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POST-CONCUSSION SYNDROME IN UKRAINIAN VETERANS: PHYSICAL AND MENTAL MANIFESTATIONS

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Abstract

In the structure of wounds on the Russian-Ukrainian war, traumatic brain injury takes 33 percent. And more than 80 percent is a mild TBI. Open clinical trial was provided by a multidisciplinary team in the National Military Medical Center (the Main military clinical hospital), Kyiv, Ukraine, under the leadership of the Military Medical Academy of Ukraine. 286 veterans, male, age 27,38±9,67 y.o with history of mTBI were observed for post-concussion syndrome. Causes of concussion were: isolated blast injury-69,3%, combine blast + shrapnel injury- 18,5% , car accidences - 6,1%, falls-7,1%/ Spectrum of PCS symptoms included all manifestations – as a physical, as mental heals problems, but dynamic in time of manifestations show the decreasing of physical signs and increasing of intensity of mental symptoms. Many patients with post-concussion syndrome also have symptoms of PTSD. In the studied group near the 40% of patients have PCL-m score more than 50.

Our study shown that post-concussion syndrome, as a result of traumatic brain morphological and functional changes, powered with combat psycho trauma, lead to functional disorders: physical, emotional and cognitive.

Keywords: mild traumatic brain injury, post-concussion syndrome, combat stress

The 4th year in the Ukraine continue the war. War against Russian supported terrorists, war for freedom and independents of our Motherland, war for the defense of democracy in the Europe.

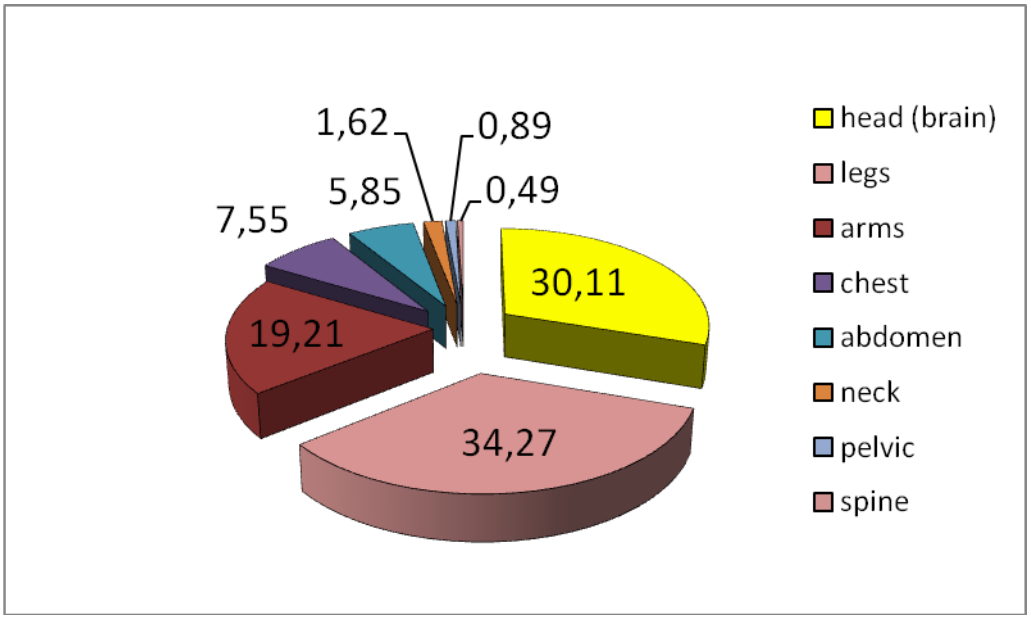
The godfather of battle field surgery, Ukrainian doctor, professor - Mykola Pirogov called the war as "a traumatic epidemic." Combat physical and mental trauma is a real results of war.

In the structure of cause of injuries the first place take blast and shrapnel wounds.

A blast injury is a complex type of physical trauma resulting from direct or indirect exposure to an explosion [1].

High-order explosives produce a supersonic overpressure shock wave, while low order explosives deflagrate and do not produce an overpressure wave. A blast wave generated by an explosion starts with a single pulse of increased air pressure, lasting a few milliseconds. The negative pressure (suction) of the blast wave follows immediately after the positive wave.

In the structure of wounds, traumatic brain injury takes 33 percent. And more than 80 percent of its are result of blast (pict.1)



Pict. 1 Structure of wounds (%%, 2016)

According to the TBI classifications (pict. 2), more than 80% of cases of TBI are mild-TBI – concussion.

Severity	Mild (Concussion)	Moderate	Severe
Structural imaging	Normal	Normal or abnormal	Normal or abnormal
Loss of consciousness (LOC)	0 to 30 minutes	30 minutes and < 24 hours	> 24 hours
Alteration of consciousness (AOC)	a moment up to 24 hours	> 24 hours	
Post traumatic amnesia (PTA)	0 to 1 day	> 1 day < 7 days	> 7 days

Source: Assistant Secretary of Defense for Health Affairs. Health Affairs Memorandum (October 1, 2007). Traumatic Brain Injury: Definition and Reporting

Pict. 2 TBI severity

Concussion is a specific mild, minor brain injury. It is closed scull trauma without visible injuries.

Pathological circle of concussion including next links: axons damage, neuron death, loss of synapses and immersion of biological active substances, excitotoxity, inflammatory edema, reduction of microcirculatory and hypoxia and next circle. Each link, each element leads to the next, strengthening and developing pathological effects.

Combat concussion has a three most common mechanisms: directly from the blast wave, shrapnel injury, falls. Or combination of this ways.

Concussion is a called as a disease of hundreds of symptoms. Common groups of symptoms are physical (central or autonomic nervous systems disorders, sensitives, balance, visual or hearing problems), cognitive and affective deviations.

Common symptoms of concussion usually resolve during from one to weeks. But more dangerous, more important problems for soldiers or veterans with concussion is a later manifestation – post-concussion syndrome [2].

According to 10th International diseases classification (IDC– 10), post -concussion syndrome is a syndrome that occurs following head trauma (usually sufficiently severe to result in loss of consciousness) and includes a number of disparate symptoms such as headache, dizziness, fatigue, irritability, difficulty in concentration and performing mental tasks, impairment of memory, insomnia, and reduced tolerance to stress, emotional excitement, or alcohol.

THE AIM OF STUDY:

To studied of Physical (Central and Autonomic Nervous Systems), Electrophysiological (EEG) and Mental peculiarities of the health state of the veterans, who got concussion in period from 2014 to 2016.

This single-site, open clinical trial was provided by a multidisciplinary team in the National Military Medical Center (the Main military clinical hospital), Kyiv, Ukraine, under the leadership of the Military Medical Academy of Ukraine

The **ARRAY of STUDY**: 286 veterans, male, age 27,38±9,67 y.o.

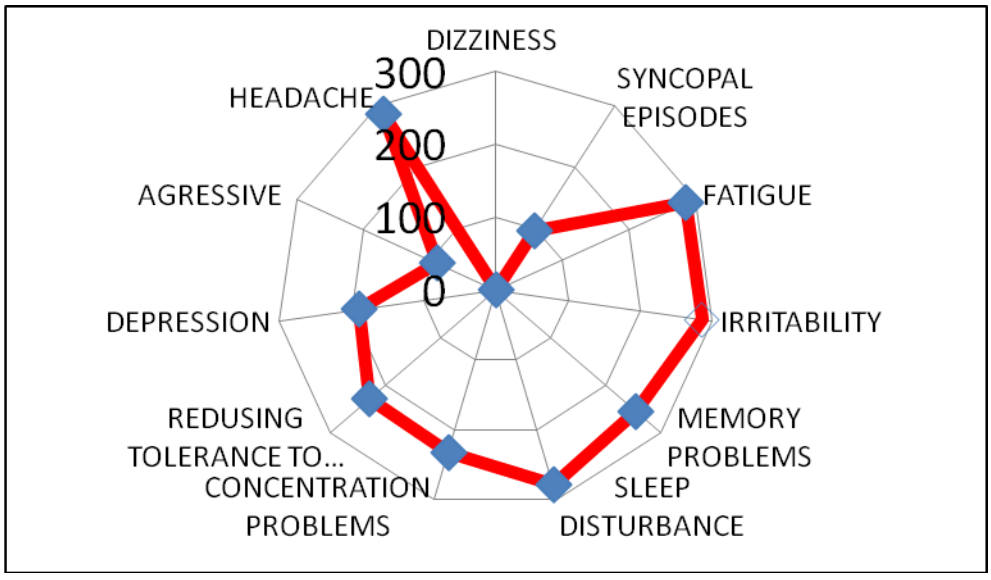
METHODS

- Anamnesis of event =TBI
- Community Integration Questionnaire (K.D. Cicerone, 2007)
- Autonomic nervous system dysfunction questionnaire (A. Wein, 1989)
- PCL (military)
- IES-R (scale of event impact)
- 12-led EEG with mathematic modeling program

RESULTS

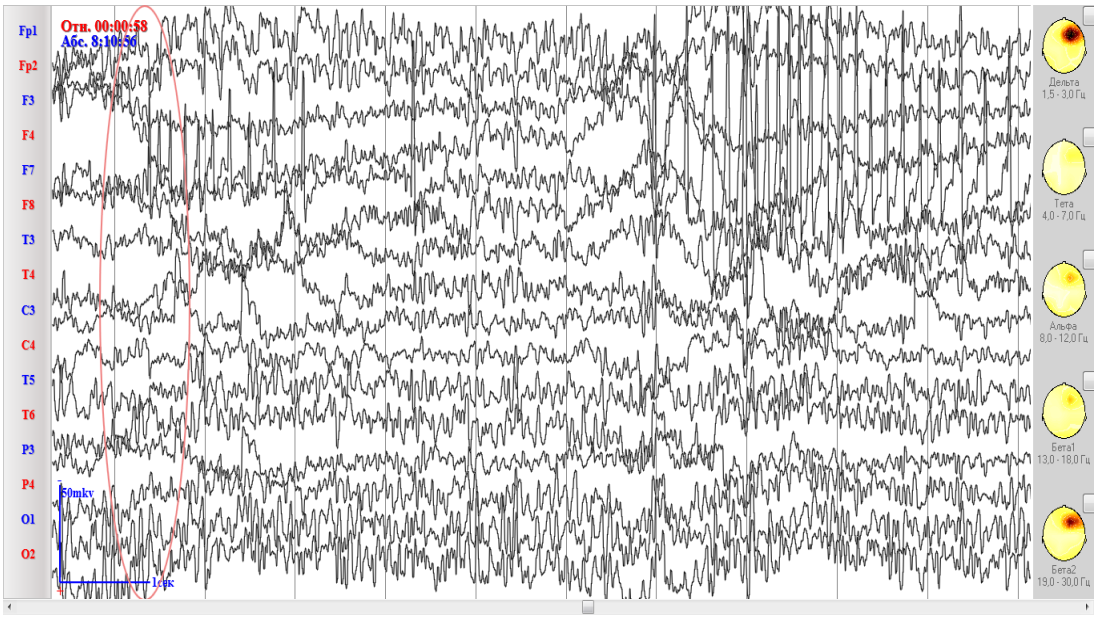
Causes of concussion were: isolated blast injury-69,3%, combine blast + shrapnel injury- 18,5%, car accidences - 6,1%, falls-7,1%

Spectrum of PCS symptoms included all manifestations – as a physical, as mental heals problems (pict. 3), but dynamic in time of manifestations show the decreasing of physical signs and increasing of intensity of mental symptoms.



Pict. 3. Spectrum of symptoms.

Common EEG – peculiarities in the studied patients were: half-sphere asymmetric > 30% and σ and θ – rhythm as leading. Near the 32% of studied patients demonstrated evoked by light and sound stimulation epileptic activity (pict.4).



Pict. 5. Evoked paroxysmal activity

Many patients with post-concussion syndrome also have symptoms of PTSD. In the studied group near the 40% of patients have PCL-m score more than 50.

Autonomic nervous system dysbalance and dysregulation were confirm by high score on the Vein Scale of symptoms (45,65±10.09$ normal rate – up to 20).

Our study shown that post-concussion syndrome, as a result of traumatic brain morphological and functional changes, powered with combat psycho trauma, lead to functional disorders: physical, emotional and cognitive.

And this problem not only problem of veteran and his doctor. It is important medical-social problem of state.

Because this patients are

- Young, social and professional active men.
- 33,3% from all wounded, and near 30% latent +!
- Alcohol and/or drug abused group
- Development of pathology like a “process”. Long-time progressive of mental insufficiency.
- Possibility of aggression (auto-incl.) and social deviation.

Study of the problem must be continuing and the time show that inter-disciplinary cooperation is needed [3].

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