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COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF MODERN MEANS OF HYPERCHOLESTEROLEMIA CORRECTION

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Hypercholesterolemia is one of the most common pathological conditions of the body and plays a particularly important role in the development of cardiovascular diseases, arterial hypertension, type 2 diabetes etc. A total of 846 outpatient records were analyzed. 582 patients were prescribed statins: atorvastatin to 283 patients, rosuvastatin to 261 patients, other statins to 38 patients. The control group consisted of 234 similar patients with uncontrolled hypertension in the group of patients who fully complied with the proposed measures (against the background of 40 mg of atorvastatin), systolic blood pressure significant decreased from 208.5±3.7 to 124.4±6.6 mm Hg, diastolic blood pressure from 153.6±7.2 to 81.7±5.8 mm Hg, cholesterol from 10.2±1.2 to 5.3±0.6 mmol/l. An analogical changes were also observed with rosuvastatin: systolic blood pressure decreased from 226.3±9.8 to 138.6±7.8 mm Hg, diastolic from 164.7±7.3 to 80.5±5.6 mm Hg, cholesterol from 9.6±1.0 to 4.7±0.5 mmol/l. In the group of patients who partially or did not follow the recommended measures (diet and physical activity), only intermediate measurements showed a slight decrease in systolic blood pressure, diastolic blood pressure and cholesterol (during the co-administration of antihypertensive drugs with statins). Then the measured indicators returned to the initial high level.

Key words: hypercholesterolemia, nutritional behavior, low physical activity

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ПОРІВНЯЛЬНА ОЦІНКА ЕФЕКТИВНОСТІ СУЧАСНИХ ЗАСОБІВ КОРЕКЦІЇ ГІПЕРХОЛЕСТЕРИНЕМІЇ

Гіперхолестеринемія є одним з найбільш поширених патологічних станів організму та відіграє особливо важливу роль у розвитку серцево-судинних захворювань, артеріальної гіпертензії, цукрового діабету 2 типу та ін. Усього було проаналізовано 846 амбулаторних карт. Статини було призначено 582 хворим: аторвастатин – 283 хворим, розувастатин – 261 хворому, інші статини – 38. Контрольну групу склали 234 аналогічних хворих з неконтрольованою артеріальною гіпертензією. У групі хворих, що повністю дотримуються запропонованих заходів (на фоні прийому 40 мг аторвастатину), артеріальний тиск систоли достовірно знизився з 208,5±3,7 до 124,4±6,6 мм рт.ст., діастолічний від 153,6±7,2 до 81,7±5,8 мм рт.ст., ХС від 10,2±1,2 до 5,3±0,6 ммоль/л. Аналогічна картина спостерігалася і на тлі розувастатину: артеріальний тиск систоли знизився з 226,3±9,8 до 138,6±7,8 мм рт.ст., діастолічний артеріальний тиск з 164,7±7,3 до 80,5±5,6 мм рт.ст., холестерин з 9,6±1,0 до 4,7±0,5 ммоль/л. У групі пацієнтів, які частково або не дотримувалися рекомендованих заходів (дієта та фізична активність), лише проміжні вимірювання показали незначне зниження систолічного артеріального тиску, діастолічного артеріального тиску та холестерину (на тлі одночасного прийому антигіпертензивних препаратів зі статинами). Потім показники, що вимірювалися, повернулися до вихідного високого рівня.

Ключові слова: гіперхолестеринемія, харчова поведінка, низька фізична активність

Although HCS (hypercholesterolemia) is one of the most common pathological conditions of the body and plays a particularly important role in the development of cardiovascular diseases, AH (arterial hypertension) [7, 14], type 2 diabetes and other NCDs, somatic diseases [1, 15], it allows many people to gain weight, but so far there has been no offer for its treatment that have a direct effect. This is explained by the fact that HCS is a socially dependent condition (with the exception of hereditary factors) and develops due to lifestyle defects in most people around the world. The main reason for the development of HCS is also the defects in human nutritional behavior [8, 11]. Excess cholesterol also accumulates in the walls of blood vessels during low physical activity, and the mechanisms of weight gain due to the formation of adipose tissue are activated [12].

A new class of drugs—statins has been made for the primary and secondary prophylaxis of cardiovascular diseases [4, 9, 13]. Their main purpose is to lower the level of CS. These drugs are popular all over the world, as well as in our country. These drugs are often prescribed by doctors to patients with cardiovascular diseases and AH, and most people use them to limit weight gain. There is a large group of statins and their synergists in the pharmacy market. Atorvastatin and rosuvastatin are more popular, but atorvastatin is more preferred. Mass use of statins is limited by the availability of relatively expensive drugs and the importance of their intake. The role of statins in the normalization of CS levels in the body has not been studied at the population level.

Given that in many clinical and scientific programs, the efficacy of statins has been proved in the prevention of cardiovascular diseases, their giants such as stroke, heart attack and etc., their use is becoming more wide spread, and there is speculation that they may be widely used among the population, at least among cardiovascular diseases and AH risk groups. All this proves once again the importance of the use of statins and other drugs that reduce the level of CS in the population. The relevance of such research is

based on at least two positions. First, HCS independently has an aggravating effect on the body, systematically developing a chain of pathological conditions. Second, HCS is a generally accepted evidence-based risk factor for the formation of cardiovascular diseases and AH. In this regard, we have conducted a number of studies on HCS to assess the population capacity of statins.

The purpose of the study was to assess the influence of various drug and non-drug methods on cholesterol levels and blood pressure indices.

Materials and methods. During our study in 3 city polyclinics and endocrinology dispensaries, which formed the basis of our research, samples of outpatient records of hypertensive patients and doctors visiting the polyclinic were taken with the registration of blood tests by lipidogram. A total of 846 outpatient records were analyzed, of which 582 patients were prescribed statins: atorvastatin to 283 patients, rosuvastatin to 261 patients, and other statins to 38 patients (this group was not analyzed due to the small number of patients). Doses vary: 10, 20, 40 and 80 mg/day. The period of observation of patients by a doctor varied from 7 months to 4 years and 5 months. The control group consisted of 234 similar patients with uncontrolled hypertension.

The study was conducted in compliance with international ethical principles (Declaration of Helsinki, 1964). Informed consent was obtained from patients.

All parameters and data were collected in an Excel table and then transferred for processing using the IBM SPSS-20 program. Continuous variables were expressed as mean \pm median (M \pm m). Categorical variables are expressed as actual numbers and percentages. Statistical analysis was performed using the Student's t-test. Values were considered statistically significant at $p < 0.05$.

Results of the study and their discussion. As a result of our study in various groups of patients, results were obtained that differed depending on the methods of correction. It is important to note that the differences concerned not only the values of the analyzed indicators, but also their dynamics.

We did not statistically determine the difference in SBP, DBP and CS in patients taking atorvastatin and rosuvastatin. Because it would take a lot of time and a lot of space in the article. The Van-der-Waerden criterion, which is more suitable for such calculations, was used. Thus, when comparing the first row of atorvastatin indices with the first row of rosuvastatin indices, the value of the Van-der-Waerden criterion was invalid and was $x=4.16$ ($p > 0.01$). Also, when comparing the indices of the second row – $x=3.18$ ($p > 0.05$) and third row – $x=4.16$ ($p > 0.05$) of these statins, the criterion was invalid, atorvastatin and rosuvastatin showed similar efficiency in the population.

Statin intake affects the value of indices. Thus, at a 10 mg/day constant dose of atorvastatin, the SBP decreases from 223.7 ± 8.8 mm Hg to 151.2 ± 6.6 mm Hg ($t=5.68$; $p < 0.001$), DBP respectively from 126.3 ± 6.3 mm Hg to 106.1 ± 6.1 mm Hg ($t=2.30$; $p < 0.05$), CS from 8.8 ± 0.9 mmol/l to 7.7 ± 0.7 mmol/l ($t=1.14$; $P > 0.05$). Appropriate results were also obtained when rosuvastatin was prescribed at a dose of 10 mg/day: SBP changed from 204.5 ± 3.4 to 158.8 ± 6.8 mm Hg ($t=3.34$; $p < 0.001$), DBP from 137.4 ± 6.2 to 107.4 ± 6.7 ($t=0.32$; $p > 0.05$), CS from 9.6 ± 1.8 mmol/l to 8.0 ± 0.8 mmol/l ($t=1.25$; $p > 0.05$). Prescribing antihypertensive drugs allowed to reduce SBP, DBP indices, but did not reach the target level. Statins at a dose of 10 mg/day were not effective.

When statins are prescribed at a dose of 20 mg/day, the rate of decrease in the measured parameters of SBP, DBP and CS is slightly accelerated. At a dose of 20 mg/day, SBP changed from 190.8 ± 8.3 to 158.0 ± 6.9 mm Hg ($t=3.13$; $p < 0.01$), DBP from 119.2 ± 6.5 to 106.1 ± 5.8 mm Hg ($t=1.59$; $p > 0.05$), CS from 9.4 ± 0.8 mmol/l to 6.8 ± 0.6 mmol/l ($t=2.60$; $p < 0.01$). When prescribing rosuvastatin at a dose of 20 mg/day, SBP changed from 211.3 ± 9.6 mm Hg to 162.4 ± 6.9 mm Hg ($t=4.14$; $p < 0.001$), DBP from 192.4 ± 6.2 to 106.3 ± 6.4 mm Hg ($t=3.10$; $p < 0.01$), CS from 8.8 ± 0.9 mmol/l to 7.1 ± 0.7 mmol/l ($t=1.49$; $p > 0.05$). Although the administration of statins at a dose of 20 mg/day accelerated the rate of change, they were not sufficient for the intended level.

Better results were obtained in the group of patients prescribed atorvastatin at a dose of 40 mg/day. For example, SBP indicators decreased from 175.6 ± 8.5 mm Hg to 143.3 ± 6.1 mm Hg ($t=5.08$; $p > 0.001$), DBP from 117.1 ± 6.4 mm Hg to 88.6 ± 5.6 mm Hg ($t=3.35$; $p < 0.01$), CS from 9.2 ± 0.8 mmol/l to 5.3 ± 0.5 mmol/l ($t=4.15$; $p < 0.001$). The efficacy of rosuvastatin at a dose of 40 mg/day was analogical: SBP indices changed from 202.8 ± 9.1 mm Hg to 137.3 ± 7.1 mm Hg ($t=5.68$; $p < 0.001$), DBP from 123.3 ± 6.4 mm Hg to 84.2 ± 6.8 mm Hg ($t=4.19$; $p < 0.001$), CS from 8.9 ± 0.8 mmol/l to 5.4 ± 0.5 mmol/l ($t=3.32$; $p < 0.001$). These results need to be clarified. First, a number of scientific studies have shown that statins have a positive effect on the clinical course of AH and contribute to its more effective course. Second, statins at a dose of 40 mg/day reduce the level of CS in the body to 6.4 mmol/l. As we mentioned, < 6.4 mmol/l level of CS in the body can be considered normal.

The results are almost the same in the group of patients prescribed statins at a dose of 80 mg/day. Nevertheless, we conducted a statistical analysis. In the prescription of atorvastatin at a dose of 80 mg/day,

SBP indices decreased from 213.4±9.1 mm Hg to 139.3±5.8 mm Hg ($t=6.87$; $p<0.001$), DBP from 122.7±6.7 mm Hg to 90.7±5.5 mm Hg ($t=3.69$; $p<0.001$), CS from 10.1±1.0 mmol/l to 5.7±0.7 mmol/l ($t=3.61$; $p<0.001$). The same results were observed during the prescription of rosuvastatin at a dose of 80 mg/day: SBP decreased from 208.8±9.3 mm Hg to 134.4±7.3 mm Hg ($t=6.29$; $p<0.001$), DBP from 127.2±6.6 mm Hg to 85.7±5.8 mm Hg ($t=4.72$; $p<0.001$). In other words, the results of statins obtained at a dose of 80 mg/day are the same as those obtained at a dose of 40 mg/day. Therefore, it is more appropriate for patients to take a dose of 40 mg/day, which also reduces the cost of their need for statins. This work was carried out with the participation of outpatient physicians, who were convinced in the appropriateness of the appointment of atorvastatin and rosuvastatin at a dose of 40 mg/day.

Antihypertensive treatment with atorvastatin and rosuvastatin at a dose of 40 mg/day permits to reduce the SBP and DBP to the target limit (140/90 mm Hg), which can be considered as a certain achievement of outpatient physicians. However, it is also clear from the above that it is not possible to achieve decrement in AH to the optimal level (120/70 mm Hg). There is also no decrease in CS to the optimal level (<5.0 mmol/l). We have suggested that one of the main reasons explaining that may be the long-term use of statins, as noted above, given that statins have a good effect on antihypertensive therapy. To test this, we performed a comparative analysis between the duration of statin intake and SBP, DBP and CS in a group of patients taking atorvastatin and rosuvastatin at a dose of 40 mg/day. The duration of statins was from 7 months to 4 years and 5 months. The indices of this analysis are given in table 1.

Table 1

Dynamics of AH and CS during different treatment periods of statins at the dose of 40 mg/day in patients with controlled AH

Years	Atorvastatin 40 mg, n=111			Rosuvastatin 40 mg, n=96		
	Number of patients	SBP/DBP (mm Hg) and CS (mmol/l) indicators at different times of measurement		Number of patients	SBP/DBP (mm Hg) and CS (mmol/l) indicators at different times of measurement	
		Initial	Final		Initial	Final
<1-SBP -DBP -CS	25	206.6±9.5 132.5±7.2 10.3±1.1	104.4±8.2 82.3±6.2 5.6±0.3	25	197.6±9.6 120.5±7.0 9.8±0.9	140.6±8.2 84.2±6.1 5.9±0.7
1-2-SBP -DBP -CS	26	227.4±10.3 125.3±7.0 8.8±1.0	144.2±6.8 88.3±6.1 5.9±0.7	26	221.5±10.4 103.3±6.8 9.6±0.9	133.7±7.6 91.5±6.4 6.0±0.6
3-4-SBP -DBP -CS	31	195.9±9.2 117.3±6.3 7.9±0.8	156.1±8.1 96.6±5.8 6.6±0.6	23	223.4±10.7 120.6±7.3 8.4±0.9	189.2±9.1 54.4±5.9 6.8±0.6
>4-SBP -DBP -CS	29	193.3±9.3 103.2±6.1 8.3±0.8	148.6±7.7 101.1±6.0 7.8±0.6	22	204.4±9.3 112.2±6.6 8.8±0.9	164.7±4.7 106.6±5.8 7.9±0.6

Note: SBP – systolic blood pressure, DBP – diastolic blood pressure, CS – cholesterol.

At the first glance, what is shown in the table seems chaotic, it is difficult to understand to what extent the duration of statin administration affects the efficacy of antihypertensive therapy and the level of CS in the body. However, the following analysis of the given parameters reveals the following regularities: when atorvastatin is prescribed at a dose of 40 mg/day, SBP index decreases from $<206.6±9.5$ mm Hg to $104.4±8.2$ mm Hg ($t=8.14$; $p<0.001$), DBP from $<132.5±6.2$ mm Hg to $82.3±8.2$ mm Hg ($t=5.28$; $p<0.001$), CS from $10.3±1.1$ to $5.6±0.9$ mmol/l ($t=3.31$; $p<0.001$). When rosuvastatin is prescribed SBP index decreases from $197.6±9.6$ mm Hg to $140.6±8.2$ mm Hg ($t=4.51$; $p<0.001$), CS from $9.8±0.9$ to $5.3±0.7$ mmol/l ($t=3.07$; $p<0.01$).

In patients taking atorvastatin at a dose of 40 mg/day for 1–2 years, SBP index decreases from $227.4±10.3$ to $144.2±6.8$ mm Hg ($t=6.74$; $P<0.001$), DBP from $125.3±7.0$ to $88.3±6.1$ mm Hg ($t=3.99$; $p<0.001$). When rosuvastatin is prescribed SBP decreases from $221.5±10.4$ to $133.7±7.6$ mm Hg ($t=6.82$; $P<0.001$), CS from $9.6±0.9$ to $6.0±0.6$ mmol/l ($t=3.33$; $p<0.001$).

Finally, let's analyze the indices in a group of patients whom statins were prescribed at the dose of 40 mg/per day for more than 4 years. Against the background of atorvastatin, SBP decreases from $193.3±9.3$ to $148.6±7.7$ mm Hg ($t=3.70$; $p<0.01$), DBP from $103.2±6.1$ to $91.1±6.0$ mm Hg ($t=1.41$; $p>0.05$), CS from $8.3±0.8$ to $7.6±0.6$ mmol/l ($t=0.60$; $p>0.05$). Against the background of rosuvastatin, SBP decreases from $204.4±9.3$ to $164.7±8.5$ mm Hg ($t=3.94$; $p<0.001$), DBP from $112.2±6.6$ to $106.6±5.8$ mm Hg ($t=2.46$; $p<0.05$), CS from $8.8±0.9$ to $7.8±0.6$ mmol/l ($t=0.74$; $p>0.05$).

Co-administration of antihypertensive drugs with statins is more effective in the first year of administration. Subsequently, the efficiency gradually decreases., but in the 4th year of the prescription , SBP, DBP and CS indices reach practically the required level. For example, the comparison of the 1st and 4th year according to the results of the last measurement gave the following results: against the background of atorvastatin SBP indices were 101.4±8.2 and 148.6±7.7 mm Hg (t=4.02), DBP 82.3±6.2 and 101.1±6.0 mm Hg (t=2.18; p<0.05), CS 5.6±0.9 and 7.8±0.6 mmol/l (t=2.04; p<0.05), against the background of rosuvastatin SBP indices were 140.6±8.2 and 184.7±7.6 mm Hg (t=3.94; p<0.001), DBP 84.2±6.1 and 106.6±5.8 mm Hg (t=2.66; p<0.01), CS 5.9±0.7 and 7.9±0.6 mmol/l (t=2.17; p<0.05).

The second group of studies included a separate analysis of the results of antihypertensive therapy with concomitant use of statins at the dose of 40 mg among patients who took measures to eliminate personality disorders and treated them irresponsibly. The results are given in table 2.

Table 2

Dynamics of AH and CS when taking statins at the dose of 40 mg/day in patients with controlled AH and implementing recommendations for the elimination of various degrees of behavioral disorders

Indices	The rate of implementing measures to increase physical activity and consumption of foods that limit CS							
	Full compliance, n=46		Incomplete compliance, n=42		Reliability of differences in different periods of indices measurement			
	SBP/DBP (mm Hg) and CS (mmol/l) indices at different times of measurement							
	Initial		Overdue		Initial		Overdue	
				T	P	T	P	
Atorvastatin								
-SBP	208.5±9.7	124.4±6.6	193.6±9.2	178.8±8.2	7.17	<0.001	1.21	<0.001
	153.6±7.2	81.7±5.8	126.2±6.6	130.3±6.6	7.77	<0.001	0.44	>0.05
-DBP	10.2±1.1	5.3±0.6	8.1±0.9	6.8±0.7	3.92	<0.001	1.14	>0.05
-CS	226.3±9.8	138.6±7.8	190.7±8.9	166.1±8.0	7.16	<0.001	2.06	<0.05
	164.7±7.3	80.5±5.6	114.3±6.8	135.6±6.8	9.15	<0.001	2.21	<0.05
Rosuvastatin	9.6±1.0	4.7±0.5	10.4±1.2	8.7±1.1	3.77	<0.001	1.04	>0.05
-SBP								
-DBP								
-CS								

Note: SBP – systolic blood pressure, DBP – diastolic blood pressure, CS – cholesterol.

Atorvastatin was prescribed at a dose of 40 mg/day in addition to antihypertensive therapy to 111 patients with controlled AH. Only 46 patients followed measures to eliminate personality and behavioral defects during the appointment period (41.4±4.7 %). Among 92 patients prescribed rosuvastatin at a dose of 40 mg, the number of such patients was 42 (42.7±5.1%). It should also be noted that many patients do not follow any of the diets, especially at home, due to the difficulty of following them. Therefore, together with doctors, it is recommended to limit foods containing CS (animal fats, mutton, eggs, carbohydrate foods, etc.). However, even such a simplified diet is not accepted by many people. They also did not try to increase physical activity. As a result, the efficacy of treatment among them was lower than among patients who fully complied with the recommendations.

Thus, in the group of patients who fully complied with the proposed measures during the observation period (against the background of 40 mg of atorvastatin), SBP decreased from 208.5±3.7 to 124.4±6.6 mm Hg (t=7.17; p<0.001), DBP from 153.6±7.2 to 81.7±5.8 mm Hg (t=7.77; p<0.001), CS from 10.2±1.2 to 5.3±0.6 mmol/l (t=3.92; p<0.001). An analogical picture was also observed against the background of rosuvastatin: SBP decreased from 226.3±9.8 to 138.6±7.8 mm Hg (t=7.16; p<0.001), DBP from 164.7±7.3 to 80.5±5.6 mm Hg (t=9.15; p<0.001), CS from 9.6±1.0 to 4.7±0.5 mmol/l (t=3.77; p<0.001). In the group of patients who partially or did not follow the recommended measures, only intermediate measurements showed a slight decrease in SBP, DBP and CS, which was associated with the co-administration of antihypertensive drugs with statins. Then the measured indicators returned to the initial high level. Subsequent measurements were not statistically accurate in all cases compared to the initial measurement, and patients continued to be monitored by physicians.

This situation is very sad. Great efforts are being made, doctors and patients are wasting a lot of time, expensive laboratory tests are being carried out, and quite a lot of money is being spent on regular medications, however, the effectiveness of the work is evident throughout the year. It is possible to achieve stability in the decrement of SBP, DBP and CS to normal levels. The parallel decrease of these indicators once again shows how interdependent they are. For the first time, the importance of treating HCS was highlighted in order to reduce controlled AH. However, from the second year of such large-scale treatment, obtained positive results are deteriorating. Therefore, the reasons for this situation need to be carefully investigated.

First, given the “epidemic” of AH, we see that those who regularly see outpatient physicians are patients with “new” AH, and this weakens the relationship between physicians and patients with “old”. Therefore, an emergency monitoring service should be established in polyclinics, the job of which is to monitor the visits of all patients to doctors, to receive information that they follow all the instructions of doctors, and this will facilitate the work of doctors. The creation of such an electronic system for the treatment of patients with serious diseases is also important because many patients feel better after treatment, forget to take medication on time or stop taking it at all, do not consult a doctor to control the disease. Only when it gets worse, they start taking medicine and see a doctor. It is no coincidence that many recurrent and chronic forms of the disease are observed among patients with controlled AH, which is difficult to treat in severe cases, especially against the background of increased levels of CS in the body. All this increases the burden of doctors.

Second, AH and HCS are socially dependent diseases, the formation of which occurs as a result of personality disorders. This is especially about HCS, which occurs against the background of eating disorders and low physical activity, which contributes to the development of excess body weight and obesity. Although statins are quite effective in lowering the level of CS in the body, it is impossible to achieve its normalization in the body without reducing personality disorders [5]. Outpatient physicians, in addition to prescribing medications, recommended patients to increase their diet and physical activity to reduce CS. However, not all patients followed these recommendations properly or took them into consideration.

The popularity of statins is growing every year, which is increasingly used in clinical practice as an effective tool in the primary and secondary prevention of diseases such as cardiovascular diseases, AH, type 2 diabetes, in other words diseases directly related to HCS [2, 3, 6]. Statins are currently the most effective and well-tolerated drugs available to reduce CS levels in the body [10]. Our observations mentioned above once again confirm this.

So, it is necessary to reduce the intake of high-calorie foods that cause the accumulation of CS and unused energy in the body, in other words, to correct cholesterol-producing factors such as nutritional behaviour. Therefore, it is also important to increase physical activity, which is a more accessible form of providing the body with the necessary physical activity and causing excess energy wastage. Unfortunately, despite the lack of restrictions on the use of statins and the fact that some patients take them without protest, the majority of patients are irresponsible in the correction of nutritional behaviour disorders and low physical activity. Therefore, new and accessible ways of educational work on improving lifestyle among the population should be found.

Conclusions

1. Antihypertensive treatment with atorvastatin and rosuvastatin at a dose of 40 mg/day allows to reduce the SBP and DBP to the target limit (140/90 mm Hg), which can be considered as a certain achievement of outpatient physicians.
2. In patients who fully complied with the proposed measures during the observation period (against the background of 40 mg of atorvastatin), statistically significant decrease ($p < 0.001$) in SBP, DBP and CS were observed.
3. In patients who partially or did not follow the recommended measures, only intermediate measurements showed a slight decrease in SBP, DBP and CS, which was associated with the co-administration of antihypertensive drugs with statins, but then the measured indicators returned to the initial high level.

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Стаття надійшла 15.05.2021 р.

DOI 10.26724/2079-8334-2022-2-80-43-47

UDC 615.811.3+615.032:546.17]:616-002.3-089

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INFLUENCE OF VACUUM INSTILLATIONS WITH INTRAVENOUS INTRODUCTION OF NITROGEN OXIDE DONATORS ON THE HEALING OF PURULENT SOFT TISSUE WOUNDS

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The efficacy of vacuum therapy with instillations of L-arginine was studied in combination with its intravenous infusion. Results were in 89 patients, treated for purulent-necrotic soft tissue diseases. Patients were emergency operated on. The main group - 44 patients, got the same therapy and intravenous 100 ml of arginine hydrochloride solution daily. 2-3 courses of vacuum therapy, 3 days each were performed. In the main group, signs of intoxication and body temperature returned to normal by an average of 3.1 days. Normalization of the level of leukocytes was observed in 5.4 days. pH-metry from the wound surface, it was found that significant changes in the average pH of patients in the main group were observed for 7-10 days - the beginning of the regeneration phase. The therapy in the main group in comparison with typical local treatment provided accelerated wound cleansing, reduction of microbial contamination and faster transition of purulent-necrotic phase to regeneration.

Key words: purulent-necrotic diseases, vacuum therapy, instillations, arginine, wound healing.

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ВПЛИВ ВАКУУМІНСТИЛЯЦІЙ З ВНУТРІШНЬОВЕННИМ ВВЕДЕННЯМ ДОНАТОРІВ ОКСИДУ АЗОТУ НА ЗАГОЄННЯ ГНІЙНИХ РАН М'ЯКИХ ТКАНИН

Вивчена ефективність вакуумної терапії інстиляціями L-аргініну в поєднанні з його внутрішньовенним вливанням. Отримано результати у 89 пацієнтів, які проходили лікування з приводу гнійно-некротичних захворювань м'яких тканин. Хворих екстрено прооперували. Основна група - 44 пацієнти, які отримували таку ж терапію та внутрішньовенно вводили 100 мл розчину аргініну гідрохлориду щодня. 2-3 курси вакуум-терапії по 3 дні кожен. В основній групі ознаки інтоксикації та температура тіла нормалізувалися в середньому на 3,1 доби. Нормалізація рівня лейкоцитів спостерігалася через 5,4 доби. рН-метрією з поверхні рани було виявлено, що достовірні зміни середнього рН у пацієнтів основної групи спостерігалися протягом 7-10 днів - початку фази регенерації. Терапія в основній групі в порівнянні з типовим місцевим лікуванням забезпечувала прискорене очищення рани, зменшення мікробного забруднення та швидший перехід гнійно-некротичної фази в регенеративну.

Ключові слова: гнійно-некротичні захворювання, вакуумна терапія, інстиляції, аргінін, загоєння ран.

The study is a part of the research project "Development of modern scientifically based principles of stratification, monitoring and prediction of surgical diseases and injuries", state registration number 0120U101176.

Despite advances in medicine, wounds healing remains one of the main problems of surgery. Depending on the size and causes of their occurrence, a variety of methods are used. One of them is the use of vacuum therapy [2, 8].

In the present day, it's an innovative method of wound healing, which accelerates the terms of the wound-healing process. The anti-inflammatory effect of its use has been proven in studies compared with typical wound healing, the level of the anti-inflammatory cytokine interleukin 10 (IL-10) is slightly higher [8], and microbial contamination is reduced by removing excess exudate [11].