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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ
ТБИЛИСИ - НЬЮ-ЙОРК

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3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

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3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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DAILY PROFILE DYNAMICS OF BLOOD PRESSURE AND DIASTOLIC FUNCTION OF LEFT VENTRICLE IN CARDIAC REHABILITATION PATIENTS DEPENDING ON SMOKING FACTOR

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Worldwide high mortality rate from CVD causes a necessity of improving approaches to secondary disease prevention that are induced by atherosclerosis of blood vessels. The study of the effects of smoking on diastolic function of the left ventricle (LV) and APregulation indices in patients with earlier ACS that undergo rehabilitation remains an urgent challenge. Smoking is known to be one of the most aggressive risk factor for development ACS. Thus, it has significant impact on both coronary circulation and peripheral circulation. First of all, pathogenesis of this effect is associated with stimulation of the sympathetic nervous system and increasing the level of catecholamine in the blood plasma with the subsequent occurrence of endothelial dysfunction, APregulation disturbances, increase of heart rate (HR) and LV diastolic dysfunction [26,49].

LV diastolic dysfunction (DD), that is characterized inability to fill LV without compensatory pressure increase in the left atrium (LA) and pulmonary veins [6] occurs long before development of disturbance of systolic contractile ability of the myocardium and clinical symptomatology of heart failure (HF) [10]. LV DD practically is always an intrinsic part (essentials) which is accompanied by energy deficit. It depends on a lot of factors, in particular - heart rate (HR), AP, LV function [21,23] etc. Myocardial relaxation disorders in DD is considered to be an independent predictor of ventricular arrhythmias risk and sudden heart death even in the presence of physiological systolic function of LV [18]. Furthermore, asymptomatic LV DD can be an early marker of increased risk of symptomatic heart failure development [39]. There are the evidences that LV DD is closely associated with reducing tolerance to physical exertion and patients' quality of life, and it can be an independent cause of HF [38]. Due to a number of studies it is found that DD more correlates with life expectancy prediction and severity of HF symptoms compared to indices of systolic function of the heart. DD has individual prognostic value [7]. Thereby, it has been proved that DD advancement increases the risk of cardiovascular death by 80% [8]. At this time, DD indices are supposed to be reliable hemodynamic marker of evaluation treatment effectiveness and life quality of patient with IHD that significantly influence the prognosis of patients with different types of acute coronary syndrome (ACS) including patients with earlier heart attack (HA) [33]. Moreover, according to some researches, routine monitoring of LV DF parameters in dynamics may reduce potential risk of complication in rehabilitation patients after cardiac surgical interventions [11] especially in patients-smokers. As a matter of fact, there are a lot of experimental researches that detect that cigarette smoking significantly alters LV DF and even every smoked cigarette provokes disturbance of LV diastolic relaxation [1,30,48,51].

Dynamics control of daily blood pressure monitoring readings (DBPM) is not less important part of evaluation of effectiveness program for rehabilitation patients with ACS. High level of APor AHT are consequences of HA (myocardial infarction or MI) occurrence [46] and at the same time – an independent predictor of reinfarction risk [3] initially related to endothelial dysfunction due to data of a number of researches. It is found that in patients with post-infarction atherosclerosis endothe-

lial dysfunction is associated with high risk of cardiovascular complications [1]. Patients with hemodynamically insignificant stenosis of coronary arteries and availability of endothelial dysfunction have much higher risk of cardiovascular complications [17]. EUROASPIRE-II survey, conducted in 1999 - 2000 in 15 European countries, evaluated patients with earlier acute coronary event 1,4 years later [14] and determined that 50% of them suffered from AH (systolic ≥ 140 mm Hg or diastolic ≥ 90 mm Hg). Subsequently Amar J. and his colleagues [9] expanded observation in PREVENIR survey conducted with the involvement of 1247 patients. They found out that approximately 1/3 patients had uncontrolled AP, especially systolic, after earlier Acute Myocardial Infarction (MI). Authors emphasize that the frequency of AH in patients with heart attack increases after discharge from the hospital, whereas patients restore their usual lifestyle, for example, - continue to keepsmoking status. Smoking is known to be associated with increased arterial stiffness [32] which is related to direct enhanced sympathetic stimulation of the nervous system by nicotine and direct cellular toxicity with further oxidative stress development. Moreover, this accelerates endothelial dysfunction development with significant increasing of average daily indices of SAPand DAPand of average daily indices of heart rate (HR) [37].

Therefore, management of patients with ACS remains an important healthcare issue, especially for those individuals were and continue to stay smokers. In this regard, the problem in developing individual approaches to prevention of acute coronary events and other cardiovascular complications remains relevant as a part of post-infarction cardiac rehabilitation (CR) measures including the issue of increasing motivation to quit smoking.

Aim - to study the peculiarities diastolic function of LV and regulation of APin the patients with a history of ACS in rehabilitation treatment dynamics depending on smoking factor.

Material and methods. 114 patients aged 42 to 78 years old (average age $56,61 \pm 1,35$) that have recently had ACS (less than 28 days ago) have been examined and have passed cardiac rehabilitation programme in the rehabilitation department after cardiac diseases at "Morshynkurort" health-resort complex. All patients have been divided into 2 groups according to smoking habit. Patients with smoking factor (smokers, $n=64$, average age $54,94 \pm 1,6$ years old) belonged to the 1st group, patients without smoking factor (non-smokers, $n=50$, average age, $58,64 \pm 1,4$ years old) belonged to the 2nd group. The 1st group was divided into 2 subgroups in the end of resort rehabilitation in order to evaluate dynamic of researched indices: IA – smokers ($n=36$), that gave upsmoking during the process of cardiac rehabilitation (CR), and IB – smokers ($n=28$) that continued smoking.

Rehabilitation program activities were carried out according to recommendation of working group of ESC on cardiac rehabilitation and physical training [44] and also according to the Unified Clinical Protocols of medical care "Non-ST segment elevation acute coronary syndrome (emergency, primary, secondary (specialized) medical care)" [4] and "ST segment elevation acute coronary syndrome (emergency, primary, secondary (specialized) medical care)" [5]. CR programme included therapeutic walking, therapeutic gymnastics (TG), laser therapy

for the cubital vein and optimal drug therapy (ODT). In order to quit smoking all smoking patients were provided with individual counseling using the “5As” strategy, unmotivated smokers – the “5R” strategy in accordance with Order № 746 dated 26.09.2012 “On approval of Methodical recommendation for healthcare professionals of health care establishments on providing medical and preventive care to patients wishing to get rid of tobacco dependence” [2,27]. All patients were interviewed using the Fagerstrom test in order to assess the degree of nicotine dependence (FTND). According to the results of the Fagerstrom test, the smoking index was calculated according to the formula: (SI) = N * E/20, where N is the number of cigarettes smoked (per day), E is smoking experience (years).

Patients with high nicotine dependence, in which individual counseling wasn't effective, was prescribed nicotine replacement drug (varenicline) to ODT with the consent of these patients. The length of stay of all cardiac rehabilitation patients was 24 days in the rehabilitation department.

There were exclusion criteria: severe heart failure (stages IIB - III), left ventricular aneurysm, decompensated diabetes mellitus, persistent atrial fibrillation, complex cardiac arrhythmias (polytopic extrasystole, bi- and trigeminal neuralgia, paroxysmal arrhythmias more than 2 times in a month, atrioventricular block II-III degree), electrocardiogram ischemic changes with dosed exercise, severe renal and hepatic failure.

Main indices of DBPM and diastolic function of LV were revealed in patients of the study group on the first and 24th days of rehabilitation treatment.

Transthoracic echocardiography (TTE) was used for assessment of LV DD indices on the first and 24th days of rehabilitation treatment. TTE was performed at rest according to standard methods using the Acuson Cypress Siemens ultrasound machine (USA) due to sector sensor with a frequency of 2-4 MHz. The following indicators were determined: correlation E/A, time of deceleration of early diastolic flow (DT), the duration of the isovolumic relaxation time (IVRT), correlation E/e' and LV DF types.

DBPM was performed using the apparatus BAT41-2 and ARI-ADA software with the definition of the following indicators: mean daily systolic arterial pressure (SAP), diastolic arterial pressure (DAP), pulse artery pressure (PAP), heart rate (HR), variability of daytime SAP and DAP, variability of night SAP and DAP, levels of morning rise of SAP and DAP, and also daily indices (DI) with definition of types of circadian fluctuations.

Statistical analyses were performed using the programme Statistica (version 10.0) and Microsoft Excel 2016. It was determined that the obtained parameters had a Gaussian and non-Gaussian distribution. Therefore, the obtained results are given in the form of arithmetic means and their errors (M±m) as well as in the form of medians with 25th- and 75th-percentiles. The Student's t-test (parametric criterion) and the Mann-Whitney U test were used to compare indicators. The Chi-squared test (χ^2 test) was used to compare the percentages. The difference at p<0.05 was considered to be significant.

Results and discussion. At the beginning of this study exceeding the target values of SAP and DAP were registered in two groups of examined rehabilitation patients. In the group of smokers these indicators were definitely higher than in non-smokers and were respectively 147.5±9.0 (I) and 91.8±6.8 (I) vs. 139.0±8.0 (II) mm Hg and 84.5±8.2 (II) mm Hg, p<0.001. The initial average levels of PAP did not exceed the optimal values and did not differ significantly (55.6±5.7 (I) vs. 54.4±6.8 (II) mm Hg, p> 0.05) in both groups. In the analysis of the initial average daily HR, morning SAP and DAP these indicators were observed to be significantly higher by 12.9%, 16% and 26.5% in smokers (I) than in non-smokers (II), and were respectively 83.7±8.1 (I) vs. 74.1±7.9 (II) bpm, p<0,001; 61.6±11.8 (I) vs. 53.1±8.8 (II) mm Hg, p<0.01; 56.3±8.7 (I) vs. 44.5±9.1 (II) mm Hg., p<0.01. A similar trend was observed in the analysis of diurnal variability of SAP (17.3±2.6 (I) vs. 16.4±2.2 (II) mm Hg, p<0.05) and DAP (15.5±2.5 (I) vs. 14.0±2.4 (II) mm Hg, p<0.01), nocturnal variability of SAP (16.4±1.9 (I) vs. 15.0±1.4 (II) mm Hg, p<0.001) and DAP (15.0±1.5 (I) vs. 13, 2±1.4 (II) mm Hg, p<0.001) (table 1).

Table 1. Average levels of DBPM indicators at the beginning of rehabilitation treatment of patients with a history of ACS depending on the habit of smoking

Indicators	Group I (n=64)	Group II (n=50)
SAP, mm Hg.: daily	147,4±8,9**	139,0±8,0
day	150,0±8,6**	141,2±8,0
night	137,9±7,9**	130,9±9,4
DAP, mm Hg.: daily	91,8±6,8**	84,5±8,2
day	94,1±6,2**	86,9±8,2
night	85,7±4,9**	78,3±7,8
PAP average daily, mm Hg.	55,6±5,7	54,4±6,8
HR average daily, Bpm.	83,5±8,2**	74,1±7,9
SAP morning value, mm Hg.	61,6±11,8**	53,1±8,8
DAP morning value, mm Hg.	56,3±8,7**	44,5±9,1
SAP variability, mm Hg, day	17,3±2,6*	16,4±2,2
night	16,4±1,9**	15,0±1,4
DAP variability, mm Hg. day	15,5±2,5**	14,0±2,4
night	15,0±1,5**	13,2±1,4
Daily SAP index,%	7,2 (5,8;10,7)	6,8 (5,8;10,1)
Daily DAP index,%	8,2 (6,4;11,6)	9,5 (7,8;12,2)

Note. *p<0,05; **p< 0,001; - the reliability of the difference between the groups I and II

The changes described above are consistent with the results of some experimental and clinical trials [12,13,16,45], the authors of which associate more pronounced changes of the daily profile of AP in smokers with the activation of nicotinic receptors in the sympathetic ganglia that leads to increase of norepinephrine release, and thus – AP and HR increase. In particular, it was demonstrated that there were significantly higher level of average daily SAP and DAP as well as daytime blood pressure load in the research by Morillo et al. [37]. However, our results of the research have shown not only significant reliable difference between the participants of the comparison groups in the levels of average daily SAP and DAP, but also in the indicators of average night SAP and DAP, which significantly exceeded the target levels. And this proves the worst prognosis in the group of smokers because the average values of AP during sleep are the most significant prognostic marker of CVD morbidity and mortality whereas progressive reduction of nocturnal AP is an important therapeutic goal and a predictor of survival without recurrent cardiovascular events [22]. However, there are other studies which report about paradoxical changes of the analyzed indicators in their participants, where AP was lower in the pa-

tients with smoker status compared with non-smokers [31,42].

Analysis of average levels of DBPM indicators was performed on the 24th days of rehabilitation treatment. To assess the impact of smoking cessation on the state of AP regulation we divided patients with smoker (I) status into two subgroups (IA and IB). It was determined that against the background of cardiac rehabilitation treatment in the group of patients who continued to smoke (IB), the recommended average daily values of SAP and DAP (120-130/70-80 mm Hg) were not achieved, although there was some significant positive dynamics of these indicators (from 147.5±10.5 to 139.3±9.0 mm Hg (IB) and from 93.9±6.8 to 84.1±6.8 mm Hg (IB), $p < 0.001$). Performed analysis of indicators of day and night SAP and DAP variability, morning SAP and DAP didn't show reliable positive dynamics in this researched group. Therefore, their target levels that are necessary for the maximum possible reduction of cardiovascular risk (CVR) were not reached. On the other hand, the expressed positive dynamics ($\Delta\%$) of the listed above DBPM indicators was registered in the group of patients that gave up smoking (IA) even compared with the group of patients initially without smoking factor (II) (table 2). It is confirmed, that the risk of development of repeated CV

Table 2. Average levels of DBPM indicators in patients with a history of ACS in dynamics of cardiac rehabilitation treatment - at the beginning (1st day) and at the end (24th days)

Indicator	Group IA (n=36)			Group IB (n=28)			Group II (n=50)		
	1 st day	24 th day	$\Delta\%$	1 st day	24 th day	$\Delta\%$	1 st day	24 th day	$\Delta\%$
SAP, mm Hg.: daily	147,4±7,7**	129,9±6,7	-11,9	147,5±10,5**	139,3±9,0	-5,5	139,0±8,0**	126,4±6,1	-9,1
SAP, mm Hg.: day	150,2±7,0**	132,2±6,7	-12	149,9±10,3**	141,3±8,6	-5,7	141,2±8,0**	129,1±6,1	-9,2
SAP, mm Hg.: night	138,2±5,5**	119,7±5,8	-13,4	137,5±10,3**	128,6±7,6	-6,5	130,9±9,4**	117,9±7,8	-9,9
DAP, mm Hg.: daily	90,2±6,4**	76,8±5,8	-14,9	93,9±6,8**	84,1±6,8	-10,5	84,5±8,2**	71,2±5,9	-15,7
DAP, mm Hg.: day	92,6±5,4**	79,2±5,7	-14,5	96,0±6,7**	86,3±6,7	-10,1	86,9±8,2**	73,9±6,0	-15
DAP, mm Hg.: night	84,7±3,7**	71,7±6,1	-15,4	87,2±5,9**	76,6±6,4	-12,2	78,3±7,8**	66,6±6,8	-14,9
PAP, mm Hg	57,2±5,0**	53,1±4,2	-7,2	53,6±6,0	55,3±6,5	3,2	54,4±6,8	55,2±5,3	1,5
HR, Bpm.	82,7±8,1**	74,4±6,2	-10,1	84,6±8,2	77,7±8,3	-8,2	74,1±7,9**	66,0±5,2	-11
Morning SAP value, mm Hg	60,7±12,5**	47,0±11,3	-22,6	62,7±11,0#	55,5±9,3	-11,5	53,1±8,8**	45,1±8,8	-15,1
Morning DAP value, mm Hg	55,4±9,9**	42,9±9,4	-22,6	57,6±6,8	54,1±7,3	-6,1	44,5±9,1**	36,5±8,7	-18
SAP variability, day, mm Hg.	17,2±2,6**	15,2±2,6	-11,6	17,4±2,7	16,2±2,1	-6,9	16,4±2,2**	14,4±2,1	-12,2
SAP variability, night, mm Hg.	16,3±1,5**	13,4±1,2	-17,8	16,7±2,3	15,5±2,4	-7,2	15,0±1,4**	12,9±1,4	-14
DAP variability, day, mm Hg.	15,4±2,8**	12,4±2,9	-19,5	15,7±2,0	14,8±2,0	-5,7	14,0±2,4*	12,5±2,3	-10,7
DAP variability, night, mm Hg.	14,7±1,3**	12,2±1,5	-17,1	15,4±1,6	14,6±1,7	-5,2	13,2±1,4**	11,0±1,3	-16,7
Daily SAP index,%	7,2 (5,8;11,7)	10,2 (5,9;11,4)		7,2 (5,8;10,2)	8,4 (7,4;12,5)		6,8 (5,8;10,1)	10,2 (5,9;11,4)	
Daily DAP index,%	7,3 (6,0;12,0)	10,8 (7,2;11,9)		9,1 (7,0;11,2)	9,3 (8,0;14,3)		9,5 (7,8;12,2)	11 (7,3;12,1)	

Note. # $p < 0,05$; * $p < 0,01$; ** $p < 0,001$ - accuracy difference between indicators after treatment

events remains high in the group of patients – persistent smokers (IB), because exceeding the target levels of morning AP, night AP and AP variability are always unfavorable prognostic marker [19,38]. In addition, high variability of SAP and DAP, which is always associated with significant target organs damage and the development of cardiovascular complications, was registered in the group of smokers who continued to smoke (IB) especially at night [40,41]. Similar results were obtained in other clinical trials, in which smoking cessation had contributed to the reduction or normalization of key indicators of AP regulation, confirming the need for compulsory correction of this factor as an important element of secondary CVD prevention [2,36], including - effective cardiac rehabilitation. In particular, in a study by Ward et al. [50] there was a significant decrease of HR and AP in the patients during the first week after they stop smoking. At the same time, there were significantly lower urinary norepinephrine levels in plasma and urine in the researched patients a week after quitting smoking. The results of other studies [15,24,29,35] simultaneously determine the opposite effects of smoking cessation, for example, about a significant increase in average AP levels compared to cur-

rent smokers (those who continue to smoke). Probable causes of such results are called weight gain due to smoking cessation and increased risk of developing hypertension against this background. Therefore, it is important that the process of quitting smoking was carried out in combination with physical exertion, which would prevent an increase in body mass index in ex-smokers. In particular, in our clinical study, all patients underwent an individualized exercise program. No weight gain was observed among those who lost their smoking habit (IB) during the observation period.

In the process of studying the dynamics of circadian oscillations of SAP, reliable increase in more than double the proportion of patients in the category of dipper (from 25% to 58.3%, $p < 0,01$) and 1.6-fold decrease in the proportion of individuals with non-dipper profile (from 66.7% to 41.7%, $p < 0.05$) were found in the group IA. A similar trend was observed in patients of the group IB.

Quite the opposite, there was no significant reliably sufficient positive dynamics of circadian rhythms of SAP during cardiac rehabilitation treatment in the group IB, that means among the patients who continued to smoke (Fig. 1).

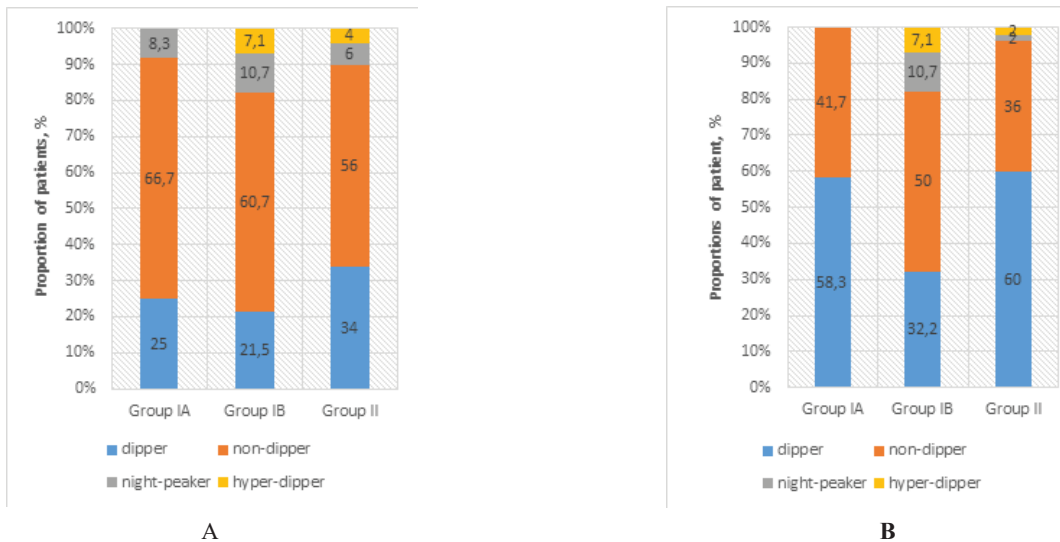


Fig. 1. Dynamics of circadian oscillations of SAP in rehabilitation patients of Groups IA, IB and II on the background of health-resort treatment.
Note: A – 1st day; B – 24th day of cardiac rehabilitation

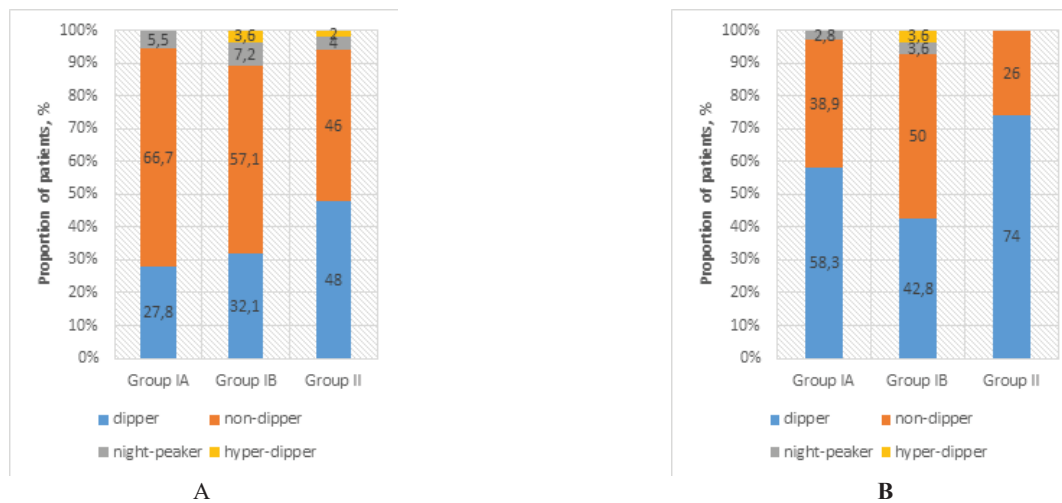


Fig. 2. Dynamics of circadian oscillations of DAP in rehabilitation patients of Groups IA, IB and II on the background of health-resort treatment
Note: A – 1st day; B – 24th day of cardiac rehabilitation

Analysis of the dynamics of the degree of nocturnal DAP-decrease also showed lack of significant positive dynamics in the group of IB patients, while in the groups IA and II there was a significant reliable increase in individuals with dipper profile (respectively, from 27.8% to 58.3% (IA), from 48% to 74% (II), $p < 0.01$), one more thing - decrease in the proportion of patients in non-dipper category (from 66.7% to 38.9% (IA) and from 46% to 26% (II), $p < 0.05$) (Fig. 2).

We have investigated dynamics of LV DF indices in the examined patients in the process of their cardiac rehabilitation treatment depending on smoking habit. For our objective assessment of changes in LV DF we analyzed the main diastolic parameters in rehabilitation patients preferably with type I LV DD because the proportion of these patients prevailed in all research groups. The most unfavorable changes were registered among patients with smoker status (I) at the beginning of the research. Average levels of DT and IVRT in patients with type I DD among smokers significantly exceeded those among non-smoking patients (II) and were, respectively, 260.0 ± 9.4 (I) vs. 250.7 ± 4.5 (II), $p < 0.001$ and 116.7 ± 6.3 against 112.3 ± 6.3 (II), $p < 0.001$. The E/A ratio was significantly higher in the group of non-smokers (II) by 26.7% and it was 0.73 ± 0.1 (II) vs 0.6 ± 0.1 (I), $p < 0.001$. The E/e' ratio did not show significant difference between the groups (9.1 ± 0.4 (I) vs 9.2 ± 0.7 (II), $p > 0.05$). Our analysis of LV DD types revealed that patients with type III LV DD predominated in the group with smoker status but without sufficient reliability (10.9% (I) vs. 2% (II), $p > 0.05$). Similar results have been published in several articles, whose authors obtained evidence of adverse effects of chronic smoking on LV diastolic function [1,14] observing below the peak ratio of E/A in the group of smokers, while the mean values of IVRT and DT were significantly higher than in the non-smoking group. Meanwhile, the severity of LV diastolic relaxation was closely correlated with the degree of dependence on smoking [14]. In clinical practice, such changes of LV DF indices are manifested in the form of decrease in the chronotropic reserve and increase of the incidence of angina attacks in patients with ACS [20]. In addition, there are studies that have shown that LV DD is a risk factor for serious adverse cardiovascular events [25,28]. In particular, patients with LVDD showed 3.53 times higher risk of cardiovascular events and 3.13 times higher mortality in a meta-analysis of Ladeiras-Lopes et al. [28].

The dynamics analysis of average levels of E/A, DT, IVRT, E/e' at the end of health-resort treatment revealed that no significant positive changes in the list indices of LV DF were observed among smoking patients who had not given up this habit (IB), unlike with patients of the groups IA and II. Unfortunately, we have not found research about study of the consequences/ effects of smoking cessation on LV DD changes in the available literature. However, there are a number of scientific articles which confirm the beneficial effect of cardiac-rehabilitation exercise programs on LV diastolic function, that is consistent with the results obtained in our study [34,43,47,52]. It is important to emphasize that it ensures the effectiveness of physical exertion against the background of successful smoking cessation in post-infarction patients. In particular, in the examined patients who continued to smoke (group IB), though no progression of LV diastolic disorders was observed during cardiac rehabilitation, but no significant positive dynamics was registered at the end of treatment.

There are average levels of LV DD indices in dynamics of cardiac rehabilitation in patients depending on smoking habit in table 3.

Analysis of dynamics of LV DD types in patients with a history of acute coronary event has determined that in the group of rehabilitation patients without smoking factor (II) proportion of patients with LV DF within normal limits has significantly increased (from 0% to 14%, $p < 0.01$) by reducing the proportion of patients in the category of type I DD. In the group of persistent smokers, no case of DF complete normalization (from 0% to 0%, $p > 0.05$) was registered at the end of health-resort treatment. Simultaneously, among rehabilitation patients, who gave up smoking (IA) increase of proportion of patients without the impairment of diastolic relaxation of LV was observed at the end of cardiac rehabilitation, although without sufficient degree of reliability (from 0% to 8.3%, $p > 0.05$) (Fig. 3,4,5). The results obtained in the group of these patients may be due to insufficient duration of our observation (only 24 days), after all, among them there was some significant positive reliable dynamics of the majority of LV indices. This allows to presume a probably larger increase in the proportion of patients without diastolic disorders of LV under condition of prolonged observation. When assessing the dynamics of types I, II, III LV DD in rehabilitation patients undergoing sanatorium-resort treatment, significant reduction of proportion of patients in these categories of LV DDF wasn't observed in all study groups.

Table 3. Average levels of LV DD indices in patients with type I DD after ACS in dynamics of cardiac rehabilitation treatment (at the beginning - 1 day) and at the end - 24 days)

Index	Group IA (n=28)			Group IB (n=20)			Group II (n=42)		
	1 day	24 day	Δ%	1 day	24 day	Δ%	1 day	24 day	Δ%
E/A	0,61±0,1*	0,71±0,1	16,4	0,59±0,1	0,63±0,1	6,8	0,73±0,1**	0,84±0,1	15,1
DT, ms	257,8±8,6**	247,6±8,8	-4	263,1±9,8	259,3±9,7	-1,5	250,7±4,5**	242,6±6,2	-3,2
IVRT, ms	116,1±6,1**	107,2±7,1	-7,7	117,5±6,7	114,1±7,1	-2,9	112,3±6,3**	105,4±7,5	-6,2
E/e'	9,1±0,4*	8,7±0,7	-4,4	9,0±0,5	8,8±0,5	-2,2	9,2±0,7**	8,4±0,7	-8,7

Note: * $p < 0.05$; ** $p < 0.001$ - accuracy difference between indicators after treatment

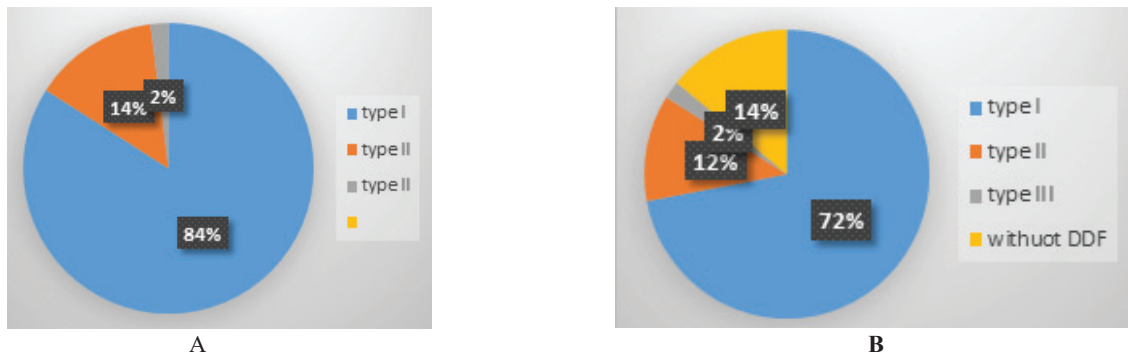


Fig. 3. Dynamics LV DF types in rehabilitation patients with type II on the background of health-resort treatment.
Note: A – 1 day; B – 24 day of cardiac rehabilitation



Fig. 4. Dynamics LV DF types in rehabilitation patients with type IA on the background of health-resort treatment.
Note: A – 1 day; B – 24 day of cardiac rehabilitation

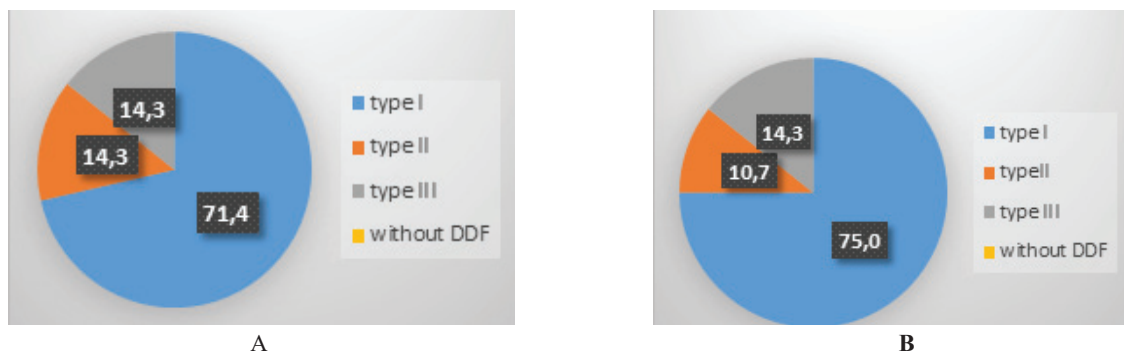


Fig. 5. Dynamics LV DF types in rehabilitation patients with type IA on the background of health-resort treatment.
Note: A – 1 day; B – 24 day of cardiac rehabilitation

Conclusions.

1. Smoking factor in the patients with a history of ACS is associated with more significant disorders of regulation of AP and LV DF indicating deeper disorders of systemic endothelial dysfunction and higher intramyocardial tension in LV, which results in decrease in chronotropic reserve and limitation of coronary blood flow.

2. Smoking cessation must be obligatory, controlled part of cardiac rehabilitation program for patients that had ACS. Therefore, rapid (during 24 days) appreciable improvement of diurnal profile of AP and LV DF is smoking cessation consequence that is the most significant positive dynamics of changes of indicators such as PAP, variability of night SAP and DAP, levels of morning rise of SAP and DAP and also positive dynamics of changes in LV DF indices, especially E/A, DT, IVRT, E/e'.

3. Significant reduction and target values achievement of AP variability, AP morning levels even against the background of proper physical training were not observed in patients – persistent smokers. As a matter of fact, these data are important

independent predictors of possible recurrence of cardiovascular events in patients with a history of ACS, there is a need to focus more on the implementation and improvement of smoking cessation programs.

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SUMMARY

DAILY PROFILE DYNAMICS OF BLOOD PRESSURE AND DIASTOLIC FUNCTION OF LEFT VENTRICLE IN CARDIAC REHABILITATION PATIENTS DEPENDING ON SMOKING FACTOR

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Aim of the research - to study the peculiar features of the left ventricle (LV) diastolic function (DF) and regulation of arterial pressure (AP) in patients with a history of acute coronary syndrome (ACS) in cardiac rehabilitation treatment dynamics depending on smoking factor.

114 patients at the age of 42-78 years old (average age 56,61±1,35) that have recently had ACS (less than 28 days ago) have been examined and have passed cardiac rehabilitation programme in the rehabilitation department after cardiac diseases at "Morshynkurort" sanatorium-resort complex. All patients have been divided into 2 groups according to smoking habit. Patients with smoking factor (smokers, n=64, average age 54,94±1,6 years old) belonged to the 1st group, patients without smoking factor (non-smokers, n=50, average age, 58,64±1,4 years old) belonged to the 2nd group. The 1st group was divided into 2 subgroups in the end of resort rehabilitation in order to evaluate dynamic of researched indices: IA – smokers (n=36), that gave up smoking during the process of cardiac rehabilitation (CR), and IB – smokers (n=28) that continued smoking. Main indices of daily arterial blood pressure monitoring (DBPM) and LV DF were detected in patients of the research groups during the 1st and 24th days of rehabilitation treatment.

In the beginning of cardiac rehabilitation programme higher mean-diurnal values of systolic arterial pressure (SAP) and diastolic arterial pressure (DAP), post-take increase SAP and DAP, morning SAP and DAP, day and night SAP and DAP variability, also average indices of LV DF and in particular DT, IVRT and E/A correlation were detected in patients of the 1st smoking group (I) in comparison with the 2nd non-smoking group (II). Dynamics analysis of AP regulation indices detected that the better positive dynamics together with achievement of the target, recommended levels of DBPM indices were being registered in the group of non-smokers (II) and in the group of smokers that quit smoking (IA), compared to the group of patients – persistent smokers (IB). Positive changes also weren't detected at the end of rehabilitation treatment by dynamics of indicators of (DT, IVRT, correlation E/A and E/e'). At the same time significant positive dynamics was observed in patients that got out of the habit of smoking (IA).

Smoking factor in patients with earlier ACS is associated with more significant disorders of regulation of AP and LV DF. Smoking cessation must be obligatory, controlled part of cardiorehabilitation program for patients that had ACS. Therefore, rapid (during 24 days) appreciable improvement of diurnal profile of AP and LV DF is smoking cessation consequence. Significant reduction and target values achievement of AP variability, AP-morning levels, even against the background of proper physical training, were not observed in patients - persistent smokers.

Keywords: cardiac rehabilitation, smoking, diastolic function, daily profile of blood pressure.

РЕЗЮМЕ

ДИНАМИКА СУТОЧНОГО ПРОФИЛЯ АРТЕРИАЛЬНОГО ДАВЛЕНИЯ И ДИАСТОЛИЧЕСКОЙ ФУНКЦИИ ЛЕВОГО ЖЕЛУДОЧКА У КАРДИОРЕАБИЛИТАЦИОННЫХ БОЛЬНЫХ В ЗАВИСИМОСТИ ОТ ФАКТОРА КУРЕНИЯ

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Цель исследования - определить особенности диастолической функции левого желудочка и регуляции артериального давления у больных после перенесенного острого коронарного синдрома в динамике кардиореабилитационного лечения в зависимости от фактора курения.

Обследовано 114 пациентов в возрасте 42-78 лет (средний возраст $56,61 \pm 1,35$ лет), которые после недавно (не более 28 дней назад) перенесенного острого коронарного синдрома (ОКС) проходили программу кардиореабилитации (КР) в отделении реабилитации после заболеваний сердца Санаторно-курортного комплекса «Моршинкурорт». В зависимости от привычки курения пациенты распределены в две группы. I группу составили пациенты с фактором курения ($n=64$, средний возраст $54,94 \pm 1,6$ лет), II группу - больные без фактора курения ($n=50$, средний возраст $58,64 \pm 1,4$ лет). В конце санаторно-курортной реабилитации для оценки динамики исследуемых показателей пациенты I группы разделены на две подгруппы: IA - курильщики ($n=36$), которые отказались от курения в процессе КР, и IB - курильщики ($n=28$), которые продолжали курить. У пациентов исследуемых групп определяли основные показатели суточного мониторинга артериального давления (СМАД) и диастолической функции (ДФ) левого желудочка (ЛЖ) на первые и 24 сутки реабилитационного лечения.

В начале кардиореабилитационной программы у больных I группы курильщиков в сравнении с группой некурящих (II) выявлены достоверно более высокие среднесуточные значения систолического артериального давления (САД) и диастолического артериального давления (ДАД), утреннего подъема, дневной и ночной вариабельности САД и ДАД, а также средние значения показателей ДФ ЛЖ, в частности показателей DT, IVRT и соотношения E/A. Анализ динамики показателей регуляции АД выявил, что в группе некурящих (II) и в группе курильщиков, бросивших курить (IA) регистрировалась лучшая положительная динамика с достижением целевых рекомендованных уровней показателей СМАД в сравнении с группой больных - персистирующих курильщиков (IB). Динамика показателей ДФ ЛЖ (DT, IVRT, соотношение E/A и E/e')

в конце кардиореабилитационного лечения не показала достоверных положительных изменений в группе IB, в то время как у больных группы IA, которые отказались от курения, наблюдалась выраженная положительная динамика.

Фактор курения у пациентов, перенесших ОКС, ассоциируется с существенными нарушениями регуляции АД и ДФ ЛЖ. Отказ от курения должен быть обязательной контролируемой составляющей программы кардиореабилитации после перенесенного ОКС, поскольку ее последствиями является быстрое (в течение 24 дней) существенное улучшение суточного профиля АД и ДФ ЛЖ. У пациентов - персистирующих курильщиков достоверного снижения и достижения целевых значений вариабельности АД, уровней утреннего подъема АД даже на фоне соответствующих физических тренировок не отмечалось.

რეზიუმე

არტერიული წნევის და მარცხენა პარკუჭის დიასტოლური ფუნქციის სადღეღამისო პროფილის დინამიკა კარდიორეაბილიტაციის დროს მოწვევის ფაქტორზე დამოკიდებულ ავადმყოფებში

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დგალიტაციის სახ. ლეოვის ეროვნული სამედიცინო უნივერსიტეტი, საოჯახო მედიცინის დეპარტამენტი, უკრაინა

კვლევის მიზანი - მარცხენა პარკუჭის დიასტოლური ფუნქციის თავისებურებების შესწავლა და არტერიული წნევის რეგულირება პაციენტებში მწვავე კორონარული სინდრომის შემდგომ გულის რეაბილიტაციის მკურნალობის დინამიკაში, მოწვევის ფაქტორის გათვალისწინებით.

გამოკვლეულია 42-78 წლის 114 პაციენტი (საშუალო ასაკი $56,61 \pm 1,35$ წ.), რომლებმაც გადატანილი მწვავე კორონარული სინდრომის (მკს) შემდეგ, არაუმეტეს 28 დღის წინ, მონაწილეობა მიიღეს კარდიორეაბილიტაციის პროგრამაში სანატორიუმ-საკურორტო კომპლექს „მორშინკურორტის“ რეაბილიტაციის განყოფილებაში. მოწვევის ჩვევების მიხედვით ყველა პაციენტი გაიყო ორ ჯგუფად: I ჯგუფი მოიცავდა მოწვევის ფაქტორის მქონე პაციენტებს ($n=64$, საშუალო ასაკი $54,94 \pm 1,6$ წ.), II ჯგუფი - პაციენტები მოწვევის ფაქტორის გარეშე ($n=50$, საშუალო ასაკი $58,64 \pm 1,4$ წ.). სანატორიუმ-საკურორტო რეაბილიტაციის დასასრულს შესწავლილი მაჩვენებლების დინამიკის შესაფასებლად I ჯგუფი გაიყო ორ ქვეჯგუფად: Ia - მწვევლები ($n=36$), რომლებმაც უარი თქვეს მოწვევაზე კარდიორეაბილიტაციის დროს, Ib - მწვევლები ($n=28$), რომლებმაც გააგრძელეს მოწვევა. საკვლევი ჯგუფების პაციენტებში სარეაბილიტაციო მკურნალობის პირველ და 24-ე დღეს ჩატარდა არტერიული წნევის (აწ) სადღეღამისო მონიტორინგის ძირითად მაჩვენებლების (სმძმ) და მარცხენა პარკუჭის (მპ) დიასტოლური ფუნქციის (დფ) განსაზღვრა.

კარდიორეაბილიტაციის პროგრამის დასაწყისში მწვევლთა I ჯგუფის პაციენტებში არამწვევლთა ჯგუფთან შედარებით გამოვლინდა საშუალო სისტოლური აწ (საწ) და დიასტოლური აწ (დაწ) სარწმუნო მაღალი საშუალო სადღეღამისო მაჩვენებლები, საწ და დაწ დღის ზრდა და მათი დღის და

ღამის ცვალებადობა, ასევე მ დღ-ის მანვენებლების საშუალო მნიშვნელობების, კერძოდ, DT, IVRT მანვენებლების და E/A თანაფარდობის სარწმუნოდ მაღალი დონე. არტერიული წნევის მარეგულირებელი მანვენებლების დინამიკის ანალიზმა აჩვენა, რომ არამწვევლთა ჯგუფში და მწვევლთა ჯგუფში, რომლებმაც უარი თქვა მოწვევაზე (Iა), დაფიქსირდა საუკეთესო დადებითი დინამიკა სადღეღამისო მონიტორინგის ძირითადი მანვენებლების მიზნობრივი რეკომენდებული დონის მიღწევით, Iბ მწვევლების ჯგუფთან შედარებით, რომლებმაც გააგრძელეს მოწვევა. მ დღ-ის მანვენებლების დინამიკამ (DT, IVRT, თანაფარდობა E/A და E/e') კარდიოსარეაბილიტაციო მკურნალობის ბოლოს ასევე არ გამოავლინა მნიშვნელოვანი პოზიტიური ცვლი-

ლება Iბ ჯგუფში, მაშინ როდესაც ავადმყოფებში, ვინც უარი თქვა მოწვევაზე (Iა), გამოვლინდა გამოხატული დადებითი დინამიკა.

მკს-ის შემდგომ პაციენტებში მოწვევის ფაქტორი დაკავშირებულია აწ და მ დღ-ის რეგულაციის არსებით დარღვევასთან. მოწვევის შეწყვეტა აუცილებელია იყოს კარდიორეაბილიტაციის პროგრამის სავალდებულო კონტროლირებადი ნაწილი მკს-ის შემდგომ პერიოდში, ვინაიდან მისი შედეგები არის აწ და მ დღ-ს სადღეღამისო პროფილის სწრაფი (24 დღის განმავლობაში) და არსებითი გაუმჯობესება. მწვევლ პაციენტებში არ გამოვლინდა აწ სარწმუნო მნიშვნელოვანი შემცირება და სამიზნე მნიშვნელობის მიღწევა, დღის აწ დონის დაკლება შესაბამისი ფიზიკური ვარჯიშის ფონზეც კი.

НЕЙРОПСИХОЛОГИЧЕСКИЙ АНАЛИЗ НАРУШЕНИЙ ВЫСШИХ ПСИХИЧЕСКИХ ФУНКЦИЙ У БОЛЬНЫХ С РАЗНЫМИ ТИПАМИ ТЕЧЕНИЯ РАССЕЯННОГО СКЛЕРОЗА

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Актуальность изучения когнитивных нарушений у больных с рассеянным склерозом (РС) обусловлена их широкой распространенностью и ранним дебютом (у 45-60% пациентов). Анализ результатов многолетних исследований различных проявлений когнитивного дефицита у больных с РС позволил заключить, что вследствие поражения вещества мозга в результате диффузной демиелинизации, приводящей к нарушению связей между различными кортикальными и субкортикальными структурами, формируются сложные, гетерогенные по природе комплексы расстройств когнитивных процессов (память, внимание, исполнительные функции, зрительно-пространственные способности), существенно влияющих на качество жизни больных [1-7]. Выявление этих нарушений на ранних стадиях заболевания позволит разработать терапевтические стратегии, направленные на сохранение когнитивных способностей.

В ранее проведенных исследованиях в основном анализировались отдельные нарушения психических процессов у больных с рассеянным склерозом, паттерны нарушений описывались просто как совокупность обнаруженных расстройств [8-16].

Полагаем, что возможность организации своевременных и адекватных реабилитационных мероприятий для больных с различными формами и типами течения РС может быть обеспечена не просто путем выявления комплекса когнитивных расстройств, а на основе определения специфических и неспецифических факторов, которые обуславливают структуру нейропсихологических синдромов, представляющих закономерное сочетание (симптомокомплекс) первичных, непосредственно связанных с фокальным поражением мозговой структуры, и вторичных, обусловленных

системным дефектом и рассогласованием функциональных систем, нарушений высших психических функций [17-20]. Ранее показано [14], что когнитивные нарушения являются более распространенными и выраженными у больных с прогрессивным типом течения РС, однако недостаточно изученным является вопрос, имеются ли не только количественные, но и качественные различия в структуре и динамике формирования когнитивных расстройств у больных с разными типами течения РС.

Исходя из вышеизложенного, целью исследования является определение структуры нейропсихологических синдромов у больных с разными типами течения рассеянного склероза, определения общих и специфических факторов, обуславливающих эти синдромы, что поможет обеспечить более точную диагностику и разработку комплексных индивидуально ориентированных программ когнитивной реабилитации.

Материал и методы. Обследовано 45 больных с рецидивирующим типом течения РС (РРС) - 1 группа и 24 больных с прогрессирующими типами течения (ПРС) - 2 группа. Средний возраст больных 1 группы составил 37,2±2,4 года, больных 2 группы – 45,3±3,2 лет.

Диагноз РС устанавливался согласно критериям McDonald [22], клиническими, анамнестическими данным и течением заболевания и данными МРТ исследований. Для детальной оценки клинико - неврологической картины и динамики состояния обследованных больных использованы шкалы Куртцке: расширенная шкала инвалидизации (EDSS) и шкала неврологического дефицита (FS).

В процессе исследования использован метод синдронового анализа нарушений высших психических функций