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# Some clinical and laboratory peculiarities of asthenic syndrome in remote period of traumatic brain injury

Study of the remote consequences of head injury is one of the most important problems in modern neurology. Results of study of brain bioelectrical activity and cerebral hemodynamics where analyzed in the comparison with clinical dominating asthenic syndrome in the remote period of traumatic brain injury. It is set that alongside with the clinical displays of disease the changes of adjusting of bioelectric activity of cerebrum and initial disorders of hemodynamics are presented.
**Key words:** remote period of traumatic brain injury, asthenic syndrome, electroencephalography, transcranial dopplerography.

## Preamble

Wide occurrence of mild traumatic brain injury (TBI) and related post-traumatic disorders makes it an important independent not only medical but also socioeconomic problem. Current understanding of the pathogenesis and clinical picture of long-term effects of mild TBI allows considering it as a "disease of regulation", which is based on the phenomenon of disintegration of brain function (Konovalov A.N. et al. (eds.), 1998; Zozulia I.S., Bondar T.S., 2005).

Asthenic syndrome in clinical picture of mild TBI long-term effects takes important place and is essential in predicting the timing of patients' recovery (Pomerantseva O.V., 2001; Tkachov A.V., 2008).

The aim of the research is to improve diagnosis of brain traumatic disease (BTD) by examining clinical and laboratory features of asthenic syndrome of long-term TBI period.

## Object and methods of research

We have carried out a comprehensive clinical and para-clinical examination of 47 patients in TBI remote period, in whose BTD clinical picture asthenic syndrome was dominating. The fact of trauma, its severity and nature was determined by studying the history and medical data of medical institutions where patients were treated in the acute phase of injury. The severity of injury was determined in accordance with TBI classification adopted in our country (Pedachenko E.G., et al., 2007). The average age of patients was 40,0 ± 0,64 years old. The control group I included 22 practically healthy persons (average age - 38,27 ± 1,81 years old); the control group II - 20 persons who have suffered traumatic brain injury, but did not have any signs of brain dysfunction (average age - 39 , 60 ± 2,10 years old). Patients were examined 6 months-20 years after a traumatic brain injury that can cover almost the entire residual period of BTD. Survey of main head arteries was carried out by transcranial linear dopplerograph «Multigon 500 M» (Multigon Industries, USA) with ultrasonic sensor of pulsed mode with radiation frequency 2 MHz. The effectiveness of transcranial dopplerography method (TCD) is defined by non-invasiveness, informative value, possibility to use in dynamics both at the outpatient and the in-patient phase. We carried out a staged location of intracranial vessels: anterior (ACA), middle (MCA), posterior cerebral artery (PCA), vertebral arteries (VA) and basilar artery (BA). Based on measurements of systolic and diastolic blood flow velocity in located vessels, we automatically calculated the average speed of blood flow through vessels (ASB). As in domestic and foreign literature, the most informative is the average linear velocity of blood flow, so we considered it as a basis for checking presence or absence of pathological changes in cerebral blood vessels (Hashimoto B.E., Hattrick C.W., 1991, Lushchyk U.B., 1997; 1998). With hardware & software complex DX-NT32 with software DX-Complexes (Ukraine) and computer processing of electroencephalography data (EEG), we studied brain biopotentials in the patients. Electrodes in the amount of 16 pieces were imposed acc. to the international scheme 10/20 in the bipolar interpretation (Stern J.M., Engel J. Jr., 2004). The results of the EEG in patients examined with leading in a remote period TBI aesthetic syndrome were interpreted according to EEG data distribution by types by E.A. Zhirmunski (1999).

## Results and Discussion

Aesthetic syndrome dominated the clinical picture of a remote period of TBI in 20 (42.6%) patients with injury prescription of 1-5 years, it also frequently was detected in patients with injury prescription > 10 years (12 (25.5%) patients), more rarely - between 6 months and 1 year after TBI (8 (17.0%) patients) and 5-10 years after TBI (7 (14.9%) patients). This syndrome was leading in the clinical picture of a remote period in 46 (97.9%) patients who had concussion of the brain and in 1 (2.1%) patient who suffered mild brain injury.

Manifestations of aesthetic syndrome predominated in patients of both genders of young and middle age and made 38.3% in the age of 40-49 and 21.3% in the age of 30-39 and <30 (Table).

**Table** — **Distribution of patients examined with aesthetic syndrome by age and gender**

| Age, years old | Number of patients, n (%) | | |
|---|---|---|---|
| | men | women | total |
| <30 | 6 (12.8) | 4 (8.5) | 10 (21.3) |
| 30-39 | 9 (19.2) | 1 (2.1) | 10 (21.3) |
| 40-49 | 8 (17.0) | 10 (21.3) | 18 (38.3) |
| => 50 | 5 (10.6) | 4 (8.5) | 9 (19.1) |
| Total | 28 (59.6) | 19 (40.4) | 47 (100.0) |

In 35 (74.5%) of patients aesthetic syndrome was combined with manifestations of vascular dystonia syndrome.

Patients with dominant aesthetic syndrome complained of quick fatigue, irritability, poor memory and attention, decreased performance. In the study of neurological status, facial asymmetry was observed in 27 (57.4%) patients, anisoreflexia of chorda and periosteal reflexes - in 23 (48.9%), drowsiness of pupillary reactions - in 22 (46.8%), light deviation of the tongue - in 15 (31.9%), light coordination disorders - in 4 (8.5%), oral automatism reflexes - in 6 (12.8%), nystagmoid - in 6 (12.8%) patients. In the psychological examination we found increased exhaust of mental processes with reduced productivity at work, emotional instability. We often diagnosed astenoneurotic syndrome which against a background of fatigue emerged as significant volatility of mood and excitability. We also discovered disorders of emotional-volitional sphere: difficulty in forming willpower, lability of attitudes, deformation of sustainable living patterns.

Aesthetic syndrome was mainly characterized by type I and II of EEG. So, the Ist (organized) type was revealed in 35 (74.5%) of patients with dominant in the TBI remote period aesthetic syndrome, the IInd (hypersynchronous) type - in 11 (23.4%). In 1 (2.1%) patient who had mild brain injury, the IIIrd (desynchronous) type prevailed.

After analyzing rheoencephalogram in 29 (61.7%) of patients we found inter-hemispheric asymmetry of brain blood filing. Blood filing asymmetry in the pool of posterior circulation arteries was identified in 32 (68.1%) cases, in the pool of internal carotid arteries - in 13 (27.7%), and simultaneously in both vascular pools – in 2 (4.2%) of cases.

Generally, on electroencephalogram, we most often registered diffuse changes of bioelectric brain activity, rarely we observed phenomenon of desynchronisation. In most cases we discovered signs of involvement of non-specific middle brain structures in the pathological process. At rheoencephalography, in most of the examined patients with distant consequences TBI, we discovered different brain disorders of vascular tone and reduced systemic blood flow volume.

TCD did not reveal probable changes (p> 0,05) in ASB in patients with aesthetic syndrome in carotid vessels, BA and both VA relative to benchmarks, but we revealed probable (p <0,05) ASB decrease in both PCA compared to benchmark (35,81 ± 0,86 and 36,58 ± 0,80 cm/s, respectively in right and left PCA). Thus, in these patients, the average value of the right ASB in right PCA was 23,84 ± 1,00 cm/s, in left PCA - 22,74 ± 0,72 cm/s.

## Conclusions

Aesthetic syndrome dominates the clinical picture of a remote period of mild TBI in patients of both genders of working age.

In patients with dominant in the remote TBI period aesthetic syndrome, changes in electroencephalogram are nonspecific, mainly of general cerebral nature.

In patients with the aesthetic syndrome leading in BTD clinical picture, we did not detect changes in blood flow in the carotid pool, while in the posterior one, we noticed reduction ASB on both PCA, which is the lowest among major arteries of the head. Obviously, this is due to the start of angiopathy in aesthetic syndrome and may indicate a particular vulnerability of diencephalic-stem structures in these patients.

Thus, along with the clinical manifestations of the disease, regulation changes of brain bioelectrical activity and primary disorders of hemo-dynamics are present.

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