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Artículos

CLINICAL AND PSYCHOLOGICAL APPROACH TO THE REHABILITATION OF PATIENTS IN A STATE OF THE DEPRESSION OF CONSCIOUSNESS AFTER SUFFERING A STROKE

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Resumen:

En este artículo se aborda el carácter interdisciplinario del problema de la conciencia. Se abordan cuestiones sobre la rehabilitación de pacientes con disminución de la conciencia. Se aporta el fundamento teórico de los enfoques de la psicología clínica sobre métodos consistentes en la estimulación de sistemas de analizadores. El artículo indica que las características del ictus puede determinar parámetros específicos del descenso de la conciencia. Se han obtenido datos estadísticos significativos sobre la relación entre el descenso del nivel de conciencia y la lateraoización y el tipo de ictus. En conclusión, los autores abordan cuestiones relacionadas con la aplicación de estimulación multimodal en la rehabilidación de la conciencia.

Palabras clave: Psicología clínica, Conciencia, Disminución de la conciencia, Rehabilitación, Estimulación multisensorial.

Abstract:

The interdisciplinary character of consciousness problem is emphasized in the article. The questions rehabilitation of patients with consciousness oppression are addressed. The theoretical background of clinical psychological approach to methods consisting of analyzers systems stimulation, which are used at the rehabilitation of patients with consciousness depression, is provided. The article shows that the stroke characteristics can determine the specific parameters of consciousness depression. Statistically significant data are obtained for a links between the depth of consciousness oppression and stroke lateralization or stroke type. In conclusion, authors outline the issues related to the application of multimodal stimulation in consciousness rehabilitation.

Keywords: Clinical psychology, Consciousness, Depression of consciousness, Rehabilitation, Multisensory stimulation.

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The problem of restoring consciousness after various cerebrovascular pathologies is particularly acute in modern clinical practice, since the quality of the subsequent restoration of mental activity correlates with the duration of the unconscious state (Aleksandrova et al., 2013). Due to that there is a continuous search for predictors affecting the contraction of the depression of consciousness and its course for the further prognosis.

According to the World Health Organization (WHO, 2015), diseases associated with disorders of the cerebral circulation are one of the leading causes of death in the world, and the number of deaths caused by them has a trend to a significant annual growth. There is a certain "rejuvenation" of these diseases - up to 30% of apoplectics today are people of working age (Vereshchagin, Varakin, 2001; Gusev et al., 2003). In terms of the number of apoplectics, Russia holds one of the first places in the world (Zaharov, Vahnina, 2011). Despite the positive dynamics compared to previous decades (Suslina, Varakin, 2009), our country is still the leader in the number of cases of stroke progression, as well as adverse consequences of this disease (Prokaeva et al., 2015).

With the progression of stroke, the risk of the depression of consciousness is very high (Paciaroni et al., 2012), and the progression of an extreme degree of the depression of consciousness - coma - often ends in a fatal outcome. The fact of the depression of consciousness and its depth are important predictors of the severity of the course and outcome of a stroke, which directly determines the degree of efforts of various specialists in the rehabilitation of apoplectics (Negovskiy, 1977; Acciarresi et al., 2006; Lan et al., 2006; Litvickij, 2010).

In order to illustrate the problem, a pilot retrospective research (analysis of the case histories) was conducted on the basis of the City Clinical Hospital No. 31 in Moscow in the Department of Neurologic reanimation.

Case histories of 112 patients with a diagnosis of "acute cerebrovascular accident" were selected (Table 1). Among them were 54 patients with the depression of consciousness and 58 patients without it.

Patients with severe concomitant diseases were not included at the group which could have a significant impact on the parameters of oppression of consciousness and act as predictors of death (pneumonia, cancer) to reduce the risk of side mixing. Patients had as comorbidities were obesity (6%), diabetes mellitus (13%), hypertension (94%) and atrial disease (13%) (patients may have several comorbidities).

Among 91 patients with diagnosis of ischemic stroke: 32 people were cardioembolic pathogenetic variant, 13 people were atherothrombotic pathogenic variant, 2 people – lacunary pathogenic variant and last 44 people – unspecified.

The group with the depression of consciousness consisted of 37 women and 17 men aged 48 to 96. The group without the depression of consciousness consisted of 29 women and 29 men aged 40 to 95, with comparable types of stroke.

Data were processed using statistical methods: Pearson's chi-squared test and analysis of variance (ANOVA).

The main objective of the pilot study was to identify the correlation dependencies of the parameters of the depression of consciousness1 on the characteristics of stroke2 and on the age and gender characteristics of patients.

It turned out that the progression of the depression of consciousness is not associated with localization and type of stroke, with pathogenic variants of ischemic stroke, with concomitant diseases (diabetes, obesity, ciliary disease). Age and gender turned out to be the parameters of the risk of depression after the stroke. In women, the depression of consciousness occurred more often (÷2 = 3,963; p # .05). The probability of the depression of consciousness increases (÷2 = 12,52; p # .01) in patients more than 60 years old. At the same time, neither sex nor age of patients significantly affect the parameters of depression (duration, depth) and the gravity of the stroke.

A significant correspondence was found between the contraction of the depression and death (÷2 = 59,3; p ## .001). There were no fatal outcomes in the group of patients without the depression after the stroke, whereas in the group with the depression the fatal outcome was observed in 68% of the patients. Interestingly, the depth of the depression of consciousness (t = 2.88; p # .01,) and the gravity of the stroke (t = -2.01; p # .05,) are higher in the group of patients with fatal outcome. The duration of the depression of consciousness does not affect the likelihood of a fatal outcome.

1 The parameters of the depression of consciousness are quantitative characteristics of the depression of consciousness, which are determined by the duration (the number of days of lack of consciousness) and depth (the Glasgow Coma Scale score).

2 Characteristics of stroke - the type and localization of stroke, the gravity of stroke on the scale of NIHSS and the pathogenic variant of an ischemic stroke. It was established according to the clinical picture given by CT and magnetic resonance imaging (MRI) of the brain.

When considering the parameters of the depression, the following statistically significant results were obtained:

1. The depth of the depression depends on the type and the location of the stroke. Hemorrhagic type of a stroke in stem structures leads to maximum depth of the depression of consciousness in comparison with other combinations of parameters of type and localization of a stroke (F = 7.33; p # .01,).

2. The gravity of a stroke depends on the type of a stroke: in a hemorrhagic stroke type, the NIHSS score is higher (F = 11,8; p # .001).

Thus, the pilot study showed that the characteristics of a stroke and the epidemiological parameters of patients can determine the specific parameters of the depression of consciousness1.

TABLE 1
INFORMATION ABOUT PATIENTS

Factor	Ischemic stroke (n = 91) n	%	Hemorrhagic stroke (n = 21) n	%	Total (n = 112) n	%
Sex						
Male	37	40,7	9	42,9	44	41,0
Female	54	59,3	12	57,1	66	59,0
Average age, years						
Men	72	—	73	—	72	—
Women	73	—	72	—	73	—
Consciousness						
not depressed	50	55,0	8	38,0	58	51,8
depressed	41	45,0	13	62,0	54	48,2
Glasgow coma scale score	7,5	—	7,5	—	7,5	—
Duration of the depression of consciousness (in the group with the depression of consciousness)						
average value, days	8	—	7,5	—	7,8	—
Stroke gravity (in the group with the depression of consciousness)						
score according to National Institutes of Health Stroke Scale (NIHSS)	24,3	—	24,7	—	24,6	—
Stroke localization						
right hemisphere	36	39,5	6	28,6	42	37,5
left hemisphere	41	45,0	7	33,3	48	42,9
brain stem structures	14	15,5	8	38,1	22	19,6
Outcome						
positive	66	72,5	9	42,9	75	67,0
fatal	25	27,5	12	57,1	37	33,0

TABLA 1
INFORMATION ABOUT PATIENTS

THE PROBLEM OF THE IMPAIRMENT OF CONSCIOUSNESS

The problem of qualification and quantification of consciousness is a key problem in modern science, whereas the consciousness is the object of study in a number of disciplines, including psychology, particularly clinical psychology. Each area of research determines consciousness within its narrow understanding, and, consequently, there are many theories of consciousness and no generally accepted theory with which everyone would agree on (Atkinson et al., 2003; Beskova, Gerasimova, Merkulov, 2010; Kotov, 2017).

For clinical psychology, the problem of consciousness is relevant though underdeveloped. S.L. Rubinshtejn (1959) advocated the separation of the mental disorder and the impairment of consciousness, due to the latter having specific characteristics. Facing the impairment of consciousness in various diseases and disorders of mental activity, each specialist should have a working definition of consciousness and criteria that allow to

analyze such an impairment. There is a well-known quotation of the Russian psychiatrist A.V. Snezhnevskij (1970, pp. 99-100), who pointed out that "if we approach consciousness in the philosophical sense, we naturally need to say that in every mental disorder the highest form of reflection of the world in our brain is broken".

The impairment of consciousness is one of the least developed questions not only in clinical psychology, but also in medicine. In clinical practice, there are various described forms of impairment of consciousness which can be observed independently of other forms of human mental activity.

The two main components of consciousness - wakefulness and content - can be correlated with the states of its depression and change, respectively. The depression of consciousness occurs when a component of wakefulness is impaired and is considered a quantitative disorder (more often found in a neurological clinic), whereas a change of consciousness is associated with qualitative disorders of its content (which is more typical of a psychiatric clinic) (Plam, Pozner, 1986; Beskova, Gerasimova, Merkulov, 2010).

SENSORY SYSTEMS AND CONSCIOUSNESS

John Locke undertook the first attempt at a philosophical substantiation of the human mind within the empirical traditions of modern times, continuing the ideas of his predecessors F. Bacon and T. Hobbes and developing them contrary to idealistic views of Berkeley. The interpretation of the nature of empirical cognition in the classical sensualism of Dzh. Lokk (1985, p. 147) relied primarily on the position of the original "not-innate" nature of the ideas of the soul, which, in fact, is a blank state ("tabula rasa") for future signs, information and representations obtained empirically through sensations: "For to remember is to perceive by memory or consciousness what was known or perceived before; without it, every idea that penetrates the soul is new, not one that is remembered. " Defending the thesis that there is nothing in the human mind that was not initially perceived through the sense organs, the philosopher came to a very important thought for psychology: the one regarding the gradual formation of the human mind, its functioning and change in the process of human interaction with the surrounding world.

The central idea of sensualists regarding the importance of the analytic and synthetic activity of the sense organs (analyzer systems) is supported and continued in A.N. Leont'ev's understanding of the structure of consciousness. Alexey Nikolaevich singled out three of its components: personal meaning, significance and sensual tissue. Under sensual tissue he understands the tissue that forms the sensory composition of particular images of reality, which can be objectively perceived or recalled: "Even a superficial analysis of consciousness reveals a very complex structure of it. First of all, it is self-evident that the picture of the world which a person is aware of, the one that appears to him, inevitably includes sensual impressions, sensual images, I prefer to say - sensual tissue. This tissue also forms the sensual composition of particular images of reality, which are actually perceived or emerging from memory, referring to the future or even just imagined "(Leont'ev, 2000, p. 97).

From the definition of sensual tissue a very important conclusion can be drawn that without the work of analyzer systems it is impossible to form consciousness, whereas disorders of consciousness must be accompanied by changes in the work of analyzer systems. In this case, the analyzer systems are in close interaction and can compensate each other in case of impairment of one of them: "There are vibratory, olfactory, kinesthetic sensations in this depleted sensual tissue. It is important to understand that if you "cut off" or "remove" these sensory components, then consciousness is impossible at all, since the sense composition of consciousness performs one seemingly trivial, but extremely important function of displaying the real picture of the world, which cannot be replaced "(ibid., p. 97).

3 This assumption requires further refinement on a larger numbers of samples.

Whereas the importance of the philosophical views of the sensationalists and the Russian school of psychology lies in them explaining the nature of consciousness and its structure, the Russian physiologists

(I.M. Sechenov, I.P. Pavlov) were the first to see the reflex mechanisms of the human psyche, that is, to apply "physiological knowledge to the phenomena of the psychic life"(Sechenov, 1952, p.52). The reflex principle does not mean that everything psychic goes through the physiological, it rather determines their similarity in structure and origin. I.M. Sechenov suggests the reflex theory of the psychic (Zhdan, 2004, p. 245), that is, the psyche arises only in the process of interaction of the subject with the surrounding world, and the information from the outside in the form of feeling (as a result of the interaction of the sense organs) is primary. I.M. Sechenov develops ideas about the active pragmatist character of perception. The mental process arises and ends in the process of interaction of the individual with the surrounding world, hence, the influence from the outside in the form of feeling is primary: "The original cause of every action lies always in external sensory arousal, because without it no thought is possible" (Sechenov, 1952, p. 104).

The recognition of the interconnection of sensations by physiologists had an important influence on the further development of not only physiological, but also psychological notions of sensory reflection and cognition, where the autonomy of analyzer systems in their relation to each other was accepted as a dogma.

I.M. Sechenov also draws a parallel between the impairments of consciousness and the work of analyzer systems, which makes it possible to study the impairments of consciousness through an analysis of their functional state: "The coincidence of insensitivity to external stimuli with the destruction of mental activity occurs ... in intoxication with wine, chloroform and fainting. ... The difference in views on the subject lies only in the fact that some people consider destruction of consciousness to be the cause of insensitivity, and the other - on the contrary. However, the fluctuation between these views is impossible. Shoot from 1, 2, 3, 100, etc. cannons above the ear of a fast asleep person, and he will wake up, with psychic activity instantly appearing. If he had no sense of hearing, you could theoretically shoot from a million cannons – the consciousness would not have come. If there was no vision, it would be the same with any strong light stimulation; if there was no feeling in the skin - the most terrible pain would remain without consequences. In a word, a person who was fast asleep and deprived of sensing nerves would continue to sleep to death. And they are saying that mental activity and its expression, a muscle movement, is possible for at least a moment without external sensory stimulation" (Sechenov, 1952, p. 127).

PSYCHOLOGICAL APPROACH TO THE STUDY OF CONSCIOUSNESS

Such an understanding of the structure of consciousness and the role of inter-institutionalization in its formation can explain the emergence of discussion issues connected to the search for criteria of its presence / absence, as well as the degree of its clarity in a person. Most likely, we will not get definitive answers to these questions, since it is difficult to observe the phenomena of pure consciousness. On the one hand, consciousness is intentional, that is, it is always "consciousness about ..."; which means it is transphenomenal. "In this form it is a very specific reality. It is not natural and not substantial. It is difficult to claim that it has certain qualities: it does not have "nature." Consciousness is "nothing" to the extent that it is impossible to find a phenomenon about which we could say that exactly this is consciousness, and no conscious phenomenon has the privilege of representing consciousness ..." (Thostov, 2002, p. 66). Thus, "consciousness manifests itself only in when it encounters with "the other", receiving an "objection" back from it "(ibid., p. 64). This "other" must become "opaque" to consciousness. In order to highlight the manifestations of consciousness, it is necessary to create a situation of awareness of something. "Strictly speaking ... the only phenomenon of consciousness is ... the phenomenon of a body understood in the broadest sense of "translucent" reality (both objectified, i.e. demonstrating resistance, and subjectified, i.e. allowing control). ... For only this is accessible to our consciousness, and it is exactly what we call a subject or an object, in the various degrees of "turbidity" (Thostov, 2002, p. 68). According to A. Sh. Thostov, where resistance occurs (i.e. "transparency" is violated and "opacity and tension" appear) as a reaction to one's own activity, the process of awareness begins. In somatic, mental and neurological diseases, the course of all

cognitive processes changes, as they become less interiorized and automated (become "opaque"), and thus accessible to awareness. This is the condition for objectifying the world, our own body, our mental functions, including consciousness. When "resistance" is lost, the consciousness disappears, turns into a "black hole": "Deprivation of the subject supports, removal of the density of the surrounding world ..." (Thostov, 2002, p. 76) are observed in sensory deprivation, in states of depressed consciousness (coma, vegetative state, stupor, concussion). In these states, the activity of the subject, and hence his "resistance to the other," is violated, which creates a unique model for searching and creating situations where the subject begins to resist, gain supports, and therefore gradually become aware of what is happening. A. Sh. Thostov (2002, p. 77) notes that the world of things and consciousness is possible only in a situation of discomfort, unstable equilibrium, when "there is no immediate connection between the state of need and its satisfaction".

GENETIC APPROACH TO CONSCIOUSNESS

Ideas for applying the genetic approach to the understanding the development of the psyche, can also be found in Sechenov's work, "Reflexes of the brain": "... All the foundations of future mental development are formed after the real encounters of the child with the surrounding world... So, the initial mental activities, as far the beginning of acts are concerned, should ... resemble reflexes. The medial member of the act, i.e. the conscious element, is out of question in newborns, still nothing is against the fact that the arousal of the sensory shells is not reflected in his consciousness by sensations ...; these sensations cannot be merged, as the newborn cannot see, listen, or touch ... "(Sechenov, 1952, p. 212). In this early period of the child's life, the most complicated processes associated with the reflection of the surrounding reality unfold in his body, or rather in his sensory systems, and the child learns to see, hear, move, etc. Mastering his own body, the child gradually masters body regulation, which means that his own self with its borders is being formed at the same time. The sensation are localized on this very boundary between the self and the non-self. (Leont'ev, 2004; Thostov, 2002, Ivannikov, 2015).

REHABILITATION OF PATIENTS WITH THE DEPRESSION OF CONSCIOUSNESS

The abovementioned genetic and psychological approaches to consciousness provide an opportunity to develop methods of clinical and psychological rehabilitation of patients with the depression of consciousness. While working with such patients the highest priority is assigned to the evaluation and maintenance of physiological functional systems, namely the functions of vital organs in accordance with the protocol of cardiopulmonary resuscitation to restore the basic indicators of vital activity of the organism. At the same time, the state of psychological functional systems is not taken into account at all, though their work should also not be interrupted for a long time while rehabilitation measures will be inadequate if they are not taken into account. Complex and mobile higher human functional systems (psychological systems), based on the higher levels of cortical organization, require synthetic afferent fields that never consist of only one afferent system. These are always "polyreceptor" afferent syntheses (Luriya, 1948). Such a multiple composition of the afferent fields of higher mental functions, each of which participates in the development of consciousness, provides compensatory interfunctional rearrangements.

Techniques to maintain functional systems of the psyche in the "working state" can be based on a multimodal sensory stimulation, since perception processes, like other cognitive processes, are not the sum of operations, but rather an active process of interaction with the environment, during which the subject itself is transformed (Najsser, 1981). That is why, most often when working with such patients, sensory stimulation includes stimuli of varying intensity and emotional significance, well established in their past experience. For example, a patient is presented with a continuous video and audio file with a rocket flying through the

labyrinth, loud music delivered through the headphones, etc. (Shendyapina et al., 2016), pat on the patient's shoulder, stroking the face or hand with a feather, directing air towards the neck or holding the syrup in the mouth of the patient for 10 seconds (Monti, Sannita, 2016).

However, it can be assumed that the stimulation described above is subjectively experienced by the patient as a neutral or satisfying feeling, since it is not of a vital nature and does not lead to a situation of "resistance" (Thostov, 2002). If stimuli are used to induce non-positive emotions (for example, a sense of pain) associated with life support functions, then one must begin to look for ways to avoid such experiences. The International Association for the Study of Pain defines the latter as an unpleasant sensory and emotional experience associated with actual or potential tissue damage (International Association for the Study of Pain, 1994). This means that pain is accompanied not only by physiological responses of the body, but also emotional ones. Recent foreign studies using high intensity electrical stimulation of the median nerve of the hand as such stimuli (Laureys et al., 2002, Kassubek, 2003, Schnakers, Zasler, 2007, Boly et al., 2008) demonstrated a functional change in the brain during such stimulation in patients with the depression of consciousness that prompted researchers to conclude that they consciously perceived pain.

CONCLUSIONS

So, the use of sensory stimulation in rehabilitation processes is justified. However, the choice of emotionally neutral, negative or positive stimuli can be determined by the degree of the depression of consciousness, which requires experimental studies specially aimed at that. Issues related to the intensity, duration and frequency of impacts, also remain so far unresolved.

CONFLICT OF INTERESTS

There is no conflict of interests

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