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KLINIK TIBBIYOT

EKSPERIMENTAL BIOLOGIYA VA TIBBIYOT

STUDY OF PHYSICAL ACTIVITY WITH EXERCISE PULSE IN PATIENTS WITH ISCHEMIC HEART DISEASE

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Annotation. *Ischemic heart disease (IHD) is one of the leading cardiovascular diseases worldwide, and hypodynamics is one of the main etiological factors of this disease. The study examined and compared patients' "exercise pulse" at the beginning of the study and after 6 months. An increase in tolerance to physical activity was noted in patients during individual optimal-dose walking exercises, which was manifested by a 2.6-fold increase in the time to reach the allowable pulse rate during walking exercises.*

Key words: *ischemic heart disease, exercise pulse, hypodinamy, physical activity, veloergometry, angina pectoris*

ЮРАК ИШЕМИК КАСАЛЛИГИ БИЛАН ОҒРИГАН БЕМОРЛАРДА МАШҚ ПУЛЬСИ ЁРДАМИДА ЖИСМОНИЙ ФАОЛЛИКНИ ЎРГАНИШ

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Аннотация. *Юрак ишемик касаллиги (ЮИК) – бутун дунё бўйича асосий юрак қон-томир касалликларидан бири хисобланиб, гиподинамия ушбу касалликнинг асосий этиологик факторларидан бири саналади. Тадқиқотда беморларнинг "Машқ пульси" белгилаб олиниб жисмоний юклама пайтида ушбу кўрсаткичига қанча вақтда етиб келиниши тадқиқот аввалида ва 6 ойдан сўнг текшириб, солиштириб кўрилди. Индивидуал оптимал дозаланган юриш машқлари ўтказилганда беморларда жисмоний юкламага толерантлик ортиши қайд этилиб, бу юриш машқлари давомида рухсат эилган пульс кўрсаткичига етиш вақти 2,6 бароварга ортишида намоён бўлди.*

Калит сўзлар: *юрак ишемик касаллиги, машқ пульси, гиподинамия, жисмоний фаоллик, велоэргометрия, зўриқиш стенокардияси*

ИЗУЧЕНИЕ ФИЗИЧЕСКОЙ АКТИВНОСТИ С ТРЕНИРОВИЧНЫМ ПУЛЬСОМ У БОЛЬНЫХ ИШЕМИЧЕСКОЙ БОЛЕЗНЬЮ СЕРДЦА

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Аннотация. *Ишемическая болезнь сердца (ИБС) является одним из ведущих сердечно-сосудистых заболеваний во всем мире, а гиподинамика является одним из основных этиологических факторов этого заболевания. В ходе исследования изучался и сравнивался «тренировочний пульс» пациентов в начале исследования и через 6 месяцев. У пациентов отмечалось повышение толерантности к физической нагрузке при индивидуальной оптимально дозированной ходьбе, что проявлялось увеличением в 2,6 раза времени достижения допустимой частоты пульса при ходьбе.*

Ключевые слова: *ишемическая болезнь сердца, тренировочний пульс, гиподинамика, физическая нагрузка, велоэргометрия, стенокардия.*

Actually of the study. According to the definition of the World Health Organization, physical activity is any type of movement that occurs with the help of muscle power, accompanied by energy expenditure, and this movement is manifested in the form of work and leisure, as well as daily physical activity. [5]

Aerobic exercise increases myocardial perfusion in people with risk factors for cardiovascular disease, an increase in the inner diameter of the large coronary arteries, improvement of microcirculation and endothelial function, modulation of autonomic autonomic balance, changes in the myocardial ischemic zone (short-term transient ischemia of the myocardium is observed during exercise, the regular continuation of this process in turn affects the increase in myocardial tolerance in long-term ischemic cases that may occur later), resulting in a reduced risk of developing myocardial injury and fatal ventricular tachyarrhythmias. [1]

Regular physical activity 150 minutes per week decreases the risk of pain with cardiovascular disease 40%, stroke 27%, type 2 diabetes 58%, Alzheimer's 40%, colorectal cancer 60%, lung cancer 20-24%, breast cancer Reduce by 50%, Concentration prevents depression and obesity, promotes a healthy lifestyle, has been proven to maintain an optimal level of professional work ability. [4]

Regular aerobic exercise has been proven to reduce the risk of death from the cardiovascular system by 30% per year, the overall risk of death by 20%, the demand for hospitalization by 60%, and the risk of recurrent myocardial infarction by 17% in cardiology rehabilitation. At the same time, a 10% increase in physical performance reduces mortality by 8-20%. Age level and individual indicators of the organism are considered in the increase of physical activity. It is recommended to limit the time allotted for sitting or lying down during the day. [3]

Hypodynamics or lack of physical activity is one of the manageable risk factors for cardiovascular disease. Hypodynamics leads to the hardening of the heart and blood vessels and the accumulation of excess body weight. Insignificant physical activity in such people also speeds up the heartbeat and raises blood pressure. It is known that IHD is 4-5 times more common in men aged 40-50 working in

the office compared to heavy physical work. [7]

The purpose of the study. To study the level of physical activity using an exercise pulse in patients with ischemic heart disease and to determine the optimal dosed walking duration for each patient.

Research materials and research methods. The study was conducted from 2019 to 2021 in the 1st cardiology department of the multidisciplinary clinic of the Tashkent Medical Academy. Patients diagnosed with IHD, stable tension angina FC II-III, being treated in the cardiology department, were selected for the study. Clinical signs of patients diagnosed with IHD, EKG (electrocardiography) information, based on the results of VEM (veloergometry) tests. Examination of compartmental fibrillation, AV block II-III degree, symptomatic arterial hypertension, fever and patients with a history of acute infectious diseases, post-infarction cardiosclerosis, acute cerebrovascular accident, diabetes mellitus, cardiac decompensation, and complex arrhythmias were not included.

The patients in the study were divided into 2 groups. Group 1 patients (main group) performed individually dosed walking exercises in combination with IHC standard therapy. Group 2 patients received only standard pharmacotherapy. When analyzing the clinical characteristics of the patients in the study, the average age of patients in group 1 was 56.3 ± 6.5, In group 2, it was 55.8 ± 5.3. In the first group, 20.9% of patients with stable tension angina belonged to functional class II, and 79.1% of patients to FC III. In turn, 19.9% of patients in group 2 had stable tension angina FC II and 80.1% had functional class III.

88.7% of the patients examined had hypertension with IHD. Of these, 25 (58.1%) of patients with AG (arterial hypertension) grade 1 belong to group 1, 20 (62.5%) to group 2; 9 (37.1%) of patients with AG grade 2 belong to group 1, 8 (25.0%) to group 2; Of the 3rd degree AG patients, 5 (4.8%) belonged to group 1 and 4 (12.5%) to group 2.

When analyzed for risk factors for IHD, overweight was 18 (40%) in group 1 patients and 11 (33.4%) in group 2 patients. Obesity is 18 (40%) in group 1 and 12 (36.3%) in group 2. Of the patients examined, 37 (82.2%) were from group 1 and 29 (87.8%) were diagnosed with arterial hypertension.

Anthropometric measurements, clinical and laboratory examinations, ECG, VEM test, SCORE, SF 36 surveys were conducted in all patients. The threshold pulse rate was determined using the "exercise pulse" formula. Based on the results of the first bicycle ergometric test, Nikolaev L.F., and Aronov D.M. The required walking rhythm for each patient is calculated using the formula:

$X = 0.042 \times M + 0.15 \times HR + 65.5$

X – walking pace (number of steps / min),

M – limiting power of loading (kgm / min),

HR – The number of high-load heart rate in the VEM test.

Patients were given physical activity on a flat road, walking at medium speed for 6 months, 3 times a week for 20-60 minutes. The "exercise load" is 50-60% of the patient's individual threshold load.

During physical activity and physical activity, O2 consumption in the body increases in proportion to their intensity. But after reaching a certain limit, the increase in physical load does not correspond to the consumption of O2. This the limit is called the maximum oxygen consumption. Maximum oxygen consumption (V O2max, l / min) is one of the most important physiological parameters for O2 of the cardiovascular and respiratory systems, indicates the limiting capacity of the organism to meet the growing demand. This figure is reduced in the elderly, people leading a sedentary lifestyle, and patients with cardiovascular disease.

During the loading period, which consumes 40-75% of the maximum oxygen consumption, metabolic processes in the body improve. There is a direct correlation between the maximum oxygen consumption and the number of heartbeats, which allows to determine the maximum number of heartbeats during exercise on a standard basis.

Standards of HRC indicators of demand for O2 depending on age and sex during exercise. (According to R. Shepard, 2002)

O2 consumption %	Age			
	40-49		50-59	
	male	female	male	female
	Number of HR per minute			
40	115	117	111	113
60	136	138	131	134
75	152	154	145	145
100	178	179	170	171

The formula "exercise pulse" was developed on the basis of the above law, using which the above figure was determined.

Exercise pulse = (220 - patient's age - patient's 1 minute of rest at rest) x 0.6 + patient's 1 minute of rest at rest.

For example: the patient is 50 years old. The patient's 1-minute heart rate at rest was 70. In this case, the exercise pulse of this patient is 130.

(220-50-70) x 0,6 + 70 = 130

At the beginning of the study and after 6 months, patients were examined and compared to determine the "exercise pulse" and how long it takes to reach this level during exercise.

SCORE (Systematic COronary Risk Evaluation) scale to determine the overall risk of cardiovascular disease, SF 36 (The Short Form-36) - Used as a nonspecific questionnaire to assess the quality of life of patients with chronic diseases.

Results of scientific research: The duration of the training was based on the results of veloergometry examination of patients at the time of the initial examination Nikolaev L.F. and Aronov D.M. The required walking rhythm was calculated for each patient using the formula. Using this formula, the patient's walking speed was determined by the number of steps per minute.

Patients who were able to perform up to 50 W load (conditionally IHD, stable voltage angina FC III) during the initial VEM test during training for 20-40 minutes, and patients who were able to perform up to 75 W load (conditionally YuIK, stable voltage angina FC II) 40-60 conducted dynamic walking exercises for minutes.

Preliminary indicators of patients' tolerance to physical activity were assessed using veloergometry. In the main group, tolerance to physical activity was found to be low in 51.1% (22 people) and moderate in 48.9% (21 people). In the control group, tolerance to physical activity was found to be low in 51.4% (19 people) and moderate in 48.6% (18 people).

When the results were analyzed on the basis of gender, in the first study in both groups it was found that the indicators of tolerance to physical activity are higher in men than in women. Among men, 56.5% and 52.9% of patients in the main and control groups had moderate tolerance to physical activity, respectively, and in women, 60% and 55% of patients in the main and control groups had low tolerance (50 W), respectively. .

The following results were obtained when examining the time of patients to reach the "exercise pulse":

	The main group (n=43)		Control group (n=37)	
	Даволашдан олдин	6 ойдан сўнг	Даволашдан олдин	6 ойдан сўнг
Time to reach the exercise pulse (in minutes)	7,05±3,41	18,35±4,28 *(p<0,05)	7,24±4,19	9,35±5,51 *(p>0,05)

The main group of patients initially reached the allowable pulse rate during walking exercises at 7.05 ± 3.41 minutes, while after 6 months of intensive walking exercises this time increased by 2.6 times and amounted to 18.35 ± 4.28 minutes. Patients in the control group initially reached the allowable pulse rate during walking at 7.24 ± 4.19 minutes, and after 6 months this time increased by 1.2 times to 9.35 ± 5.51 minutes. Although a positive trend was observed in all patients, the results were reliable only in the main group of patients who performed walking exercises (p<0,05).

When analyzing the body mass index of the patients, initially overweight (BWI 25.0-29.9) was detected in 35 of the examiners (43.8%). This figure was 20 (46.5%) among patients in the main group and 15 (40.5%) among patients in the control group. 29 patients (36.3%) in the study were obese (body mass index 30.0 and above), which is 15 (34.5%) in the main group and 14 (37.8%) in the control group. When patients were re-analyzed for height and weight after 6 months, after 6 months of dynamic exercise 3 times a week for 20-60 minutes, the following was found.

After 6 months of physical activity, obesity in the main group of patients decreased by 27.9% to 12. With 3 patients overweight from the obesity group, 5 overweight patients returned to normal body weight at baseline. After 6 months, overweight was present in 18 (41.8%) of the examiners. An increase in obesity was observed in patients receiving only standard pharmacotherapy for 6 months. After 6 months, obesity was detected in 40.5% (15 people) of patients in the control group. Overweight was also observed in 15 patients (40.5%).

When evaluating on the SCORE scale, the risk of death from cardiovascular complications in the next 10 years in the primary and control group patients was 4.3 ± 1.9% and 4.1 ± 2.1%, respectively. When the results were analyzed after 6 months, a positive trend was observed in both groups. 4.1 ± 2.05% in the main group and 4.0 ± 1.85% in the control group. Although a positive trend was observed, the results after 6 months were not reliable in both groups (p> 0.05).

Significant differences were observed after treatment in the main group of patients who regularly exercised on the scale of physical limitation (PL - physical limitation). In the main group, the PL index was 44.6 ± 3.9% before treatment and 62.3 ± 6.0% after 6 months, respectively (r <0.05). In the control group, before treatment, the rate was 43.5 ± 4.1%, and at 6 months, the rate was 48.7 ± 4.9% (r <0.05). A positive trend was observed in all patients on the attack stability scale AS (Angina stability), attack frequency scale AF (Angina frequency), treatment satisfaction scale TS (Treatment satisfaction), but the results were not reliable (p> 0.05).

Conclusion: Increased tolerance to physical activity was observed in patients with IHD, stable stenocardy II and III functional class, when combined with standard pharmacotherapy for 6 months, 3 times a week for 20-60 minutes with individual optimal dose walking exercises. time to reach the given pulse rate increased by 2.6 times. Stabilization of hemodynamic parameters of patients and a positive change in the BWI index were more noted in

patients when standard pharmacotherapy was performed in combination with individual optimally dosed walking exercises.

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