

DYNAMICS OF PSYCHOLOGICAL AND SENSORY PARAMETERS FROM WOUNDED

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The importance of psychological research and subsequent correction of wounded is caused by the following statistical results. On the data of military campaigns of XX century the percent of wounded in extremities makes 54-65 % among the casualties of the combatants of all categories. From them 65-70 % return in active army as skilled commanders and soldier. Terms of returning to the official duties depend on severity of the gunshot wound and speed of adaptive processes. No doubts there are, that the psychic adaptation determines not only motivation and emotion to the subsequent activity. It directly influences on reparation processes [1-4].

We understand mental adaptation interaction of functional systems of organism, ensuring perception and processing of the information, cycle dream - activity, emotional reactions, condition of the homeokinesis and social contacts [11].

The sensory systems and cycle dream - activity play a paramount role. The rhythmic and consecutive increase and decrease of mental activity depends on them, which determine opportunities of human activity. On neurophysiological level it is realized by influence ascending arousal reticular system on the brain cortex condition [8].

The importance of mechanisms of emotions in the maintenance of process of adaptation is well known. As consider revising testifies, disintegration between aspirations, representations and opportunities of actions, often result in emotional frustration. Most frequently they are shown by formation of feeling of fear, melancholy, variability of mood, depression or rage, raised aggression.

At violation of psychic adaptation the disorganization of social contacts is observed various on quality and degree. The opportunities of self-regulation of the acts are reduced, egocentric acts amplify, the relation to military activity changes. On this background the change of the somatic status at a wound quite often deprives the man from real prospects and causes reorganizations in orientations of values [1, 4, 9, 10].

The estimation of dynamics of psychological and sensory parameters at combatants with battle injuries of extremities at a stage of the specialized medical aid as the purpose of the present research served. First, choice of optimal methods of inspection of the given category of the casualties, and, secondly, estimation of the validity of these methods for the prognosis of rehabilitation of mental and motor functions were as the research tasks.

METHODS

The complex psychological test of 72 combatants, wounded in extremities, was carried out: on 3-5 day after the injury and in 30-40 days after reception in Military Traumatology and Orthopedic clinic of Military Medical Academy.

Projective techniques – the Rosenzweig Picture-Frustration Study (P-F study), hand-test, 8-colour test Lusher's and blank tests – Spielberger's and state of health – activity - mood were applied. They have allowed to estimate tolerance to frustration, level of the aggressive tendencies, personal and reactive anxiety, depression, and also state of health, activity, mood, degree of asthenization and of hypochondriac fixing, condition of vegetative nervous system.

Condition of the sensory systems, ensuring movement and damaged as a result of injury, estimated at 43 casualties on the data of brain mapping of the somatosensory evoked potentials

(SEPs). SEPs registered by computer neuromapper «brain surveyor». The researched nerves were stimulated by electrical signals in there projections. The technical requirements corresponded to International [5, 7].

RESULTS AND THEIR DISCUSSION

1. Dynamics of psychological parameters

A line of circumstances defines the choice of optimal methods of estimation of the psychic status of the wounded. To them it is necessary to relate a limit of time and also absence of monotony and expressed intellectual loading. On this basis the volumetric, multifactor tests for the majority wounded are unacceptable. Therefore for unification of research a line of projective methods and short blank tests were used.

The test of Rozenzweig's figurative association corresponds to these requirements and allows to receive parameters of answers on frustration. It is characteristic, that the majority of the forms of the emotional answers on frustration are identical to the descriptions of signs of stress. Depression, expressed alarm, increased reactivity and irritability, passing in aggressive actions are the attributes

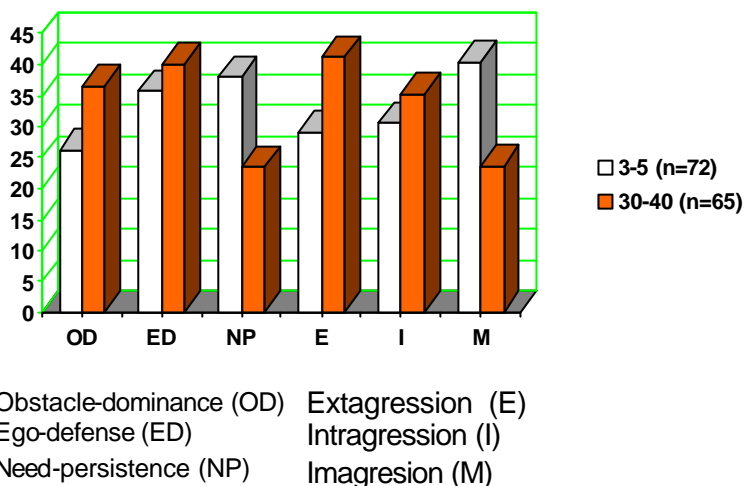


Fig. 1. P-F study of the wounded during of the stay in clinic, %

of posttraumatic stress.

As known, the frustration is defined by a condition, which is caused by objective (or subjective) insuperable difficulties arising on the way to achievement of the purpose, or decision of a task, and expressing by characteristics of experiences and behaviour.

The data of the applications of Rosenzweig study (P-F study) at wounded are submitted in fig. 1. The general profile of frustration of the wounded in the beginning treatment had the following kind: by a type - NP > ED > OD, on a direction - M > I > E. Through 30-40 days the profile has changed as for a type (ED > OD > NP), and on a direction (E > I > M).

Thus, the results of the test show, that in due to the course at wounded, the amount of reactions expressing censure, reproaches, indignation, animosities, on the one hand, is increased, and with another, the reactions of self-accusation are amplified. In the whole such dynamics of the reactions testifies to development at them of the negative tendencies in a mental condition. The significant amount without accused and small share of OD-reactions in the beginning of treatment are explained of asthenization of the wounded.

It is well known, that the increase of the level of aggressive tendencies is one of violation of the adaptation at the participants of the battle operations, which have appeared in conditions of peace

life. In this connection from aggressive psychological scales (physical - verbal, active - passive and direct - indirect) the actions of the participants of the battle operations can be qualified as physical, active and direct.

For diagnostics of aggression or predisposition to it we used a projective technique hand test. The test allows to predict and to estimate the tendencies of the person to open aggressive behaviour, predicting not a concrete kind of reactions, and propensity to them. Besides on parameters of the test it is possible to judge about degree of the astenization, emotional tension, of ipochondric fixing, demonstration in behaviour and fear before aggression on the part of other people.

According to received data, in 30-40 days after the injury at the surveyed casualties the parameters of aggression, cripple, tension and dependence were significantly ($P < 0.01$) increased (fig. 2). The results testify to increase of probability of display at wounded of open aggressive behaviour, decrease of reactions of adaptation to a social environment, growth of a level of ipochondric fixing and emotional tension, increase of need in the help and support on the part of

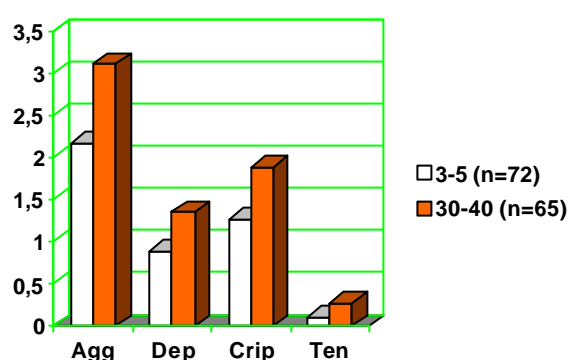


Fig. 2. Dynamics of significant parameters of the "hand test" at wounded, $X \pm m$

other persons, amplification of feeling of fault.

The following important characteristic of a mental condition of the wounded, which had the battle stress, is the degree of the emotional tension on the data of level of reactive anxiety. This parameter, in turn, is closely connected to a condition of vegetative nervous system. The estimation of a level of reactive anxiety on a Spilberger's technique and of the balance of vegetative nervous system by the 8-colour Lusher's test showed, that to the beginning of the second month of treatment a level of reactive anxiety significantly grew and also raised activity of sympathetic part of vegetative nervous system. These changes are accompanied by significant reduction at the majority surveyed of subjective estimation of the mood (fig. 3). Increase of an emotional tension and increase of time of stay in medical establishment are estimated as reduction of physiological reserves of organism and increase of probability of development of violations of adaptation.

In other series of research the employees of special divisions of other power department - Ministry of Internal Affairs were surveyed [12]. 38 men took part in battle actions, and 20 - in military operations did not participate. In searches of interactions of signs and factors, the revealing of most essential of them the following methods were used: Eysenck's test (EPQ), Eysenck's test of diagnostics of a self-estimation of mental condition, Spielberger's test, test of diagnostics of parameters and forms of aggression Bassa-Dark, multifactor Cattell's test. Correlation and the factor analysis for data processing were applied.

The comparative analysis of parameters of the psychological characteristics of the employees of the Ministry of Internal Affairs, taking part in battle actions and which did not take part in military

operations, has allowed to establish. All surveyed have the general features by virtue of specificity of carried out work. However, there is a line of significant distinctions of psychological features.

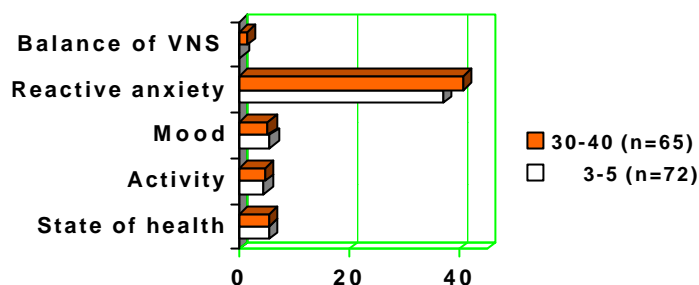


Fig. 3. Dynamics of parameters of the tests (SAM, Spielberger's, Lusher's), $X \pm m_x$

Parameters of a level of physical aggression (in the first group on 26,6 % above second), level of neurotism (21, 5 %), suspiciousness (51,1 %), cruelty (30,9 %), carelessness (20,6 %) and feeling of fault (26 %) here concern.

2. The parameters of sensory activity

Proceeding from a rule, that the mechanisms of sensory perception are basis in construction of more complex psychic acts [6, 11](dream - activity, thinking, emotion, motivation, training, language, consciousness and etc.), we investigated processes of somatosensory perception at 43 wounded with gunshot wounds of the extremities, received in battle conditions. It is necessary to tell, that on the initial stage only diagnostic tasks were put. The degree and level of damage of a nerve were necessary to define. However, further analysis the mechanisms of influence of the damaged paths of somatosensory system on psychic activity allowed to establish.

The evoked potentials (or event-related potentials) for an estimation of a psychic condition in various laboratories frequently are used [5-7]. In a short statement the components SEPs have the following neurogenesis and psychological importance. It is considered, that the first wave with latency about 14 ms reflects activity of neurons from a brainstem to switching nucleuses of thalamus. The complex of waves D_{25-30}/N_{35-40} is first specific sensory pattern, registered on a thalamic-cortical level. As a source of first of these components the switching nucleuses of a ventral-basal complex of the thalamus are considered. The wave N_{35-40} reflects specific sensory activity in a primary projective zone (parietal cortex). The components SEPs with latency from 10 ms to 40 ms not only reflect activity of neurons of a brainstem. Their connection with mechanisms of selective attention, and also with ascending arousal reticular system of a brain recently is established. Later waves with latency are higher 70 ms are generated by various fields of a cortex of the brain and are connected to complex psychic processes [5, 6, 8].

During multichannel registration the components SEP of the healthy man are symmetrically distributed on all surface of a brain. Let's look at the condition of somatosensory systems at gunshot wounds of the extremities. In a fig. 4 schematic distribution SEP at a gunshot wound of the left leg is shown. At stimulation of branches of a left ischial nerve potential is formed only in four sites. The

conclusion about formation of irreversible violations is made. Thus, irradiation of pathological activity is distributed as on a lumbosacral plexus, and on ascending arousal reticular system of the brain.

The selective deenergizing of cortex fields at gunshot damages of the extremities is observed quite often (~55 % on our data). It is necessary to note, that at ours (difficult on quality of a wound) casualties the complete anatomic damages of nerves were absent. However, if some days the nerve is in region of posttraumatic hypoxia, percent of its fibers is switched off. It promotes pathological impulses on higher departments of nervous system.

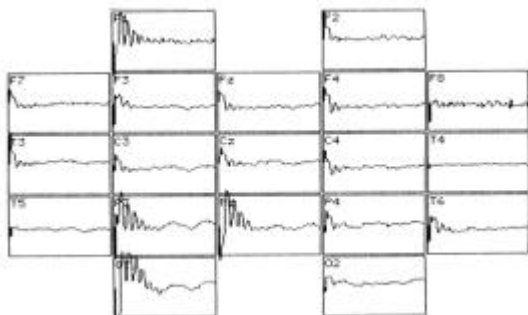


Fig. 5. Schematic distribution of SEP on surface of the brain at gunshot wound of left leg.

The rule about selective formation of the evoked answer in cortex of the brain in rehabilitation (medical and psychological) measures has the large importance. A neurophysiological basis of selective processes is the activity of somatosensory systems. These systems answer for a filtration and modulation of signals. The motivation-emotional component of sensations is provided by reticular, limbic and frontal structures. Cells of the formation reticular define the level of intensity of irritation. They summarize impulses from various receptors of a body (central processor of the analysis of intensity). The integration of the motivation-emotional items of information at a level of the centers of thalamus and of the cortex makes a part of process, which provides a cognitive portion of painful sensation. Last is connected to higher associative and integrative the centers, and, first of all - with frontal and premotor zones of the cortex.

CONCLUSION

In the beginning of the specialized treatment at the majority wounded it is marked expressed asthenization. The projective methods with emotionally sated by a material are expedient to psychological test in this period for applying. Such requirements satisfy the Rosenzweg Picture-Frustration Study, hand-test, 8-colour Lusher's test. The application of short scales directed to an estimation of condition (to reactive anxiety, state of health – activity - mood) is possible. After one month of the beginning of the treatment at the casualties the mood is significantly reduced. The signs of depression, level of reactive anxiety, activity of a sympathetic part of vegetative nervous system, aggression are raised. It relates to increase of a degree of an emotional tension.

Depending on a degree of the hypoxia, or of traumatic compression of peripheral nerves the somatosensory evoked answer or in general is absent, or is formed in a brain selectively. The selective formation of the pattern of somatosensory evoked potential in cortex of the large hemispheres depends on restoration of motor and sensory functions after hypoxia or traumatic compression of a nerve. As favorable are considered that topomaps, where the evoked answer is formed more than in 60 % of sites, and if more than 50 % of points of registration "is silent" – the restoration of function is practically not probable.

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