INFLUENCE OF METABOLIC THERAPY ON THE FUNCTIONAL STATE OF ATHLETES

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The main goal of sports medicine is to preserve and strengthen the health of people involved in physical culture and sports, to treat and prevent pathological conditions and diseases, to promote the rational use of means and methods of physical culture and sports, to optimize the processes of post-stress recovery and increase efficiency, to prolong the active creative period of life. .

The sport of the highest achievements with its extreme physical and psycho-emotional stress, of course, requires new adaptive levels from the human body, the achievement of which without outside intervention often becomes extremely difficult, and sometimes almost impossible.

That is why back in 1969 A.V. Korobov, one of the leading experts in the field of sports medicine, actively advocated the right of athletes to pharmacological support and prevention, equating them in this respect with winterers in Antarctica, mountain rescuers, scientists during a period of maximum stress, and astronauts. However, hardly anyone at that time imagined that the great, perhaps the most valuable achievement of scientific and technological progress - modern medicines - would burst so violently into the world of sports and cause (and not only among athletes and coaches, but also among sports doctors) an almost uncontrollable pharmacological boom that has been going on for decades. This situation is especially alarming, since it is in the practice of sports medicine that it is necessary to observe a very special, jewelry technique for the use of approved pharmacological preparations, which should take into account both the subtlest mechanisms of their action and the special conditions for the functioning of the body's leading systems in conditions of intense muscular activity (G.A. Makarova, 2003).

It is customary to attribute overwork to a pre-pathological condition that can occur with the irrational use of physical activity and the presence of concomitant risk factors. This is a condition that occurs when the phenomena of fatigue are layered, when the athlete's body does not recover from one activity or competition to another for a certain time. Overfatigue manifests itself in a longer than usual persistence of feeling tired after exercise, deterioration in well-being, sleep, increased fatigue, and unstable mood. Sports performance may generally remain unchanged or slightly decrease, but there is a noticeable difficulty in the formation of new motor skills, solving complex tactical problems, and technical errors appear. Objectively, a decrease in strength indicators, deterioration in coordination, and a lengthening of the recovery period after exercise are often determined. (N.D. Graevskaya, 2004)

A sharp decrease in the biological activity and adaptive capabilities of the body causes the development of a special condition, which is a series of successive stages of the adaptation process, characterized by a certain level of functioning of the main physiological systems, tension of the regulatory mechanisms and, finally, depletion of functional reserves, the clinical expression of which is asthenia, which is fundamentally different from overwork. Asthenia is a state of the body characterized by general weakness, increased fatigue, headaches, dizziness, decreased performance, frequent mood swings, autonomic disorders, sleep disorders, and muscle pain. In the absence of organic causes of asthenic syndrome, the functional nature of asthenia, which occurs most often, can be assumed. In the pathogenesis of asthenia, the leading role is played by metabolic disorders leading to hypoxia, acidosis, followed by a violation of the processes of formation and use of energy. If the inclusion of pyruvate in the Krebs cycle is disturbed and it is transformed into lactate, the cell not only receives less than 36 molecules of the energy substrate, but also suffers from acidosis, which only exacerbates metabolic disorders. If necessary, rapid synthesis of ATP can be formed in the following way: ADP + ADP \u003d ATP + AMP. In this case, the gradual accumulation of AMP molecules and ammonia formed during their deamination inhibits the formation of ATP in the Krebs cycle, aggravates the phenomena of acidosis and leads to a state of fatigue. Part of the ammonia is excreted by the kidneys, but the main route of its metabolism is the synthesis of urea in hepatocytes. Therefore, any factor that stimulates the formation of urea is able to reduce the severity of asthenia associated with hyperammonemia. It is also important to eliminate tissue acidosis by reducing lactate, since a sufficient amount of CO2 is necessary for the synthesis of urea (V.Yu. Prikhodko, 2001).

To eliminate the cause of fatigue and asthenia, it is necessary to correct the metabolism. Such correctors and normalizers of cellular metabolism are preparations CARDONAT and STIMOL.

STIMOL consists of 2 substances that are normally always present in the body and are catalysts for metabolic processes - citrulline and malate. When these substances are added to the body at the time of the onset of an adaptive crisis, metabolic reactions are intensified and lactate and ammonium are excreted. Malate helps limit lactic acid buildup. Citrulline enhances the excretion of ammonia.

CARDONAT is a combined preparation containing vitamins, amino acids and their derivatives: carnitine chloride, lysine hydrochloride, vitamin B12 coenzyme, vitamin B1 coenzyme, vitamin B6 coenzyme. The action of the drug is due to the synergistic effect of its components. L-carnitine is an anabolic agent. Carnitine is the main cofactor in the metabolism of fatty acids in the heart, liver and skeletal muscles, it plays the role of the main carrier of long-chain fatty acids in the mitochondria, where they are beta-oxidized to acetyl-CoA, which is a substrate for the formation of ATP in the Krebs cycle. The ability of carnitine to reduce the adverse effects of free radicals on the vascular endothelium was revealed. The inclusion of

carnitine in the diet helps prevent the formation of fatty acid metabolites, reduces the level of total cholesterol and triglycerides, and increases the content of high-density lipoproteins. The use of L-carnitine helps to eliminate functional disorders of the nervous system. Lysine is an essential amino acid that takes part in all processes of assimilation and growth, promotes ossification and growth of bone tissue, stimulates cell mitosis. Vitamin B12 coenzyme activates the metabolism of carbohydrates, proteins and lipids, participates in the synthesis of labile methyl groups, in the formation of choline, methionine, nucleic acids, creatinine, and contributes to the accumulation of compounds with sulfhydryl groups in erythrocytes. Being a growth factor, it stimulates the function of the bone marrow, which is necessary for normoblastic erythropoiesis. Contributes to the normalization of liver and nervous system function. Vitamin B1 coenzyme has a regulatory effect on metabolic processes in the body. It plays a particularly important role in carbohydrate and fat metabolism, in particular in the oxidative decarboxylation of keto acids, as well as in the pentose-phosphate pathway of glucose metabolism. Improves the absorption of glucose, trophism of the nervous tissue, contributes to the normalization of the cardiovascular system.

Vitamin B6 coenzyme plays an important role in metabolism and is necessary for the normal functioning of the central and peripheral nervous system. It is a coenzyme of a large number of enzymes that act on the non-oxidative metabolism of amino acids. Participates in the exchange of tryptophan, methionine, cysteine, glutamine and other amino acids. Catabolizes metabolic processes, which are especially important in chronic fatigue and asthenia. (Directory of drugs, 2003).

On the basis of the Regional Medical and Sports Dispensary in Donetsk, we have been studying the effectiveness of CARDONAT and STIMOL preparations for one year.

The study involved 60 athletes aged 18-20 years, various sports and sports qualifications. All athletes underwent an in-depth medical examination: examination of 12 narrow specialists, electrocardiography, rheoencephalography, ultrasound diagnostics of internal organs, laboratory tests, questionnaires, etc.

To evaluate the effectiveness of the use of drugs CARDONAT and STIMOL in the complex treatment of physical overwork and asthenia in athletes.

We divided all athletes into 2 groups, including 30 people each: main and control. In the clinical picture, athletes with physical overwork were observed: increased fatigue in 27 (90%) of the main and 24 (80%) control groups, a decrease in sports performance in 30 (100%) of the main and 28 (93.3%) of the control group , deterioration of sleep and appetite in 22 (73.3%) of the main and 20 (66.6%) of the control group, in addition, athletes were bothered by headaches in 17 (56.6%) of the main and 15 (50%) of the control groups, dizziness in 19 (63.3%) main and 17 (56.6%) control groups, impaired concentration in 16 (53.3%) main and 14 (46.6%) control groups, daytime sleepiness in 24 (80%) of the main and 22 (73.3%) of the

control group, feeling tired in the morning in 19 (63.3%) of the main and 16 (53.3%) of the control group, which is typical for asthenic syndrome (Table . one).

Table 1.

The main clinical symptoms of the main and control groups before treatment

№	Clinical symptoms	Main group		Control group	
		human	%	human	%
1.	Fatigue	27	(90%)	24	(80%)
2.	Decreased sports performance	30	(100%)	28	(93,3%)
3.	Decreased sleep and appetite	22	(73,3%)	20	(66,6%)
4.	Headache	17	(56,6%)	15	(50%)
5.	Dizziness	19	(63,3%)	17	(56,6%)
6.	Concentration disorder	16	(53,3%)	14	(46,6%)
7.	Daytime sleepiness	24	(80%)	22	(73,3%)
8.	Feeling tired in the morning	19	(63,3%)	16	(53,3%)

Athletes of the main and control groups were reduced physical activity during training sessions by 50% - the first week, by 30% - the second or third week. Athletes of the main group received CARDONAT and STIMOL as part of complex therapy, which included multivitamins. The duration of treatment was three weeks. In athletes in the control group, treatment included only multivitamin preparations.

Positive changes already at the end of the first week of treatment with CARDONAT and STIMOL were an increase in working capacity in 18 (66.6%) patients, an improvement in exercise tolerance in 12 (40%); decreased headache in 10 (58.8%), dizziness in 12 (63.1%), daytime sleepiness in 13 (56.5%), fatigue in the morning in 11 (57.8%); sleep and appetite stabilized in 14 (63.6%); improved concentration in 12 (75%). In the second week of therapy, working capacity increased already in 22 (81.4%), sleep and appetite stabilized in 18 (81.8%), exercise tolerance improved in 26 (86.6%), headache decreased in 14 (82, 3%), dizziness in 15 (78.9%), daytime sleepiness in 18 (78.2%), tiredness in the morning in 15 (78.9%), concentration of attention improved in 14 (87.5%). A complete recovery of objective and subjective data was noted on the third week of treatment, while in the athletes of the control group, against the background of a decrease in training load and taking multivitamin preparations, positive dynamics was noted by the end of the second week: working capacity increased in 8 (33.3%), physical tolerance improved. exercise in 11 (39.2%), decreased headache in 8 (53.3%), dizziness in 8 (47%), feeling of fatigue in the morning in 10 (62.5%), daytime sleepiness in 10 (45.4%) %), sleep and appetite stabilized in 9 (45%), attention concentration improved in 7 (50%). In the third week of therapy, only 14 (58.3%) athletes

increased their working capacity, 18 (64.2%) athletes improved their exercise tolerance, 14 (63.6%) had a decrease in daytime sleepiness, and 14 (87) athletes felt tired in the morning. 5%), headache in 12 (80%), dizziness in 12 (70.5%), sleep and appetite stabilized in 16 (80%), concentration of attention improved in 12 (85.7%).

Only by the end of the fourth week of treatment, the athletes of the control group had no headache, dizziness, tiredness in the morning, and their concentration of attention improved.Complete recovery of clinical symptoms was noted by the end of the fifth week of therapy. The dynamics of clinical symptoms by groups during treatment is presented in Table 2.

Table 2.

Dynamics of clinical symptoms (main and control groups) during treatment

№	Clinical symptoms	Main group			Control group				
		1 weeks	2 weeks	3 weeks	1 weeks	2 weeks	3 weeks	4 weeks	5 weeks
		human, %	human, %	human, %	human, %	human, %	human, %	human, %	human, %
1	Increasing efficiency	18, 66. 6%	22, 81, 4%	27, 100%	3, 12,5%	8, 33, 3%	14, 58,3%	20, 83.3%	24, 100%
2	Improving physical tolerance loads	12, 40%	26, 86,6%	30, 100%	4, 14,2%	11, 39,2%	18, 64,2%	23, 82,1%	28, 100%
3	Stabilization of sleep and appetite	14, 63,6%	18, 81.8%	22, 100%	4, 20%	9, 45%	16, 80%	18, 90%	20, 100%
4	Headache Reduction	10, 58,8%	14, 82,3%	17, 100%	5, 33,3%	8, 53,3%	12, 80%	15, 100%	
5	Reducing dizziness	12, 63,1%	15, 78,9%	19, 100%	4, 23,5%	8, 47%	12, 70,5%	17, 100%	
6	Improving concentration	12, 75%	14, 87,5%	16, 100%	3, 21,4%	7, 50%	12, 85,7%	14, 100%	
7	Decreased daytime sleepiness	13, 56,5%	18, 78,2%	24, 100%	6, 27,2%	10, 45,4%	14, 63,6%	19, 86,3%	22, 100%
8	Reducing the feeling of tiredness in the morning	11, 57,8%	15, 78,9%	19, 100%	5, 31,2%	10, 62,5%	14, 87,5%	16, 100%	

As a result of our study, it was also noted that CARDONAT and STIMOL preparations do not lead to an increase in blood pressure, an increase in heart rate, and do not have a stimulating effect on heart function, which allows them to be recommended to athletes with a tendency to arterial hypertension.

CONCLUSIONS:

1. CARDONAT and STIMOL are the means of choice for metabolic therapy in athletes.
2. STIMOL is an excellent corrector of astheno-metabolic disorders.

3. STIMOL improves the psychological state of athletes, significantly reduces reactive anxiety.
4. The drugs do not affect blood pressure, heart rate, which allows them to be recommended to athletes with a tendency to arterial hypertension.
5. When using the drugs, no side effects were noted, which makes it possible to judge their good tolerability.

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