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Autonomic Dysfunction and Psychosomatic Condition in Patients With Trigeminal Neuralgia

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Resume: The study included 78 patients suffering from severe pain caused by damage to one of the branches of the trigeminal nerve. The average age of the participants was 47.6 ± 23.8 years, and the duration of the disease was 5.9 ± 3.2 years. Of these, 63 patients (81%) were women, and 15 (19%) were men. The study revealed signs of vegetative imbalance and impaired autonomic reactivity. The activation of trophotropic adaptation mechanisms, as well as the increased influence of higher levels of regulation on the vegetative supply of the body, is a destabilizing factor that requires additional efforts from the body to maintain optimal vegetative balance. Since the state of the autonomic nervous system has a significant impact on the intensity and nature of pain in trigeminal neuralgia, the results of the study confirm that increased sympathetic regulation contributes to the exacerbation of pain, which, in turn, triggers a cascade of psychosomatic disorders, creating a vicious circle of pain in this disease.

Keywords: autonomic regulation, trigeminal neuralgia

The problem of trigeminal neuralgia (HTN) remains one of the urgent unsolved problems of modern neurology [1, 2, 6]. Studies have shown that many cases of HTN are associated with compression of the trigeminal nerve root in the area of its entrance to the brainstem. Other factors in the development of NTN include the effects of viral infections, dental interventions, and psychoemotional stress. An important aspect of the formation of pain syndrome in NTN is the state of the autonomic nervous system, which can worsen the course of the disease [4]. In this regard, the study of vegetative support, including the reactivity of the body, allows an objective assessment of the degree of tension of the regulatory processes of vegetative activity in pain syndrome. Assessment of the body's adaptation is related to the diagnosis of pathological changes and their compensation in response to stressful situations, including pain syndrome in NTN.

The aim of the study was to evaluate the psychosomatic state and vegetative support in patients with NTN in order to develop treatment approaches.

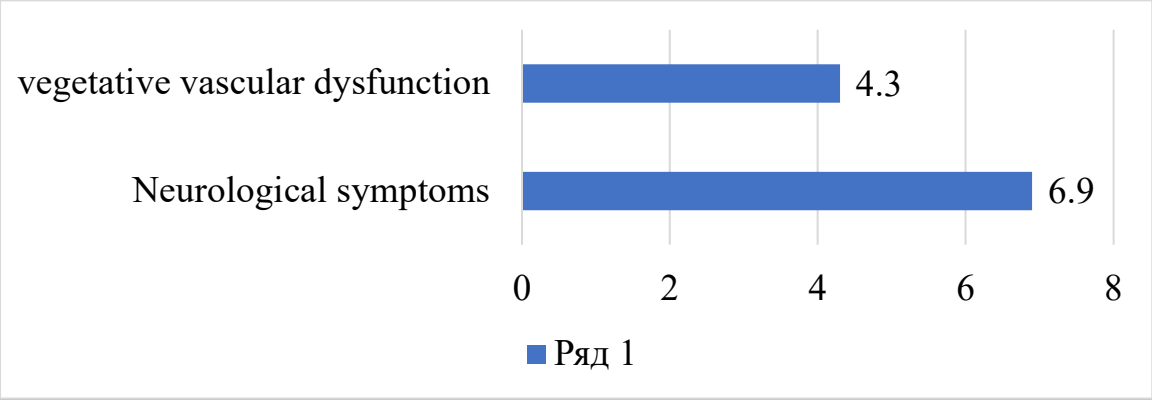
Materials and methods of the study: We examined 78 patients during the period of severe pain associated with damage to one of the branches of the trigeminal nerve. The average age of the participants was 47.6 ± 23.8 years, and the duration of the disease was 5.9 ± 3.2 years. Of these, 63 people (81%) were women, 15 people (19%) were men. Neurological, psychodiagnostic, and clinical neurophysiological examinations were performed. To assess the emotional and anxiety state, the Beck depression scale was used, vegetative support and reactivity were assessed using cardiointervalography (CIG), as well as the analysis of heart rate variability according to R.M. Baevsky [3, 8]. To assess the reactivity of the autonomic nervous system, a cardiovascular test based on recording changes in heart rate in response to exercise (clinoorthostatic test (CPC)) was used. Changes in the heart rate during this test make it possible to identify the degree of vagus effect on cardiac activity and assess the body's adaptation to changes in environmental conditions. The control group consisted of 26 healthy people of the same age.

The following indicators were studied: Mode (Mo) is the range of the most common cardiointervals reflecting the level of functioning of the circulatory system; Mode amplitude (AMo) is the number of cardiointervals corresponding to the mode range, which shows the mobilizing effect of heart rate centralization under the influence of the sympathetic link of the autonomic nervous system; variation range (BP) is the total effect of heart rate regulation under the influence of the parasympathetic system

stress index (IN) – the degree of centralization of heart rate control; the index of autonomic equilibrium (IVR) is the ratio of the activity of the sympathetic and parasympathetic links of the autonomic nervous system; the indicator of the adequacy of the processes of regulation of the AMo /Mo (PAPR) is the conjugation of the activity of the sympathetic department with the level of functioning of the sinus node; the autonomic rhythm indicator (VPR) is the activity of autonomous regulation.

The results of the study and their discussion

Trigeminal neuralgia is manifested by pain in the face (78 patients, 100%). Patients described the pain as intense, paroxysmal, which lasted from several hours to several days, gradually decreasing in intensity or giving way to itching. Only 15 (19.2%) patients had seizures lasting about 1 hour, while the majority (63 (80.7%)) had a painful attack lasting more than a day. In 68 (87.9%) cases, seizures occurred in the early morning hours, often leading to patients waking up. The pain intensity on the visual analog scale (VAS) was 78.4 ± 5.83 mm. An objective examination showed the presence of neurological organic microsymptomatics in all patients, among whom asymmetry of the nasolabial folds was most common (67 (86.2%)) and sensory insufficiency in the orofacial region (loss of peripheral sensitivity in the innervation zone of the II or III branches of the trigeminal nerve). In 42 (53.4%) cases, there was a decrease in the corneal reflex on the side of the pain syndrome. Anisoreflexia of tendon and periosteal reflexes was detected in 39 (50%) patients. Temperature and pain hyposthesia on the skin of the distal parts of the upper and lower extremities was found in 34 (43.1%). Vegetative symptoms in the form of acrohyperhidrosis, acrocyanosis and acrohypothermia occurred in 36 (46.6%). The average number of concomitant symptoms per patient was 6.9 ± 1.8, and autonomic dysfunction was 4.3 ± 1.23.



1. The average number of concomitant neurological and autonomic dysfunction in the examined patients

As a rule, the pain did not have a pronounced vegetative component. However, in some cases, as the pain decreased, patients described the pain as "aching," "excruciating," "deep." It should be noted that 31 patients (53.4%) did not notice or reported a minor therapeutic effect from taking anticonvulsants such as carbamazepine or lyrica.

A study of vegetative support using CIG indicators revealed the following changes in patients with NTN. The initial data showed the presence of disorders of vegetative support, which is presented in Table 1. Significant differences in CIG indicators were revealed compared with the control group, which indicates the predominance of sympathetic effects in this disease. This was confirmed by a statistically significant ($p < 0.01$) increase in the AMo index, which was 12.29 ± 1.11%, while in the control group this indicator was 8.15 ± 0.79.

Table – 1 Cardiointervalography parameters in patients with NTN and control groups

Indicators	The control group	cop	Patients with NTN, acute period	cop
Mo(c)	0,73±0,08	0,67±0,07	0,93±0,09	1,37± 0,06
A Mo, %	8,15±0,7	14,5±0,8	12,29±1,11	19,2 ±1,79
BP Variation range (c)	0,41±0,15	0,5± 0,1	0,9± 0,6*	1,7± 0,5
IN Voltage index (conl.units)	28,6± 4,0	30,4± 5,2	39,8±7,3	44,9 ±4,5
HEBREW (conl.ed.)	39,93± 18,8	45,7± 12,6	45,7±12,4	56,8±6,4
PAPR (unit)	11,16 ± 3,86	21,6± 6,3	13,0±3,6*	13,9 ±5,4
VPR (conl.ed.)	6,67 ± 2,28	4,7± 4,2	9,7±2,8	11,5 ±4,8
Note	*p is given in relation to the control group. * – p < 0.05; ** – p < 0.01*			

The enhancement of adrenergic systems was also indicated by an increase in the MO index, which was 0.938 ± 0.092 s, and was higher than those in comparison with the control group (0.737 ± 0.081). The activity of regulation of the sympathetic link is also indicated by secondary indicators of CIG, such as the index of vegetative equilibrium, which was 45.72 ± 12.46 units, and the vegetative rhythm index – 9.73 ± 2.81 units. PAPR indicators characterizing the relationship between the activity of the sympathetic division of the autonomic nervous system and the leading level of functioning of the sinus node, which generally reflects the adequacy of regulatory processes, indicated an increase in the central link of regulation, and consequently, the existing imbalance of autonomic regulation, where the background values were 13.08 ± 3.67 units (control – 11.16 ± 3.86). The reaction in COP confirmed that the PAPR indicators had an increase mainly in the central link (the study group was 13.91 ± 5.47 units, the control was 21.64 ± 6.38).

The results of CIG in 88% of cases of background recording were changed towards the predominance of trophotropic effects on the heart rhythm. The results of the study are presented.

Of particular interest was the study of the reactivity of the autonomic nervous system, which was studied according to the results of the CPC. We have noted the maximum increase in the influence of the sympathetic link on adaptive processes. In COP, the sympathetic component of vegetative support also dominated, which gives reason to assert that in the pathology under study, there is a prolonged arousal of the sympathetic component of vegetative support. Thus, the degree of disruption of adaptation processes was significantly ($p < 0.01$) indicated by the IN indicators, which amounted to 44.9 ± 4.52 units (control 30.4 ± 5.21).

It was noted that in 27.4% of cases there was a vegetative accompaniment of the attack in the form of hyperemia and swelling of the corresponding half of the face, lacrimation, rhinorrhea, hypersalivation, nasal congestion.

Dissomnic disorders occurred in 55 (94.8%) patients, in 86.2% of cases, patients reported increased fatigue and decreased performance with moderate physical and mental exertion. In 32.8% of cases (19 people), at the beginning of the attack, patients experienced feelings of anxiety and fear, accompanied by sensations of pain in the heart, "lack of air" and other psychosomatic symptoms, which constituted the second stage of the study.

In the course of the study, we identified a high incidence of concomitant somatic pathology in the examined patients. Thus, various allergic manifestations were detected in 35 (60.3%) cases; bronchial asthma (of infectious and allergic origin) - in 19 (32.7%) cases; chronic gastrointestinal diseases - in 15

(25.8%) cases; skin diseases - in 25 (43.1%) cases. It was noted that in 77% of cases there was a combination of two or more diseases, where the frequency of the identified disorders was significantly

it differed from the indicators of the examined control group. The conducted psychodiagnostic testing revealed a high level of personal and reactive anxiety. Both indicators were significantly higher compared to those of the control group. When studying the level of depression, high scores on the Beck scale were also recorded, significantly exceeding the indicators of healthy subjects.

Table 2 Severity of depression on the Beck scale in the examined patients with NTN and in the control group

The level of depression	Examined patients		Control Group	
	абс.	%	абс	% %
Standard	–	–	23	87,5
Soft	9	12,3	2	6,25
Moderate	20	25,7	2	6,25
Strong	33	42,3	–	–
Maximum	15	18,9	–	–

The conducted study of the dynamics of HTN formation (according to the medical history and medical documentation) revealed that in patients with pain syndrome it became permanent from the first manifestations of the disease. In our opinion, it is important to assess the factors that caused the occurrence of the disease. Thus, 43 (55.1%) patients attributed chronic stress and traumatic situations to the causes of NTD. Somatogenic factors, such as exacerbation of chronic diseases and surgical interventions, caused the disease in 23 (29.3%) patients. The reasons related to dental pathology were mentioned by 13 (17.2%) people. In the vast majority of cases, 64 (82.7%), there was a combination of provoking factors. It should also be noted that in all cases, a trigger paradigm was identified for the development of NTN, which led to the development of the disease.

According to medical documentation, during the transformation of the paroxysmal form of HTN into permanent, there was an increase in the number of cases of seeking medical help for concomitant inflammatory diseases of the oral cavity and various manifestations of psychosomatic and autonomic disorders. Thus, in the three-year period preceding the onset of the disease, the average number of referrals averaged 3.7 ± 2.1 per year for dental pathology and 6.3 ± 3.1 cases for psychosomatic and neurological pathology, whereas in patients with a disease duration of more than 3 years, the average number of referrals was 9.8 ± 3.77 and 11.9 ± 3.91 cases, respectively. (Fig. 3). It was noted that in all cases, psychosomatic and psychovegetative disorders were predominantly depressive or hypochondriacal in nature, with a fixation on various painful and non-painful sensations, leading to a vicious cycle of disease development.

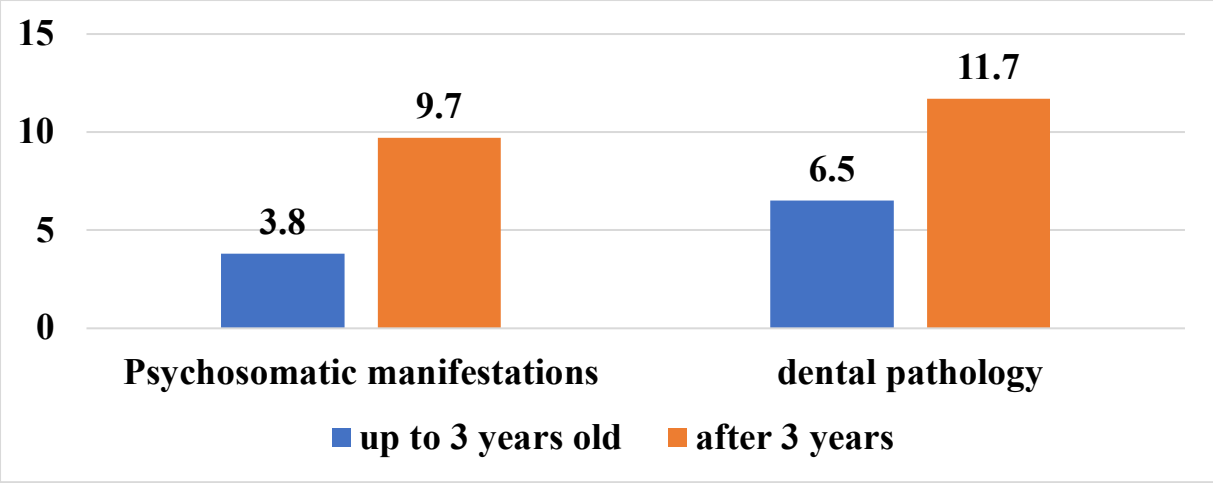


Fig. 3. The average number of cases of dental and psychosomatic pathology in patients with NTN in the dynamics of the disease

Conclusion: Thus, the results of the study showed that patients with NTN are characterized by the presence of organic neurological microsymptomatics, as well as pronounced emotional disorders of an anxiety-depressive nature. The study revealed a violation of vegetative balance and reactivity. Activation of trophotropic adaptation mechanisms and increased effects of higher levels of regulation on the vegetative supply of the body have a destabilizing effect, which requires additional physiological costs from the body to maintain optimal vegetative balance. Increased activity of the sympathetic part of the autonomic nervous system contributes to increased pain, which, in turn, triggers a cascade of psychosomatic and autonomic disorders, forming a vicious circle as the disease progresses.

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