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NEUROPHYSIOLOGICAL BASIS OF PSYCHOSOMATIC DISORDERS IN TRIGEMINAL NEURALGIA

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Introduction. Trigeminal neuralgia (TN) is one of the most severe forms of neuropathic facial pain and is characterized by recurrent, short-lasting, unilateral episodes of electric shock-like pain in the distribution of the trigeminal nerve.(1-3)Despite the predominantly neurological nature of the disorder, chronic and recurrent pain may significantly affect the patient's emotional state, sleep, social activity, and overall quality of life.(6-7) Psychosomatic manifestations, particularly anxiety, depressive symptoms, sleep disturbances, and autonomic dysfunction, may further contribute to the persistence and exacerbation of pain.(8-9-10)

Keywords: trigeminal neuralgia, neuropathic pain, neurophysiology, psychosomatic disorders, central sensitization, anxiety, depression, sleep disturbance, limbic system, pain modulation.

Aim. To investigate the neurophysiological mechanisms underlying psychosomatic manifestations in patients with trigeminal neuralgia and to determine the relationship between pain intensity, frequency of attacks, and psychoemotional disturbances.

Materials and Methods. A model clinical study was conducted involving 60 patients with clinically diagnosed trigeminal neuralgia aged 35–72 years. The clinical characteristics of pain were assessed according to localization, intensity, duration and frequency of paroxysms. Pain intensity was evaluated using the Visual Analogue Scale (VAS). Anxiety and depressive symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS), while sleep disturbances were evaluated using a standardized sleep-quality questionnaire. Quality of life was assessed using a pain-related quality-of-life scale.

Neurophysiological interpretation was based on the functional interaction of the trigeminal nociceptive system, spinal trigeminal nucleus, thalamocortical pathways, descending antinociceptive systems, limbic structures and autonomic regulatory centers.

Results. The analysis demonstrated that patients with frequent and severe pain attacks had more pronounced psychoemotional disturbances. In the model study population, clinically significant anxiety symptoms were observed in approximately 55% of patients, while depressive manifestations were present in approximately 40%. Sleep disturbances were reported by more than half of the patients and were more pronounced among individuals with frequent nocturnal or evening pain attacks.

A positive association was observed between pain intensity and the severity of anxiety and depressive symptoms. Patients with higher VAS scores demonstrated greater emotional tension, sleep impairment, and reduction in daily activity. These findings support the concept that persistent activation of the trigeminal nociceptive system is accompanied by functional changes in central pain-processing networks.

From a neurophysiological perspective, repeated nociceptive stimulation may increase the excitability of neurons within the spinal trigeminal nucleus and facilitate transmission through thalamocortical pathways. At the same time, dysfunction of descending pain-control mechanisms may reduce endogenous inhibition of nociceptive signals.(2-4) The involvement of limbic structures,

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including the amygdala and hippocampal networks, may contribute to the development of anxiety, emotional instability and maladaptive responses to pain.(5-6)

An important feature is the bidirectional relationship between pain and psychosomatic disorders. Severe and recurrent facial pain increases psychological stress, anxiety and sleep disturbances, whereas emotional stress and insufficient sleep can lower the pain threshold and enhance central nociceptive processing. Consequently, a pathological "pain–stress–sleep disturbance–pain" cycle may develop, contributing to the chronicity of trigeminal neuralgia.

Discussion. The obtained model findings indicate that psychosomatic manifestations in trigeminal neuralgia should not be regarded merely as secondary psychological reactions. They may reflect functional changes in the central nervous system associated with prolonged nociceptive stimulation and impaired interaction between sensory, emotional and autonomic regulatory systems. This provides a neurophysiological basis for integrating psychoemotional assessment into the clinical management of patients with TN.

Assessment of anxiety, depressive symptoms and sleep quality may therefore provide additional information about disease severity and treatment response. A comprehensive therapeutic strategy combining adequate neuropathic pain management with correction of sleep and psychoemotional disturbances may potentially improve clinical outcomes and quality of life.

Conclusion. Psychosomatic disorders in trigeminal neuralgia are closely associated with the neurophysiological mechanisms of chronic neuropathic pain. (6-7)Persistent hyperexcitability of the trigeminal nociceptive system, impaired descending pain modulation, and interaction with limbic and autonomic regulatory networks contribute to the development of anxiety, depressive symptoms and sleep disturbances(3-4) The bidirectional relationship between pain and psychoemotional dysfunction may facilitate the maintenance of chronic pain. Therefore, comprehensive neurological and psychoemotional assessment should be considered an important component of the management of patients with trigeminal neuralgia.

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