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AMENDMENTS OF HEMODYNAMIC PARAMETERS IN FUNCTIONAL LOAD OF UNDERGRADUATE STUDENTS OF THE KAZAKH NATIONAL MEDICAL UNIVERSITY

The purpose of this research was to determine the parameters of hemodynamics among undergraduate students by applying functional loads. The research detected the changes in blood pressure, heart rate, systolic and minute volume of blood of cardiac index. This fact can be seen as a normal response of the cardiovascular system in healthy younger students.

Keywords: hemodynamic parameters, functional loading tests.

The health status of the university students is attracting more attention of specialists in various fields of medicine. This is due to the role played by this social group in the society. The prosperity of any country depends on the degree of qualification, and the condition of their health.

Acquisition, processing and application of knowledge requires maximum mental stress, in addition different kinds of factors affects to the health of students: hypodynamia, financial problems, violation of work and leisure, food, inconvenient working schedule. All these factors cause shifts of many systems, especially on the part of cardio - vascular system of students.

The aim of the research was to investigate the hemodynamic parameters of 86 healthy students of the first and second courses. At the beginning of class a blood pressure (systolic (SP) and diastolic blood pressure (DP) by the method of Karotkov, pulse with heart rate monitor) of each respondent was measured several times in a physical rest. Results of the research of each respondent were averaged and calculated by the method of N.N. Savitsky: pulse pressure (PP), average dynamic pressure (ADP); Calculation of characterizing the heart systolic volume of blood (SVB) and minute volume of blood (MVB) were performed by the Starr's formula. Cardiac index (CI) is a value which characterizes the blood supply of the body in one minute. Calculated by following formula: $CI = MVB/SB$ (l/min/m²). SB - body surface in m² determines the table Dubois.

These data was considered as a background for the assessment of cardio - vascular system of the students in the rest condition. Functional loadings like physical and emotional were used to establish the physiological reserves of cardio - vascular system. Functional test of Martine was used as an exercise (20 sit-ups in 30 seconds). As an emotional load was used differentiated credit test (difcredit). Arterial pressure (AP) and heart rate were measured before and after testing.

There were three series of observations: in the first one – observed the rate of hemodynamics at rest condition, in the second - investigated the changes in hemodynamics according to functional test of Martine, in the third - the impact of emotional stress on the same indicators.

The results of the first series showed that hemodynamic parameters at rest condition are characterized by the following variations, so SP-110-114 mm m. (mercury); DP – 70-75 mm m., PP – 40-45 mm m., HR – 72-75 beats per minute; ADP-78-84 mm m., SVB – 60-72 ml, MVB – 4.6-5.1 l; CI – 2.6-3.5 l/min m². Since arterial blood pressure is regulated by the relation of basic hemodynamic parameters can be assumed that in the regulation of arterial blood pressure, heart rate, takes part in both vascular and cardiac components.

The second series of observations were carried out to estimate status of students cardio - vascular system to standard exercise. Obtained data suggests that physical loading causes the changes in almost all hemodynamic parameters, causing the increase of rates of SP and PP, but not DP, increases SVB, MVB, CI. The cardiac performance is mainly due to the increase of heart rate. Heart rate is increased by an average of 42%. Thus, the changes of hemodynamic parameters can be regarded as a normal response of cardio - vascular system in healthy students, and increase MVB and HR after exercise suggests about lack of fitness.

Research carried out just before passing the differentiated offset showed that there is an increase in arterial blood pressure, and the increase in both SP and DP on average 20-22%, MVB increased by 30-32%, HR by 32%. MVB is due to the increase in heart rate. The nature of the response to emotionally charged testimony to the increasing role of the sympathetic - adrenal system on the heart. After passing the differential offset hemodynamic parameters are beginning to return to the initial value, and this is individual and depends on the outcome of such set-off and the type of VNA.

In summary, our studies have revealed changes of hemodynamic parameters with physical and emotional loadings. At the present stage of development of physiology, cardio - vascular system is seen as self-regulating system of the body, so a change in one of its links lead to the corresponding compensatory changes in other, which is especially evident in a young body.

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Т.М. ИСМАГУЛОВА, У.Б. ИСКАКОВА**
ҚАЗҰМУ-НІҢ БАСТАПҚЫ КУРС СТУДЕНТТЕРІНІҢ ФУНКЦИОНАЛДЫҚ ЖҮКТЕМЕ БЕРІЛГЕН КЕЗДЕГІ
ҚАН АЙНАЛЫМ ЖҮЙЕСІНІҢ КӨРСЕТКІШТЕРІНІҢ ӨЗГЕРУІ

Түйін: Осы жұмыс барысында ҚазҰМУ-нің бастапқы курс студенттерінің функционалдық жүктеме берілген кездегі қан айналым жүйесінің көрсеткіштері зерттелінді. Зерттелудің нәтижесі артериалық қысым, жүрек жиырылу жиілігі, систолалық, минуттық қан көлемдері және жүрек индексінің өзгергенін көрсетті. ҚазҰМУ-нің бастапқы курс студенттерінде байқалған гемодинамикалық өзгерістерді жүрек-қан тамыр жүйесінің қалыпты жауабы деп қарастыруға болады.

Түйінді сөздер: Қан айналым жүйесінің көрсеткіштері, функционалдық жүктеме

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ИЗМЕНЕНИЕ ПАРАМЕТРОВ ГЕМОДИНАМИКИ ПРИ ФУНКЦИОНАЛЬНЫХ НАГРУЗКАХ У СТУДЕНТОВ
МЛАДШИХ КУРСОВ КАЗНМУ

Резюме: Целью данного исследования явилось изучение параметров гемодинамики у студентов младших курсов при функциональных нагрузках. В результате исследования выявлены изменения артериального давления, частоты сердечных сокращений, систолического и минутного объема крови, сердечного индекса. Отмеченный факт можно рассматривать как нормальную реакцию сердечно-сосудистой системы у практически здоровых студентов младших курсов.

Ключевые слова: Параметры гемодинамики, функциональные нагрузочные пробы