

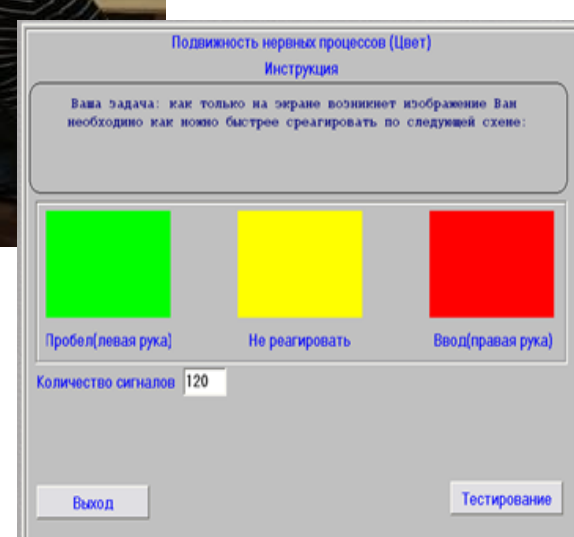
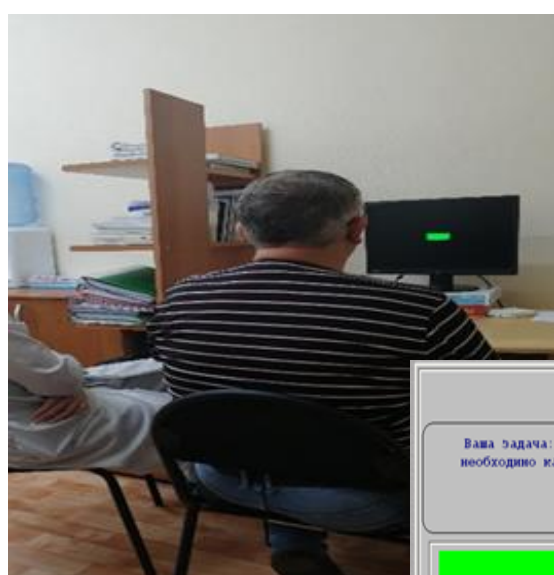
Risk factors for cognitive decline in patients after coronary artery bypass grafting (five-year follow-up)

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AIM: To develop a prognostic model and identify risk factors that may lead to cognitive decline 5-7 years after coronary artery bypass surgery

METHOD



The computer program “Psychophysiological Complex” was used for complex neuropsychological testing with the determination of indicators of psychomotor and executive functions, attention and short-term memory

Preoperative clinical characteristics of patients, n = 152

Characteristics	Patients
Age, years	57 [53; 61]
Arterial hypertension	129 (85)
Carotid artery stenosis	56 (37)
Duration of carotid artery stenosis, years	4 [2; 8]
Coronary artery disease duration, years	5 [3; 8]
Myocardial infarction in history	114 (75)
SYNTAX score	23 [16; 28]
Number of affected arteries	2 [2; 3]
Left ventricular ejection fraction, %	60 [51; 63]

Clinical characteristics of patients

Characteristics	Patients, n = 152		p
	Before the CABG	After 5 years	
Class I-II angina pectoris	86 (57)	30 (20)	0.0004
Class III angina pectoris	33 (22)	5 (3)	< 0.0001
Class I-II CHF	116 (77)	146 (96)	0.001
Class III CHF	36 (24)	6 (4)	0.0007
Atrial fibrillation	5 (3)	12 (8)	0.1
Type 2 diabetes mellitus	21 (14)	39 (26)	0.002
CA stenosis	56 (37)	86 (57)	0.0001

The inclusion criteria were: age 45-69 years, male gender, normal or adjusted to normal vision and hearing, planned primary CABG with CPB. **The exclusion criteria were:** prior acute cerebrovascular accident (CVA), traumatic brain injury, depression (more than 8 points on the Beck's Depression Inventory), dementia (less than 24 points according to the [MMSE](#)), carotid artery stenosis (CA) greater than 50%, severe respiratory, renal and hepatic insufficiency, oncological diseases.

Changes in cognitive functions were calculated using 13 parameters from a common set of tests. Cognitive decline was determined by the “20-20” criterion: postoperative indicators of cognitive functions should be lower by 20% or more compared to preoperative values in 20% of all the indicators used in the study

RESULTS & DISCUSSION

Prevalence of more than 20% cognitive decline in the postoperative period

Cognitive domain	Parameters	Patients, n=146
Neurodynamics	Average exposure	24 (16.4)
	Mistakes	57 (39.0)
	Missed signals	89 (60.9)
Attention	The Bourdon test, processed characters: – during the 1 st minute – during the 4 th minute	12 (8.2) 11 (7.5)
Memory	10 numbers memory test	31 (21.2)
	10 syllables memory test	30 (20.6)
	10 words memory test	36 (24.7)

The main results of binary logistic regression predicting the development of cognitive decline

Step 6	B coefficient	RMSE	Wald	p	Exp (B)
CVA	21.634	16644.068	0.000	0.999	2485603116.578
CA stenosis (5 years)	1.018	0.396	6.625	0.010	2.769
LVEF (before CABG)	-0.925	0.448	4.273	0.039	0.396
Smoking (before CABG)	1.067	0.381	7.841	0.005	2.906
HDL cholesterol (5 years)	1.171	0.617	3.605	0.058	3.226
Triglycerides (5 years)	0.533	0.209	6.527	0.011	1.704
Constant	-2.576	1.208	4.546	0.033	0.076

Classification matrix of the predictive model of cognitive decline in the long-term postoperative period

Actual cognitive decline	Predicted cognitive decline		Percent correct classification, %
	Absent	Present	
Absent	65	14	82.3
Present	26	41	61.2
Total percent of correct classification, %			72.6

CONCLUSION

5-7 years after CABG surgery, 46% of patients experience a decrease in cognitive functions, manifested in the form of neurodynamic disorders, as well as deterioration of short-term memory. The factors included in the prognostic model were CA stenosis, low left ventricular ejection fraction and high triglyceride levels, as well as smoking in patients. This indicates the need to improve approaches to postoperative follow-up of patients who have undergone cardiac surgery in order to minimize adverse neurological consequences.

References: Tarasova I.V., Trubnikova O.A., Syrova I.D., Barbarash O.L. Long-term neurophysiological outcomes in patients undergoing coronary artery bypass grafting. Braz J Cardiovasc Surg. 2021;36(5):629-638. DOI: 10.21470/1678-9741-2020-0390