DIAGNOSTIC EVALUATION OF CENTRAL NERVOUS SYSTEM DYSFUNCTION THROUGH COGNITIVE ASSESSMENT IN ISCHEMIC STROKE

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Abstract: A previous stroke is a major factor in the development of cognitive impairment. Cognitive dysfunctions are among the earliest manifestations of disturbances in the nervous system. In clinical practice, various psychophysiological tests and their combinations are used. This article presents the results of applying the MMSE and MoCA scales. The study included 53 patients (23 women and 30 men) aged 55 to 75 years.

Key words: cognitive dysfunctions, scales, MMSE, MoCA.

Introduction. Stroke is the second leading cause of death and disability worldwide. Approximately 2,400 strokes occur per 1 million people each year. The incidence of stroke and its consequences continue to rise due to population aging and comorbid conditions. In most patients, ischemic stroke (IS) leads not only to motor and sensory impairments but also to cognitive dysfunction, which contributes significantly to disability, complicates rehabilitation, and reduces the quality of life for both patients and their families.

Cognitive functions represent the most complex brain activities responsible for rational perception of the world. These include memory, gnosis, speech, praxis, and intellect. Since cognitive functions are associated with integrated brain activity, cognitive impairment naturally develops in both focal and diffuse brain lesions. The longer the time elapsed since the onset of stroke, the greater the role of cognitive disorders as a cause of disability.

The type of stroke—ischemic or hemorrhagic—significantly influences mortality and disability rates. Ischemic stroke occurs more frequently and leads to reduced functionality in survivors, while hemorrhagic stroke is associated with higher mortality rates. In recent decades, the number of people surviving the acute phase of ischemic stroke has increased. According to the Global Burden of Disease study (2016), approximately 13.6 million people suffer a stroke each year (9.6 million ischemic and 4 million hemorrhagic), whereas 79.6 million people live with its consequences (67.6 million ischemic and 15.3 million hemorrhagic).

A prior stroke is the main factor contributing to the development of cognitive impairment (CI). Studies report widely varying rates of post-stroke CI, depending on patient age, comorbidities, diagnostic criteria, and neuropsychological methods used. In an international study conducted in 12 countries, 30% of patients had CI (<27 points on the MMSE scale). In studies from Sweden and the UK, CI was found in 24–39% of patients according to MMSE, and in 96% after detailed neuropsychological testing three months post-stroke. Finnish researchers reported that 83% of patients exhibited impairment in at least one cognitive domain three months after stroke, and in 50% of cases, it was multifactorial. French data indicate that among patients without prior dementia who experienced their first stroke, CI was found in 47% after three months.

The severity of cognitive impairment depends more on the location of brain lesions in areas critical for cognition than on the infarct volume. Post-stroke CI can result not only from focal vascular brain damage but also from coexisting degenerative or vascular pathologies exacerbated after stroke. The prevalence of CI increases with age, recurrent strokes, hypertension, atrial fibrillation, diabetes mellitus, and depression, and decreases with higher educational level.

Purpose

To study the features of development and clinical course of cognitive impairments using assessment scales in patients after ischemic stroke.

Materials and methods

The study included 53 patients (23 women and 30 men) aged 55–75 years, all diagnosed with ischemic stroke in the early recovery period (with hemiparesis of 3–4 points). The duration of the disease ranged from 1 to 6 months. All 53 patients completed the study. Exclusion criteria included severe motor or sensory impairments that could hinder neuropsychological testing, as well as severe or unstable somatic diseases, major depression, or other clinically significant neurological or psychiatric disorders. All patients underwent comprehensive clinical, neurological, and neuropsychological testing, including the MMSE and MoCA scales.

Results and discussion

A history of arterial hypertension was present in 92% of patients, ischemic heart disease in 54.5%, and diabetes mellitus in 32%. The Montreal Cognitive Assessment (MoCA) revealed that in patients aged 55–65, memory, speech, and executive skills were most often affected. In the 66–75 age group, abstract thinking worsened, and after 75 years, attention deficits were also noted. In general, cognitive function among middle-aged patients corresponded to average levels, while in older patients it was below average or indicated a pre-dementia state.

The Mini-Mental State Examination (MMSE) showed that in patients aged 55–65, memory, attention, and arithmetic operations were impaired. In the 66–75 group, additional deficits in performing sequential actions appeared, and after 75 years, perception and speech were also affected.

Conclusion

The peculiarity of this study lies in the fact that patients had minimal speech and motor impairments, and their disability was largely determined by cognitive deficits. The progression of these impairments over time may significantly contribute to increased disability and reduced quality of life. The use of comprehensive assessment methods, including both quantitative and qualitative neuropsychological tests, allows for a more accurate determination of neurological deficits and higher brain functions in patients with ischemic stroke, as well as timely initiation of appropriate therapy and evaluation of its effectiveness. Among various diagnostic tools, the MMSE and MoCA scales are the most practical and effective for use in clinical neurology.

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