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NEUROPSYCHOLOGICAL CHARACTERISTICS IN DIFFERENT MIGRAINE FORMS

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Annotation: Migraine is a common neurological disorder characterized not only by recurrent headache attacks but also by a wide range of cognitive and emotional disturbances. In recent years, increasing attention has been paid to the neuropsychological characteristics of migraine, as these features significantly affect patients' quality of life, daily functioning, and social adaptation. The severity and nature of neuropsychological impairments may vary depending on the clinical form of migraine, including uncomplicated (simple) and complicated (complex) variants. Patients with different migraine forms may demonstrate changes in attention, memory, executive functions, and information processing speed, both during migraine attacks and in the interictal period. Complex forms of migraine are more often associated with pronounced neuropsychological deficits, including impaired concentration, reduced working memory capacity, emotional lability, increased anxiety, and depressive symptoms. In contrast, individuals with uncomplicated migraine typically exhibit milder and more transient cognitive disturbances, which are often reversible and closely related to headache frequency and intensity. The pathophysiological mechanisms underlying neuropsychological changes in migraine are multifactorial and include cortical hyperexcitability, altered functional connectivity, dysregulation of neurotransmitter systems, and recurrent pain-related stress. Repeated migraine attacks may contribute to cumulative cognitive effects, particularly in patients with long disease duration and high attack frequency. This review highlights the neuropsychological characteristics observed in different migraine forms and emphasizes the importance of comprehensive neuropsychological assessment in migraine patients. Early identification of cognitive and emotional disturbances allows for more individualized treatment strategies, improved therapeutic outcomes, and better long-term prognosis.

Keywords: Migren, HADS, SF-36, MoCA, mental health

Introduction. Migren is one of the most common neurological diseases worldwide, accompanied by pulsating headaches. According to the International Classification of Headaches (ICHD-3), it is divided into two main types: simple (without aura) migraine and complex (with aura or acute neurological symptoms) migraine. Aura manifests as visual, sensory, speech, or motor changes and is an expression of temporary electrophysiological imbalance in the brain. Scientific literature notes that cortical spread-depression, trigeminal-vascular system activation, serotonin imbalance, genetic polymorphisms (CACNA1A, ATP1A2, SCN1A) play an important role in the pathogenesis of migraine.

Neuropsychological studies of recent years show that migraine has a significant impact not only on pain symptoms but also on cognitive function (memory, attention, performance), emotional state, and quality of life. In patients with complex migraine, these changes were more profound, which is explained by a decrease in functional connection in the brain during neuroimaging studies (MRI, PET), functional changes in the anterior singular cortex, thalamus, and limbic structures.

In many scientific articles (Shah et al., 2020; Dodick, 2019; Lipton et al., 2021) emphasize the connection between migraine and mental health, noting that the prevalence of anxiety and depression in migraine patients is twice as high as in the general population. Such psycho-emotional stress leads to accelerated pain attacks, decreased quality of life, and social isolation.

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From this perspective, it is becoming increasingly relevant to evaluate migraine types not only by clinical and neurological signs but also by cognitive, affective, and psychosocial changes. The application of international criteria such as SF-36, MoCA, and HADS allows for a multifaceted assessment of patients' condition and the selection of an individual treatment strategy.

The purpose of the study is to identify differences in the quality of life, mental health, and cognitive functions between patients with simple and complex migraine, analyze their statistical significance, and deepen the study of the neuropsychological consequences of migraine.

Materials and methods. Two groups - patients with simple migraine and patients with complex migraine - participated in the study. Patients were evaluated according to the following criteria:

SF-36 Quality of Life Scale (physical and mental health domains),

HADS (Hospital Anxiety and Depression Scale) - anxiety and depression level,

MoCA (Montreal Cognitive Assessment) - Assessment of Cognitive Functions.

The average values were presented as M ± m, the differences between the groups were assessed according to the t-criterion. $p<0.05$ was accepted as statistically significant.

Results of a comparative analysis of neuropsychological indicators in simple and complex types of migraine

Indicators	**Common migraine (M ± m)**	**Complicated migraine (M ± m)**	**t-test**
Physical functioning	85.07 ± 0.72.	79.9 ± 0.72.	5.08**
Physical Restrictions (Role Physical)	76.79 ± 1.14	75.2 ± 0.82	1.13.
Body pain	78.6 ± 0.79	76.7 ± 0.57	1.95
General health	84.8 ± 0.15	79.1 ± 0.69	8.07**.
Satisfaction with life	76.5 ± 0.56	77.5 ± 0.57	-1.25.
Social functioning	80.4 ± 0.25	76.2 ± 0.64	6.11**
Role-based emotional limitations	73.95 ± 0.76	74.1 ± 0.62	-0.15
Mental health	83.95 ± 0.37	75 ± 0.69	11.43**.
HADS (depression/anxiety index)	16.95 ± 0.14	13.8 ± 0.18	13.81**
MoCA (cognitive assessment scale)	25.8 ± 0.14	23.22 ± 0.09	15.50**.

*Note: **<.00001. these differences are recognized as statistically significant at a level of $p<0.05$.*

Results: In terms of physical activity, patients with complex migraine experience significant limitations in physical activity ($t=5.08$; $p<0.05$). This condition is explained by limited activity due to prolonged attacks, neurological disorders, and episodes of recurring pain.

Although there is a difference between the two types in terms of physical limitations and pain, it was noted that its statistical significance is insufficient or is at a close border. That is, in the complex type, the pain is stronger (76.7 points), but in some patients, this difference remained insignificant due to the acclimatization or adaptation to pain.

In terms of overall health indicators, patients with complex migraine scored 79.1 points, which is significantly lower than patients with simple migraine (84.8 points). This difference has high significance ($t=8.07$), which means that in the complex type, patients generally feel worse.

The indicator of social activity is lower in the complex type (76.2 points), which is associated with the patient's detachment from social relations, limited communication due to migraine attacks, cognitive impairments, and anxiety states. This difference is also significant ($t=6.11$).

Mental health and HADS are characterized by sharply lower results in the complex type. The mental health indicator in the complex type was 75 points, while in the simple type it was 83.95 points. This is due to the psycho-emotional intensity of migraines, the psychological stress

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associated with aura, and a predisposition to depression. According to the HADS scale, the complex type score is also significantly higher (16.95), which indicates a high level of anxiety and depression.

Results on the MoCA scale also reveal the cognitive impact of migraine. In the complex type, the average score was 23.22, which indicates a decrease in cognitive functions (attention, memory, thinking). In the normal type, this indicator is 25.8, which is close to normal. The t-criterion is 15.50, indicating a very high significance of the difference.

In patients with a complex type of migraine, a significant decrease in the quality of life is observed in many areas, especially in mental health, social activity, and cognitive functions. This condition is due to the fact that the complicated type proceeds with aura, central sensitization, sensitivity to light and noise, and additional neurological and psychological complications. These indicators indicate the need to introduce pathogenetic approaches, cognitive rehabilitation, and psychotherapy into individual treatment tactics.

Conclusion

1. In patients with complex migraine, a significant decrease in SF-36, MoCA, and HADS indicators was noted ($p<0.05$).
2. The level of mental health, anxiety, and depression in the complex type is extremely high, leading to psychoemotional instability combined with headache syndrome.
3. Cognitive functions are particularly significantly impaired, indicating the profound neuropsychological consequences of migraine.
4. During treatment, only analgesic and migraine-stopping therapy is insufficient; cognitive training, psychological support, and comprehensive rehabilitation are necessary.

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