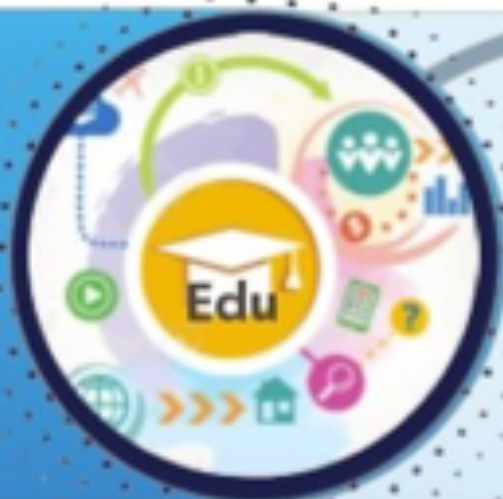


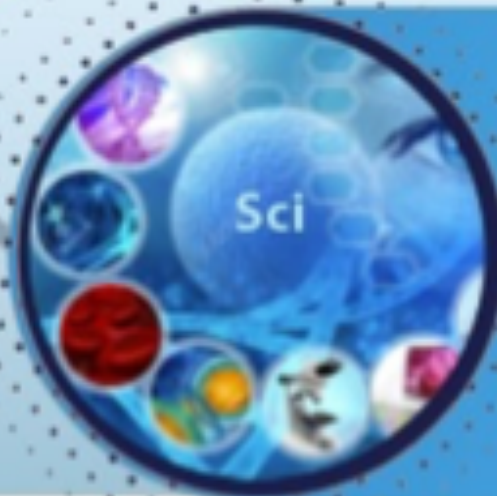


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Analysis of the Neuropsychological State of Patients with Autonomic Disorders in Chronic Cerebral Ischemia

¹Tolibov D.S., Mirzaeva D.B., Abdurasulova N.A.

ABSTRACT

Background. The syndrome of autonomic dysfunction is currently considered as a comorbid pathology of chronic cerebral ischemia (CCI), accompanying it as it develops. Changes occurring in the autonomic nervous system precede the subsequent neurological disorders and serve as a manifestation of maladaptive reactions.

Purpose. To conduct a neuropsychological study to identify cognitive impairment in patients with autonomic dysfunction at various stages of chronic cerebral ischemia.

Methods. A study was conducted on 99 patients with autonomic dysfunction in CCI. There were examined cognitive violations at help special neuropsychological scales – MMSE, MoCA, HADS. The assessment of the vegetative status was performed using the Wayne questionnaire.

Results. The results of our study revealed the absence of a direct proportional relationship between the patient's age and the stage of CCI, but there was a clear tendency towards an increase in the manifestations of CCI as the age of the patients increased. When studying the cognitive sphere with the MMSE scale, a direct correlation was noted between the worsening of cognitive impairment and the increase in the stage of chronic cerebral ischemia. The MoCA test showed memory impairment, difficulties in performing speed and attention tasks, as well as delayed recall in patients with stages II and III of chronic cerebral ischemia. Assessment of anxiety and depression using the HADS scale revealed an increase in anxiety-depressive manifestations with an increase in the severity of chronic cerebral ischemia (stage I – $8,0 \pm 1,5$ points; stage II – $12,3 \pm 1,5$ points and stage III – $14,2 \pm 1,7$ points).

Conclusion. In patients with autonomic dysfunction in chronic cerebral ischemia, cognitive impairment was observed. For definitions expressions cognitive dysfunctions follows apply special evaluation scales. Our studies revealed direct correlation changes in the severity of cognitive impairment with an increase in the stage of CCI.

Keywords: chronic cerebral ischemia, autonomic dysfunction syndrome, cognitive impairment, Wein questionnaire, special rating scales

¹ **Author for correspondence:** DSc, Associate Professor of the Department of Neurology and medical psychology, Tashkent Medical Academy, Tashkent, Uzbekistan, Almazar district, Farobi-2 street, 100109, e-mail: dr.dilshodts@mail.ru

INTRODUCTION

Chronic cerebral ischemia (CCI) is the most common cerebrovascular disease and is characterized by a negative impact on the quality of life of the population [2].

According to various studies, the epidemiological prevalence of CCI in the entire structure of cerebrovascular pathology is 60-75% [5].

The syndrome of autonomic dysfunction in chronic cerebral ischemia manifests itself mainly by vegetative symptoms and emotional disorders [1, 4]. The initial manifestations of CCI affect the emotional sphere to a greater extent, and are often manifested by astheno-depressive, asthenic and neurosis-like conditions [1, 8].

There is an increase in the number of patients with chronic cerebral circulatory insufficiency associated with cognitive impairment [2].

Cognitive impairment in CCI develops in more than 20% of cases [7].

At the same time, vascular cognitive impairment of both dementia and non-dementia forms of cognitive decline in the age category of patients over 65 years reaches a prevalence of 2,8% to 10% [3, 7].

According to various authors, moderate and severe cognitive dysfunction occurs in 16,5% of cases in patients with CCI over 60 years of age [6].

Cognitive impairment in patients with CCI occurs as a result of brain damage caused by dysfunction of extra- and intracranial blood circulation during progressive ischemia. Mild cognitive impairment in cerebrovascular diseases is manifested by memory loss, impaired concentration and attention span, and the development of generalized asthenization. In addition, with CCI, sleep disorders are often observed, which manifest themselves already at an early stage of the disease and have a significant impact on the quality of life of patients [2, 7].

Currently, as a result of the high level of instability in the social sphere and the constant process of stress, there is an increase in the demands on the adaptive capabilities of a person. As a result of decompensation of adaptation mechanisms, the development of manifestations of various diseases occurs [1, 2, 4].

Dysfunction of the autonomic nervous system in CCI develops as a result of pathological disturbances in the area of non-specific systems of the brain that regulate psycho-auto-somatic unity [2, 8].

Most researchers associate selected neurophysiological characteristics with the peculiarities of psychological and constitutional-genetic status in patients with dysfunction of the autonomic nervous system [7].

Clinical manifestations of autonomic dysfunction and their diagnostics are quite subjective, since they are based on the patient's own sensations. In this regard, the issues of diagnostics and objectification of autonomic dysfunctions in chronic cerebral ischemia are of particular relevance [4, 5].

To date, there are a number of studies devoted to the analysis of the vegetative status and cognitive sphere in CCI, but they are quite few in number, have different designs and often show divergent results. In addition, vegetative disorders in patients with CCI are usually studied without regard to age-related changes in the central nervous system. These circumstances served to determine the purpose and objectives of this study. The purpose of our study was to conduct a neuropsychological study to identify cognitive disorders in patients with autonomic dysfunctions at various stages of chronic cerebral ischemia.

MATERIALS AND METHODS

We conducted studies on 99 patients with chronic cerebral ischemia. All patients were hospitalized in the neurological department of the Tashkent Medical Academy. Our study included patients who signed a written informed consent to participate in the study.

To analyze the state of the autonomic nervous system, the "Questionnaire for identifying signs of autonomic changes" by A.M. Vein (1998) was used. The Mini-Mental State Examination (MMSE) was used for screening assessment of the presence of cognitive impairment. The screening assessment was necessary because complaints of autonomic dysfunction and patients' responses to the "Questionnaire for the Identification of Signs of Autonomic Changes" by A.M. Vein, as well as to the scales for identifying emotional, anxiety and depressive disorders are purely subjective, and the results largely depend on the presence and severity of cognitive dysfunction. Therefore, patients with MMSE less than 20 points were not included in the study. The Montreal Cognitive Assessment Scale (MoCA test) was used for objectification and quantitative assessment of the identified disorders in the cognitive sphere. Emotional disorders in the form of irritability, tearfulness, emotional lability and sudden mood swings, as well as anxiety and depression always accompany autonomic dysfunction. The use of the Hospital Anxiety and Depression Scale (HADS) allows to identify the state of anxiety and depression in the patient. In statistical analysis, the data were evaluated using SPSS software for Windows (version 21.0).

RESULTS

The analysis of the average age of patients treated in the neurological department of the TMA for chronic cerebral ischemia of stages I, II and III was carried out. Table 1 shows the distribution of patients depending on the stage of CCI.

Table 1. Analysis of the average age of patients depending on the stage of chronic cerebral ischemia

Stages of chronic cerebral ischemia	Stage I		Stage II		Stage III		Total	
Gender								
Men	25	25,3	20	20,2	2	2,0	47	47,5
Women	27	27,3	22	22,2	3	3,0	52	52,5
Total	52	53,6	42	42,4	5	5,0	99	100
Average age (years)	68,8±6,9		77,9±10,6		84,9±8,0		77,2±9,8	

As can be seen from the data in the table, there is no direct proportional relationship between age and the stage of CCI, but there is a clear tendency towards an increase in the manifestations of CCI as the age of patients increases.

All the patients examined were found to have certain concomitant diseases: atherosclerosis of the cerebral vessels (100%) with stenosis of the brachiocephalic trunk vessels of no more than 60% (38,4%), stable angina in 47,6%, arterial hypertension - 71%, dyslipidemia - 74,5%, impaired glucose tolerance and type II diabetes mellitus (insulin-independent) - 20,2%, chronic gastro-duodenitis - 41,7%, deforming spondylosis and spondylarthrosis in 66,8% of patients.

Patients with stage I CCI presented the following complaints: headache, non-systemic dizziness, tinnitus, memory loss, irritability, emotional lability, sleep disorders, general asthenia, a feeling of heart sinking, numbness in fingers, fluctuations in blood pressure. These complaints had been bothering patients for the past 6-12 months and were persistent and progressive. The neurological status revealed diffuse neurological symptoms, including bilateral activation of tendon reflexes, symptoms of oral automatism, weakness of convergence, bilateral mild impairments in performing coordination tests, etc. As a rule, affective-emotional disorders were noted in the form of asthenic (astheno-neurotic), astheno-hypochondriac or astheno-depressive syndromes.

Patients with stage II CCI complained of headache, non-systemic dizziness, tinnitus, unsteadiness when walking, sleep disorders, emotional lability, stiffness and limitation when walking, trembling in the arms and legs, a feeling of the heart stopping or stopping, numbness in the fingers, fluctuations in blood pressure, deterioration of health with a change in the weather. In the neurologi-

cal status, as a rule, one or two neurological syndromes were revealed: amyostatic (hypomimia, slowness of movements, stiffness, trembling of the fingers, head), pyramidal (increased tendon reflexes, clonus of the feet), pseudobulbar (choking when swallowing, slurred speech), vestibulo-ataxic syndrome (dizziness, unsteadiness when walking, staggering), as well as asthenic, astheno-neurotic, astheno-depressive manifestations.

Patients with stage III of the disease complained of headache, dizziness of systemic and non-systemic nature, tinnitus, unsteadiness when walking, sleep disturbances, emotional lability, stiffness and limitation when walking, trembling movements in the arms and legs, general weakness, a feeling of cardiac arrest, numbness of the fingers, fluctuations in blood pressure, deterioration of health with a change in the weather, a tendency to constipation, bloating. Some decrease in the patient's criticism of his condition, the presence of cognitive dysfunctions were noted, due to which patients could not present all their complaints. In the neurological status, two to four neurological syndromes were detected: amyostatic (hypomimia, slowness of movements, stiffness, trembling of the fingers and head), pyramidal (increased tendon reflexes, clonus of the feet), pseudobulbar (choking when swallowing, slurred speech), vestibulo-ataxic syndrome (dizziness, unsteadiness when walking, staggering), as well as a significant decrease in cognitive functions. In addition, asthenic, astheno-neurotic, astheno-depressive manifestations were usually noted.

The study of the state of the autonomic nervous system in patients with CCI was conducted using the "Questionnaire for identifying signs of autonomic changes". Using the "Questionnaire for identifying signs of autonomic changes" made it possible to determine the presence of autonomic dysfunction when the study result exceeded 15 points. The study showed that in patients with stage I CCI, the sum of points ranged from 15 to 19 and averaged 16,5±1,8; in patients with stage II CCI - 21,2±2,4 points (from 18 to 24 points); with stage III CCI - from 22 to 28 points and an average of 25,0±2,1 points.

Impaired cognitive function is a characteristic manifestation of chronic cerebral ischemia, which can be detected already at stage I of the disease and naturally increases as the stage of CCI increases. All patients were tested using MMSE, which revealed cognitive decline increasing from stages I to III of CCI. Thus, in patients with stage I of CCI, the MMSE score fluctuated from 30 to 26 and averaged 27,5±1,6 points. In patients with stage II of CCI, the average score was 25,5 ±2,4 (fluctua-

tions from 28 to 23 points), and at stage III of CCI, the average score was $20,9 \pm 2,8$ with fluctuations from 27 to 20 points. According to the data obtained, it should be considered that the stage of chronic cerebral ischemia plays the greatest role in the severity of cognitive impairment.

When conducting the MoCA test in patients with stage I CCI, the average score was $26,8 \pm 1,9$. In patients with stage II CCI, the result was $26,2 \pm 1,8$. At stage III CCI, the average score was $24,1 \pm 2,1$. When conducting the test, patients with stages II and III CCI showed memory impairment, difficulties in performing tasks on speed and attention, as well as on delayed playback. In patients with stages II and III chronic cerebral ischemia, when performing tasks, difficulties in switching attention, memorizing and reproducing information were noted, associated with mental slowness.

The presence and severity of anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS). Patients with stage I CCI had only anxiety disorders ($8,0 \pm 1,5$ points). At stage II CCI, an increase in anxiety ($12,3 \pm 1,5$ points) and depression ($13,1 \pm 1,9$ points) was noted. At stage III CCI, manifestations of anxiety and depression were even more pronounced (anxiety – $13,8 \pm 1,4$ points, depression – $14,2 \pm 1,7$ points) compared to the figures at stages I and II of the disease. Thus, as the severity of chronic cerebral ischemia increases, an increase in anxiety-depressive manifestations is noted.

DISCUSSION

The severity of the clinical picture of CCI depends on the stage of the disease. The initial manifestations of CCI affect the emotional sphere to a greater extent, and are often manifested by asthenodepressive, asthenic and neurosis-like conditions. In patients with chronic cerebral ischemia, especially in older age groups, in addition to the main neurological symptoms of the disease, it is necessary to identify vegetative disorders, which are a set of clinical manifestations from various body systems.

In our study, vegetative disorders in chronic cerebral ischemia were detected in 100% of observations and were characterized by various clinical manifestations affecting various body systems (cardiovascular, respiratory, urinary, gastrointestinal tract, etc.) and having a significant impact on the course of chronic cerebral ischemia.

In the current study, we observed cognitive impairment in patients with vegetative disorders with CCI. According to various authors, moderate and severe cogni-

tive dysfunction occurs in 16,5% of cases in patients with CCI [5]. Cognitive impairment in patients with CCI occurs as a result of brain damage caused by dysfunction of extra- and intracranial blood circulation during progressive ischemia [2]. During the survey, patients complained of various cognitive impairments, the severity of which increased depending on the stage of CCI. The differences obtained are statistically significant ($p < 0,01$).

Along with various impairments, there is a change in the psychoemotional state, characterized by anxiety and depression, changing depending on the stage of the disease. A study of the level of anxiety and depression using the HADS scale revealed an increase in anxiety-depressive manifestations as the stage of CCI increases. Patients with stage I CCI only had a state of anxiety, while depressive manifestations were added at stages II and III ($p < 0,05$).

CONCLUSION

Thus, in the diagnosis of vegetative and cognitive disorders in chronic cerebral ischemia, it is necessary to use clinical examination data, special scales and tests that determine the presence of vegetative and cognitive dysfunction in patients. Severe vegetative disorders aggravate the course of chronic cerebral ischemia and significantly affect the quality of life of patients. The incidence and severity of vegetative and cognitive disorders increases with the progression of the disease and with increasing age of the patient. The severity of vegetative and cognitive disorders is influenced to a greater extent by the stage of chronic cerebral ischemia than by the age of the patient.

Ethical clearance—All experimental studies were reviewed, discussed, and approved by the bio-ethical committee of the Ministry of Health of the Republic of Uzbekistan.

Source of funding —Self.

Conflict of Interest —No

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BOSH MIYA SURUNKALI ISHEMIYASIDA VEGETATIV KASALLIKLARI BO'LGAN BEMORLARNING NEYROPSIXOLOGIK HOLATINI TAHLIL QILISH.

**Tolibov D.S., Mirzaeva D.B., Abdurasulova N.A.
Toshkent Tibbiyot Akademiyasi**

Dolzarbligi. Hozirgi vaqtda vegetativ disfunktsiya sindromi surunkali bosh miya ishemiyasining komorbid patologiyasi sifatida qaraladi va u rivojlanib borishi bilan birga keladi. Vegetativ asab tizimida sodir bo'lgan o'zgarishlar navbatdagi asab kasalliklarini keltirib chiqarishi mumkin va dezadaptiv holatlarni yuzaga keltiradi.

Maqsad. Surunkali bosh miya ishemiyasining turli bosqichlarida vegetativ disfunktsiya mavjud bemorlarda kognitiv buzilishlar holatini aniqlash uchun neyropsixologik taxlil o'tkazish.

Tadqiqot. Surunkali bosh miya ishemiyasida vegetativ disfunktsiya sindromi mavjud 99 bemorda tadqiqot o'tkazildi. Kognitiv buzilishlar maxsus neyropsixologik shkalalar - MMSE, MoCA, HADS yordamida tekshirildi. Vegetativ holat Veyn so'rovnomasi yordamida baholandi.

Natijalar. Tadqiqotimiz natijalari shuni ko'rsatdiki, bemorning yoshi va surunkali bosh miya ishemiyasi bosqichlari o'rtasida to'g'ridan-to'g'ri proporsional bog'liqlik aniqlanmadi, ammo bemorlar yoshining ulg'ayishi bilan surunkali bosh miya ishemiyasi klinik jixatdan yuzaga kelishi chuqurlashib borishining bog'liqlik tendensiyasi mavjud edi. Kognitiv holatni MMSE shkalasi bilan tekshirganda, surunkali bosh miya ishemiyasi bosqichlari oshib borgan sari kognitiv buzilishning yomonlashishi o'rtasida to'g'ridan-to'g'ri bog'liqlik qayd etildi. MoCA testi xotira buzilishini, tezlik va diqqat vazifalarini bajarishda qiyinchiliklarni, shuningdek, surunkali bosh miya ishemiyasi II va III bosqichlari bo'lgan bemorlarda kechikkan nutqni ko'rsatdi.

Xulosa. Surunkali bosh miya ishemiyasi tufayli vegetativ buzilishlari bo'lgan bemorlarda kognitiv holatning buzilishi kuzatildi. Kognitiv disfunktsiyaning yaqqolligini aniqlash uchun maxsus baholash shkalalaridan foydalanish kerakligi aniqlandi. Bizning tadqiqotlarimiz surunkali bosh miya ishemiyasi bosqichlari oshib borgan sari kognitiv buzilishning yomonlashishi o'rtasida to'g'ridan-to'g'ri bog'liqlik borligini ko'rsatdi.

Kalit so'zlar: surunkali bosh miya ishemiyasi, vegetativ disfunktsiya sindromi, kognitiv buzilishlar, Veyn so'rovnomasi, baholash shkalalari.

АНАЛИЗ НЕЙРОПСИХОЛОГИЧЕСКОГО СОСТОЯНИЯ БОЛЬНЫХ С ВЕГЕТАТИВНЫМИ РАССТРОЙСТВАМИ ПРИ ХРОНИЧЕСКОЙ ИШЕМИИ ГОЛОВНОГО МОЗГА

**Толибов Д.С., Мирзаева Д.Б., Абдурасулова Н.А.
Ташкентская Медицинская Академия**

Актуальность. Синдром вегетативной дисфункции в настоящее время рассматривается как коморбидная патология хронической ишемии головного мозга, сопровождающая ее по мере развития. Изменения, происходящие в вегетативной нервной системе, предшествуют возникающим впоследствии неврологическим нарушениям и служат проявлением дезадаптивных реакций.

Цель. Проводить нейропсихологическое исследование для выявления когнитивных нарушений у пациентов с вегетативными дисфункциями при различных стадиях хронической ишемии головного мозга.

Методы. Проведено исследование у 99 пациентов с вегетативными нарушениями при ХИМ. Были обследованы когнитивные нарушения при помощи специальными нейропсихологическими шкалами – MMSE, MoCA, HADS. Оценка вегетативного статуса выполнена с вопросником Вейна.

Результаты. Результаты нашего исследования выявили отсутствия прямой пропорциональной зависимости между возрастом пациента и стадией ХИМ, но отмечались четкая тенденция к нарастанию проявлений ХИМ по мере увеличения возраста пациентов. При исследовании когнитивной сферы с шкалой MMSE отмечались прямая корреляционная связь ухудшения когнитивного нарушения с увеличением стадии ХИМ. MoCA-тест показал нарушение памяти, трудности в выполнении заданий на скорость и внимание, а также на отсроченное воспроизведение у пациентов со II и III стадиями ХИМ.

Заключение. У пациентов с вегетативными нарушениями при хронической ишемии мозга наблюдались нарушения когнитивной функции. Для определения выраженности когнитивной дисфункции следует применить специальные оценочные шкалы. Наши исследования выявили прямые корреляционные изменения выраженности когнитивных нарушений с увеличением стадии ХИМ.

Ключевые слова: хроническая ишемия мозга, синдром вегетативной дисфункции, когнитивные нарушения, вопросник Вейна, оценочные шкалы