

deeply, duration of the exhale should be longer than inhale. The intensity of the exercises should be adjusted according to human's physical state and overall well-being.

Don't seek to "round up" the weight as soon as possible. Loss of 4-5 kg in two or three months is considered to be acceptable to the body, but more dramatic weight loss can give undesirable effect. It is important to remember that the measure should be present even in the active lifestyle, do not misuse the amount of exercises.

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THE POSSIBILITIES OF NON-PHARMACOLOGICAL CORRECTION OF ENDOTHELIAL DYSFUNCTION IN THE ACUTE PERIOD OF ISCHEMIC STROKE

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Abstract The level of plasma endothelin-1 was studied depending on sex, age, severity of the disease and of the therapy by conducting a survey of 43 patients with acute ischemic stroke, carried out in the primary vascular center. At the time of admission an increase in plasma concentrations of endothelin-1 to an average of $0,97 \pm 0,23$ fmol / ml was revealed. The maximum blood concentration of endothelin-1 was recorded among patients with moderate and severe neurological deficits and those over the age of 60 years old. Analysis of endothelin-1 level after the course of early rehabilitation has shown that the use of acupuncture leads to significantly greater reduction of this index after 2 weeks of treatment. Therefore, combination of pharmaceutical effects with the early application of acupuncture techniques greatly reduces the severity of endothelial dysfunction and contributes to the successful rehabilitation of the patients.

Key words: ischemic stroke, endothelial dysfunction, endothelin-1

Stroke takes one of the first places as a cause of death and is major cause of disability. [2] Thus, a cerebral catastrophe entails heavy moral, social and economic consequences. Currently, the major importance is given to the study of the acute cerebral ischemia pathophysiology and the development of effective methods for correction of detected changes. Scientific researches of the last decade, that have been made in our country and abroad, suggest that endothelial dysfunction (ED) is one of the universal mechanisms of the pathogenesis of atherosclerosis, hypertension, coronary heart disease and may be an independent predictor of coronary and cerebral accidents [1,3,6,7]. Accumulated evidence of the role of endothelium in the pathogenesis of cardiovascular diseases has led to the concept of the endothelium formation as a target for prevention and treatment of cerebrovascular diseases. ED can be defined as an imbalance between relaxing and constrictor factors [8]. Development of these disorders is mainly caused by a decrease in biological activity of the primary vasodilator - NO, and increase of vasoconstrictor endothelin-1, which may be one of the pathogenesis of ischemic stroke [1,9]. There is no doubt that the positive impact on the ED, cerebral and cardiac hemodynamics - is one of the most important parts of the treatment of patients with ischemic stroke.

The aim of our study was:

1. To study of the level of endothelin-1 among patients with acute ischemic stroke according to gender, age, and disease severity
2. To assess the possible impact of correcting reflexology techniques on the background of basic treatment on the severity of ED in patients with acute ischemic stroke in primary vascular center.

Materials and methods. We conducted a survey of 43 patients aged from 43 to 78 years old (mean age $63,3 \pm 2,2$), who were treated in primary vascular center of Blagoveshchensk. All patients received standard basic therapy. The study group included 30 patients whose standard medical therapy was optimized with different acupuncture techniques. Reflexology included corporal acupuncture, scalp acupuncture [4], ear acupuncture, dynamic electroneurostimulation [5]. The comparison group consisted of 13 people who received only standard therapy. Examined groups were comparable in terms of age, sex, severity of neurological deficit, pathogenic variants of stroke and comorbidities. Both groups consisted predominantly of women (66.7% - in the main group, and 61.5% - in the comparison group). In all cases, the diagnosis of ischemic stroke was established in the hospital based on anamnestic data, clinical features and neuroimaging (CT or MRI of the brain). Evaluation of neurological deficit was based on the results of clinical examination and complemented with NIHSS score (National Institute of Health Stroke Scale). The total score on the NIHSS scale of less than 6 is considered as an easy neurological deficit, the range of 7-12 points corresponds to moderate and more than 14 points - severe neurological deficit [10]. At the beginning of therapy, the mean values of the total score on NIHSS scale was $6,73 \pm 0,52$ points in the main group and $6,46 \pm 1,16$ points - in the comparison group. Severe neurological deficit was observed among 2 patients in the primary and 1 - in the comparison group, moderate - among 8 and 3, respectively, easy - 20 in the main and 9 - in the comparison group.

Endothelin-1 level was studied in venous blood plasma by ELISA using production «Biomedica» kit (Austria) before and after treatment (14 days). Blood sampling was performed in the morning. Values of endo-

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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