

## NEUROPSYCHOLOGY IN THE SERVICE OF PREVENTIVE MEDICINE AND STANDARD CLINICAL EXAMINATION

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*Paper offers practical techniques for conducting Neuropsychological studies and recommendations for content opinions issued on aged patients receiving ambulatory, as well as conditionally healthy citizens during examinations.*

**Objective:** *To create a Neuropsychological study program of non-invasive adult population in order to prevent disturbances of the brain, strokes, falls in health during examinations and for diagnosis of age-related brain changes.*

**Materials and methods:** *Review and layout in accordance with specified objectives of early detection of organic brain dysfunctions and disorders of cognitive activity, sensitivity analysis and applicability in pursuit of predetermined objectives of order techniques offered in Neuropsychological albums, as well as selected subsidiary methods study of higher cognitive functions.*

**Results:** *Paper provides a list of Neuropsychological diagnostic methods recommended for introducing into examinations and approximate structure of proposed written opinion.*

**Conclusion:** *A standard has been suggested for non-invasive investigation techniques for the initial diagnosis and safety control during the examinations in the context of the preservation of higher mental functions and brain health.*

**Keywords:** *quality of life; preventive medicine; higher mental functions; clinical examination; stroke prevention; diagnosis of neuropsychological; cognitive impairment; behavioral disorders; organic brain disorders.*

### Introduction

During the last decade more attention is being paid to preventive medicine [2, 4 and al.], early diagnosis, and in particular, – prophy-

lactic medical examination of the population (including additional) [3, 11, 18, 19, 23, 26–28, 34, 37, 48, 66, 73, 77, 81, 83, 85, 98, 99] to optimize health care in terms of health insurance and considering the imperative of minimizing the costs and complying with the treatment standards. Whereas due to the presence of appropriate medical technology for heart attack and prevention of hypertension, diabetes, atherosclerosis, as well as consultation of mammology, mammography, research on HIV and other working age significantly reduces the risk of mortality measures has long been occupying a place in the minds of countrymen [58, 69, 85 and al.], the measures for early diagnosis and prevention of diseases of the brain (including vascular disease, geriatric change effects of teratogenic effects on the production of [17, 18, 19, 20, 22, 29, 33, 37, 47, 51, 53 56, 60, 62, 64, 67, 69, 71, 73, 78, 79, 86, 91], etc.), stroke prevention and disorders of higher mental functions [5, 6, 9, 12–16, 20, 21, 25, 32, 35, 38, 39, 40, 42, 46, 49, 50, 52, 54, 55, 57, 59, 61–63, 67, 70, 72, 74–76, 80, 84, 87–91, 93, 96, 100] aren't yet so familiar to the consumer. On the other hand, experience with the demands of customers in pharmacy (retail outlets – pharmacies State budget institution of Health “Center for Pharmaceutical QA” of the Department of Health of the City of Moscow, the observation time – April 2012 – March 2016 years) shows that up to 70–80% of the population over the age of 50 years applies to the pharmaceutical retail trade in order to purchase drugs specifically for the treatment of diseases and to mitigate the symptoms of cerebral, vascular and general cognitive impairment [36]. This refers to the observation relating to the demand for tablet form products “Mexidolum” (“Mexicor”), “Actovegin”, “Cavinton” (“Vinpocetine”), 5 mg / 10 mg, “Cinnarizinum”, “Picamilonum” 50 mg, “Trental” (“Pentoxifylline”) of 100 mg and 400 mg, “Phezam”, “Betaserc” (“Vestibo”, “Betaver”, “Betagistine”), 24 mg / 16 mg / 8 mg, “Tanakan” (“Bilobil”, “Ginkoum”, “Ginkgo-Biloba”), “Nootropil” (“Piracetam”) 400 mg / 800 mg / 1200 mg, “Phenotropil”, “Milgamma Compozitum”, “Neuromultiv-it”, “Combilipen”, ampoules “Actovegin” 1 ml / 2 ml / 5 ml / 10 ml,

“Cerepro” 4 ml, “Cerebrolysin” 1ml / 2 ml / 5 ml / 10 ml, “Trental”, “Mexidolum” 2 ml / 5 ml, “Milgamma” et al. Pharmaceuticals taken in long tablet form, but on the background of symptoms (usually a general decline in cognitive function, memory, often undiagnosed persistent dizziness, tinnitus and others) significant improvements are no longer observed. In some cases, in addition to age-related changes, such violations are provoked teratogenic factors such as alcohol, smoking, exposure to chemical pollutants and conditions in producing or general adverse environmental conditions [10, 18, 19, 37, 57, 64, 76]. Young people and children born with impaired functioning of the structures of the brain [24, 29, 30, 62, 90] represent high-risk group. As a rule, in the diagnosis of mild cases or when it detects the first signs of violations are reduced at best to consult a neurologist, who appoints the patient quite expensive medications for long-term use, it does not guarantee complete rehabilitation. Many patients do not return to re-consult, taking these drugs uncontrollably for a long time. According to modern standards of service hospitals patients as outpatient and inpatient required standard unit is the rate of a clinical psychologist. A clinical psychologist is responsible for assisting in the detection of pre-medical during mass prophylactic medical examination of the first signs of higher mental functions disorders, dysfunctional manifestations in the brain. This approach in neuropsychology (serving the needs of preventive medicine) and in the diagnosis of patients with chronic conditions or working in hazardous occupations has become firmly established in the science in the 1970s. [6, 8, 10, 15–17, 20–24, 29, 31, 33, 44, 47, 51, 53–56, 59–62, 65, 68, 69, 79, 82, 86, 89, 91, 92, 94, 95, 97] Neuropsychological diagnostic role in the monitoring of healthy individuals working age and the age of patients age can hardly be overestimated: it is an important “input” (to determine the localization of organic brain lesions or to eliminate them), as well as for the current / total control of the state and confirm the effectiveness of therapeutic interventions, to avoid cumulative effect of exposure to teratogens on respondents of working age in dynamics

(for example, in hazardous industries with high noise levels, chemical exposure and others on working time of the contract).

### **The purpose**

Discussion and reasoned recommendation is included in a standard clinical examination of the existing non-invasive low-cost and diagnostically reliable procedures that detect the early stages of dysfunction of brain structures, and as a consequence – early breach of higher mental functions, as well as characterizing the dynamics of the patient's condition at low cost, including processes described for mild cognitive impairment in the elderly.

### **Data for study**

1) self-assembled “blinded” full neuropsychological testing protocols “Mental Health” clinic patients, Moscow; 2) neuropsychological written opinion (over 100), made during the initial reception, support and rehabilitation of patients suffering from disorders, including food, diseases of the nervous system and psyche in the clinic “Mental Health”, Moscow.

### **The object of study**

The potential neuropsychological diagnostic techniques for use in the course of clinical examination for early detection of dysfunctions and organic brain lesions in patients of old age and contingent working in hazardous environments.

### **Subject of research**

A set of techniques of structuring and sequencing for implementation in the clinical examination of the procedure and in the routine medical examinations for early detection of disorders of higher mental functions and brain dysfunction in patients with mass of preclinical diagnosis (in this case additional medical examination), at the patients aging, with the aim of monitoring the state of the brain, as well as

prevention of stroke and timely correction of gerontological changes in cognitive processes.

### **Fundamentals**

The central task of neuropsychological research was based on the representation of the system structure of higher mental functions, – according to which each function is a complex functional system consisting of many units, – and assisted by the theory of dynamical localization, according to which the infringement of the same function takes place, therefore depending on different units affected, as well as basing the theory of neuroplasticity, – to determine the quality and qualification of the symptom as much as possible, and clearly indicate the zone the most likely mechanics of violations.

### **Methods**

Analysis techniques, procedures implementing neuropsychological methods contained in diagnostic albums [8, 24, 65, 82, 92, 94, 95, 97] as well as the suitability of analysis for use during a baseline medical examination, clinical examination of certain additional techniques possessing such features as small time-consuming and high diagnostic ability to accurately determine the localization of dysfunction.

Evaluate and follow a comprehensive selection of neuropsychological diagnostic techniques and methods of physiological and psychological functional systems of the following criteria: 1) the diagnostic power / reliability (a) describe the presence of cognitive impairment; b) determining the localization of dysfunction), 2) the time required to conduct research and data processing, 3) the possibility of rehabilitating measures of the study; 4) the possibility of subsequent significant current change control, 5) the admissibility of the application in a high density stream of patients / conditionally healthy respondents in a medical examination, 6), the criterion of social good. The main criteria for selection are techniques – the ability to realize during exercise localization principle, the result of the accuracy, reproducibility exercise in dynamics.

At least to perform a minimum set of neuropsychological tests to patients, including jobs reading, arbitrary and on the instructions of drawing, play of words, phrases, images, association, reasoning and interpretation, the ability to reproduce the position of the body / identify the body posture / shape of the object, emotional gnosis and others. To determine with a high degree of probability the presence of disorders of higher mental functions in patients with lesions of the brain to distinguish between sensory and gnostic disorders, to determine their location, make syndromic analysis and analysis of neuropsychological factors.

Along with a set of exercises classical neuropsychological albums (in the traditional paper form and the automatic processing), neuropsychologists practitioners, depending on the specifics of the surveyed persons and the alleged violations can be optionally used, and even successfully developed (e.g., experimental methods B.V. Zeygarnik, T.G. Vizel et al.), non-invasive methods for the study of conservation areas of the brain and higher mental functions. The study is preceded by the establishment of compliance and gathering extensive medical history, which in neuropsychological diagnostics is briefly mentioned in the preamble to conclusion, including the purpose of the rational organization of medical examination of the electronic card member / patient.

### **Results of the study**

In the course of neuropsychological studies of clinic patients in the outpatient reception, reinvestigation and dynamics in the office of clinical psychologist the conditional “standard” neuropsychological research and content writing neuropsychological conclusion of the diagnosis of adults was determined as relatively healthy, working-age, so and for aged patients to prevent aging and early detection of various cognitive dysfunctions, as well as areas of the brain.

Approximate volume extended neuropsychological conclusion may consist of up to 5 sheets of A4 format with half interval, size 14 (about 10 000 printed characters) in comparison with a brief (usually

with tenths symbol of preservation of a function / of the assignment), holding to a single sheet.

Before analyzing the results of neuropsychological album assignments summarizing of the history must be made, the survey basing on which to detect the causes of possible violations of the brain functioning. Order of birth is specified, with the special features of the birth, life history – about the health of the facts and length of life of the parents, significant diseases (injuries) patients from birth, affect the state of the brain (fever cases, concussions and al.). Accessibility of the patient productive contacts, specific judgment and thinking is described, including the ability to engage in dialogue, to observe interpersonal distance, to absorb the job and keep up the pace. Conclusion should list the patient's complaints of physical and cognitive negative subjective experiences, indicate the patient called significant events leading to shocks / changes in health / behavior, regularly affecting the general condition of the patient teratogenic microfactors, including manufacturing (e.g., day mode). It also shows features of the patient's psycho-emotional reactions in the area, condition of the patient's own self-assessment of higher mental functions and their changes over time, possible problems with the body perception, motor responses (the registration of hypochondria, gipernozognozia, anosognosia and al.). These data history – compared with the observation neuropsychologist during interviewing optionally in the evaluation of the statements used PANSS tests [103], the GAF and the PSP [104], YMRS [101] OASCL [102], and others from traditional psychological questionnaires because of the limited time and other research problems – may, nevertheless, be used in the test of K.Leongard, G.Shmishek "Accentuation of character and temperament" (1970) with the automatic processing and Minimult – "Multifactor diagnostics instruments "Minimult v 3.0 (An abbreviated version of the MMPI)" (compact, but reliable version of SMIL / MMPI) [1]. Inclusion of test methods of data gives reliable information about the violation of socialization, including violations of behavioral and psycho-emotional.

Actually the study begins with the initial testing of auditory-verbal memory: 1) play an immediate and deferred 10/5 words, 2) the reproduction of a series of 3 words with the study of contamination memory, 3) play two proposals to the study of contamination; reading and retelling of the text – reproduction and interpretation of the content of (direct / trace). Evaluated speech – distinguishing sounds, articulation, kinetics, nomination, understanding, intonation, relevance possession voice, simultaneously measured the acoustic nonverbal gnosis (the distinction of playing and rhythm). We investigate the patient's attention to the assessment of efficiency of performance (index of perception of tempo and sensorimotor reactions and attention), the rate of entry into operation level, mental stability, dynamics, time parameters and others. With Schulte tables (red-black square by Gorbov), sample Münsterberg, proofreading test. Held on the functional asymmetry of the sample (and possibly a deep survey using the "Profile" of the system). It is proposed to test a visual memory – without drawing a direct observation of the object / delayed 6 figures, as well as in optical-spatial gnosis: redraw/copying figure by Taylor (left hand) and by Rey-Osterrieth (right hand) and delayed reproduction. Necessary sufficient jobs kinesthetic Gnosis / praxis: the identification of objects, dynamic test "fist rib palm" blind transfer poses for kinesthetic sample, two-handed sample control perception of body schema. This exercise should use Kraepelin, the sample to perform arithmetic operations on selective attention (Stroop test), job icons Association (pairs / simple / complex analogy), "Exclusion items" / "Exclusion concepts" (4–8 Series depending on the characteristics of the patient's response), the allocation of the essential features of the concept, analysis of the perception of the values of phraseology and proverbs. Written opinion on the patient / conditional healthy respondent, in addition to a gentle display history should include not only conclusions about the state of functions (including those with a score of), but also the results of the job with a list of proposed stimulus material (for the possibility of a repetition of research neuropsychologist with specific intervals, for example, during the clinical examination of the following



drugs or receiving end). It concludes with a description of the state of emotional and volitional, dynamics and arbitrary regulation of activity. General conclusion is completed by the identified violations and their localization in the cortex and subcortical structures.

### **Conclusion**

Written neuropsychological conclusion of a document on the patients of working age, the activity of which is related to the influence of harmful factors during clinical examination, as well as on elderly patients (or on the testimony of any age), shall present at the general inspection the complaints related to violation of the functioning of the symptoms brain of unknown etiology, and would allow use low cost prenosological methods with a high degree of accuracy for judging the nature of the violations of higher mental functions and brain function in patients or in apparently healthy individuals, as well as provide valuable supporting material for later medical report and forecast further development of symptoms and fix the effectiveness of therapy by changing the results of their assignments.

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