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COGNITIVE FUNCTIONS IN THE EARLY DIAGNOSIS OF VASCULAR DEMENTIA OF STENOSIS OF THE MAIN ARTERIES OF THE HEAD.

Tolibov Dilshod Sirojovich
dr.dilshodts@mail.ru
Ismatov Alimardon Nabijon o'g'li
doctormardon307@gmail.com
Tashkent Medical Academy, Department of Neurology, Tashkent, Uzbekistan

Abstract:The purpose of this study was to study the effectiveness of diagnosing cognitive impairment in patients with chronic cerebrovascular insufficiency (CCVI) II-III stage. with vascular dementia using the Montreal Cognitive Assessment Scale (MoCA test) and Khachinsky Ischemic Scale. The study involved 60 patients (32 men and 28 women) aged 45 to 70 years (mean age 61.6ë5.3 years) divided into 2 groups: Group 1 main group CCVI (II-III stage) 30 patients with vascular dementia and 30 patients with CCVI (II-III stage) without cognitive impairment. Based on a study of patients, it was found that differences in duplex scanning of neck vessels and topography of morphological cerebral changes in patients with various types of onset of vascular dementia with cognitive and neuropsychological states of patients, and shows the importance of early diagnosis of vascular dementia.

Keywords: duplex scanning, magnetic resonance imaging, vascular dementia, dementia of the Alzheimer's type.

Relevance: Impairment of cognitive functions is the earliest manifestation of chronic cerebrovascular insufficiency (initial manifestations of insufficient blood supply to the brain, dyscirculatory encephalopathy) in patients. According to the WHO, cerebrovascular disease and dementia rank third among the causes of death in the world after heart disease and malignant neoplasms. Most publications and clinical studies deal with each of these nosological forms separately, but at the same time, there is more and more evidence that both AD patients and patients with vascular dementia (VD) show both neurodegenerative and vascular changes [1]. Clinically, both neurodegeneration and cerebrovascular pathology significantly potentiate each other and cause the development of more severe intellectual-mnestic disorders [2]. Such coexistence of two nosological units is usually defined as mixed vascular-neurodegenerative dementia (VND) [3]. Quite often, one of the first symptoms of chronic cerebral ischemia with stenosing lesions of the MAH are cognitive impairments that prompt the patient to seek medical attention. Currently, for the purpose of early diagnosis of moderate and severe cognitive impairment, the Montreal scale for assessing cognitive functions (the so-called MoCA-test) and the Khachinsky ischemic scale are used.

The purpose of the study: to study the effectiveness of diagnosing cognitive impairment in patients with chronic cerebrovascular insufficiency (CCVI) II-III stage with vascular dementia using the Montreal Cognitive Assessment Scale (MoCA test) and the Khachinsky Ischemic Scale.

Material and methods of research: All patients underwent clinical and neurological examination according to the standard method. In order to identify cognitive dysfunction, all patients underwent neuropsychological studies using special scales (Khachinsky, MoCA test).

To determine the etiology of cognitive impairment, the state of the cerebral structure, the localization of the anatomical substrate neuroimaging studies were used using MRI

of the brain. In this case, an open-type Toshiba OPART device with a magnetic field strength of 1.5 Tesla and duplex scanning of neck vessels were used. The study involved 60 patients (32 men and 28 women) aged 45 to 70 years (mean age 61.6ë5.3 years) divided into 2 groups: Group 1 main group CCVI (II-III stage) 30 patients with vascular dementia and 30 patients with CCVI (II-III stage) without cognitive impairment. The ischemic scale of Khachinsky was used as a method for studying objective indicators of cognitive functions and MoCA-test was used for including tasks for memory, attention, orientation, "control" functions, abstraction, constructive praxis, visual-objective gnosis and the nominative function of speech. The control group was the results of a study of 30 practically healthy volunteers who did not have CNS pathology and did not suffer from cognitive impairment. Results of the study: The results of the observed complaints of patients are given in a clinical study in an objective study of patients with vascular dementia.

The results of the study of higher cortical function in patients with cognitive impairments are shown in Figure 2.

Table 1.
The results of studies of complaints of patients of all groups

Complaints of patients	Groups					
	1st group*		2nd group *		3rd group *	
	abs.	%	abs.	%	abs.	%
Decreased memory	48	92,3	48	100	75	75
Sleep disturbance	32	61,5	30	62,5	65	65
Decreased mood	17	32,7	23	47,9	63	63
Emotional lability	21	40,3	16	33,3	76	76
Decreased performance	26	50	46	95,8	61	61
Decreased attention	38	73	46	95,8	52	52
Non-systemic dizziness	23	44,2	40	83,3	75	75
Fatigue	36	69,2	39	81,2	51	51
Disproportionality of ideas	42	80,7	47	97,9	48	48
Nausea	16	30,7	23	47,9	44	44
Noise in my head	23	44,2	19	39,5	78	78
Headache	30	57,7	12	25	73	73
Excitability	24	46,1	11	22,9	46	46
Increase in blood pressure	8	15,3	6	12,5	83	83
Urinary incontinence	6	11,5	35	72,9	42	42
forced crying	5	9,6	9	18,8	51	51
Balance and movement disorders	9	17,3	38	79,1	46	46
*p<0,05						

The use of the Khachinsky scale made it possible to differentiate the vascular cause of cognitive impairment and to randomize patients into groups not only by clinical symptoms and syndromes, but also by the results of testing on the Khachinsky scale. The results of the study are given.

Examination of cognitive functions according to the Khachinsky scale

Table 2.

Sum of points	Distribution of subjects by groups							
	1st group		2nd group		3rd group		Total	
	abs.	%	abs.	%	abs.	%	abs.	%
	M±m		M±m		M±m		M±m	
≤ 4	45	22,5	40	20,0	-	-	85	42,5
	3,62±0,07		3,05±0,12		-		3,35±0,08	
4–7	7	3,5	8	4,0	-	-	15	7,5
	5,29±0,20		5,25±0,17		-		5,27±0,12	
≥ 7	-	-	-	-	100	50,0	100	50,0
	-		-		10,9±0,14		10,90±0,14	
Total	52	26,0	48	24,0	100	50,0	200	100
	3,85±0,10		3,42±0,16		10,9±0,14		7,27±0,27	
Note: p<0,01								

As can be seen from Table 2, in 7 (3.5%) patients in group 1 and in 8 (4%) patients in group 2 with dementia of the Alzheimer's type, the distribution of scores in the "gray zone" was observed, i.e. in the range from 4 to 7, which does not allow diagnosing with confidence, according to the Khachinsky scale, the cause of neurodegenerative disorders in these patients. In addition, the distribution of scores on the Khachinsky scale may imply the presence of dementia of mixed genesis, due to both vascular and neurodegenerative factors. [] The proportion of such patients in our studies was 7.5% in groups diagnosed with AD. This allows us to conclude that the Khachinsky scale is insufficient for diagnosing AD and requires the use of additional methods in patients with neurodegenerative pathology to increase the efficiency and diagnostic significance of using the Khachinsky scale.

During the study, the following indicators were obtained: in group I - visual-executive skills 2.9±0.2 points, name 0.8±0.2 points, short-term memory 0 points, attention test 2.8±0.2 points, fluency test 0.9±0.2 points, abstract thinking 0 points, delayed reproduction 1.8±0.2 points, time orientation test 1.7±0.3 points. When summing up the scores, 10.9±0.4 points were established. In group II - visual-executive skills averaged 4.9±0.1 points, naming 2.8±0.2 points, short-term memory 1 point, attention test 3.8±0.4 points, fluency test speech 2.1 ± 0.3 points, test for abstract thinking 1.9 ± 0.1 points, delayed reproduction 3.8 ± 0.3 points, test for orientation in time 4.7 ± 0.2 points. When summing up the scores, 24.1±0.3 points were established. Whereas in the control group, visual-executive skills averaged 5.0 points, name 2.9±0.1 points, short-term memory 1 point, attention test 4.2±0.2 points, speech fluency test 2, 8±0.2 points, abstract thinking test 2.0 points, delayed recall 3.9±0.1 points, time orientation test 4.9±0.1 points. When summing up the scores, 26.7±0.1 points were established.

The values of all indicators of the MMSE scale, which evaluates cognitive functions, showed statistically significantly higher in the group of patients with CCVI ($p<0.001$).

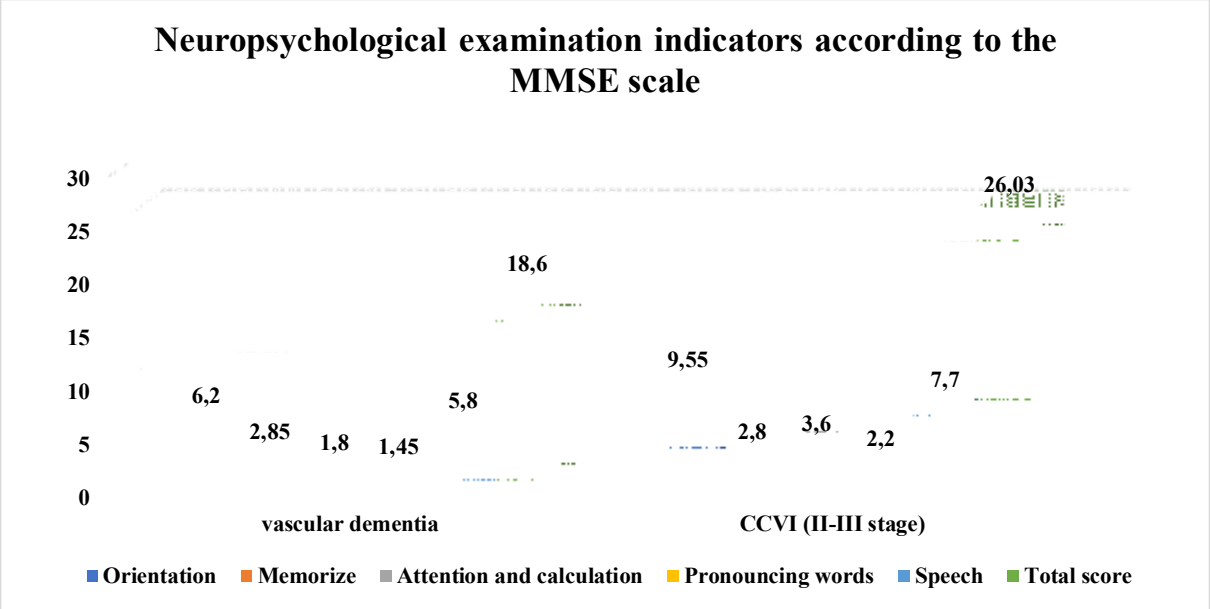

Table 3. MoCa Items average scores

Names	I group	II group	control group
Trails	0,6±0,3	1,0	1,0
Cube	0,4±0,2	1,0	1,0
Clock	1,9±0,2	2,9±0,1	3,0
Naming	0,8±0,2	2,8±0,2	2,9±0,1
Memory	0	1,0	1,0
Digit span	0,9±0,1	1,6±0,4	1,8±0,2
Letter A	0,2±0,2	0,7±0,2	0,8±0,1
Serial 7	1,7±0,2	1,5±0,3	1,6±0,2
Sentence repeat	0,7±0,1	1,3±0,2	1,9±0,1
Fluency F	0,2±0,2	0,8±0,2	0,9±0,1
Abstraction	0	1,9±0,1	2,0
Postpone reproduction	1,8±0,2	3,8±0,2	3,9±0,1
Orientation	1,7±0,3	4,7±0,3	4,9±0,1
Total	10,9±0,4	24,1±0,3	26,7±0,1

Duplex scanning of the vessels of the neck revealed the presence of a hemodynamically significant deficit in group I 65%, the presence of a hemodynamically insignificant deficit in group II 47%, in the control group 30-32% within the normal range. Correlation analysis of the total showed the MoCA test and the thickness of the intima media complex $p<0.05$ in group I, and p?0.05 in group II, which indicates the presence of an inverse correlation between the studied parameters.

Discussion. The study made it possible to establish a high incidence of cognitive disorders in patients with vascular dementia. An analysis of the dependence of the severity of CR on various factors showed that their development is determined not only by damage to the brain and the main arteries by its localization, but also by the initial state of the substance of the brain. In some patients with timely detection of stenosing lesions of the MAH with a hemodynamically significant deficiency, it is necessary,

along with duplex scanning of the neck vessels, to study the state of cognitive functions and the syndrome of violations of higher neuropsychological functions is determined mainly by pathology from the parietotemporal and deep structures, while in other patients it is predominantly dysfunction of deep and anterior (frontal) structures of the brain. Neuropsychological analysis of the state of patients with vascular dementia of the type showed that the syndrome of mild dementia in them was determined primarily by gradually increasing dysmnestic and intellectual disorders proper. Memory disorders were formed with a gradual relatively slower [8,9]. There was an early loss of criticism of one's condition with pronounced personality changes in the form of a transindividual restructuring of character, which was determined by previously uncharacteristic traits of stinginess, rigidity, egocentrism, conflict and suspicion. The disease most often began in presenile age (up to 65 years). The results of a neuropsychological study of patients with mild dementia made it possible to state that the syndrome of disorders of higher neurological functions in them was determined by a decrease in control, programming, and voluntary regulation of activity. At the same time, there were defects in the spatial organization of neurological functions, which manifested themselves in sensitized conditions, and in the kinetic organization of movements (dynamic praxis). Memory impairment consisted of the following components: narrowing of the volume of direct memorization, increased influence of interfering activity on reproduction, violation of selectivity during reproduction. Almost all patients at this stage of dementia development showed relative preservation of various components of the speech function, with the exception of the nominative function of speech (latency in naming was more pronounced than in the group of healthy subjects) [10]. The preservation of visual and auditory gnosis should be noted. Patients in this group actively complained of memory loss. Their timing was not always accurate.

Conclusions. 1. In order to timely detect a stenosing lesion of the MA with a hemodynamically significant deficiency, it is necessary, along with duplex scanning of the neck vessels, to study the state of cognitive functions using the MoCA test.

2. The degree of cognitive impairment is inversely proportional to the thickness of the intima-media complex and the severity of the stenosing process.

3. The total score on the Montreal Cognitive Scale is a sensitive indicator of cognitive impairment from mild to moderate to deep vascular dementia, and is effective in determining the tactics of treatment approaches in patients with stenotic lesions of the MAH.

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