athletes should ensure strict bed rest in a semi-reclining position. It is necessary medical assistance and hospitalization. First aid will depend on the existing pathological changes and the causal mechanism of sudden death. Success can be expected if medical intervention because the first minutes. Much later, even after the recovery of blood flow, usually remain permanent damage to some brain functions.

## **4. CONCLUSION**

### **4.1. Prevention of acute heart failure or sudden cardiac death and pre-competitive screening**

Athletes with diagnosed cardiovascular disease (even clinically silent) compared with normal individuals, because of the intensity of their regular training and participation in sports are at increased risk of sudden cardiac death or occurrence clinical exacerbations. The two main objectives pre-competition screening are: a) early identification of athletes with structural heart diseases and b) the formulation of indications which represent a reasonable balance between the risks and benefits of participating in competitive sports (Pigoza et al., 2003).

Given the importance of the problem and the fact that 55-80% of athletes who died of sudden cardiac death had any symptoms of heart disease (Drezner et al., 2007), the question arises: "What else could be done to identify People with increased risk? ". As the incidence of death, 1: 200,000, even using screening tests whose sensitivity and specificity is 99%, we would get only one athlete with the real positive and 1999 with a false-positive result. Another of the disadvantages of screening are "abnormal" detected during the tests, which actually represent normal variation. Such changes were found in patients with athlete's heart syndrome, in which the detected electrocardiographic, radiografskei echosonographic changes due to enlargement of the heart muscle and reduced vagal tone. While the clinical criteria for differentiation athlete's heart in relation to the pathological conditions well studied, the distinction between normal findings by physiological variations can be very difficult. A good screening test should be inexpensive, valid, secure and widely accepted procedures, which make it possible to detect the disease in the asymptomatic phase (Inkelaar et al., 2007). Athletes with prodromal symptoms, syncope and palpitations, dyspnea during exercise and chest pain at rest or during physical activity, should be subjected to detailed control (pedo, 2000 FIROOZ et al., 2003). European Society of Cardiology (Corrado al., 2005) in turn gave recommendations on which all professional athletes should be involved in the screening protocol at Lausanne in two acts. The first step, the basic screening which involves taking a detailed medical history (personal I familiar) filling in the sports medical form, accompanied by physical



examination and 12-lead electrocardiogram (ECG). For athletes in whom there is a reasonable suspicion of heart disease, continues to search (the second step), using all available diagnostic procedures, echocardiography, stress ECG, computed tomography (CT) and nuclear magnetic resonance (NMR). The American Heart Association (AHA) in 1996 adopted the 12 recommendations for pre-competitive screening of the cardiovascular system, of which 8 are related to a history and physical examination for 4 (Maron et al., 1996 b). If any of the above elements screening answered with 'yes', it is necessary to continue further investigations of the cardiovascular system.

#### 4.1. Recommendations for sports athletes found to have a heart weakness

Do not be coming to the previously mentioned conditions, athletes should regularly do the following:

- \* Must be regularly reviewed systematically remediated
- \* all focal foci (caries, chronic tonsillitis, chronic inflammation of the ovaries, carrier state
- \* Allow only healthy and fully recovered athletes to compete
- \* The athlete has to perform only in their age category or with special medical examination for older age
- \* Athlete compete in their quality group

At the 36th Bethesda Conference, held January 2004 , made recommendations for the practice of sport among people with diagnosed heart disease (Maron, 2005) According to the panel, doctor examining physician has an ethical, medical and legal obligation to thoroughly inform athletes about the risks that occur in competitive sport and in case of high cardiovascular risk physician is responsible for the final conclusion in order to prevent unwanted events or risk reduction for disease progression. Recommendations depend on the nature and severity of cardiovascular disease, as well as the classification of sport (static and dynamic).

**Table 2.** Recommendations for sports for people with diseases of the heart, which are the most common cause of sudden cardiac death (Bethesda 2004)

DIAGNOSIS	RECOMMENDATIONS
Dystrophy infarction	Generally not permitted to engage in sports
Myocardial infarction	Permission is granted to recreational sports with constant control
Congenital anomalies of the coronary artery	It is not allowed to engage in sportom.Sportisti without signs of ischemia on stress test load can play sports after 6 months after surgery
Arrhythmogenic right ventricular cardiomyopathy	It is not allowed to engage in sports
Myocarditis	It is not allowed to engage in sports for at least 6 months after healing and complete recovery. I can again play sports professionally, after normalization functions chamber and the absence of cardiac arrhythmias, with optional ECG monitoring.

Based on the above said, we can conclude the following:

1. From the earlier conclusion that the heart in athletes "weak point" in the system that is sensitive to the diverse and sometimes banal on external etiological factors. So, sometimes, an ordinary flu having had the legs, can be the beginning of a pathological condition in the cardiac muscle because the virus can localize it.

2. The heart can not hurt, and is not able to thus signals the emergence of the virus in our own muscles as if an early start with the training may complicate acute heart failure (failure) I had in the previous presentation and described.

3. Sudden cardiac death in athletes is an extremely rare event, whose incidence ranges from 0.5 to 1.6 per 100,000 athletes. It occurs nine times more often in men, and the most common cause of death in HCM. The disturbing fact that the majority of athletes who died of ISS had no previous history of heart disease or prodromal symptoms pre death, a difficult task physicians to detect persons with increased risk. The dilemma is even greater due to disagreements American and European recommendations, that it is a screening test most economical and most optimal for detecting athletes with increased risk. While the European Society of Cardiology examination ECG sets the gold standard for any screening test, it categorically rejects the ANA, due to its low sensitivity large number of false positive results. In support of European recommendations going by the fact that in Italy in the last ten years there were no cases of SCD in athletes undergoing pre-competitive screening.

4. They are, depending on the findings, were excluded from competitive activities and undergo therapy. Given the modest economic standard of the Republic of Serbia is difficult to determine which screening test is reliable, and inexpensive. My opinion is that all active athletes should require by law to undergo pre-competitive pregladu certain, licensed clinics and institutions. The review should be standardized and disable the "overlooked". For elite athletes it is necessary to annually perform ultrasound (US) examination of the heart. All participants in the sport, which diagnosed the disease are subject to standard medical diagnostic and therapeutic procedures, and the recommendation for the scope and type of physical activity by physicians according to current international recommendations have been collected and redirected Sports Medicine Association of Serbia (Dikić, Ostojic, explains, Mazić 2004 ).

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