

GNOSTIC DISORDERS AND THEIR COMPENSATION IN NEUROPSYCHOLOGICAL SYNDROME OF VASCULAR COGNITIVE DISORDERS IN OLD AGE

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Abstract. *In old age, the work of analyzer systems gradually deteriorates. In vascular diseases of the brain, changes affect not only the receptor peripheral apparatus, but also the central apparatus, generating Gnostic diseases in different levels of vision, hearing, kinesthetic areas. But along with disruptive involutinal trends, there are also compensatory trends based on neuroplasticity. Understanding these trends, in addition to drug treatment, is essential for the use of the patient's resources during neuropsychological correction of cognitive disorders.*

Keywords: *old age, cognitive disorders, neuropsychological syndrome, correction, treatment.*

Introduction. The safety of the cognitive sphere is essential for an elderly person to adapt [1]. In domestic and foreign Neuropsychology, the concept of physiological aging is widely used, which means a slow increase in cognitive decline, which is poorly expressed and does not lead to socio-domestic malfunctions of older people [2-4]. Along with physiological aging, the concept of pathological aging stands out, which means a previous and deeper cognitive decline due to an increase in the cerebrovascular process. In mixed vascular degenerative dementias and Alzheimer's dementia models, complete data has been collected on changes in higher mental functions during physiological and pathological aging [5-7].

Particular attention of researchers is attracted by mild to moderate cognitive disorders in old age in terms of their prognostic importance in the development of dementia [8]. But it is equally important to study the compensatory restructuring of higher mental functions that interfere with cognitive decline. This is necessary for the development of basic neuropsychological correction methods aimed at reconstructing and strengthening the higher mental functions of the compensatory orientation [9-11].

To solve the specified practical problem, it is important to understand which areas of the brain have failed and which are "turned on" in response to dysfunction. Compensatory strategies as a source of cognitive domain in elderly people with chronic cerebrovascular insufficiency have become a focus in this study [12].

A neuropsychological approach based on the analysis of methods that help the subject to improve the result of performing tasks during experimental psychological research. Introduced the concept of compensation ("compensatory tertiary formations") when talking about the structure of

neuropsychological syndrome. Compensatory formations were seen as necessary and inevitable changes in response to a decrease in one or another high mental function [13-16].

Described the phenomenon of "vicariation compensation" as the ability of certain parts of the brain to assume damaged functions [17]. He also proposed to have topic-diagnostic significance in the methods applied to patients in the event of difficulties in conducting neuropsychological tests [18]. Engaged in the training of patients with aphasia on recovery in accounting, reading and writing disorders, finding that in the conditions of targeted programmed education, higher mental functions can be reconstructed with changes in functional systems that carry them out [19].

The individual factor plays an important role in the implementation of the compensatory resource in the rehabilitation process: the attitude to cognitive disorders, self-esteem and the general emotional state of the patient [20].

In a study of the higher mental functions of elderly people with physiological aging (mild cognitive disorders), he found a tendency to automate mental actions and actions, their greater awareness. The tendency to improper automation is explained by the author as a manifestation of the left compensatory shift of the functional asymmetry of hemispheres [21-24]. Increase in inhibitory processes during physiological aging: a general slowdown in the pace of the formation of mental activity and skills, difficulties in joining the task, a weakening of the ability to carry out several programs at the same time. Compensating for these violations was achieved by the regulatory effect of pronouncing actions by elderly people, moving to the gradual implementation of the program [25-27].

Described the listed violations the first functional block of the brain (energy) sees as a manifestation of dysfunction. Luria, which is compensated by enhancing the regulatory effect of a secure third programming block, regulating and managing activities [28]. Actively being carried out on the compensatory restructuring of individual higher mental functions – memory, attention, thinking [29]. In the process of performing samples for sequential removal, some operations were included in the external plan, their pronunciation was observed [30]. When memorizing material, its semantic mediation was used [31], while finger-tracking movements were used during reading. During cognitive operations, it was found to reconstruct the interaction of the cerebral hemispheres in old age [32].

A neurophysiological approach based on the identification of brain regions involved in solving various cognitive tasks (simultaneous use of neuroimaging methods with experimental-psychological research – recording EEG, conducting fMRI) [33-36]. Using this methodology, structural changes in the brain that are "strategically important" for the development of cognitive disorders and their successful compensation were studied. Studies using neuroimaging techniques (MRI, PET, EEG) have shown that nerve cells can increase activity compensationally and branch, forming connections, explaining the relatively satisfactory state of cognitive function even if there are structural changes in the brain [37]. Positive changes in brain structures occur mainly in the context of stimulation and learning [38]. This feature is shown in the literature as neuroplasticity [39]. Neuroplasticity as the basis for a compensatory restructuring of higher mental functions [40]. According to the results of the study, several theories have been formulated based on this approach. The theory of compensatory reconstruction in the cognitive field, literally – "the theory of building bases" (cognitive aging - the scientific theory of stacks) considers the brain as a homeostatic organ, since in some of its areas the decrease in neuronal activity is accompanied by a compensatory

participation in the activities of others [39-41]. At the same time, additional neural networks that do not participate in youth have been shown to be activated in solving cognitive problems in old age [42]. Y. The Stern (the concept of "cognitive reserve") cognitive reserve concept follows similar visions [43].

Developed by the interhemispheric asymmetry mitigation model (age-related asymmetry reductions) based on data on the dual activation ("opposite attraction", contralateral recruitment) of homologous brain regions in elderly people when performing tasks, and at a young age, such activation becomes one-sided. The anterior - posterior shift theory (posterior-anterior shift model) is based on determining the increased activation of anterior structures during aging [44]. These concepts are the basis for the vision of brain aging and its compensatory restructuring, and can be applied in understanding the changes that occur at the level of individual higher mental functions. Thus, important materials have been collected in areas related to neuropsychology and medical psychology [45].

The purpose of the study: analysis of the semiotics of gnosis disorders and their compensation.

Materials and methods. 120 elderly people undergoing inpatient treatment were examined at the city's medical and social Geriatrics Center. 3 groups were compared: 1) cognitively conserved (n=31); 2) with moderate cognitive decline (n=47); 3) with vascular dementia (n=42). The vascular nature of cognitive disorders is confirmed by instrumental studies (brain MRI, cerebral vessels ultrasound and extracranial vessels), higher than 6 points on the Khachinsky scale. All participants in the study are examined by a neurologist, psychiatrist and neuropsychologist. Visual and auditory Gnosis were evaluated. For this, samples were used to recognize volumetric and contoured unfinished images of the subject (visual object Gnosis), determine the time by dialing without numbers (visual-spatial), interpret the plot picture "broken window" (simulated gnosis). Tests to replicate words revealed impaired auditory speech Gnosis. In the event of difficulties, self-help methods used by the elderly were noted. Interest rates and frequency of occurrence are calculated.

Results and their discussion. In 5 (16,13%) of cognitively preserved study participants, visual subject Gnosis is impaired. In all cases, the disorders are mild and are diagnosed only in sensitive samples when recognizing unfinished contour images. The optical-spatial gnosis, based on the ability to move in real space and symbolically (determine time by hour, use maps and schemes), has not been disturbed by anyone. Simultan agnosia events occur only in 6 (19,35%) and most are mild, with 1 (3,23%) being moderate in observation. Older people gradually realized the meaning of the plot image, missed insignificant details, the strategy of perception, on the contrary, was sequential, "contemplative": describing each detail and only then summarizing it, it could cause inaccuracies, but did not have a significant impact on the understanding of the meaning. Thus, a violation of visual Gnosis with cognitive security is rare, erased, partially and largely expressed by a weakening of the synthetic component of visual perception. They are identified in a small percentage of older people in this group and do not disrupt their daily activities, are not reflected in complaints.

The Gnosis of acoustic speech is largely preserved. In a small part of the cases (6 people, 19,35%), disorders were found in the differentiation of phonemes with impaired speech heard while hearing was preserved. Thus, in cognitively preserved people, slight disturbances predominate in the work of the cortical connection of the visual analyzer.

With a moderate cognitive decline in vascular dementia, impaired object recognition occurs in 17 (36,2%) people. They were usually light or rarely moderate, and even difficult to perceive images of things in common.

At approximately the same frequency, a violation of 15 (31,9%) optical-spatial object recognition was detected: the perception of spatial properties of objects and the orientation in the legal coordinate system were disrupted. Basically, the violations were light (25,5%), manifested by fatigue and increased complexity of tasks.

In rare cases-on average (6,4%) and on the map is reflected in complaints about the previously uncharacteristic deterioration of the direction to the ground. In the perception of a complex plot image in 25 (53,2%) people, signs of a simulated object recognition disorder were identified. Mild diseases (27,7%) prevailed, moderate (8,5%) and clear (17,0%) are less characteristic. In the case of moderate disturbances, important details were omitted, leading to a misunderstanding of what was happening, but errors were corrected when focusing on them. In 2 (4,3%) people, pseudoagnosia was observed, where the conclusion about the subject or logic of the relationship between the heroes of the picture was made impulsively on the basis of detail, without analyzing the whole.

The types of visual object recognition considered could be both combined and observed separately. Thus, although holistic visual perception, optical - spatial analysis and synthesis, in rare cases, perceptual activity worsens. Auditory object recognition disorders, which are mostly deleted, have been frequently identified in 20 (42,6%) observations. They were often accompanied by complaints of "bad hearing", requests to repeat what was said in the absence of violations according to the examination of the ENT doctor. Thus, the analytical-synthetic activity of visual and auditory analyzers it gets worse to the same extent. In addition, there are cases of violation of the regulatory component of perception.

Disorders of visual object recognition in vascular dementia occur in most people-29 (69,05%) and were moderate to severe. This was demonstrated by the difficulty of recognizing common objects. In 27 (64,39%), spatial relations and the perception of the right-left direction are impaired. In 30 (71,42%) observations, a sharp narrowing of the volume of visual perception occurred with a violation of the simultaneous object recognition. In numerous observations, a violation of the regulatory component of perception was found. Thus, a complex violation of the analysis and synthesis of visual information develops in dementia. Voice discrimination and consequent speech comprehension disorders are 26 (61.9%) patient-specific, mostly moderate to severe.

According to our observations, elderly people used various methods of self-help in the performance of tasks: speech mediation (oral description of the image), kinesthetic mediation (drawing with a finger along the contour), the creation of hypotheses. These techniques can be seen as strategies to compensate for object recognition deficits that occur as a natural response to involuntal and pathological brain changes. Their basis is perhaps the source of neuroplasticity of the brain and the personal attitude of an elderly person to active life and systemic intellectual loads. The proportion of people with cognitively preserved and moderate cognitive decline who develop compensatory strategies to overcome difficulties in object recognition is similar (12,8% and 12,77%) and significantly lower in vascular dementia (2,38%). Similar dynamics could be observed for the optical-spatial object recognition. The number of seniors who use the strategy of compensating for simultaneous object recognition disorders has increased with the severity of cognitive decline. However, in vascular dementia, they were often ineffective, unlike people with VHD. The need

for counseling has increased linearly cognitive deterioration. Similar patterns have also been observed for the acoustic Gnostic field.

Conclusions. Thus, in the early stages of perturbations in the cortical branch of modal specific data processing, mechanisms for compensating for the perturbation of Gnostic functions are updated by connecting additional afferentations (kinesthetic) or the regulatory function of speech. With the severity of cognitive disorders, compensatory strategies are less developed and lose effectiveness. But violations of the studied forms of Gnosis remain. This condition leaves the resource and hopes for some success in neuropsychological correction.

A wide range of supramodal strategies (the application of abstract-logical strategies) to compensate for the disruption of higher mental functions corresponds to the previous theory of displacement, the use of which we have identified in older people with mild cognitive decline indicates an increased activation of previous structures in physiological aging. The activation of method-specific compensation strategies (connecting additional afferentation), more clearly expressed by moderate cognitive decline, is confirmed by domestic and Foreign Studies, according to which additional areas of the brain during aging are involved in the performance of cognitive tasks. At the same time, this study shows that method-specific compensation strategies are only applicable and effective for cognitive decline-mild to moderate cognitive impairment.

The results we get point to the significant compensatory potential of higher mental functions in the stage of mild to moderate cognitive impairment. This potential must be identified and taken into account when developing corrective programs based on a differentiated approach when choosing tasks based on the severity of cognitive decline. Neuroprotective therapy increases the plasticity of nerve tissue and the effect of neuropsychological repair carries out this potential, promoting the formation of new and compensatory remodeling of existing neural networks. With older people, it is important to carry out psychological correction work aimed at correcting higher mental functions and improving the quality of adaptation.

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