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## Condition of Cognitive Functions in Neurooncological Patients with Convulsive Syndrome

**Keywords:** *brain tumor, convulsive seizures, cognitive disorders, psychological tests, post-operative period.*

**Annotation:** *In the Republican Scientific Center of Neurosurgery standardized tests were used in 69 patients suffering from brain tumors, and concomitant with seizures, to study the speech, memory, and spatial organization of movements. The tests were: expressive and impressive speech, auditory-verbal memory, as well as the Montreal range of cognitive functions. Neuropsychological study in patients with symptomatic epilepsy with right hemispheric epileptic foci before tumor surgery revealed different types of disorders in mental functions. In the immediate postoperative period, there was an increase of these disorders. Within 6 months after surgery, compensation of lost mental functions, speech, memory and attention was developed.*

Mental disorders in patients with tumors of the brain, according to the literature, are observed in 15-100% of patients (1). They may be the first and only sign of disease in 15-20% of patients with brain tumors (2).

Detailed description of mental disorders in tumoral brain damage occurs only among psychiatrists who work directly with neurosurgical patients in the neurosurgical hospitals (1). In general practice psychiatrists often have no such opportunities. Meanwhile, the lack of knowledge in mental disorders depending on the local pathology of the brain, leads to the fact that 3-10% of patients with intracerebral tumors are treated initially in psychiatric hospitals (2).

Description of mental disorders in patient with brain tumors is also found among neurologists, neuropsychologists and neurosurgeons. But in their studies the most serious mental disorders (which can not be missed), or only some psychiatric symptoms are marked (3). For example patients with psychomotor agitation, severe productive symptoms, patients with mind confusion are not available for neuropsychological examination (4). Neurologists and neurosurgeons pay special attention to motor and sensory symptoms, level of impairment of consciousness. However, they often ignore the unspoken mnemonic and emotional disorders, neurotic symptoms, seizures as psychosensory phenomena (olfactory and visual hallucinations, a state of "déjà vu", the distortion of space and perception of one's own body, affective paroxysms, etc.) (5).

Differences in psychopathology based on the nature of the tumor process and depending on the lesion side are very rare and can be observed only in some publications (6).

The aim of this study was to evaluate some neuropsychological techniques in research of higher mental functions in neurooncological patients with symptomatic epilepsy during their surgical treatment. In 67 patients with suffering from tumors of the brain and a convulsive syndrome, aged 22 to 50 years (men - 39, women - 28), a comprehensive clinical, electrophysiological and neuroimaging studies (magnetic resonance and computer imaging - MRI, CT) were carried out as recommended by ILAE (1997).

Standardized tests were used in order to study speech, memory, and spatial organization of movements, among them: expressive and impressive speech, auditory-verbal memory, as well as the Montreal cognitive assessment scale (MoCA). Neuropsychological tests were performed in the preoperative, early and late (6 months) postoperative periods. Seizure types were diagnosed according to the international classification of epileptic seizures (Kyoto, 1981).

On the basis of clinical, electrophysiological and neuroimaging studies which were held in preoperative period, and depending on the lateralization of epileptic foci patients were divided in two groups: 1 (32) - primarily with a lesion of the right hemisphere and the 2nd - the left hemisphere (37). Duration of the disease ranged from 1 to 4 years.

Simple partial seizures with secondary generalization were observed in 32 (46.3%), complex - in 26 (37.7%), generalized convulsive - in 11 (15.9%) patients. Focal neurological symptoms in the form of hemiparesis was observed in 43 (63.3%) patients, weakness of convergence, anisoreflexia was detected in 21 (30.4%) patients. Intellectual-mental disorders were observed in 12 (17.4%) patients.

Diffuse changes in brain activity were recorded on the electroencephalogram (EEG) in 56 (81.2%) patients, it was a slow waves of delta and theta diapason, as well as individual paroxysms or bilaterally synchronized flash-based potentials. In 9 (13%) patients bilaterally synchronous generalized outbreaks of strain or reduced peak-wave complex, multi-pulse peak-wave and high-amplitude sharp waves with a frequency of 2-4 count/s, were found.

When MRI was held, in all patients in addition to the identified signs of brain tumors, various structural and morphological changes were diagnosed: hydrocephalus - in 33 (47.8%), atrophic changes in the cerebral cortex - in 26 (37.7%), arachnoid cysts - 7 (10.1%).

In 1 group, with a focus of epileptic foci in the right hemisphere the following disorders of higher mental functions were found: dysmnestic disorders in 7 (21.8%), psychomotor paroxysms in 14 (43.8%), twilight disorders of consciousness in 2 (6, 3%). Affective disorders manifested as melancholy in 17 (53.1%), anxiety in 14 (43.8%) and combined with the olfactory and tactile hallucinations in 3 (9.4%).

In 2 group, with a focus of epileptic foci in the left hemisphere, speech disorders identified as aphasia in 13 (35.1%), sensory in 9 (24.3%), amnesic in 5 (13.5%), damage of verbal thinking (thought dips) in 10 (27%), violent thoughts in 12 (32.4%), memory lapses in 11 (29.7%), agnosia in 8 (21.6%), apraxia 7 (21.9%). Psychomotor paroxysms occurred in 6 (16.2%), depersonalization and derealization status - in 4 (10.8%), twilight disorders of consciousness - in 2 (5.4%), auditory and visual hallucinations - 9 (24.3 %) patients. Violations of verbal memory occurred in 7 (21.9%).

Using neuropsychological tests a number of features in functional asymmetry and disorders of higher mental functions was revealed, due to the localization of epileptic foci. In right hemisphere localization - dismnesic, psychomotor and twilight disturbances of consciousness were observed, as well as state of derealization and depersonalization. When talking about left hemisphere involvement there was auditory and visual hallucinations, speech disorders, verbal memory and thinking, agnosia and apraxia, which coincided with the data of various authors (11).

In preoperative period, disorders of expressive and impressive speech, verbal memory and visual-spatial modality mainly were observed. In right hemisphere epileptic foci mainly visual dysmnesia was observed. And in left hemisphere - disorders of speech and verbal memory were observed.

There was a growth of higher mental function disorders in postoperative period (1.5 - 2 months.): aphasia, verbal memory, speech disorders in the form of sensory and amnesic aphasia, disorders of thinking and verbal agnosia. Increase of the mentioned violations was noted dominantly in patients with left-hemispheric localization of epileptic seizures. Repeated neuropsychological study 6 months after surgery, showed compensation of lost mental functions, mainly disorders of speech, verbal memory and visual dysmnesia.

The obtained data indicate that the use of standardized neuropsychological tests helps to clarify the topography of the epileptic focus, examine the extent of compensation for the lost mental functions in the nearest, and late postoperative periods in patients who underwent surgical treatment because of brain tumors, combined with seizures.

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