thelin-1 in plasma obtained from healthy individuals accounted to 0,2-0,3 fmol / ml (mean 0.26 ± 0.07 fmol / ml).

Statistical analysis of the results was carried out according to Student's test. The differences between the groups of patients were recognized as statistically significant at p ‹0,05.

Results and discussion. At the beginning of therapy a significant increase of endothelin-1 was revealed in both groups (0,96 ± 0,25 fmol / ml in the main and 0,97 ± 0,21 fmol / ml - in the comparison group). At the same time the maximum values of endothelin-1 were observed among patients with moderate and severe neurological deficits in both - the main and the comparison - groups (1,17 ± 0,51 fmol / ml and 1,22 ± 0,57 fmol / ml, respectively), comparing to patients who had slight neurological deficit (0,82 ± 0,27 fmol / ml and 0,40 ± 0,06 fmol / ml, respectively) (p ‹ 0,05, p ‹0,05). Slightly higher level of endothelin-1 was among the patients at the age after 60 years old in both groups (0,88 ± 0,25 and 0.90 ± 0.62 fmol / ml) comparing to patients aged from 41 to 60 years old (0,78 ± 0,3 and 0.53 ± 0.19 fmol / ml) (p › 0,05). Significant gender differences in the production of endothelin-1 at the beginning of stroke therapy were not revealed.

During 14 days of main group treatment, the overall neurological deficit decreased to an average of 3.17 ± 0.45 points (3.56 points). At the same time significant reduction of endothelin-1 levels (up to 0,52 ± 0,13 fmol / ml) (p ‹ 0,05) was recorded. In the comparison group, the total neurological deficit was decreased only by 2 points (up to 4,46 ± 0,88 points), and also was noticed a tendency to reduce endothelin-1 level, but it was less pronounced than in the main group (up to 0.77 ± 0 15 fmol / ml) (p › 0.05). Moreover, in both groups women obtained more pronounced dynamics than men. Significant age differences in the dynamics of endothelin-1 after the treatment were not revealed.

Conclusions. Therefore, patients with ischemic stroke revealed pronounced predominance of ED with pathological vasoconstriction, caused by the increased concentrations of endothelin-1 in plasma (3.7 times comparing to its level among healthy individuals). Increased concentration of endothelin-1 in blood was the most pronounced among patients with moderate and severe neurological deficits and over the age of 60 years old. Data analysis obtained over time showed that the use of acupuncture leads to a significantly greater reduction in plasma levels of endothelin-1 after 2 weeks of treatment, while the more pronounced regress of neurological deficit. Therefore, the combination of effects of pharmaceuticals with the early application of acupuncture techniques greatly reduces the ED and contributes to the successful rehabilitation of the patients.

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EVALUATION OF THE EFFECTIVENESS OF THE USE OF NATURAL ANTIOXIDANTS IN THE GENERAL COOLING OF THE BODY IN RATS OF DIFFERENT AGE GROUPS

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Abstract The highest rates of reaction products of lipid peroxidation (LPO) in the peripheral blood by the action of low temperatures on the organism are detected in older animals at the age of 19-20 months. In young rats (6-7 months) when using dihydroquercetin amid a general cooling of the body showed a significant decrease in diene conjugates of hydroperoxides, malondialdehyde. Under the influence of low temperatures on the body of old animals both arabinogalactan and dihydroquercetin have roughly the same effect, moderately reducing the level of the reaction products of lipid peroxidation, increasing the amount of ceruloplasmin and vitamin E.

Key words: general cooling, diene conjugates, hydroperoxide, malondialdehyde, vitamin E, ceruloplasmin.

Introduction. Lipid peroxidation (LPO) exists in the normally functioning cells, which permanently contains lipid hydroperoxides in a low concentration, which plays an important role in the regulation of cell metabolism. The primary products of lipid peroxidation are diene conjugates, which have a damaging effect on the lipoproteins, proteins, enzymes and nucleic acids. Further products of lipid peroxidation - is aldehydes and ketones, continuous accumulation of which destabilizes the membrane and promotes cell destruction [2]. Activation hydroperoxide processes occur either as a result of excessively enhanced generation of active oxygen radicals, or due to insufficient antioxidant mechanisms, or a combination of these two phenomena. The activity of lipid peroxidation reactions in the tissues is controlled by antioxidant system that not only provides protection against the damaging effects of free radicals, but also affect the adaptive response [1,5]. The dynamic nature of the cooling installation phase flow of lipid peroxidation in experimental animals. Low temperatures resulted in experiments on animals to a significant increase in tissue content of the initial and final POL products [4]. Ischemia and tissue hypoxia observed in the action of the cold are additional factors contributing to the increased formation of reactive oxidants. The reaction of cells and tissues of the effect of low temperatures depend on the age of the organism, as as aging occurs reduction metabolic processes that lead to excessive accumulation of products of lipid peroxidation and activation of oxidative stress [2].

In this situation, a special interest is the study of natural compounds derived from plants growing in the Far East, with a wide range of antioxidant activity [3, 6].

Objective: to evaluate the effectiveness of antioxidant drugs (dihydroquercetin and arabinogalactan) in a general cooling of the body, and a comparative analysis of their impact on young and old animals.

Materials and methods. Work carried out on mongrel white rats aged 6-7 months (young) and 19-20 months (old). The study material of 120 animals. In accordance with the tasks experimental animals were divided into two main groups (young and old). Each group consisted of 4 groups: 1. Intact; 2. Animals that were cooled in a total period of 14 days to 3 hours per day at a temperature of -15 ° C; 3 and 4 groups of animals for two weeks or arabinogalactan orally administered dose of 5 mg / 100 g or dihydroquercetin of 5 mg / 100g. Then, with the overall cooling within 14 days to 3 hours per day at a temperature of -15 ° C was continued oral administration or arabinogalactan or dihydroquercetin.

Biochemical studies was peripheral blood. To determine the products of lipid peroxidation and vitamin E, lipids extracted from the blood by the method of Bligh-Dyer (1975). Diene conjugates was determined by I.D. Steel, lipid hydroperoxide - by L.A. Romanov and I.D.Stalnoy content of malondialdehyde - method E.A. Borodin and A.I. Archakova (1987). Antioxidant status was evaluated by ceruloplasmin activity by the method of V. Kolb and V.S. Kamyshnikova; the amount of vitamin E by the method of R.J. Kiselevich and S.I. Squarks. Statistical processing was performed using the statistical package STATISTICA v. 6.0 for Windows (StatSoft Inc., 1984-2001). The resulting digital data is processed by standard parametric statistical methods using Student t-test.

Own data. Under the influence of low temperature on young animals (6-7 months) in the peripheral blood revealed a significant increase in all indicators of lipid peroxidation, as diene conjugates increased by 11.8%, 12.5% hydroperoxide, malondialdehyde by 19.5%. Against this background, there is a decrease of ceruloplasmin and 24.8% vitamin E is 10.4% (Table. 1). The use of arabinogalactan via the action of low temperatures leads to a decrease in peripheral blood malondialdehyde and hydroperoxides by 17% and an increase of ceruloplasmin level by 15%. Against the backdrop of the introduction of cooling dihydroquercetin in young rats leads to a significant reduction of all parameters of the reaction of lipid peroxidation by 20% and a significant increase in ceruloplasmin at 30% (Table. 1).

In animals aged 19-20 months (old) under a general cooling in the peripheral blood lipid peroxidation are increased significantly more than in young, growing at 25 - 30% (Table. 2). The use of arabinogalactan on the background of low temperatures in the experimental group resulted in a significant reduction in lipid peroxidation products, especially malondialdehyde (41%) and a moderate increase in vitamin E. Action dihydroquercetin on the background on the performance of cooling the reaction is similar to lipid peroxidation, as well as the application of arabinogalactan, but wherein a significantly increased content of antioxidant protection substances, in particular vitamin E, especially ceruloplasmin (Table. 2).

Thus in young animals on the background of low temperatures in the blood observed a moderate growth of LP and a significant reduction of ceruloplasmin. The positive effect of the application of DHQ on lipid perox-

idation more significant than with arabinogalactan.

With the general cooling in old animals compared with young, there is a more pronounced increase in lipid peroxidation. The effect of arabinogalactan and dihydroquercetin about the same, at the same time revealed a significant decrease in the most aggressive lipid peroxidation products, namely malondialdehyde.

Table 1. Indicators of lipid peroxidation products and antioxidant system in blood in rats aged 6 - 7 months

Indicators / Groups	Intact	Cooling for 14 days	Arabinogalactan + cooling	Dihydroquercetin + cooling
	I	II	III	IV
Diene conjugates nmol/ml	37,17±1,28	42,13±0,46*	38,88±1,48	34,87±1,82***
Lipid hydroperoxide nmol/ml	31,15±0,58	35,62±1,31*	30,32±1,61**	29,7±0,89***
Malondialdehyde nmol/ml	4,13±0,23	5,13±0,22*	4,36±0,4**	4,32±0,27***
Vitamin E nmol/ml	42,03±1,97	38,07±0,89*	39,47±1,25	40,75±1,05
Ceruloplasmin mg/100ml	23,77±1,36	19,05±0,75*	22,46±1,04**	27,04±2,12***

Confidence level when comparing: * I and II (p ‹0,05); ** II and III (p ‹0,05); *** II and IV groups (p ‹0,05)

Table 2. Indicators of lipid peroxidation products and antioxidant system in blood in rats aged 19 - 20 months

Indicators / Groups	Intact	Cooling for 14 days	Arabinogalactan + cooling	Dihydroquercetin + cooling
	I	II	III	IV
Diene conjugates nmol/ml	34,1±1,6	45,73±1,49*	38,29±1,13**	41,27±1,81
Lipid hydroperoxide nmol/ml	27,27±1,37	38,3±1,32*	30,69±0,79**	31,91±1,93***
Malondialdehyde nmol/ml	4,27±0,54	6,38±0,4*	4,52±0,2**	4,55±0,88***
Vitamin E nmol/ml	40,87±0,33	36,05±1,44*	39,92±1,36	41,51±0,84***
Ceruloplasmin mg/100ml	22,87±0,52	19,47±1,44	19,51±1,03	23,06±1,28

Confidence level when comparing: * I and II (p ‹0,05); ** II and III (p ‹0,05); *** II and IV groups (p ‹0,05)

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