УДК 616.831-001-085:615.214]-082.5-083:159.942.22

DEFINITION OF QUALITY OF LIFE IN PATIENTS WITH SEQUELLAE OF MILD TRAUMATIC BRAIN INJURIES BEFORE AND AFTER NEUROMETABOLIC THERAPY

Iu. IAKUBENKO

Kharkiv Medical Academy of Postgraduate Education, Kharkiv, Ukraine

The study involved 75 patients with sequellae of mild traumatic brain injuries. The neurometabolic therapy in the patients with sequellae of mild traumatic brain injuries was more effective in comparison with basic symptomatic therapy, since neurometabolic therapy influenced the processes of metabolism of brain, decreased its sensation to chronic hypoxia, which developed against a background of vegetative dystonia due to the injury and influence of the above therapy on the neurotransmitter system. The neurometabolic therapy in patients with sequellae of mild traumatic brain injuries improved the quality of life.

Key words: mild traumatic brain injury, sequellae of mild traumatic brain injuries, quality of life, metabolic therapy.

In recent years, mild traumatic brain injury (MTBI) has emerged as a leading public health concern. Eighty-five percent of 1.5 millions of traumatic brain injuries sustained by Americans every year are considered «mild» [1, 2]. Mild traumatic brain injury is a serious neurologic condition that can have long-term cognitive, physical, emotional, and social sequellae. Mild traumatic brain injury is a traumatic form of brain injury that requires careful diagnosis, management, and follow up [1, 2, 3].

The combination of brain concussion with mild contusion into one term of mild brain injury of 13–15 points according to Glasgow Coma Scale (GCS) is reasonably criticized not only by Ukrainian authors (L. B. Likhterman, S. Y. Gasimov, D. V. Kravchuk, M. M. Filatov), but also foreign authors (S. C. Stein, S. E. Ross, M. S. Greenberg), who recommend to consider only brain concussion as a mild brain injury of 14–15 points according to Glasgow Coma Scale [2, 3, 4].

In a number of previous studies, brain concussion is defined as the mildest, most reversible form of closed traumatic brain injury without morphological changes of the brain.

But this definition is not sufficient. The research done during the recent decades pointed out that significant microstructural changes exist mainly in axons; it allows to consider the brain concussion to be a mild clinical form of diffuse axonal disturbances of the brain. Ultrastructural, cytochemical and biochemical changes, mainly in synapses, can disrupt integrative activity of the brain and mediate the formation of long-term sequellae [5, 7, 10, 12].

The most frequent complaint of patients with sequellae of traumatic brain injury (TBI) is headache.

The number of people who develop chronic post-traumatic headache after mild head injury ranges from 30 % to 90 %; the percentages vary from one country to another. In most countries, about one-third of people with head injuries report headaches after 6 months and approximately one-fourth after 4 years. Chronic post-traumatic headache is often evident and significantly reduces the quality of life in patients with mild traumatic brain injury [4, 5, 7, 10].

According to the definition of the World Health Organization, quality of life (QOL) is characterized by physical, psychological, emotional and social functioning, based on their subjective perception [8, 9, 10, 11]. The term health and related quality of life' is widely spread in foreign medical literature nowadays [8, 9]. Health and related quality of life evaluate the components, associated and not associated with the disease and allows differential detection of the impact of illness and treatment on the psychological and emotional state of the patient, his or her social status. The indicators of quality of life and characteristics of findings change with time, depending on the patient's state; it allows to monitor the results of the treatment and, if necessary, to correct it [8, 9, 10].

A wide range of medication, mainly vasoactive and metabolic eliminating the symptoms of the disease, is used for treatment of the patients with mild traumatic brain injury and its sequellae. Considering the pathogenesis, neurometabolic therapy is very important in particular, which is aimed to regulate energetic metabolism of the brain as well as prescription of medications that influence vegetative disorders accompanying this disease. One of these mixed medications is Phenibut, a derivative of gamma-aminobutyric acid and β-Phenyl-γ-aminobutyric acid hydrochloride. Phenibut increases the number of mitochondria and the processes of lipid peroxidation which is especially important for treatment of patients with brain injuries. Additionally, Phenibut has sedative qualities, decreases the severity of cognitive disorders, anxiety and fear, normalizes sleep, improves physical and mental capacity.

The purpose of our study was to define QOL in patients with sequellae of mild traumatic brain injury in order to evaluate the clinical response to neurometabolic therapy.

The study involved 75 patients with sequellae of MTBI (52 men and 23 women) aged of 25–33. The duration of the disease was 3–5 years. All patients were examined in standard clinical neurological conditions. The patients were divided into two groups: group 1 included 38 patients (26 men and 12 women), who were administered palliative treatment consisting of vasoactive drugs, vitamins, light sedation drugs. The course of treatment lasted for 2 months. Group 2 consisted of 37 patients (26 men and 11 women), who were administered symptomatic therapy and simultaneously the course of neuroprotective therapy with Phenibut at a dose of 250 mg 3 times a day for 2 months.

The controls were 30 age- and sex-matched healthy persons without TBI.

In order to detect the QOL in the patients with sequellae of MTBI appropriate neuropsychological investigations were carried out. They included detection of state and trait anxiety using Spielberger – Hanin Test; according to this test, the total score of 30 points was evaluated as low anxiety, the score of 31–45 points was considered to be moderate anxiety and the score of 46 and more points was assessed as high anxiety.

The QOL was evaluated using the questionnaire MOS SF-36. The questionnaire comprises 36 items which are divided into 8 scales: 1) physical functioning, 2) role functioning, which is determined by physical state; 3) intensity of pain, 4) the state of health, 5) life activity, 6) social functioning, 7) role functioning, which is determined by emotional state, 8) mental health.

The data obtained were assessed using variations method, criterion *t*-Student and criterion R Fisher, correlation was taken into consideration using program packages Excel XP build 10.6612.6625-SP3 (Microsoft), Statistica 6.0 (Statsoft Inc).

Leading syndromes in the patients were identified: cephalgic, asthenic and syndrome of vegetative dystonia. The patients complained of headaches (98.9%), memory disorders (37.2%), vertigo (13.1%), fatigue (76.2%), irritability (45.3%), anxiety (39.3%), sleep disorders (43.5%). In neurological status neurological symptoms in the form of weakening convergence (64.5%), facial asymmetry (78.9%), revival of tendon reflexes (76.5%), asymmetry of tendon reflexes (37.5%), pallor (32.3%), red dermographism (75.8%), white dermographism (24.2%) were observed in all the patients.

When the data of neuropsychoneurologic investigation of group 1 was studied, the following results were obtained: in the group of patients with brain concussion the QOL according to the Scale of Pain was 64.2±2.1 points before the treatment with symptomatic therapy and 75.5±1.4 after the treatment. According to the questionnaire by Spielberger – Hanin, moderate state anxiety and trait anxiety were registered. The average value of state anxiety was 46.2±1.8 points (in the controls 12.3±0.5 points; $p < 0.001$) and the average meaning of trait anxiety was 39.4±2.3 points (in the controls 13.2±1.6 points). After the treatment the level of state anxiety was 42.5±3.2 points ($p < 0.05$), trait anxiety was 37.5±5.2 points ($p < 0.05$).

When evaluating the QOL, its decrease was marked according to all scales of SF-36 questionnaire. According to the scale of physical functioning the QOL was on average 72.5±5.2 points and as to role functioning, it was 62.3±3.5 points. The impact of pain reduced daily activity to 65.7±1.8 points and the common state of health was evaluated as 65.7±1.8 points. The QOL according to the scale of social functioning and emotional role functioning which was determined by emotional state, was 66.8±5.7 points and 64.4±2.7 points, respectively. The mental health of patients with MTBI was evaluated in the patients as 70.5±2.5 points.

The data obtained are presented in fig. 1.

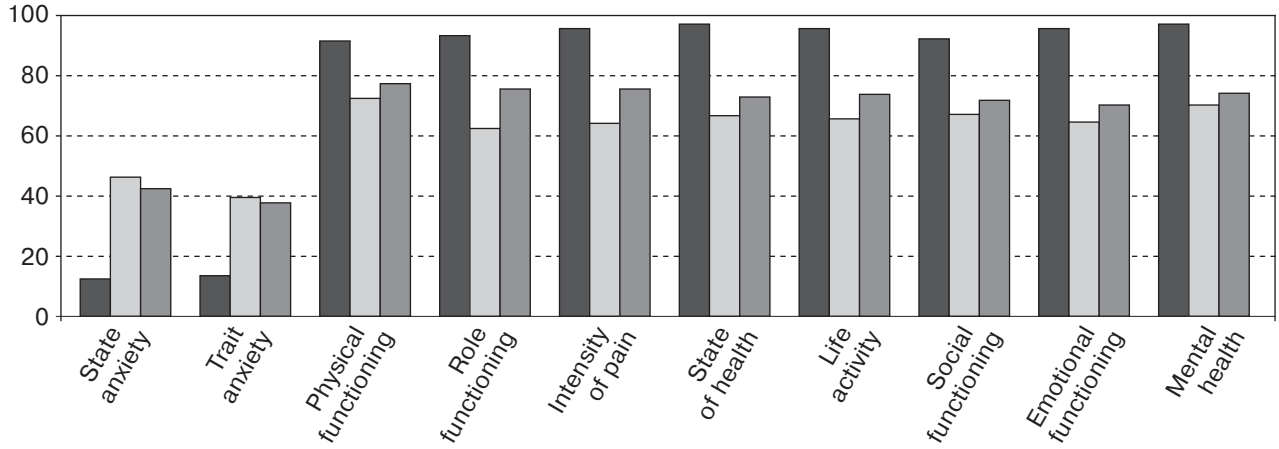

Fig. 1. The indicators of quality of life in patients with mild brain injuries before and after symptomatic therapy:
■ – control group, □ – before treatment, ■ – after treatment

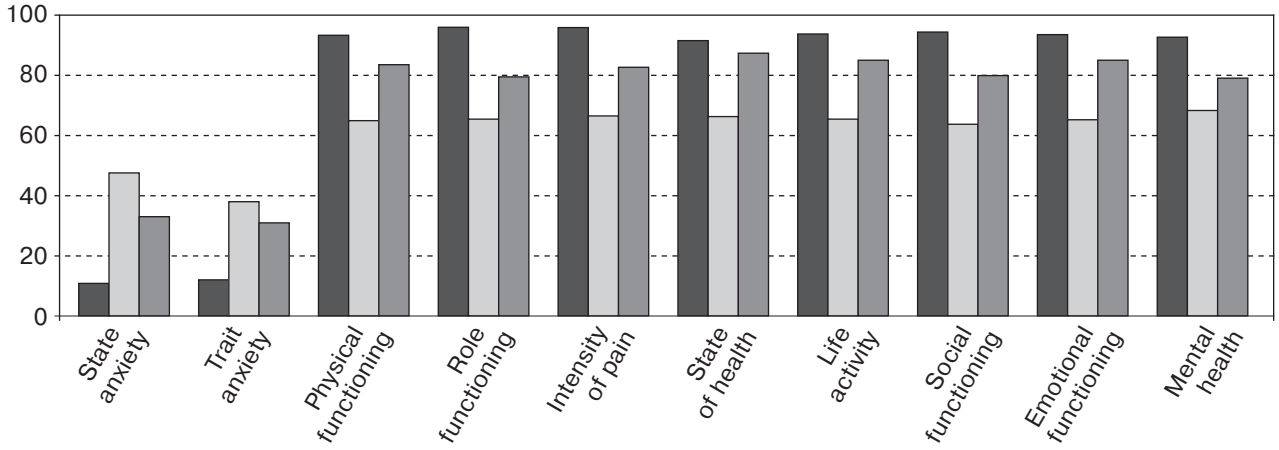

Fig. 2. The indicators of quality of life in patients with mild brain injuries before and after metabolic therapy in complex with symptomatic therapy: ■ — control group, ■ — before treatment, ■ — after treatment

The analysis the data of neuropsychoneurologic research of group 2 who received complex symptomatic therapy with the course of Phenibut, gave the following results: in the group of patients with brain concussion the QOL according to the Scale of Pain was 66.3±3.9 before the metabolic therapy and 82.5±3.6 points after the treatment. According to the questionnaire by Spielberger – Hanin, moderate reactive anxiety and personal anxiety of the patients were registered. The average meaning of state anxiety was 47.5±1.5 points (in the controls – 11.2±2.8 points) and the average value of trait anxiety was 38.2±8.7 points (in the controls – 12.3±1.7 points). After the metabolic treatment the level of state anxiety was 33.5±2.1 points, trait anxiety was 31.4±3.2 points ($p > 0.0001$).

When evaluating the QOL, its decrease was noted in all scales of SF-36 questionnaire. According to the scale of physical functioning the QOL was on an average 65.2±4.2 points and as to role functioning, it was 65.5±2.5 points before the treatment. After the metabolic treatment, the level of physical functioning of the QOL was 83.7±3.2 and as to role functioning, it was 79.5±2.1. The impact of pain reduced daily activity up to 65.7±1.7 points and the common state of health was evaluated as 66.2±3.8 points. After the metabolic treatment, daily activity was 81.2±1.7 points and the common state of health was evaluated as 82.2±3.8 points. The QOL according to the scale of social functioning and emotional functioning before the treatment was 63.7±2.5 points and 65.1±1.8 points, respectively. After the metabolic treatment it was 79.8±3.5 points and 85.1±5.1 points, respectively. The mental health of patients with MTBI were evaluated on an average as 68.3±3.1 points before the treatment and 79.2±2.5 after the metabolic treatment. The data obtained are presented in figure 2.

The above findings suggest that treatment of the patients with sequellae of MTBI with Phenibut helped to normalize neurovegetative and neuropsychological disorders in these patients which positively influenced subjective QOL. The patients who received neurometabolic therapy with Phenibut were observed to have a considerable reduction in asthenic and vasovegetative symptoms including headaches and heaviness in the head. After treatment with this medication, asthenic and emotionally unstable patients reported better health, increase of interest and activity, motivation, improvement of memory and attention span.

Administration of Phenibut in patients who suffered MTBI, resulted in statistically significant increase of quality of life according to Scale of Pain, emotional and social function, life activity.

In conclusion, we can suppose that changes in the patients with MTBI causing disorders of nerve cells functioning on synaptic level, are a variant of mild diffuse brain lesion; these changes can lead to development of traumatic brain disease with psychoneurological changes. Taking into consideration the pathogenesis of this disease, the use of neurometabolic therapy, is important as this therapy improves metabolic processes in the brain, decreases sensation of brain to hypoxia, developing against a background of vegetative dystonia in the result of the injury. Such therapy also influences the neurotransmitter system.

The obtained findings suggest that:

Integral evaluation of QOL according to the questionnaire SF-36 showed the decrease of QOL according to the scales of pain intensity, social functioning and mental health.

The treatment of patients with sequellae of MTBI with neurometabolic therapy improves quality of their life.

References

1. Evaluation and management of mild traumatic brain injury: An Eastern Association for the Surgery of Trauma practice management guideline / **R. Ronald**, J. Randeep, M. Jennifer [et al.] // J. of Trauma

and Acute Care Surgery.– 2012.– Vol. 73, № 5.– P. 307–314.
2. *Jeanne M.* Chronic post-traumatic headache after mild head injury / M. Jeanne, W. Allen, L. Sylvia // Cephalalgia.– 2014.– Vol. 34.– P. 174–182.
3. Quality of life after traumatic brain injury: the clinical use of the QOLIBRI, a novel disease-specific instrument / J. Truelle, S. Koskinen, G. Hawthorne [et al.] // Brain Inj.– 2010.– Vol. 24.– P. 1272–1291.
4. Quality of Life after Brain Injury (QOLIBRI): scale development and metric properties / N. Von Steinbuchel, L. Wilson, H. Gibbons [et al.] // J. Neurotrauma.– 2010.– Vol. 27.– P. 1167–1185.
5. Measuring functional and quality of life outcomes following major head injury: common scales and checklists / A. Nichol, A. Higgins, B. Gabbe [et al.] // Injury.– 2011.– Vol. 42.– P. 281–287.
6. Quality of Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury / P. Bragge, L. Pattuwage, Sh. Pitt V. Marshall, L. Piccenna // J. of Head Trauma Rehabilitation.– 2014.– Vol. 29, № 4.– P. 277–289.
7. *Zupan B.* Affect Recognition in Traumatic Brain Injury: Responses to Unimodal and Multimodal Media / B. Zupan, D. Neumann // J. of Head Trauma Rehabilitation.– 2014.– Vol. 29, № 4.– P. 213–220.
8. A Trial of Intracranial-Pressure Monitoring in Traumatic Brain Injury / R. Chesnut, N. Temkin, N. Carney [et al.] // The New Eng. J. of Medicine.– 2012.– Vol. 367.– P. 2471–2481.
9. *Samir H.* Critical care management of severe traumatic brain injury in adults / H. Samir, M. Yaseen // Scandinavian J. of Trauma, Resuscitation and Emergency Medicine.– 2012.– Vol. 20, № 12.– P. 215–222.
10. Sahler Ch. Traumatic Brain Injury in Sports: A Review / Ch. Sahler, B. Greenwald // Rehabilitation Res. and Practice.– 2012.– Vol. 20.– P. 10–17.
11. Persistent, Long-term Cerebral White Matter Changes After Sports-related Repetitive Head Impacts / J. J. Bazarian, T. Zhu, J. Zhong [et al.] // PLOS One.– 2014.– Vol. 9, № 4.– P. 234–247.
12. Sport-Related Concussion: Ongoing Debate / S. Slobounov, J. Bazarian, E. Bigler [et al.] // British J. of Sports Medicine.– 2014.– Vol. 48, № 2.– P. 75–76.

ВИЗНАЧЕННЯ ЯКОСТІ ЖИТТЯ У ПАЦІЄНТІВ ІЗ НАСЛІДКАМИ ЛЕГКИХ ЧЕРЕПНО-МОЗКОВИХ ТРАВМ ДО ТА ПІСЛЯ ЛІКУВАННЯ НЕЙРОМЕТАБОЛІЧНОЮ ТЕРАПІЄЮ

Ю. В. ЯКУБЕНКО

Обстежено 75 пацієнтів із наслідками перенесених легких черепно-мозкових травм. Проведення нейрометаболічної терапії пацієнтам із наслідками легкої черепно-мозкової травми є ефективнішим порівняно із застосуванням базисної симптоматичної терапії через її вплив на процеси метаболізму головного мозку, зниження його сприйнятливості до хронічної гіпоксії, яка розвивається на тлі вегетативної дистонії внаслідок отриманої травми, а також через вплив даних препаратів на нейротрансмітерні системи. Застосування нейрометаболічної терапії пацієнтам із наслідками черепно-мозкових травм призводить до поліпшення якості їхнього життя.

Ключові слова: легка черепно-мозкова травма, наслідки легкої черепно-мозкової травми, якість життя, метаболічна терапія.

ОПРЕДЕЛЕНИЕ КАЧЕСТВА ЖИЗНИ У ПАЦИЕНТОВ С ПОСЛЕДСТВИЯМИ ЛЕГКИХ ЧЕРЕПНО-МОЗГОВЫХ ТРАВМ ДО И ПОСЛЕ ЛЕЧЕНИЯ НЕЙРОМЕТАБОЛИЧЕСКОЙ ТЕРАПИЕЙ

Ю. В. ЯКУБЕНКО

Обследовано 75 пациентов с последствиями перенесенных легких черепно-мозговых травм. Проведение нейрометаболической терапиии пациентам с последствиями легкой черепно-мозговой травмы является более эффективным в сравнении с применением базисной симптоматической терапии в связи с ее влиянием на процессы метаболизма головного мозга, снижения его восприимчивости к хронической гипоксии, которая развивается на фоне вегетативной дистонии вследствие полученной травмы, а также влиянием данных препаратов на нейротрансмиттерные системы. Применение нейрометаболической терапиии пациентам с последствиями черепно-мозговых травм приводит к улучшению их качества жизни.

Ключевые слова: легкая черепно-мозговая травма, последствия легкой черепно-мозговой травмы, качество жизни, метаболическая терапия.

Надійшла 28.08.2014