

## HIPPOCAMPAL DYSFUNCTION AS PREDICTOR OF POSTOPERATIVE DELIRIUM IN ELDERLY PATIENTS WITH CARDIAC SURGERIES

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**Background:** Development of an acute cerebral dysfunction in a form of delirium after cardiac surgeries is common general medical problem that associated with prolonged hospital stay after the surgery, risk of development of infection, risk of subsequent neurocognitive changes, and postoperative morbidity.

ICD 10 defines delirium phenomenologically as exogenous psychosis and the main criterion is disturbance of consciousness. In DSM 5 delirium describes in Criteria A as disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment) and Criteria B as disturbance that develops over a short period of time, represents an acute change from baseline attention and awareness, and tends to fluctuate in severity during the course of a day.

The risk factors of development of postsurgical delirium are traditionally divided into preoperative (baseline), perioperative and postoperative. Significance of preoperative risk factors (gender, education, smoking, using alcohol, and other psychoactive substances) usually derived from the major retrospective studies and not accepted by all researchers. One exclusion is the age, the only well-established factor of development of postoperative delirium.

Complex pathogenesis of postoperative delirium including proven disbalance of neurotransmitter systems sustaining cascade of pathological reactions represents relationships between delirium and cognitive disturbance. According to several studies, clinically significant cognitive disturbances diagnosed before surgical intervention can be predictors of postoperative delirium. Results of the different studies showed that postoperative delirium can be independent risk factor of developing of dementia. Both statements show the cohesion of postoperative delirium and cognitive disturbances and allow seeing relationship “Diathesis-Stress,” where biological stress represents the relationship between peri- and postoperative impacts on CNS of the patient, his cognition. Developing of delirium is seen as disturbance of adaptation and brain capacity.

According to this conception, it’s important to establish early markers of brain dysfunction, for example, neurodegeneration, that can be predictors of postoperative delirium. Screening of the cognitive disturbances used in the majority of studies targets mostly significant changes reaching dementia level. Resolution ability of neuroimaging commonly used in clinical practice (MRI and CT brain) doesn’t allow detecting early (preclinical) signs of brain pathology.

One of the most common age-specific pathologies of the brain Alzheimer’s disease has slow-progressive course and doesn’t have clinical symptoms defining beginning of the disease. In the early stages memory issues and other neurocognitive symptoms don’t affect day to day life and normal functioning. This stage of the disease is represented by some local hippocampal dysfunction that can be confirmed by specific neuropsychological tests. In spite of mild clinical symptoms, all pathological processes are continuing to develop and represent neurodegeneration. Therefore, timely detection of mild cognitive disturbance hippocampal type shows brain vulnerability towards external factors (peri and postoperative factors), and becoming predictor of failed adaptation, clinically presented as postoperative delirium.

**Purpose of the study:** to compare risk of development of postoperative delirium in elderly patients with and without hippocampal dysfunction.

**Research objectives:**

- Assessment of hippocampal function in dynamics in patients after cardiac surgeries (preoperative and early stages of postoperative period).
- Testing of hypothesis about correlation between hippocampal dysfunction in preoperative period and subsequent developing of delirium.

**Subjects and methods:** Type of study: selective observational longitudinal study of the same group of objects in pre and postoperative period.

Inclusion criteria: males and females older than 65 years old having indication for cardiac surgery.

Methods: neuropsychological testing (FCSRT-IR), statistical analysis.

**Results and discussion:** For the diagnosis of degenerative process in CNS on early stages Free and cued selective reminding test immediate recall (FCSRT-IT) was shown to be the most sensitive. Based on learning of verbal material and semantic cues with recalling, FCSRT-IT allows differentiating amnesic disturbances hippocampal type from secondary disturbances of memory due to neurodynamic changes.

Comparing different memory assessment tests and biomarkers of Alzheimer's disease (A $\beta$  (1-42) / tau-protein), has shown that FCSRT-IT test is the best in detecting early signs of degeneration of Alzheimer's type.

Many patients in elderly have increased risk of postoperative delirium.

There is a need for developing of algorithm of diagnosis and assessment of risk factors of this pathology. Understanding of pathogenesis and predictors of developing of postoperative delirium would allow using prophylactic measures before surgical treatment.

Timely and comprehensive assessment allows detecting postoperative delirium on early stages and increasing quality of psychoneurological help in these patients.

**Conclusion:** Hippocampal dysfunction is a factor of developing of postoperative delirium in elderly patients that requires using additional measures in patients with mild cognitive disturbance to prevent developing of postoperative delirium.

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## AGE-RELATED CHANGES OF COGNITIVE FUNCTIONS OF MEDICAL WORKERS

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**Background:** The current socio-demographic situation is characterized by an aging population. Globally, the group of people aged 60 years and older is growing at a faster rate than other population groups. Ageing is accelerating in all regions of the world. In this regard, older persons are increasingly seen as active participants in the process of social development. This determines the need for the elderly person to be an active subject of the social process and retain their cognitive abilities. To maintain adequate social activity and preserve "social capital", longterm good physical and mental health is necessary. The quality of "social capital", social activity, participation in decision-making in the community, lack of need for care in everyday life, the depth of social relations are related to the quality of the cognitive functions of the elderly. Cognitive disorders limit the possibility of participation of an aging person in social and production processes and require additional costs from family members, society, social services and health care, the state for the maintenance and treatment of an elderly person. Diagnostic criteria of age-related cognitive forms are contradictory and insufficient. Researchers and clinicians note that it is very difficult to distinguish "normal aging" from degenerative and cerebrovascular pathology. This is due to the lack of sensitivity of standard neurocognitive scales. A large-scale study of aging in a large national sample of older people in England showed that cognitive aging has several possible trajectories. Gender-specific models included age, sex, education, financial condition, concomitant somatic diseases, physical activity, alcohol intake, Smoking, depression. Gender, age, depression, physical inactivity were important parameters for the rate of General aging. Of the cognitive functions, Executive functions and global cognitive function were the most sensitive. The review of studies shows the lack of a unified methodological approach to the assessment of neurocognitive functions in aging. Fixation of disparate indicators does not allow understanding the process of General cognitive aging. Varako N. A. et al. neuropsychological assessment by A. R. Luria (praxis, gnosis, reading, calculation, attention, memory, reasoning, visual-spatial and Executive functions) was used. Heterogeneity of cognitive aging, neuropsychological mechanisms of possible compensation of reduced functions were revealed. Intensive rates of demographic aging, the need to maintain social and cognitive activity of the elderly determine the relevance of studies of normative aging. The lack of a unified methodological approach to the study of normative aging and a standardized set of cognitive assessment tests allows developing their own psychometric tools.

The aim of the study is to investigate age-related dynamics of cognitive functions of health workers as members of society.

**Subjects and methods:** Participants of the study-148 employees of medical institutions: 12 men, 136 women, their age ranged from 27 to 74 years. The average age was 45.1+5.7 years. Inclusion criteria: 1. Right-handed (leading right hand). 2. There are no clinically significant diseases (somatic and mental disorders) in the history. Neuropsychological and statistical research methods were applied. The research tool was the neuropsychological rapid method, including the subtests: "Memorizing 9 words in three