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CHANGES OF PSG PARAMETERS AFTER CARDIAC SURGERY

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1. INTRODUCTION

Cerebral disorders are the most frequent complication of cardiac surgery and not seldom is associated with: death high risks and high quality of disability. Four neurologic and cognitive complications are observed after Cardiopulmonal Bypass CPB: stroke (the most serious, with an incidence of 1.5 to 5.2%)12; postoperative delirium (10 to 30%)345; and short-term (33 to 83%)67 as well as long-term cognitive changes (20 to 60%). Aim: Correlates Clinical neurological and physiological parameters before and after cardiac surgery.

2. METHODS

In our clinic for the last three years were 507 patients with cardiac surgery. 104 patients out of these (55 men and 49 women) were under neurological monitoring. The patients underwent the following types of cardiac surgery:

Coronary artery bypass grafting (CABG) 74 patient, valve operation in 25 cases, intervention on ascending aorta and aortal arch 5 cases. In 71 cases out of surgical treatments were provided without CBP. In all patients we used PSG (polysomnographic) monitoring before and after cardiac surgery, with AURA PSG system.

3. RESULTS

Postoperative neurological disorder was detected in 69 patients. Patients were divided into three clinical groups. Revealed changes in the PSG parameters: sleep latency, REM latency, sleep stages and etc.

4. CONCLUSION

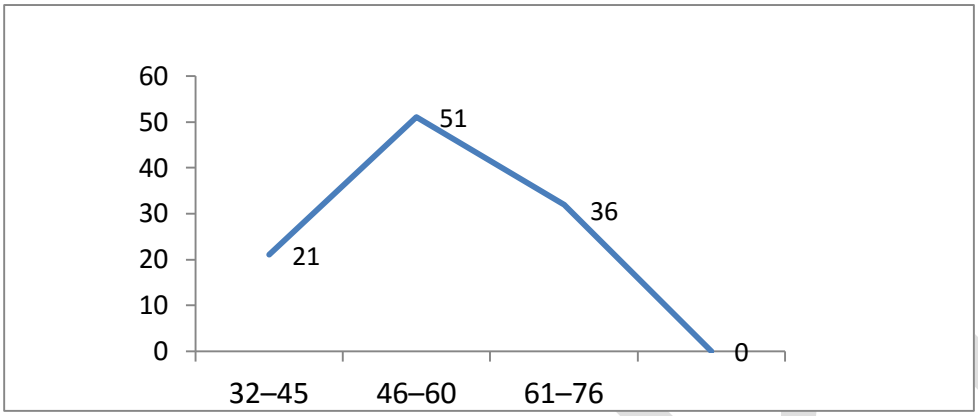
Cardio surgical intervention is high risk of postoperative cerebral disorders. The changes of PSG (Polysomnographic) parameters defends of types neurological disorders after cardiac intervention therapy.

Cerebral disorders are the most frequent complication of cardiac surgery and not seldom is associated with: death high risks and high quality of disability. Four neurologic and cognitive complications are observed after CPB: stroke (the most serious, with an incidence of 1.5 to 5.2%)[12]; postoperative delirium (10 to 30%)[345]; and short-term (33 to 83%)[67] as well as long-term cognitive changes (20 to 60%).[8]. Although the cerebral consequences of cardiopulmonary bypass have been measured clinically, insights into the resulting molecular and pathologic events within the brain have only begun to be investigated. Adverse cerebral outcomes after CPB for cardiac surgery have been well documented.[1] These injuries encompass a wide spectrum, from subtle cognitive impairment to deadly stroke. After cardiac surgery prolonged postoperative cognitive dysfunction (POCD) is reported to occur frequently after cardiac surgery. POCD is characterized by impairment of memory, concentration, language comprehension, and social integration. It can last from some days to some weeks or month after surgery and may remain as permanent disorder.[78] The etiology of cerebral injuries associated with POCD probably represents a complex interaction between cerebral microemboli, global cerebral hypoperfusion, inflammation, and genetic susceptibility.[9101112] Depression of CNS function is a part of anesthesia. This condition is expected to be perfectly reversible and transient, but several complications may arise, some of them causing serious disability. Previous studies[5,8,15] suggest that intraoperative hypotension and multiple emboli in brain microvessels are possible mechanisms for the cognitive decline after cardiac surgery. MRI researches in diffusion held in postoperative period after cardiac surgery showed ischemic stroke in 45% of cases without clinical manifestation. During recent 30 years citicoline as neuroprotector has been studied actively. Placebo-

controled researches in west Europe and Japan reflect the positive effect of this medicine during the severe period of ischemic stroke as well as during neurocognitive dysfunction.

Materials and Methods : 507 patient had cardiac surgery of different kind during 2011–2014. 104 patients were under neurological monitoring in pre and postoperative period, among them 55 men and 49 women, between 32 and 76 years old. Scheme N1 shows division of patient according to age groups.

Scheme N1



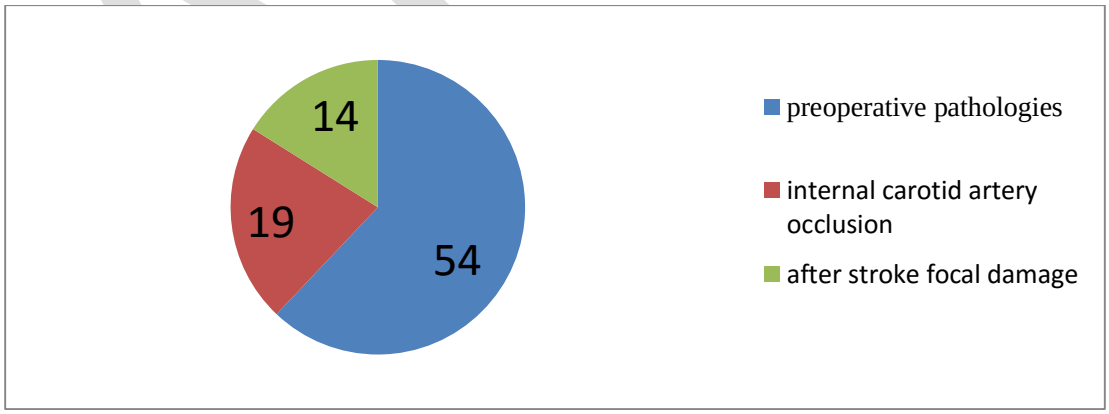
AAs in preoperative as in postoperative periods patients had had:

- Clinico-Neurological estimation
- Neuropsychological tests (MiniMental Status Examination –MMSE, Clock drawing test and etc)
- Neurovisual researches (CT,MRI);
- Dopplerography;
- EEG
- PSG- Polysomnographic monitoring with portable AURA PSG system.

Coronary artery bypass grafting (CABG) 74 patient, valve operation in 25 cases, intervention on ascending aorta and aortal arch 5 cases. In 71 cases out of surgical treatments were provided without CBP.

RESULTS: Researches in preoperative period in 54 patients revealed various preoperative pathologies: stroke, transit ischemic attack (TIA), diabetes, arterial hypertension, chronic renal disorders, arrhythmia and so on. 19 patients had occlusion of internal carotid artery (without clinical manifestation), in 14 patients neurovisually was revealed after stroke focal damage, that is given on scheme N2.

Scheme N2

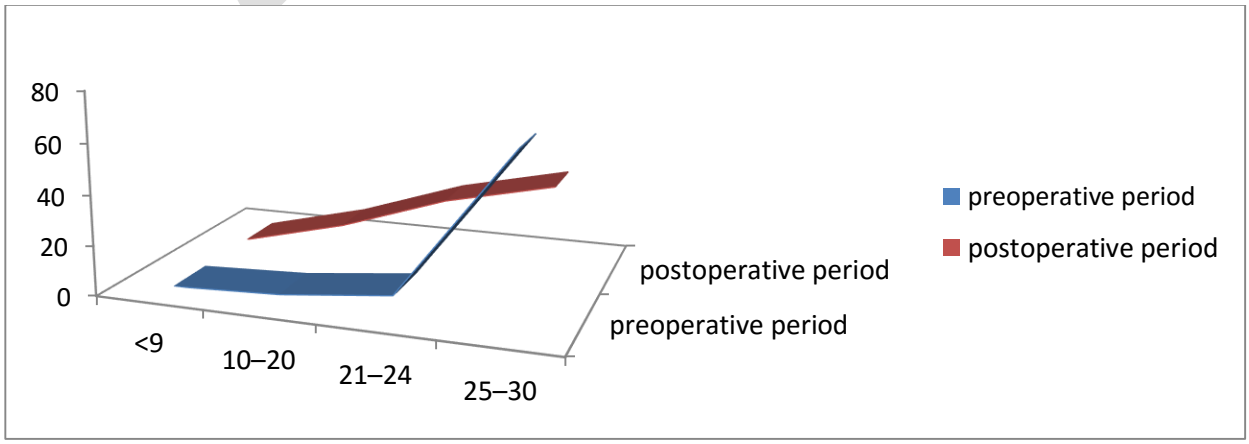


Different kind of neurological disorders were revealed in postoperative period: ischemic stroke– 3 cases; cognitive dysfunction –35 cases; in 19 patient-sleep disorders (nightmares, non-epileptic paroxysms of sleep, sleep apnea and etc.); in 3 cases-epileptic seizures;in 1 cases polyneuropathic syndrome, that is shown in table N1.

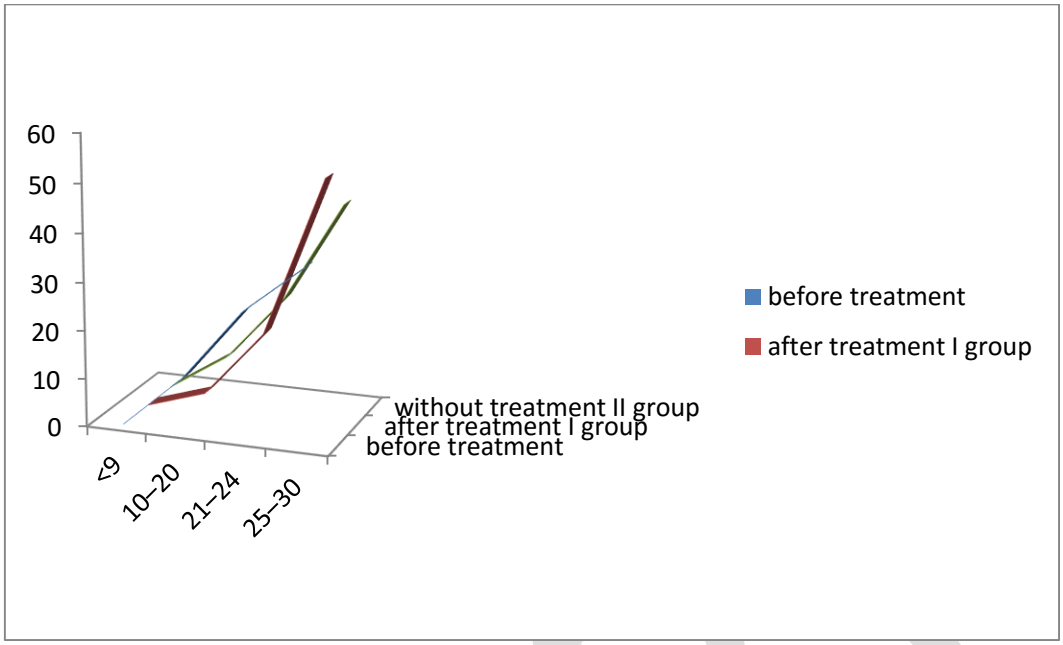
Table N1

Postoperative neurological disorders	
Stroke	3
Cognitive dysfunction	35
Sleep disorders	19
Epileptic seizures	3
Polyneuripathic syndrome	1

We have divided patients with neurocognitive dysfunction into two goups: I group-22 patients treated with citicoloine according to the following scheme: 1000 mg. intra venous during 10 days, then 1000 mg. intra muscle during 20 days; II group - control group – 13 patients were not treated with citicoline.
All patients underwent neuropsychological tests to evaluated cognitive functions in pre and post-operative periods. Scheme N3 shows these relations according to MiniMental-Tests.
Scheme N3

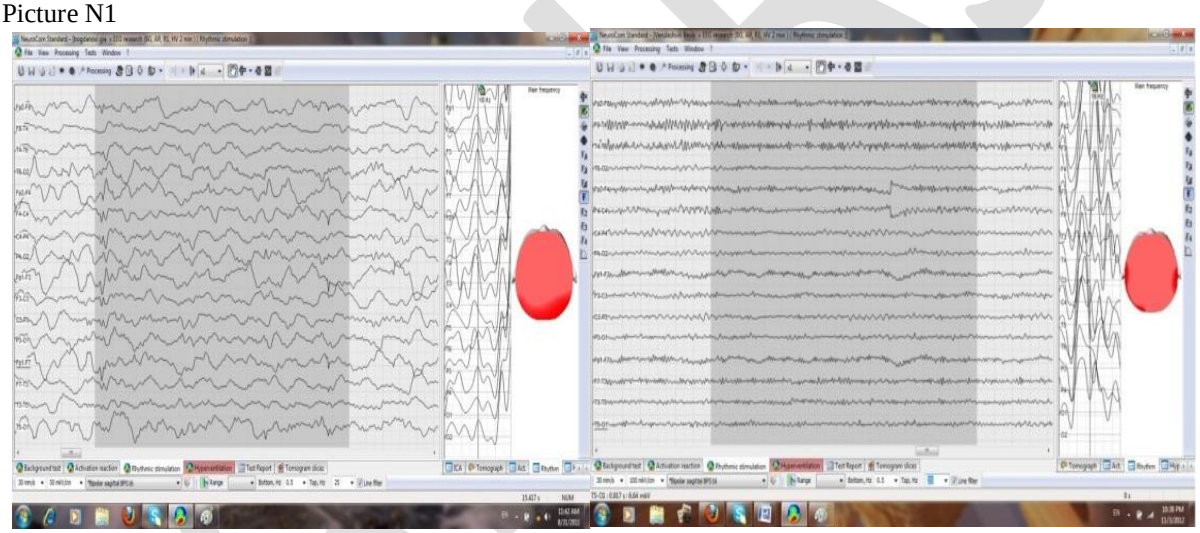


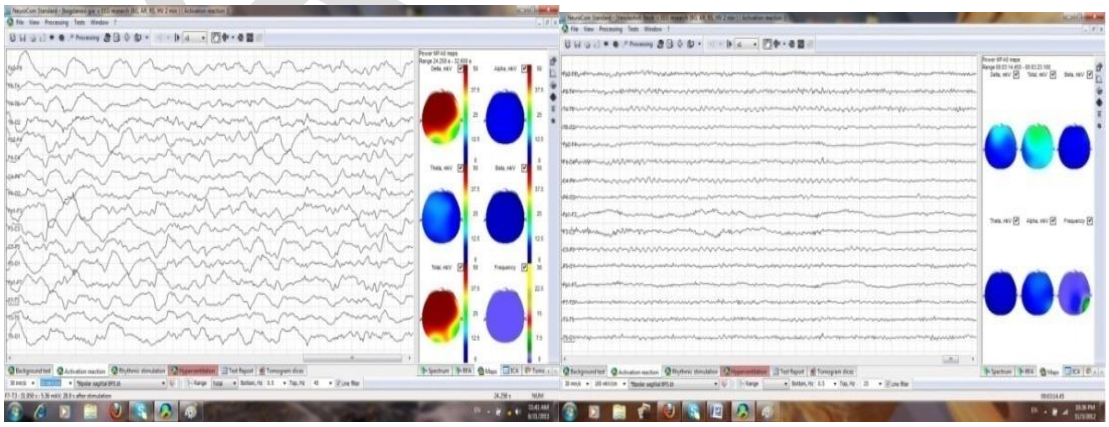
Scheme N4 shows decrease of neurocognitive dysfunction before and after treatment in I and II group patients.
Scheme N4



Picture N1 shows dynamics of EEG in postoperative period.

Picture N1





picture N2 -- MRT changes in postoperative period without clinical manifestation.

Picture N2

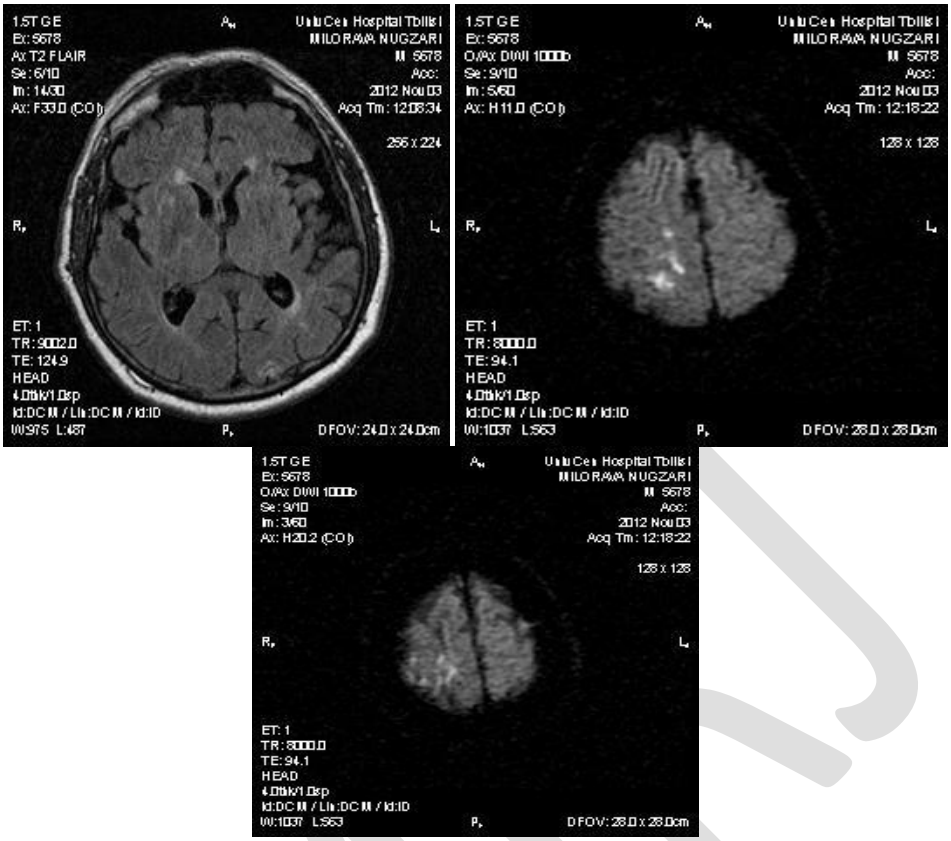


Table N2 shows changes in PPSG-parameters in 11 patients with neurogognitive dysfunction before and after treatment with citicoline.

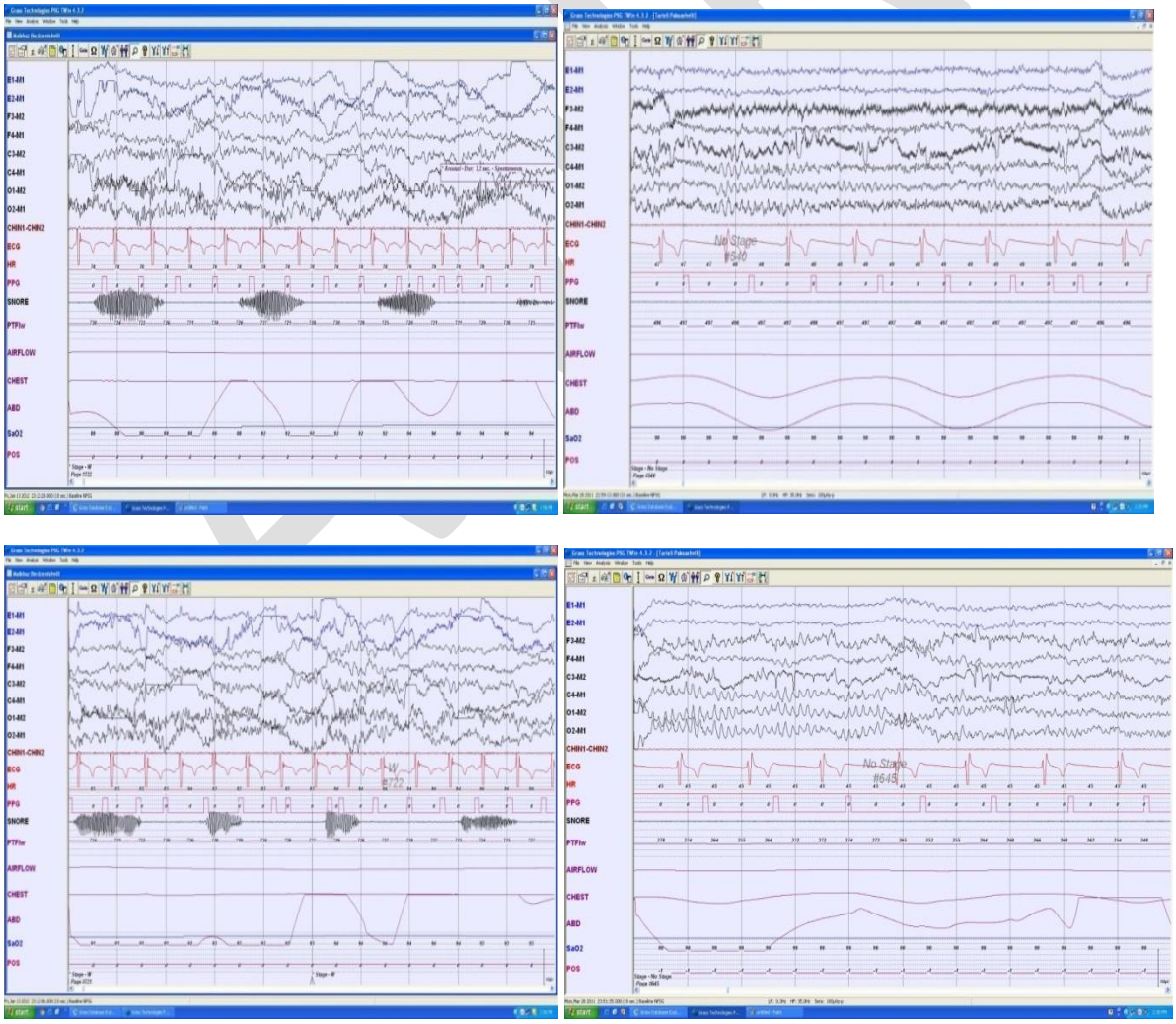
Table N2

PPPSG parameters	Postoperative period	Normal	Before treatment	After treatment
Sleep latency	354	23	79	223
REM-sleep latency	34	136-156	109	82
A/H Index	29	<5	14	22
Arousals spontaneous (N/h)	674.3	9–16	37	102

Snore index	85.7	–	75.0	71.0
SaO2	88%	95–100%	94%	90%
NREM-Sleep	28.2%	74–83%	57%	38.9%
REM-Sleep	71.4 %	17–26%	43%	61.1%
Sleep efficiency	6.4 %	89%	40.5%	17.2%

Picture N3 shows PSG in dynamics.

Picture N3



5. CONCLUSION

Cardiac surgery is of great risk in development of cerebral disorders. Pre, peri and post-operative factors are very important in development of cerebral complications. The changes of PSG parameters defends of types neurological disorders after cardiac intervention therapy.

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