

## TO THE ISSUE OF DEVELOPMENT OF CARDIOVASCULAR DISEASES AT ATHLETES

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### ABSTRACT

Pathology of a cardiovascular system at athletes is high on the list in structure of their general incidence. It is known that well balanced regulation of muscular activity allows the athlete in the presence of the due level of motivation as much as possible to use the functionality, provides a necessary economization of functions during the work on endurance and defines speed of recovery processes. Dysfunction of a cardiovascular system is a precursory symptom of failure of adaptation of an organism of the athlete to loadings and leads to decrease in

working capacity that as a result is shown by these or those clinical signs of diseases of this system.

**KEYWORDS:** *sport, physical activities, cardiovascular violations.*

### Actuality

In big sports, the athlete is characterized by physical and psycho-emotional loads, which are often excessive, since they exceed the capabilities of the human body to perform them. Excessive loads cause overstrain in the functioning of many organs and systems, disrupt neuroendocrine regulation and contribute to the development of pathological changes, primarily from the cardiovascular system.

In this regard, today one of the topical areas in the field of sports cardiology is the study of the causes of failure of the mechanisms of adaptation of the cardiovascular system of athletes to physical activity.

Diseases of the cardiovascular system have such syndromes: heart failure syndrome, hypertensive (hypertensive); cardiological; arrhythmic; hypotonic (hypotensive). All

symptoms have their own signs, for example, cardiac syndrome is characterized by pain in the heart. Cardiac syndrome, can develop due to congenital pathologies and diseases of other organs. With cardiological syndrome, coronary circulation is disrupted, angina occurs. As a result of power sports, such as Boxing, it is possible to get serious injuries of various nature with subsequent damage to organs. Because hit his head when knocked down and knocked out for boxers do not go unnoticed. With injuries of this nature, blood pressure increases and is disturbed. In arrhythmic syndrome, the rhythm of the heart is disturbed. Patients have complaints of palpitations. Rhythm is broken. In arrhythmic syndrome, sinus tachycardia, bradycardia, extrasystole, ventricular asystole, atrial fibrillation (atrial fibrillation) is observed. In any case, with the wrong attitude to the loads and inadequate choice of sport problems can be purchased very much. Fatalities among athletes are common. However, everything can be avoided. With improper heart function, which can occur with the acquisition of diseases of the cardiovascular system, a person will feel different manifestations of improper heart function. If pain, arrhythmia, extrasystole, shortness of breath and other sensations appear during physical activity, it is necessary to stop classes. If the symptoms do not stop, but rather increase, after training, you need to see a doctor and undergo a diagnostic examination. If the problem is small, then with the right treatment it can be eliminated and again return to sports competitions.

Pathological change in the myocardium is usually caused by excessive stress, this fact leads to developing heart failure. If you do not stop the load, the changes will become irreversible. In athletes, there is necrosis of muscle fibers. Because of the abrupt disruption of conduction functions in the ventricular flutter, sudden death may occur. If death does not occur, then cardiosclerosis develops, that is, in places of necrosis of muscle fibers, especially in the left ventricle, connective tissue develops in the form of scars. As a result, chronic heart failure develops, the work of the heart is limited. Only from the behavior of the patient depend on the timing of the development of the described processes. Pathological changes in the heart can be expressed in myocardial dystrophy. Affect the process can not only physical activity, but also hard mental work, emotional state, stress. For athletes, it is very important to exclude pathological and pre-pathological changes in conditions. For this purpose, special objective studies are carried out. Even a healthy person with irrational loads, excessive exercise may well develop diseases of the cardiovascular system. This rhythm disorders and hypertonic and hypotonic condition, tonzillaktomii syndrome, and more. Diseases of the cardiovascular system in athletes require close attention from the sports doctor and coach.

Whether a person is an Amateur in sports, or professionally, the factors of pathogenesis and etiology will not have a discrepancy.

In 1960-70 in foreign literature for designation of defeat of heart at athletes the term "heartstrain" - overstrain of heart was used. In his classification of myocardial dystrophy, this defeat of the heart in athletes G. F. Lang called "myocardial dystrophy, due to physical strain" (1936).<sup>[10]</sup> For many years, this term has been widely used in our country, both in numerous scientific studies and in clinical practice.<sup>[2,4,7]</sup>

Modern sport is associated with significant physical and psychological stress, complications of the technique of performing sports exercises, often exceeding the adaptive capacity of the body. Adequate physical activity increases the functioning of the cardiovascular system, allow the athlete in the presence of the proper level of motivation to maximize the reserves of the body. Adequate physical activity increases the functioning of the cardiovascular system, allow the athlete in the presence of the proper level of motivation to maximize the reserves of the body. Adequate physical activity increases the functioning of the cardiovascular system, allow the athlete in the presence of the proper level of motivation to maximize the reserves of the body. At the same time, excessive intensity or duration of the training process and the lack of time allotted for the restoration of the functional state of the circulatory apparatus can cause a violation of adaptation and carry the risk of overstrain.<sup>[5,6]</sup> The study of cardiac hemodynamics is Central to sports medicine. It is the state of the cardiovascular system that determines the maximum performance of healthy athletes and limits their achievements.<sup>[7,11]</sup> The possibility of starting a sports career or continuing the participation of highly qualified athletes in competitions with cardiovascular disorders is discussed in various sports associations, but the standards of medical supervision and control are not fully developed. It is necessary to consider all reserve possibilities of an organism of the athletes aspiring to improve the sports result.<sup>[3,12,13]</sup> The use of modern methods of functional diagnostics in the detection of early hemodynamic disorders and physical performance is crucial in assessing the adaptive potential of the cardiovascular system.<sup>[1]</sup>

Currently, the influence of various types of physical activity on the heart of an athlete is well studied, which is associated with the widespread introduction of echocardiography into practice. Adaptive changes are formed only with systematic regular (more than 1 year) training and are mainly characterized by a moderate increase in the volume of the heart chambers against the background of unchanged systolic and diastolic function of the left

ventricle.<sup>[19]</sup>

Analyzing ECHOCARDIOGRAPHY data, B. M. Pluim (2000)<sup>[25]</sup> noted the predominance of interventricular septum thickness (MVP) in athletes training the quality of strength, compared with athletes training the quality of endurance - 11.8 mm and 10.5 mm, respectively.<sup>[23]</sup> In 2002, the normative values of ECHOCARDIOGRAPHY parameters in athletes were determined. According to the recommendations, the thickness of the myocardium in males should not exceed 13 mm, LV CDR-no more than 65 mm; in females-11 and 60 mm, respectively.<sup>[20,23]</sup> A more specific change in athletes is the formation of moderate dilatation of the heart cavities, which provides adequate shock volume, and the presence of LVH is not a mandatory component of the sports heart. According to recent research, it has been established that compensation for athlete's heart hyperfunction can occur without myocardial hypertrophy, due to other mechanisms.<sup>[24]</sup>

Such close attention to the issues of myocardial hypertrophy in athletes is primarily due to the fact that 90% of the causes of sudden death in sports are cardiovascular diseases, of which about 40% are hypertrophic cardiomyopathy.<sup>[21,22]</sup> Today, one of the most relevant areas in the field of sports cardiology is the study of the causes of failure of the mechanisms of adaptation of the cardiovascular system of athletes to physical activity. The pathogenesis of this condition is recognized by most experts as poorly studied.<sup>[27]</sup> Along with the widespread opinion about the involvement of the sympathoadrenal system in the pathological process<sup>[7,26]</sup>, the contribution of the renin-angiotensin system (RAS) has not been studied.

The research group Harmon K. G. et al.<sup>[15]</sup> based on the analysis of the database of the National Association of University Athletes for 2003-2013, which included 514 cases of sudden death, made a number of interesting conclusions. According to the data, the most common cause of sudden death in athletes are accidents, such as a car accident, drowning, falling from a height, etc. (N-257; 50%) and only in second place are diseases (N-147; 29%), of which the majority are cardiovascular (N-7; 15%). The most common autopsy findings were sudden unexplained death without morphological changes (N-16; 25%), and hypertrophic cardiomyopathy (N-5; 8%).

According to Maron B. J. and co-authors<sup>[16-17]</sup>, who studied the national (USA) register of sudden death in athletes for the period from 2002 to 2011, of the 152 athletes who died (average age 20 + 1.7 years, 85% male, 64% white), 31 cases of suicide, 21 cases of fatal

alcohol poisoning and 64 cases of sudden cardiac death were registered. At autopsy at the athletes who died as a result of cardiovascular diseases, in 21 cases the cause of death was hypertrophic cardiomyopathy and in 8 cases – congenital anomaly of coronary vessels.

The same scientists in an earlier and larger study<sup>[15,17]</sup>, which captured the period 1980 to 2006, analyzed the causes of 1866 cases of sudden death in athletes. It was found that the contribution of cardiovascular diseases to the structure of mortality among athletes is the greatest (N=1049; 56%). However, in this number, the researchers also included cases of heart injury and heat stroke (N=416; 22%). At the same time, 937 (89%) of the dead were male and only 112 (11%) female (although it should be taken into account that women are less likely to play sports). Sudden cardiac death was more common in nonwhite athletes than in whites (64% vs. 51%,  $p=0.001$ ). Among the dead were representatives of 38 sports, however, the highest mortality was found in those engaged in basketball (N=349; 33%) and football (N=281, 25%). Sudden cardiac death occurred mainly during training or participation in competitions (N=844; 80%), while during normal household activity, rest and sleep, the number of deaths was 4 times less (N=205; 20%). In this study, as in those previously described, the most common causes of death due to cardiovascular disease were hypertrophic cardiomyopathy and congenital anomalies of the coronary vessels.

In Europe, Italian researchers Corrado D. and co-authors have done a lot of work to study the structure of mortality among athletes.<sup>[18]</sup> From 1979 to 1999, they studied the population of young people (aged 12 to 35 years) of the Italian region of Veneto (the largest city is Venice). During the observation, the average number of young people was 1386,600, of which males-692,100, and females-694,500. Of these athletes were 112790 (8%), including male-90690 and female 22100. Over the course of 21 years, there were 300 cases of sudden death in the General population, which was 1:100,000 per year. In males, mortality was greater than in females by 1.5 times. In 55 cases (18%), the dead were athletes. A greater risk of sudden death in athletes was associated with congenital coronary artery disease, arrhythmogenic right ventricular dysplasia, and early coronary atherosclerosis. Low incidence of hypertrophic cardiomyopathy at autopsy, which contradicts the results of American researchers, Corrado D. and the co-authors explain by systematic screening examinations of athletes before competitions, which have been practiced in the Veneto region for more than 20 years. Based on the study, the authors concluded that exercise is associated with a greater risk of sudden death in both men and women. At the same time, they believe that sport is not a direct cause

of death, but rather predisposes to the appearance of life-threatening ventricular arrhythmias.

Diseases of the cardiovascular system in recent years are increasingly observed in medical examination. However, many luminaries of science on the contrary are convinced that sports relieve a person from various diseases of the cardiovascular system. Scientists say that athletes are adapting, their heart adapts to the loads and is considered more resilient, and the heart could have been damaged before the start of exercise. However, this point of view cannot be fully agreed. Doubts on this score were and will be. Where is the truth that determines the diseases of the cardiovascular system in athletes, today is not known. A lot of questions about this will still arise.

To solve this problem requires a detailed in-depth study of the pathogenetic mechanisms of heart disease in athletes, the identification of early diagnostic criteria and the development of preventive measures to prevent this disease. This will contribute to the preservation of health, physical performance of athletes with a reduction in the risk of sudden death.

#### **LIST OF REFERENCES**

1. Belotserkovsky Z. B. Ergometric and cardiological criteria of physical performance in athletes. - Moscow: Soviet sport, 2005; 312.
2. Butchenko L. A., pre-Pathological conditions and pathological changes in irrational sports/ / Sports medicine. - M.: Medicine, 1984; 152-169.
3. Gavrilova E. A. Sports heart. Stress-induced cardiomyopathy. - Moscow: Soviet sport, 2007; 200.
4. Dembo A. G., zemtsovsky E. V., on the importance of heart rate research in sports medicine. - Theory and practice of physical culture, 1980; N3: 13-15.
5. Jordanskaya F. A., Yudintseva M. S. health Monitoring and functional preparedness of highly qualified athletes in the process of training work and competitive activity. - Moscow: Soviet sport, 2006; 184.
6. Kozlenok A.V., Berezina A.V. Diastolic dysfunction of the left ventricle as an early sign of impaired adaptation to physical activity in athletes. Arterial hypertension, 2006; 12(4): 319-322.
7. Meerson F. 3., Pshennikova M. G. Adaptation to stressful situations and physical activity. - M.: Medicine, 1988; 256.
8. Meerson F. Z., Satykova V. A., Didenko V. V. et al. Cardiology, 1984; 24(5): 61-68.
9. Mikhailova A.V., Smolensky A.V. Cardiac factors limiting physical performance of

- athletes // *Physiotherapy and sports medicine*, 2009; 7(67): 22-26.
10. Lang G. F. Questions of cardiology. Moscow: Medicine, 1936; 189.
  11. Yakobashvili V. A., Makarova G. A. Heart in the conditions of sports activity. - Moscow: Soviet sport, 2006; 128-141.
  12. Baggish, A. L., Wood M. J. Athlete's heart and cardiovascular care of the athlete: scientific and clinical update. // *Circulation*, 2011; 123: 2723-2735.
  13. To A.C.Y., Dhillon A., Desai M.Y. Cardiac Magnetic Resonance in Hypertrophic Cardiomyopathy // *J Am CollCardiol*, 2011; 4(10): 1123-1137.
  14. Silvia G. Priori S.G., Carina Blomstrom-Lundqvist C., Mazzanti A., et al. 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death // *European Heart Journal*, 2015; 87.
  15. Harmon K.G., Asif I.M., Maleszewski J.J. et al. Incidence, cause, and comparative frequency of sudden cardiac death in National Collegiate Athletic Association Athletes // *Circulation*, 2015; 132: 10-19.
  16. Maron B.J., Haas T.S., Murphy C.J., Ahluwalia A., Rutten-Ramos S. Incidence and causes of sudden death in U.S. college athletes. // *J Am CollCardiol*, 2014; 63: 1636–1643.
  17. Maron B.J., Doerer J.J., Haas T.S., Tierney D.M., Mueller F.O. Sudden deaths in young competitive athletes: analysis of 1866 deaths in the United States, 1980–2006. // *Circulation*, 2009; 119: 1085–1092.
  18. Corrado D., Basso C., Rizzoli G., Schiavon M., Thiene G. Does sports activity enhance the risk of sudden death in adolescents and young adults? // *J Am CollCardiol*, 2003; 42: 1959–1963.
  19. Knudsen, C.W. Diagnostic value of B-Type natriuretic peptide and chest radiographic findings in patients with acute dyspnea. / C.W Knudsen, T.Omland, P. Clopton // *Am. J. Med.*, 2004; 116(6): 363-368.
  20. Cardiological protocols on evaluation of fitness for competitive sports / P. Delise, U. Guiducci, P. Zeppilli et al. // *Ital. Heart J.*, 2005; 6(8): 502-546.
  21. Chevalier, L. Sudden unexpected death in young athletes: reconsidering «hypertrophic cardiomyopathy» / L. Chevalier // *Eur. J. Cardiovasc*, 2009; 3: 23-28.
  22. Mancia, G. The role of blood pressure variability in end-organ damage. / G. Mancia, G. Parati // *J. Hypertens*, 2003; 21(6): 17-23.
  23. McAdoo, W.G. Race and gender influence hemodynamic responses to psychological and physical stimuli. / W.G. McAdoo, M.N. Weinberger, J.Z. Miller // *J. Hypertens*, 1990; 8:

961-967.

24. The relationship between visit-to-visit variability in systolic blood pressure and all-cause mortality in the general population: Findings from NHANES III, 1998 to 1994. / P. Muntner, D. Shimbo, M. Tonelli et al. // *Hypertension*, 2011; 57: 160-166.
25. Pluim, B.M. The athlete's heart a meta-analysis of cardiac structure and function / B.M. Pluim // *J. Circulation*, 2000; 101(3): 336-344.
26. Winnick J., Davis JM., Welsh R., Carmichael M., Murphy E. & Blackmon J. Carbohydrate feeding during team sport exercise preserve physical and CSN function. *Medicine and Science in Sports and Exercise*, 2005; 37: 306-315.
27. Green D.J., Spence A., Rowley N., Thijssen D.N.J. et al. Vascular adaptation at athletes: is there an «athletes»' artery? *Experimental physiology*, 2012; 97(3): 295-304.