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Modern Diagnostic Methods, Quality of Life Assessment, and Differentiated Treatment of Patients with Trigeminal Neuralgia

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Abstract The article details the historical aspects of such a serious illness as trigeminal neuralgia, dynamic development of ways and methods of conservative and surgical treatment. In connection with the development of medicine and the emergence of modern diagnostic methods, the analysis and importance for determining the severity of trigeminal neuralgia are given. The advantages of the methods of treatment of trigeminal neuralgia are given, the validity of a differentiated approach, taking into account the severity of the disease. Studies of the quality of life of patients using questionnaires, based on the analysis of the data obtained, the choice of a method for treating trigeminal neuralgia and improving results.

Keywords Trigeminal neuralgia, Diagnosis, Quality of life, Differentiated approach, Severity of neuralgia

1. Introduction

Trigeminal neuralgia (TN) is a syndrome characterized by sudden, brief, intense, and recurring pain in the distribution of one or more branches of the trigeminal nerve. This definition of TN is endorsed by the International Association for the Study of Pain [1,4,12,19]. Pain during long-term, recurring episodes of neuralgia can change—it can become constant, diffuse, and acquire a burning, pressing, or aching character [5,11,16,18].

Trigeminal neuralgia is quite common, affecting between 30 and 50 patients per 100,000 inhabitants in most countries. According to the World Health Organization (WHO), the incidence rate reaches three to five cases per 100,000 inhabitants per year. Currently, it is not possible to accurately estimate the incidence and morbidity, as patients are most often treated by various specialists in their community [6,7,11,13,15,19].

At the current stage of medical development, the most valuable diagnostic methods for trigeminal neuralgia are magnetic resonance imaging (MRI) from 1.5 to 3.0 Tesla, T2 (3D-FIESTA, DRIVE, or CISS), time-of-flight magnetic resonance angiography (MRA) (3D-TOF), and contrast-enhanced T1-weighted imaging [2,5,14,16,17].

A more modern and very important method in the diagnosis of trigeminal neuralgia is electroneuromyography (ENMG), which determines the level of damage to the nerve branches, i.e., central or peripheral irritation. ENMG allows us to choose surgical or conservative treatment strategies for trigeminal neuralgia based on the level of damage [1,2,5,14,16].

Currently, quality of life (QOL), based on the patient's subjective perceptions, is an important, and in some situations, one of the main criteria for assessing treatment effectiveness in clinical trials. Quality of life reflects the impact of the disease and treatment on patient well-being is a measure of their physical, emotional, and social well-being, which changes under the influence of the disease or its treatment. Therefore, scientists around the world have begun to increasingly study it [3,8,9,10].

Study Objective: To improve treatment outcomes for patients with trigeminal neuralgia through a differentiated approach, taking into account the severity of the disease and assessing quality of life.

2. Material and Methods

The study is based on the results of observations of 171 patients with trigeminal neuralgia treated in the inpatient department of the Tashkent Medical Academy, a multidisciplinary clinic, and the neurosurgery department from 2019 to 2023.

To establish a diagnosis and select a treatment method, all patients underwent a comprehensive examination, including clinical, neurological, and instrumental examination methods.

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During the initial examination of patients, the following symptoms were considered as the main criteria for trigeminal neuralgia (TN): unilateral paroxysmal facial pain; the presence of a trigger zone; tenderness of the Valais points (pressure on which triggers an attack); increased pain with eating and talking; and a positive effect of Finley Psin treatment in the early stages of the disease. Symptoms such as hypertonicity of the masticatory muscles, autonomic disorders, and hypoesthesia of the innervation zones of individual branches or the entire side of the face were also assessed. TN is characterized by short attacks (2-15 minutes) that can recur frequently (up to 30 times per day).

Patients' quality of life was assessed using the "Assessment of Quality of Life in Neuralgia" questionnaire developed by the Republican Specialized Scientific and Practical Medical Center of Neurosurgery "Trigeminal Nerve" and "Pain Assessment in Trigeminal Neuralgia."

3. Results and Discussion

We examined the observational data of 171 patients with trigeminal neuralgia treated in the inpatient department of the Tashkent Medical Academy, a multidisciplinary clinic, and the neurosurgery department from 2019 to 2023.

All patients were divided into three groups based on treatment methods, trigeminal neuralgia severity, and physical status.

Group one included 55 patients (32.2%) who underwent conservative treatment and trigeminal nerve blockades. Group two included 57 patients (33.3%) who underwent Gasser ganglion blocks and trigeminal nerve exeresis. The third group consisted of 59 patients (34.5%) who underwent microvascular decompression of the trigeminal nerve root.

By age, the patients were distributed according to the WHO classification, which provides for the following age groups: young age (14-19 years); younger middle age (20-44 years); older middle age (45-59 years); elderly age (60-74 years); and old age (75-89 years).

The distribution of patients by age and gender showed that women predominated among the patients: 103 (60.2%), while men accounted for 68 (39.8%), which is 1.5 times less than women. The majority of patients (71 (41.5%) were older middle-aged and elderly, with the largest number of patients (52 (30.4%)) in the 60-74 age group, which is consistent with data from international scientists.

When examining the somatic status, it was revealed that among 171 patients, 69 (40.5%) patients had somatic pathology, manifested in the form of arterial hypertension in 53 (31.0%) patients, ischemic heart disease in 13 patients (7.8%). In 19 (11.2%) cases, diabetes mellitus was noted, in 4 (2.6%) patients, liver one patient (0.9%) had pathology and renal failure. It should be noted that a combination of two or more somatic diseases was observed in the same patient, especially cardiovascular diseases.

Analysis of precipitating factors based on the study results revealed that almost all patients had the following precipitating factors: chewing and talking in over 93% of cases, touch in second place (up to 8% of cases), and cold, brushing teeth, washing, shaving, and opening the mouth in less than 5% of cases.

Prior to admission to the clinic, all patients received comprehensive conservative treatment; patients were treated by dentists, neurologists, and maxillofacial surgeons. During examination of patients, the following symptoms were identified as the main criteria for trigeminal neuralgia: unilateral paroxysmal facial pain, the presence of a trigger point, and the presence of a trigger point. In 171 patients examined, the localization of trigger points yielded the following results, with a total of 33 (19.3%) observations. Among the 33 patients with trigger points, the nasolabial triangle ranked first by localization (16 (48.5%)), the mental region ranked second (8 (24.3%)), the frontal-zygomatic region ranked third (3 (9.1%)). The remaining zones included the oral cavity, cheek, parotid region, Vale's points, and the neck in the area of the spinous processes of the third and fourth cervical vertebrae, accounting for 3% to 6% of cases. Symptoms of hypertonicity of the masticatory muscles, autonomic disorders, and hypoesthesia of the innervation zones of individual branches or the entire half of the face were also checked. Moreover, we found that trigeminal neuralgia is characterized by short attacks (2-15 minutes) that can recur frequently (up to 30 times per day). A study of sensory disturbances in the innervation zone of the trigeminal nerve branches yielded the following results.

In our study, 92 (54%) of 171 patients had these symptoms sensory disturbances in the innervation zone of the trigeminal nerve branches were observed: hypesthesia (52.2%), paresthesia (40.2%), hyperesthesia (6.5%), and one case of anesthesia resulting from previous surgical interventions. This case was observed among patients in the third group. As a result of multiple exeresis surgeries, sensitivity in the innervation zone was completely lost, and trophic changes in the facial muscles occurred on the side of the affected trigeminal nerve branches.

Autonomic disorders were observed in 18 (10.5%) cases in our patients. Of these, hyperemia (50.1%) was the most common, lacrimation (33.3%), and salivation (16.6%). When considered by group, the incidence was 55.6% in the third group, 27.7% in the second group, and the least (16.7%) in the first group. Autonomic disorders were restored after treatment. An analysis of the 171 patients examined, based on the location of the affected trigeminal nerve branches, revealed the following results. Trigeminal neuralgia was noted on the right side in 134 (78.4%) patients, on the left in 34 (19.8%) patients, and on both sides in 3 (1.8%) cases. In our study, the second (33.3%) and second and third branches (4.6%) were most often affected. As noted above, right-sided neuralgia was observed in most cases, confirming its typical nature.

Thus, in our study, two branches were most often affected simultaneously (50.9%). Damage to all three branches was observed in 31.9% of patients, and to one branch in 17.2%.

Pain was most often felt on the right side (78.4%), on the left (19.8%), and on both sides (1.8%). Our patient study data are consistent with published data from other authors worldwide. Of the 171 patients studied, 163 (95.0%) showed positive results, while 8 (5.0%) showed no changes. The best results were seen in Group 3, with all patients in this group showing positive results.

This demonstrates the effectiveness of surgical intervention with a differentiated approach to the treatment of trigeminal neuralgia, taking into account the patient's somatic status.

Analysis of the obtained data showed that 87% of patients in the third group showed significant improvement, 13% showed improvement but no change, 25.5% in the second group showed significant improvement, 66.7% showed improvement, only 9.2% in the first group showed significant improvement, 83.3% showed improvement, and more than 7% of patients in the first and second groups showed no change in almost equal proportions.

In our studies, microvascular decompression of the trigeminal nerve root at the brainstem proved to be a more effective surgical intervention, as 87% of patients in this group showed significant improvement. In our studies, questionnaires from the Republican Specialized Scientific and Practical Medical Center of Neurosurgery were used to assess the quality of life and pain in patients with trigeminal neuralgia.

Application of the "Quality of Life Assessment in Trigeminal Neuralgia" questionnaire showed similar quality of life scores in all study groups: that is, preoperative quality of life scores was low in all groups.

After treatment, quality of life scores immediately began to improve in patients with trigeminal neuralgia, particularly in the third group. Positive treatment results were also seen in patients in the second and first groups.

Application of the "Pain Assessment in Trigeminal Neuralgia" questionnaire in the third period showed that preoperative pain scores differed by scores in all study groups.

High scores were recorded in the first group the pain intensity in the preoperative group corresponded to a severe level of severity. After treatment, pain decreased to a moderate level in both the first and second groups, as indicated by questionnaire data.

Analyzing the anamnestic data of these patients, it is worth noting the following points, which indicate the complexity of diagnosis and, consequently, inappropriate treatment. For example, of the five patients with first-branch neuralgia, three had previously been diagnosed with migraine and received appropriate therapy. However, third-branch or third-branch neuralgia is the most difficult and detrimental to health. Almost all patients in the second group (57) consulted dentists for toothache.

Almost all patients underwent dental treatment, including tooth extraction. Further progression of the pain allowed for an accurate diagnosis and subsequent treatment of the underlying condition. Thus, comparative assessment data from all used quality-of-life and pain questionnaires in patients with trigeminal neuralgia before and after microvascular decompression of the trigeminal nerve root correlated with each other.

According to the "Trigeminal Neuralgia Pain Assessment" questionnaire, a score of up to 10 points indicates mild trigeminal neuralgia, 11-21 points indicates moderate trigeminal neuralgia, and 22-32 points indicates severe trigeminal neuralgia. Out of 171 patients, the questionnaire identified mild pain in 41 (24.4%), moderate pain in 121 (71.3%), and severe pain in 9 (5.2%). In the postoperative period, complete pain relief was observed in 166 (97.3%) patients, and mild pain in 5 (2.9%) patients.

According to the "Quality of Life Assessment in Trigeminal Neuralgia" questionnaire, a score of up to 10 points indicates a slight deterioration in quality of life, 11-21 points indicates a moderate deterioration in quality of life, and 22-33 points indicates a significant deterioration in quality of life. A questionnaire-based assessment of quality of life in 171 patients with trigeminal neuralgia revealed a significant deterioration in quality of life in the preoperative period in 130 (76.5%) patients, and a deterioration in quality of life in 41 (24.4%) patients. Postoperatively, 18 patients (10.4%) experienced a significant improvement in quality of life, 146 (85.4%) experienced an improvement, and 7 (4.3%) patients experienced a slight improvement in quality of life.

4. Conclusions

1. The distribution of patients by age and gender revealed that women predominated among the patients: 103 (60.2%), while men accounted for 68 (39.8%), representing 1.5 times fewer cases than women. The majority of patients (71 (41.5%) were middle-aged and elderly, with the largest number of patients (52 (30.4%)) in the 60-74 age group, consistent with data from international researchers.
2. Chewing and talking were the precipitating factors in over 93% of cases, followed by touching (up to 8%), and cold, brushing teeth, washing, shaving, and opening the mouth (less than 5%).
3. When examining the somatic status, it was revealed that among 171 patients, 69 (40.5%) had concomitant pathology, such as arterial hypertension in 53 (31.0%) cases, ischemic heart disease in 13 (7.8%) cases, diabetes mellitus was noted in 19 (11.2%) observations, liver pathology in 4 (2.6%) and renal failure in 1 (0.9%).
4. Trigger zones in 171 patients in a total of 33 cases (19.3%) of observations, among 33 the following were identified: nasolabial triangle 16 (48.5), mental region 8 (24.3%), fronto-zygomatic region 3 (9.1%), other zones such as the oral cavity, cheek, parotid region, Valee points, neck in the area of the spinous processes of the III-IV cervical vertebrae from 3% to 6% of cases.

5. In our study, 92 (54%) of 171 patients experienced sensory disturbances in the innervation zone of the trigeminal nerve branches: hypesthesia (52.2%), paresthesia (40.2%), hyperesthesia (6.5%), and one case of anesthesia due to previous surgical interventions.
6. Autonomic disorders were observed in 18 (10.5%) patients, with hyperemia (50.1%), lacrimation (33.3%), and salivation (16.6%) the most common.
7. Positive results after treatment of 171 patients were noted in 163 (95.0%), and unchanged results in 8 (5.0%), proving that all methods of treating neuralgia are quite effective when used in a differentiated manner.
8. Assessment of pain syndrome in trigeminal neuralgia using a questionnaire allowed us to identify mild pain in 41 (24.4%) patients, moderate pain in 121 (71.3%), and severe pain in 9 (5.2%). In the postoperative period, a complete absence of pain was noted in 166 (97.3%) patients and mild pain in 5 (2.9%) patients.
9. Assessment of quality of life using a questionnaire in 171 patients with trigeminal neuralgia showed a significant deterioration in quality of life in the preoperative period in 130 (76.5%) patients, and a deterioration in quality of life in 41 (24.4%). In the postoperative period, 18 (10.4%) patients had a significant improvement in quality of life, and 146 (85.4%) had an improvement; a slight improvement in quality of life was noted in 7 (4.3%) patients.

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