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Editor
Komarytskyy M.L.
Ph.D. in Economics, Associate Professor

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e-mail: toronto@sci-conf.com.ua

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COMPREHENSIVE REHABILITATION OF PATIENTS WITH POST-TRAUMATIC HEADACHE AFTER MINE-BLAST INJURY

Turchina N. S.,
Krylova V. Y.,
Geletiuk Y. L.,
Mishura S. S.
D.M.,Ph.D. Associate Professor of the Department of Neurology,
Bogomolets National Medical University, Kyiv,
Ph.D., Associate Professor of the Department of Neurology,
Bogomolets National Medical University, Kyiv,
Ph.D., Associate Professor of the Department of Neurology,
Bogomolets National Medical University, Kyiv
Bogomolets National Medical University, Kyiv, Ukraine

Abstract

Mine-blast trauma (MBT) results from the impact of a single-shot heterogeneous explosive device impact on the body. It involves organs and systems in various combinations within the pathological process. According to another definition, blast trauma is a complex type of physical injury that occurs in result of direct or indirect exposure to a blast wave [1]. Concussion, contusion, and brain compression occur in result of traumatic brain injury (TBI), which accounts for 33% of injuries, of the Russo-Ukrainian war – more than 80% of all cases of blast injury.

Headache (HA) can be considered not only one of the most common symptoms after suffering TBI due to mTBI, but also the most persistent and disabling factor. Post-traumatic headache (PTH) is a common consequence of TBI and is classified as secondary headache in the International Classification of Headache, Third Revision (ICHD)-3. The main risk factors for PTH are the history of migraines or headaches, female gender, early adulthood, pre-existing more severe head injuries, and concomitant psychological symptoms such as anxiety and depression. The clinical manifestations of PTH following MVT vary in terms of onset, frequency, duration, and intensity [2]. They resemble tension headache (TCH), or migraine headache,

cervicogenic headache, occipital neuralgia (Mavroudis, I. et al., 2023). Patients with PTH may also have complaints of dizziness, fatigue, concentration and sleep problems, and seizure. PTH is poorly understood and is often poorly treated. This can mean a serious risk of disability even after a relatively mild TBI [3].

Based on the duration, PTH can be classified as acute (defined by the onset of HA within 7 days with remission within 3 months after the onset); and persistent if it lasts longer than 3 months. Patients with persistent PTH with migraine-like attacks report that bright light, stress, and poor sleep quality exacerbate it. Based on the severity of the injury, PTH can also be classified as associated with either mild, moderate, or severe TBI (The International Classification of Headache Disorders, 3rd edition. Cephalalgia 2018) .

Pathophysiological mechanisms, such as neurometabolic changes, calcitonin generelated peptide (CGRP) release, similar in migraine attacks and TBI, also underlie PTH, but are not fully understood. CGRP is a neuropeptide that can mediate trigeminal-vascular pain transmission and trigger migraine attacks [4].

An interview with the patient is usually sufficient to diagnose PTH. The presence of a MVT history leading to TBI is highly likely to indicate that the patient has developed PTH.

Given the multiplicity of clinical symptoms characteristic of PTH and the mechanisms that may underlie it, a neurological examination for signs and symptoms of TBI is recommended. Psychological assessment, early detection of symptoms, and early intervention are also important. Treatment strategies are appropriate to the type of TBI and clinical findings. Individualized, multidisciplinary treatment is the optimal approach for individuals suffering from PTH.

Keywords: mine-blast trauma, post-traumatic headache, traumatic brain injury.

Objective: To demonstrate that treatment involving a complex use of Sermion, Piracetam and medical and psychological methods affects the reduction of the PTH intensity and improves the state of cognitive functions following MVT, closed head injury, concussion and mild brain contusion.

Materials and Methods: 122 patients were examined in the State Institution "Main Medical Center of the Ministry of Internal Affairs of Ukraine" from June 2022 to June 2024, all were men aged 32.1±5.7 years with a diagnosis of MVT, TBI, concussion or mild bruising. All of them were admitted to the medical facility on average 83.2±19.5 days after TBI with complaints of persistent PGB. The patients' condition was assessed by neurological examination using the Visual Analog Scale for Pain (VAS): Visual Analog Scale for Pain (VAS Pain). The psychological state was assessed using the MoCA (Montreal Cognitive Assessment) scale. All patients were prescribed a comprehensive rehabilitation program involving medication, medical and psychological interventions: kinesio-, art-, canis- and equine-assisted therapy. Patients were divided into 2 groups: 1) the main group (MG) – 32 men aged 32.7 ± 5.5 years, who were prescribed piracetam (5 ml once daily V drip for 5 days), sermion (4 mg with 0.9% saline – 100 ml IV drip for 4 days, then 1 tablet 30 mg twice daily for 21 days) and medical and psychological rehabilitation; 2) comparison group (CG) - 30 men aged 31 ± 3.0 years, who were prescribed analgin (50% – 2 ml once daily for 10 days), platyphylline (0.2% – 1 ml once daily for 10 days), and then gidazepam (50 mg, 1 tablet at night for 21 days) and medical and psychological rehabilitation. After 3-4 weeks of staying in the hospital, the following results were received.

Results: Upon admission to the department 2-2.5 months after MVT, mild concussion and contusion, we were provided with discharge summaries detailing the symptoms detected during the initial examination of neurological status along with the data from paraclinical examination methods (complete blood count; biochemical blood count; craniography in 2 projections; MRI of the brain; ophthalmologist's examination) performed in hospitals located close to the injury site. It should be noted that prior to the MVT and TBI, the patients were considered healthy people with no history of headache.

The neurological status of the patients was maintained. No meningeal signs were detected. Eye slits D=S, pupils D=S, pupillary reactions were preserved. There was no facial asymmetry, no tongue deviation, and slight instability in the Romberg

pose. Minor sensory disorders of segmental type on the face in Sölder's zones, periodic hearing loss, tendon reflexes are vigorous on both sides, slightly expressed anisoreflexia, muscle tone is not changed, positive subcortical and foot pathological reflexes: lip, palmomental, Strumpell on both sides in patients with mild brain contusion. Lability of the autonomic nervous system manifested as either red or white dermographism, acrohyperhidrosis, acrohyperthermia, eyelid and outstretched fingers tremor was significantly expressed.

On admission, the results on the pain scale in the MG were 6.9±1.6 points; in the CG - 5.9± 2.6 points ($P<0.01$). After treatment in the department after 3-4 weeks of PTH, the pain scale in the MG was 1±0.5 points, in the CG – 1.5±0.5 points ($P<0.01$). On admission to the department in 2-2.5 months, the impairment of cognitive functions (mostly adaptive capabilities) according to the MoCA scale in the MG was 23.4±1.6 points and in the CG 25.8±1.2 points ($P<0.05$). The medical psychotherapy included kinesitherapy, art therapy with the use of drawing and pottery making, equine therapy (horseback riding in the countryside once every 3 days for 30 minutes) and canine therapy (each patient from both groups was visited by a dog handler with a dog for 10 minutes before the examination by the ward doctor). Using the MoCA scale, the medical psychologists of the Department assessed the psychological state of patients immediately before the visit of the dog handler, immediately after it, and 20 minutes after the event. In turn, we conducted a survey on the intensity of PTH taking into account the VAS.

After 4 weeks, improvement in the MoCA scale was found in both groups, but in the MG, even taking into account the major age, later start of treatment and rehabilitation and higher VAS pain scores: the results on the MoCA scale were better - 29.5±1.5 compared to the CG, which had 26.5± 0.5 ($P<0.05$).

Thus, the use of drugs that improve brain metabolism and active vascularization after MBT, TBI, concussion and mild contusion with persistent PGB, together with medical and psychological methods, opens up wide opportunities for treatment without analgesics and sedatives to which patients become addicted.

Conclusions:

1) The treatment of patients in the MG involving Sermion and Piracetam together with medical and psychological rehabilitation leads to a decrease in the intensity of post-traumatic headache in the MG to 1±0.5 points and in the CG to 1.5±0.5 points ($P<0.01$).

2) The treatment with Sermion and Piracetam, along with medical and psychological rehabilitation, led to an improvement in cognitive functions, namely adaptive mechanisms in the MG on the MoCA scale - 29.5±1.5 points compared to the CG - 26.5± 0.5 points ($P<0.05$).

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