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Clinico-Psychological Features Of Patients With Cerbrovascular Diseases And Their Dynamics After Therapeutic Correction

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ABSTRACT

Objective of this study was to investigate the clinical and paraclinical features of patients with cerebrovascular diseases and their dynamics under the influence of therapy. Total 121 patients (32 men and 89 women, average age of 63.6 ± 8.8 years) with cerebrovascular disease were examined before and after treatment. Patients were divided into groups based on the severity of the disease. We studied the neurological status with the evaluation of the emotional sphere, and applied additional methods of research. We revealed the most common neurological symptoms characterizing the pyramidal, vestibular-cerebellar and extrapyramidal syndromes in different groups of cerebral vascular diseases. The symptoms that characterize the vestibular-cerebellar syndrome have demonstrated positive dynamics: the dynamic ataxia in stage I vascular encephalopathy before treatment was up to 66.7%, and after treatment - 29.2%; in stage II vascular encephalopathy before treatment - 44.0%, after treatment - 32.0%; the static-locomotor ataxia before treatment - 86.7%, after treatment - 64.0%, with the growing cognitive potential in the course of evaluation of emotional sphere. The effectiveness of therapy is confirmed by additional research methods. It was revealed that neurological symptoms in this study that characterize the vestibular-cerebellar syndrome respond to therapy in all groups of cerebrovascular diseases and show a decreased influence of emotional factors and a subsequent increase of the cognitive potential.

Keywords: the brain, blood circulation, clinical features.

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INTRODUCTION

Today, cerebrovascular diseases are the most common pathology in the neurological practice [4]. Chronic vascular diseases of the brain are characterized by slow gradual or step-like increase of neurological symptoms, progressive state characterized by small focal lesions of the nervous system with clinical neuropsychological disorders [1]. The term "encephalopathy" is often found in Russian literature. The diagnostic criteria include: 1) clinical, anamnestic and instrumental signs of brain damage; 2) signs of acute or chronic cerebral circulatory distress; 3) hemodynamic instability with the development of clinical, neuropsychological, psychiatric symptoms; and 4) clinical and paraclinical progression of cerebral vascular insufficiency [7]. One of the causes of chronic cerebral circulatory insufficiency is atherosclerosis [3]. The term “discirculatory encephalopathy" reflects the location of the lesion (encephalopathy) and its nature (circulatory distress, acute or chronic) [2, 6]. the treatment algorithm of chronic vascular disease includes preventive treatment that considers all the risk factors existing in patients, the etiological and pathogenetic treatment [5, 8], syndromic treatment with the correction of syndromes arising in the course of disease progression, and the rehabilitation measures. Objective of this study was to investigate the clinical and paraclinical features of patients with cerebrovascular diseases and their dynamics under the influence of therapy.

MATERIALS AND METHODS

Total 121 patients aged 41-75 years (average age - 63.6±8.8 years) were examined, 32 men and 89 women. The neurological examination with the evaluation of the emotional sphere was conducted, as well as paraclinical examination methods were applied. The patients were divided into three groups depending on the nosology: with initial symptoms of cerebrovascular insufficiency (ISCVI), stage I discirculatory encephalopathy (DCEP I) and stage II discirculatory encephalopathy (DCEP II). All patients received outpatient medical treatment. The therapy consisted of the following drugs: Vinpocetine, Nicergoline, ginkgo biloba extract, N-carbamoylmethyl-4-phenyl-2-pyrrolidone, piracetam, ethylmethylhydroxypyridine succinate. Subject to indications, the patients were taking tranquilizers, antihypertensives, cholesterol-lowering drugs, as well as underwent psychological correction. The treatment effect was re-evaluated in 2 months.

Statistical processing was performed with the Statistical Package “SPSS 12.0 for Windows”. We used Student's t-test to evaluate intergroup differences, McNemar's test to compare indicators before and after treatment in the same group, and Pearson's chi-squared test to compare the results of unrelated groups.

The cerebrovascular disease was detected in different age groups; its nosological structure is presented in Table 1.

Table 1: Age-specific nosology distribution

Age, years	Number of patients, abs. (%)			Total
	ISCVI(n=22)	DCEP I(n=24)	DCEP II(n=75)	n=121
41-50	8(36.4)	5(20.8)	1(1.3)	14(11.6)
51-60	11(50.0)	10(41.7)	9(12.1)	30(24.8)
61-70	3(13.6)	6(25.0)	19(25.3)	28(23.1)
71-75	0	3(12.5)	46(61.3)	49(40.5)

Note: empirical value of Pearson’s test $\chi 2emp=162.79$, $p<0.001$; ISCVI – the initial symptoms of cerebrovascular insufficiency; DCEP I – stage I discirculatory encephalopathy, DCEP II – stage II discirculatory encephalopathy.

The above data demonstrate the age-specific distribution of nosology: ISCVI and DCEP I are often diagnosed in the age group of 51-60 years, DCEP II – in the age of 71-75 years.

Symptoms identified in the study of neurological status of the examined patients are shown in Table 2.

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Table 2: Disease-specific nosology distribution

Neurologic symptoms	Number of patients, abs. (%)		
	ISCVI(n=22)	DCEP I(n=24)	DCEP II(n=75)
Muscle hypertonus	1(4.5)	13(54.2)	14(18.7)
Bilateral hyperreflexia	1(4.5)	17(70.8)	35(46.7)
Anisoreflexia	-	-	9(12.0)
Muscle rigidity	1(4.5)	1(4.2)	13(17.3)
Tremor	1(4.5)	1(4.2)	2(2.7)
Lagging oxyopia	-	1(4.2)	1(1.3)
Horizontal nystagmus	-	7(29.2)	25(33.3)
Staticolocomotory ataxia	1(4.5)	13(54.2)	65(86.7)
Dynamic ataxia	-	16(66.7)	33(44.0)

Note: ISCVI – the initial symptoms of cerebrovascular insufficiency; DCEP I – stage I discirculatory encephalopathy, DCEP II – stage II discirculatory encephalopathy.

5 patients from the ISCVI group had neurological symptoms detected, however, they had no history of organic brain pathology and were clearly consistent with other organic criteria.

We evaluated an emotionally-personal sphere in all patients with cerebrovascular diseases using a "memorizing emotional words" test: the patients were first presented 10 emotional words and asked to repeat everything that they remember, then – 10 neutral words with the same request, with the subsequent interpretation after therapeutic correction.

Examination of patients with cerebrovascular diseases involved also the transcranial Doppler sonography, which results are shown in Fig. 1

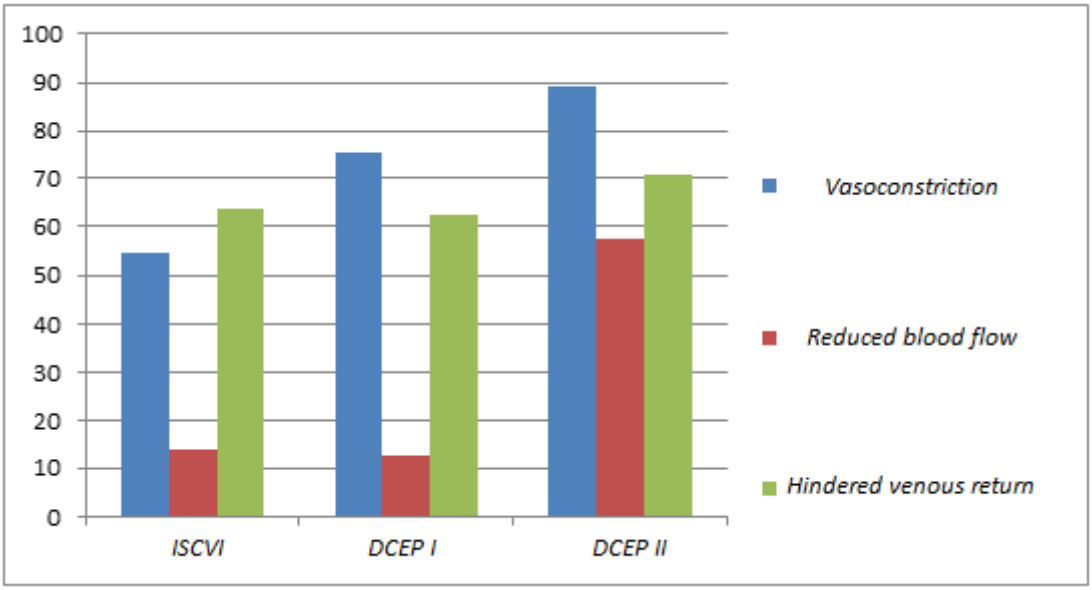

Fig. 1. Data on changes in transcranial Doppler sonography indices by groups: ISCVI – the initial symptoms of cerebrovascular insufficiency; DCEP I – stage I discirculatory encephalopathy, DCEP II – stage II discirculatory encephalopathy

There is an increase in number of patients with vasoconstriction depending on the severity of the disease: in ISCVI – 54.5%, in DCEP I – 75.0%, in DCEP II - 89.3%.

The therapeutic correction resulted in positive dynamics in neurological status in patients with varying severity of cerebrovascular diseases. In ISCVI, there was no staticolocomotor ataxia in 1 case after treatment. Patients of DCEP I group showed positive dynamic in the neurological status after therapeutic correction, which data are presented in Table 3.

Table 3: The frequency of neurological symptoms in stage I discirculatory encephalopathy before and after therapy (n=24)

Neurologic symptoms	Number of patients, abs. (%)		p
	before treatment	after treatment	
Horizontal nystagmus	7(29.2)	3(12.5)	>0.05
Staticolocomotory ataxia	13(54.2)	6(25.0)	>0.05
Dynamic ataxia	16(66.7)	7(29.2)	<0.05

We observed a decrease in the number of patients with symptoms typical of the vestibular-cerebellar syndrome. The number of patients with other symptoms remained unchanged after therapy.

Patients of DCEP II group demonstrated increase in changes in their neurological status (Table 4), mainly in symptoms typical of the vestibular-cerebellar syndrome.

Table 4: The frequency of neurological symptoms in stage II discirculatory encephalopathy before and after therapy (n=75)

Neurologic symptoms	Number of patients, abs. (%)		p
	before treatment	after treatment	
Horizontal nystagmus	25(33.3)	20(26.7)	<0.05
Staticolocomotory ataxia	65(86.7)	48(64.0)	<0.005
Dynamic ataxia	33(44.0)	24(32.0)	<0.05

Data on the dynamics of the state of emotionally-personal sphere are presented in Table 5.

Table 5: Comparative data of the "memorizing emotional words" test before and after treatment by groups

Test	Test data (M± m)					
	ISCVI		DCEP I		DCEP II	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
Emotional words	3.9±0.21	3.9±0.25	3.0±0.33	3.0±0.30	3.3±0.13	3.3±0.14
Neutral words	3.0±0.19	3.3±0.29	2.9±0.34	3.2±0.22	2.6±0.12*	3.1±0.12*

Note: ISCVI – the initial symptoms of cerebrovascular insufficiency; DCEP I – stage I discirculatory encephalopathy, DCEP II – stage II discirculatory encephalopathy; *in DCEP II (the number of neutral words memorized) p<0.001, in rest groups - p>0.05

Study of emotionally-personal sphere resulted in the increased volume of memorized neutral words in all groups, while the number of stored emotional words remained the same, which indicates an improvement of cognitive capacity and reduced significance of passion.

The transcranial Doppler sonography showed a positive trend in patients after treatment:

- the presence of vasoconstriction: in the ISCVI group before treatment - 54.5%, after treatment - 18.2% (p<0.01); DCEP I before treatment - 75.0%, after treatment - 42.7% (p<0.01); DCEP II before treatment - 89.3%, after treatment - 42.7% (p<0.001);
- reduced blood flow: patients with ISCVI before treatment - 13.6%, after treatment - 4.5% (p>0.05); DCEP II before treatment - 57.3%, after treatment - 26.7% (p<0.001);
- hindered venous return: NPNMK in the group before the treatment - 63.6%, after treatment - 9.1% (p<0.01);

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DCEP I before treatment - 62.5%, after treatment - 25.0% ($p<0.01$); DCEP II before treatment - 70.7%, after treatment - 23.1% ($p<0.001$).

Data on the dynamics of changes of transcranial Doppler sonography in the study group (n=121) before and after treatment are shown in Fig. 2.

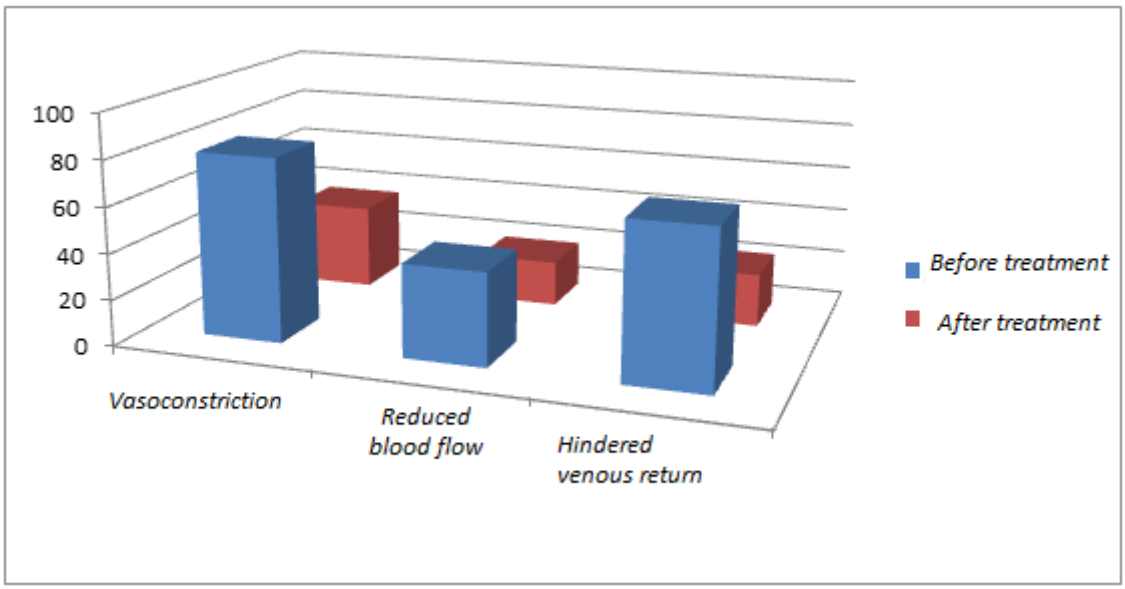

Fig. 2. The dynamics of changes of transcranial Doppler sonography in the study group before and after treatment ($p<0.005$).

RESULTS

The conducted study revealed the following neurological symptoms in patients with cerebrovascular diseases: muscle hypertonicity, bilateral hyperreflexia, anisoreflexia, muscle rigidity, tremor, lagging oxyopia, horizontal nystagmus, staticolocomotor and dynamic ataxia.

Positive dynamics after the treatment was observed upon evaluation of symptoms typical of vestibular-cerebellar syndrome: the number of patients with dynamic ataxia decreased from 44.0 to 32.0% ($p<0.05$), with static-locomotor ataxia - from 86.7 to 64.0% in DCEP II ($p<0.005$), with dynamic ataxia - from 66.7 to 29.2% in DCEP I ($p<0.05$).

The study of the emotionally-personal sphere with the use of the "memorizing emotional words" test revealed the presence of positive dynamics after treatment, and consequently the significance of changes in cerebrovascular disease. Activity of the emotional factor decreased: constant memorizing of emotional words has improved the memorization of neutral words. It should be noted that the DCEP I group memorized less emotional words both before and after treatment than the DCEP II group, whereby the cognitive potential has increased the volume of memorizing neutral words increased. In this study, the volume of memorized neutral words before and after treatment was greater in DCEP I ($p>0.05$) as compared with DCEP II ($p<0.001$).

According to the results of transcranial Doppler sonography, the most frequent pathologies in the evaluation of the dynamic state of cerebral vessels were: vasoconstriction before treatment - 80.2%, after treatment - 37.2% ($p<0.005$), reduced blood flow before treatment - 40.5%, after treatment - 19.8% ($p<0.005$), the difficulty of venous outflow before treatment - 67.7%, after treatment - 23.1% ($p<0.005$). The evaluation of the reduction in blood flow by transcranial Doppler sonography in the DCEP I group after treatment revealed no positive dynamics presenting.

SUMMARY

- The study of neurological status before and after treatment in cerebrovascular diseases showed a positive trend in the evaluation of static-locomotor and dynamic ataxia being a partr of the vestibular-cerebellar syndrome, mostly in patients with stage II discirculatory encephalopathy, confirming the positive dynamics with the data of transcranial Doppler sonography for all groups of cerebrovascular diseases.
- Lesion in the vertebrobasilar basin, followed by symptoms typical of lesions of the cerebellum and its connections, responds to its therapeutic correction.
- The presence and effect of emotional factors is most significant in the group with initial signs of cerebrovascular insufficiency and stage II discirculatory encephalopathy, which decreased significance after the therapeutic correction leads to increase in the cognitive potential.

Conclusion. Neurological symptoms in this study, horizontal nystagmus, staticolocomotor and dynamic ataxia, characterizing the vestibular-cerebellar syndrome, decrease under the influence of therapy at all stages of cerebrovascular diseases with the following reduction of the activity of the emotional factor and improvement of cognitive functions. As a confirmation, the positive dynamics is observed according to the transcranial Doppler sonography.

CONCLUSION

Objective of this study was to investigate the clinical and paraclinical features of patients with cerebrovascular diseases and their dynamics under the influence of therapy. Total 121 patients (32 men and 89 women, average age of 63.6 ± 8.8 years) with cerebrovascular disease were examined before and after treatment. Patients were divided into groups based on the severity of the disease. We studied the neurological status with the evaluation of the emotional sphere, and applied additional methods of research.

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It was revealed that neurological symptoms in this study that characterize the vestibular-cerebellar syndrome respond to therapy in all groups of cerebrovascular diseases and show a decreased influence of emotional factors and a subsequent increase of the cognitive potential.

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