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Volume 2 • Issue 4 • 2018

Research Article

Current Opinions in Neurological Science

ISSN: 2575-5447

The Comparative Characteristic of Quality of Life in Patients with Distant Consequences of Combat Brain Injury

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Received: May 25, 2018; **Published:** June 20, 2018

Abstract

Statement of the Problem: The work defines the main directions of diagnostic, therapeutic and rehabilitation actions at persons, who have had a combat brain injury on the basis of assessment and comparison of indicators of quality of life in various terms of the postponed trauma.

Materials & Methodology: We have examined 180 male people: 100 combatants in the Democratic republic Afghanistan (1979-1989) and 80 - combatants of the conflict in the east of Ukraine (from 2014 till present) with consequences of a combat brain injury of varying severity. We used clinical-neurological, instrumental (craniography of skull, magnetic resonance imaging, ultrasonic Doppler sonography of the main vessels of the head and neck), biochemical, statistical methods of a research, and also questionnaire scale SF-36.

Results: The study found that indicators of quality of life of persons, who have had a combat brain injury depend on severity and term which has passed from getting combat brain injury. In early terms after the combat brain injury and also at the persons who have had easy and average weight combat brain injury, the indicators connected with a psychological component are mainly broken. While the patients, who have had a combat brain injury, have violations of all aspects (physical, psychological and social), which in the absence of necessary rehabilitation and treatment are identically shown in different terms of trauma.

Conclusions: The results showed that the level of quality of life is in many respects caused by weight of functional violations, leading to activity restriction first of all in the social sphere considerably affecting adaptation potential of organism.

Volume 2 Issue 4 June 2018

Introduction

Cranio-cerebral trauma (CCT) is one of the most significant, the most severe and widespread forms of damage to the central nervous system. Its consequences are not only a medical, but also a social and economic problem of modern medicine and neurology in particular [1,4 and 5]. The reason for this is the persistent growth in the number of CCT and, consequently, its long-term consequences [1,6]. Another important reason is that the CCT most often affects people of young and middle working age (25-40 years). This has a particularly important social and economic significance in connection with the trend towards an increase in the elderly disabled population and a decrease

in the birth rate. The consequences of CCT are the most important in the social and economic sense as one of the main manifestations of traumatic brain disease [5,9].

The consequences of CCT may acquire a chronic character. The consequence of this is a deterioration in the quality of life of the patient, a decrease in his ability to work and, according to statistics, this leads to more than 100,000 persons with disabilities annually. In recent decades, local military conflicts have increased in the world, which leads to an increase in the number of cases of military traumatic brain injuries. In this regard, the so-called "battle cranio-cereberal trauma" - brain damage, which takes the main share among the cerebral traumatism and received during the conduct of hostilities (i.e., in wartime), attracts attention among the priority and socially significant problems of modern medicine in recent times [5,6 and 10]. The study of this medical and social problem is actual due to the high prevalence and steady increase in the number of CCT, a high percentage of complications, disability and mortality of a large number of people [2].

Disturbances in the regulatory influence of the nervous system on the processes that ensure an adequate adaptation of the organism to volatile environmental conditions are at the basis of violations of compensatory-adaptation processes in the residual period of the cranio-cereberal trauma [3,4]. However, the role of combat CCT in the start of mechanisms of adaptation disorders of the organism is still not fully investigated. At the same time, the disclosure of this issue will allow us to move to an increase in the adaptive capacity of people who have undergone CCI of different severity at different times of the transferred trauma in the future. Quality of life assessment (QOL) is one of the new criteria for the effectiveness of treatment and rehabilitation measures, which has become widespread in countries with a high level of development of medicine in recent years.

The quality of life is the perception by individuals of their position in life in the context of culture and the value system in which they live, in accordance with the goals, expectations, norms and cares, as defined by WHO. QOL is determined by the physical, social and emotional factors of a person's life, which are important for him and affect him. QOL is the degree of comfort of a person both within himself and within his society. The long-term consequences of CCT, as well as the fact of the combat CCT obtained during the conduct of hostilities, lead to pronounced functional disorders, psychological problems and social limitations, which significantly worsens the quality of life of such patients [5,10].

The social category of QOL includes 12 parameters, in the first place is health (according to the UN). The European Economic Commission has systematized eight groups of social indicators of QOL, and the health also being placed on the first place. Consequently, QOL, related to the health, can be considered as an integral characteristic of the physical, mental and social functioning of a healthy and sick person, based on his subjective perception.

The concept of "quality of life due to health" allowed to identify the parameters that describe the state of health, caring for it and the quality of medical care from the general concept of quality of life. Currently, WHO has developed the following criteria for assessing the quality of life due to health?

- Physical (strength, energy, tiredness, pain, discomfort, dream, rest);
- Psychological (emotions, level of cognitive functions, self-appraisal);
- Level of independence (daily activity, working capacity);
- Social life (personal relationships, social value);
- Environment (safety, ecology, security, accessibility and quality of medical care, information, training opportunities, everyday life).

The concept of quality of life research in medicine is based on single methodological approaches that include three basic principles: multidimensional evaluation, variability of QOL parameters in time, and patient participation in assessing their condition [4,10]. The assessment tools (general and specific forms) developed by experts from the world's leading clinical centers in accordance with the principles of evidence-based medicine and the requirements of Good Clinical Practices (GCP), have created an opportunity for a

quantitative assessment of the main spheres of human life. Application of them together with other generally accepted clinical, laboratory and instrumental methods of research allows to expand the doctor's understanding about the patient's condition as a whole.

The long-term consequences of combat traumatic brain injury have a diverse range of disorders of all spheres of vital activity of the organism, foremost, physical or functional, which determine the individual level of the patient's QOL [4,10]. Quantitative determination of the functional state of this group of patients is a rather difficult and complex task, as it is determined by the patient's attitude to the performance of not only professional and non-professional obligations, but also social adaptation. Nevertheless, in this case the assessment of the patient's functional activity is schematic and does not express quantitatively, which makes it very difficult to assess the change in the functional status of patients in dynamics, especially in short-term studies. Therefore, the quantitative accounting of changes in QOL indicators over time is one of the important principles of QOL research. This allows us to monitor the patient's condition in dynamics.

The concept and methodology of QOL research are very important for us. They created opportunities for studying various aspects of the patient's life, raised new questions and tasks in the development of further approaches to a complex evaluation of QOL patients with long-term consequences of combat CCT, testing new research tools. Objective information about the quality of life provides a real opportunity to find ways to improve the effectiveness of treatment and rehabilitation activities and develop new programs to improve the quality of life of the population [10]. This shows the relevance of the chosen problems.

Article purpose

Define the main directions of diagnostic, therapeutic and rehabilitation actions at persons, who have had a fighting cranio-cereberal trauma, on the basis of assessment and comparison of indicators of quality of life in various terms of the postponed trauma.

Material and Methods

We have examined 180 male people: 100 combatants in the Democratic republic Afghanistan (1979-1989) (1 group) and 80 - combatants of the conflict in the east of Ukraine (from 2014 till present) (2 group) with consequences of a fighting cranio-cereberal trauma of varying severity. All patients are the persons of able to work age in the moment of research. All patients were divided into 3 subgroups depending on the degree of severity: 1a and 2a - easy CCT (40 and 30 persons accordingly); 1b and 2b – CCT of middle degree (30 and 20 persons); 1c and 2c - heavy CCT (30 and 30 persons). The control group is 30 practically healthy men, comparable in age.

Patients with the consequences of combat CCT were examined by us through a clinical-neurological examination using additional methods. The symptomatic of the acute period of CCT was studied on the basis of the anamnestic data noted in the extract from the hospitals and the polyclinic card. A standard set of laboratory studies of patients was made (clinical analysis of blood, urine, blood glucose test, biochemical blood test, lipid spectrum condition, blood coagulation system indicators).

Additional methods of investigation (electroencephalography (EEG), ECHO-encephaloscopy, ultrasonic dopplerography of the main vessels of the neck, neuroimaging methods) were also used to clarify the diagnosis and localization of the process. We used clinical-neurological, instrumental (craniography of skull, magnetic resonance imaging, ultrasonic Doppler sonography of the main vessels of the head and neck), biochemical, statistical methods of a research, and also questionnaire scale SF-36.

Questionnaire of MOS SF - 36 (MOS 36 - Item Short - Form Health Survey) is the most widespread in clinical researches and at the individual monitoring of quality of life. It can be used both – at healthy persons and at different pathologies. This questionnaire includes 36 questions, representing 8 conceptions (scales) of health: physical ability to work, social activity, degree of limitation of physical ability to work and social activity, energeticness or fatigue ability, psychical health, pain and general estimation of health.

All data statistically treated through the program Statistica 6.0, package of statistical analysis of the program "Microsoft Excel 2010". Thus determined mean values (M) and their standard deviations (m). Statistically the reliable was consider the condition of $p < 0.05$. For realization of cross-correlation analysis used the coefficients of correlations of Pearson.

Results

As a result of the study, it was noted that complaints of dizziness, general weakness, headache and unsteadiness in walking occurred in all patients. Meningeal signs were negative in all groups in 100% of cases. Visual impairments by diplopia type were determined in patients who underwent a combat CCT and severe trauma in the first group "b" and "c" subgroups (18.2% and 20.09% of cases, respectively). The central paresis of the facial nerve was in patients of the first group "c" - 55.3% and the second group "b" and "c" - 64.9% and 73.3%, respectively. The decrease in the esophageal reflex was detected in only 7 patients (23.3%) in group 1 b. Reflexes of oral automatism also predominated for patients, carrying CCT of middle (31,6% and 29,2%) and heavy degree (75,3 and 80%) in both groups.

Declines of muscular force for the patients of the first group "A" and second groups "A" is not educed. However deep paresises (to the 2x points) were educed for patients carrying heavy battle CCT. Patients in the first "b" group had an increase in spinal muscle tone in 15.8% of cases, and in plastic type in 31.6%. In patients of the first "c" group, the increase in muscle tone was 43.3% and 46.7%, respectively. Pathological reflexes also predominated for patients the first and second "в" groups.

Comparison of patients who underwent combat CCT of varying severity showed that age and sex were identical in both groups (± 3.5 years). Patients of the first and second "a" group had mainly subjective symptoms and cerebral symptoms. While for the patients of the first and second "b" and the first and second "c" groups the general cerebral and focal symptoms, as well as the presence of a variety of paroxysmal conditions (syncopal, vegetative-vascular paroxysms and epileptic seizures) were characteristic.

Studies of the bioelectric activity of the brain in patients have shown that the period of long-term effects of CCT is characterized by changes in the frequency and amplitude of alpha rhythm. This indicates the dysfunction of nonspecific brain systems in patients with "a" subgroups and approaches the indices of patients "b" and "c" subgroups. Violations of the bioelectric reactivity of the brain spoke of the disharmonious interaction between sensory, autonomic and psychic systems of the brain during the formation of a new action, the reduction of neuro adaptive mechanisms under the influence of environmental factors.

Thus, in the central nervous system at persons carrying combat CCT of middle and heavy degree, there are powerful "tectonic violations": the mode of functioning of the nervous system, her sensitiveness to external influences, speed and adequacy of reacting on them, changes. The ability of nerve cells to move from one mode of operation to another is reduced. This indicates a lower level of transmission and processing of information and leads to a decrease in the level of adaptive and regulatory processes of the central nervous system, which are indicators of health.

The reduced level of cerebral blood stream against the background of increased resistive activity in combination with cerebrospinal fluid circulation in persons who undergo combat traumatic brain injury of various severity can lead to chronic dyscirculatory hypoxia, which is one of the pathogenetic links of traumatic brain disease.

Cerebral dyscirculation increases tissue and intracranial pressure. At the same time, processes that increase tissue pressure, disrupt microcirculation and vascular auto regulation, thus closing the "vicious circle" and determining in most cases the progredient nature of the course of traumatic illness in persons who have undergone combat CCT. The evaluation of the quality of life of patients who underwent combat CCT was the resultant of different components and was based on precise mathematical criteria that characterized various aspects of human life as a biological and social individual.

The integrated assessment of QOL on the scales of the SF-36 questionnaire showed a decrease in physical, mental emotional and social functioning of patients in the long-term combat CCT, reliably dependent on the severity of the trauma and correlated with the

duration of the trauma. The lowest values for all scales, both physical and psychological health, and the overall quality of life indicator, were recorded in individuals who had suffered severe military TBI. This significantly differs from similar parameters in patients "a" and "b" groups ($p < 0.05$). Patients in 1 group showed a more pronounced decrease in physical health, depending on the time elapsed since the injury. And in patients of the 2nd group, violations of the components of psychological health predominated ($p < 0.05$).

Research of quality of life through the questionnaire of SF - 36 allowed effectively to estimate influence of degree of combat CCT on the physical and social functioning of patients. Reliable changes for the patients of different groups depended on the degree of trauma and the remoteness of trauma ($p < 0.05$). In general, the indices of patients with middle CCT were significantly lower than the patients in the "a" group. The got results testify that heavy combat CCT results in limitation of all aspects of vital functions of man. The study showed that patients who undergo military TBI are characterized by a very low assessment of their general health, a significant decrease in physical activity and chronic pain, which sharply limits the ability to exercise and fulfill daily life responsibilities.

We have additionally analyzed the advisory opinions of a full-time psychologist in order to prove the existence of an effect on the QOL of the psychological state of this contingent of patients. The data of the analysis testified to the violation of the psychoemotional sphere, with the predominance of expression in the persons of the second group. It can be concluded that with the increase in the specific gravity of the transferred combat CCT, the QOL of patients progressively decreases. This is manifested by an increasing deterioration in the physical condition, a decrease in vital activity, depression and anxiety, as well as the emergence of cognitive and emotional-volitional disorders, which completely correlates with the clinical features of the course of the disease.

On the basis of realization of cross-correlation analysis direct connections of physical components with the presence of nidal activity (r=+0, 67) during realization EEG [6,9], and psychological components with the presence of пароксизмальной activity (r=+0, 72) and epileptic activity (r=+0, 36) were identified. These data demonstrate that the decrease in QOL, depending on the degree of severity of the transferred combat CCT, is interrelated with changes that are recorded during EEG. In the course of our study, it was found in the course of our study, it was found, that any battle CCT changes the person's mental state, restricts his adaptation and social contacts, which causes a low tolerance to stressful external factors. Of course, the factors listed above cannot fail to appear on such an integral indicator as a patient's QOL.

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The assessment of QOL, which is made by the patient himself, along with traditional diagnostic methods, is a valuable and reliable indicator of the general condition of the patient, makes it possible to compile a complete and objective picture of the disease and should be included in the list of diagnostic measures when patients are referred to the hospital, and when evaluating therapeutic and rehabilitation activities.

Conclusion

The results of the research showed that the level of quality of life is largely determined by the severity of functional disorders, which, resulting in a limitation of life activity, primarily in the social sphere, significantly effect on the adaptive potential of the organism. The QOL indicators of persons who have suffered a combat cranio-cereberal trauma depend on the degree of severity and the time elapsed since the time of injury.

In patients with a short period after the transferred combat CCT, as well as in patients who have undergone light and moderate severity of the CCT, the indicators associated with the psychological component are mainly violated. At the same time, patients who underwent severe CCT suffered violations of all aspects of health (physical, psychological, social), which, in the absence of the necessary rehabilitation and treatment, are equally expressed in different terms of the trauma.

In conclusion it is possible to say that battle CCT especially heavy, it is necessary to examine not only as a factor, defiant traumatic illness cerebrum, but also as a stressor defeat adaptation potential of organism and defiant development of clinic neurological syndromes. Taking into account the adaptive disorders revealed during the research those who have undergone combat CCT should be allocated to the priority surveillance group, depending on the prescription and severity of injury in the planning of medical and social activities

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