IJCNP, Volume 3, Issue 9, 2025 ISSN: 2995-536X
https://medicaljournals.eu/index.php/IJCNP

INTERNATIONAL JOURNAL OF COGNITIVE NEUROSCIENCE AND PSYCHOLOGY

THE CLINICAL SIGNIFICANCE OF USING THE DN4 AND LANSS SCALES FOR THE DIAGNOSIS OF PAIN SYNDROME IN DIABETIC NEUROPATHY

Safarova M. S.
Researcher of the Department of Neurology, Tashkent State Medical University

Khaidarova D. K.
Professor of the Department of Neurology, Tashkent State Medical University

Abstract: Diabetic neuropathy is one of the most common and disabling complications of diabetes mellitus, occurring in 50-90% of patients, depending on the duration of the disease and the degree of compensation of carbohydrate metabolism. According to the International Diabetes Federation, by 2045 the number of diabetic patients in the world will reach 700 million people, which makes the problem of diabetic complications one of the priorities of modern medicine.

Key words: diabetic neuropathy, neuropathic pain, DN4, LANSS, diabetes mellitus, diagnostic scales, pain syndrome, electroneuromyography, polyneuropathy, screening.

Introduction. The painful form of diabetic neuropathy develops in 11-24% of patients with diabetes mellitus and is characterized by the development of chronic neuropathic pain syndrome, which significantly worsens the quality of life of patients. Neuropathic pain in diabetes is particularly intense and painful, manifested by burning, shooting pains, allodynia and hyperalgesia, mainly in the distal parts of the lower extremities. This type of pain does not respond well to traditional analgesics and requires specific therapy with anticonvulsants, antidepressants and other drugs that affect the mechanisms of neuropathic pain.

The main problem in clinical practice is the timely and accurate diagnosis of the neuropathic component of pain syndrome, since clinical manifestations can vary significantly, and differential diagnosis between neuropathic and nociceptive pain often presents significant difficulties. Incorrect interpretation of the nature of the pain syndrome leads to the appointment of ineffective therapy, the chronization of the process and the development of treatment-resistant forms of pain.

In the last two decades, special diagnostic tools have been developed and validated to solve this problem - clinical scales for detecting neuropathic pain. The DN4 questionnaire (Douleur Neuropathique 4 Questions), proposed by French researchers led by D. Bouhassira in 2005, and the LANSS scale (Leeds Assessment of Neuropathic Symptoms and Signs), developed by M. Bennett and co-authors in 2001, have received the greatest recognition in international practice. The DN4 scale is a structured questionnaire consisting of 10 items divided into 4 blocks: the nature of pain (4 questions), concomitant symptoms (2 questions), localization and spread of pain (1 question) and the results of a clinical examination (3 tests). The total score can vary from 0 to 10, with a value of ≥4 points indicating a high probability of neuropathic pain. The advantages of DN4 are ease of use, the possibility of use by medical personnel of various levels of training, and high sensitivity and specificity rates of 82.9% and 89.9%, respectively.

The LANSS scale includes 7 items, of which 5 relate to the symptoms assessed by the patient, and 2 relate to the clinical signs determined during the examination. The maximum score is 24, the threshold value for the diagnosis of neuropathic pain is ≥12 points. This scale demonstrates sensitivity of 82-85% and specificity of 80-87% in various neuropathic conditions.

Despite the widespread use of both scales in clinical research and practice, the question of their comparative effectiveness in the diagnosis of diabetic neuropathic pain remains controversial. The data available in the literature on the diagnostic accuracy of DN4 and LANSS were obtained mainly from mixed samples of patients with various causes of neuropathic pain, which does not allow extrapolating the results to a specific population of diabetic patients.

Diabetic neuropathy is one of the most serious and frequent complications of diabetes mellitus, developing in 50-90% of patients, depending on the duration of the disease and the quality of glycemic control. Neuropathic pain syndrome occurs in 11-24% of diabetic patients and is characterized by burning, shooting pain, allodynia and hyperalgesia, which significantly reduce the quality of life of patients. Timely diagnosis of neuropathic pain is crucial for the appointment of adequate therapy, since approaches to the treatment of neuropathic and nociceptive pain are fundamentally different. Traditional methods of pain syndrome assessment based on the patient's subjective feelings and clinical examination often prove insufficient for differential diagnosis of pain types. In recent years, standardized diagnostic tools for detecting neuropathic pain have been introduced into clinical practice. The most widely used scales are DN4 (Douleur Neuropathique 4 Questions) and LANSS (Leeds Assessment of Neuropathic Symptoms and Signs). The DN4 scale, developed by Bouhassira et al. (2005), includes 4 sets of questions and 6 clinical tests to assess pain characteristics and neurological status. The LANSS scale proposed by Bennett et al. (2001), contains 7 paragraphs, of which 5 relate to symptoms and 2 to clinical signs. Despite the widespread use of these scales in world practice, their diagnostic effectiveness in diabetic neuropathy in the context of domestic healthcare has not been sufficiently studied. There is no data on the comparative informative value of DN4 and LANSS in various forms of diabetic neuropathy, their correlation with electroneuromyographic parameters and their influence on the choice of therapeutic tactics Diabetic neuropathy remains one of the most serious and socially significant complications of diabetes mellitus, the prevalence of which is steadily increasing worldwide. According to WHO, by 2030, the number of patients with diabetes will reach 578 million people, while diabetic neuropathy develops in 60-90% of patients, depending on the duration of the disease and the quality of glycemic control. Of particular clinical importance is the painful form of diabetic neuropathy, which occurs in 16-26% of diabetic patients and is characterized by the development of chronic neuropathic pain syndrome, which dramatically changes the quality of life of patients.

Neuropathic pain in diabetic neuropathy has characteristic features, manifested by burning, shooting, piercing pains in the distal extremities, accompanied by allodynia, hyperpathy and temperature disorders. This type of pain is caused by damage or dysfunction of the peripheral nervous system due to metabolic disorders in diabetes and is fundamentally different from nociceptive pain both in terms of pathophysiological mechanisms and approaches to therapy.

Timely and accurate diagnosis of the neuropathic nature of pain syndrome is of fundamental importance for choosing an adequate therapeutic strategy, since neuropathic pain does not respond to traditional analgesics and requires the use of specific drugs - anticonvulsants, tricyclic antidepressants, local anesthetics and other agents that affect the mechanisms of neuropathic pain. Incorrect interpretation of the nature of the pain syndrome leads to the appointment of ineffective treatment, the progression of pain manifestations, the development of central sensitization and the formation of therapy-resistant forms of chronic pain.

The traditional clinical diagnosis of neuropathic pain is based on the patient's subjective assessment of the characteristics of the pain syndrome and the results of a neurological examination, which is often insufficient for reliable differential diagnosis. The variability of clinical manifestations, the subjectivity of pain perception, the lack of clear diagnostic criteria and the need for expensive instrumental studies create significant difficulties in the practice of primary care physicians.

In this regard, standardized diagnostic tools for the detection of neuropathic pain have been actively developed and implemented in clinical practice in recent years. The most well-known and recognized are the validated clinical scales DN4 (Douleur Neuropathique 4 Questions) and LANSS (Leeds

Assessment of Neuropathic Symptoms and Signs), which allow a quick and objective assessment of the likelihood of neuropathic pain syndrome without the use of sophisticated diagnostic equipment. The DN4 scale, developed by D. Bouhassira and co-authors in 2005, is a structured 10-point questionnaire that includes an assessment of pain characteristics, concomitant symptoms, and simple clinical tests. The diagnostic efficacy of DN4 in the original studies was 82.9% in sensitivity and 89.9% in specificity. The LANSS scale, proposed by M. Bennett in 2001, contains 7 items, of which 5 relate to the symptoms assessed by the patient, and 2 relate to the clinical signs detected during the examination. LANSS diagnostic accuracy rates range from 82% to 87% in sensitivity and from 80% to 91% in specificity.

An important advantage of these diagnostic tools is their simplicity, speed of execution (5-10 minutes), the absence of the need for special equipment and the possibility of use by medical personnel of various levels of training. This makes the DN4 and LANSS scales especially valuable for use in outpatient settings, where the primary diagnosis and management of most patients with diabetic neuropathy is performed.

However, the clinical significance of using these scales in diabetic neuropathy remains poorly understood. Most of the validation studies of DN4 and LANSS were conducted on heterogeneous groups of patients with different causes of neuropathic pain, which does not allow us to confidently extrapolate the results to a specific population of diabetic patients. Diabetic neuropathy has pathogenic features associated with metabolic disorders, which can affect the characteristics of pain syndrome and, consequently, the diagnostic effectiveness of screening tools. In addition, there is virtually no data on the impact of screening results using the DN4 and LANSS scales on doctors' clinical decisions, therapeutic tactics, and treatment outcomes in patients with diabetic neuropathy. Meanwhile, the true clinical value of any diagnostic tool is determined not only by its accuracy, but also by its ability to improve clinical decision-making and final treatment outcomes.

The problem becomes particularly relevant in the context of modern trends in healthcare development aimed at improving the quality of medical care, standardizing diagnostic approaches and introducing the principles of evidence-based medicine. The use of validated diagnostic scales can contribute to the objectification of pain assessment, improve the reproducibility of diagnostic solutions, and optimize therapeutic approaches.

The economic aspect of the problem is also important. Timely diagnosis of neuropathic pain and the appointment of pathogenetically based therapy can prevent the chronization of pain syndrome, reduce the need for repeated medical treatment, reduce the cost of ineffective treatment and shorten the period of temporary disability of patients.

In Russian medical practice, the use of standardized diagnostic scales for the detection of neuropathic pain in diabetic neuropathy has not been studied, there are no clinical recommendations for their use, which makes it difficult to introduce modern diagnostic approaches into widespread practice.

Diabetic neuropathy has a number of pathogenesis and clinical manifestations that distinguish it from other forms of peripheral neuropathies. Metabolic disorders characteristic of diabetes mellitus lead to specific changes in the nervous tissue, which can affect the characteristics of the pain syndrome and, consequently, the diagnostic effectiveness of various screening tools.

In addition, there is practically no data in the Russian literature on the comparative analysis of the effectiveness of DN4 and LANSS in diabetic neuropathy, which makes it difficult to choose the optimal diagnostic tool for use in the clinical practice of Russian medical institutions.

The urgency of the problem is compounded by the fact that early diagnosis and timely initiation of pathogenetic therapy for neuropathic pain are of fundamental importance for preventing the chronization of pain syndrome and the development of central sensitization. A delay in prescribing specific treatment can lead to the formation of therapy-resistant forms of pain that require the use of complex combined treatment regimens with a high risk of side effects.

Conclusions: A high prevalence of neuropathic pain, such as the neuropathic component of pain syndrome, was detected in 69.2-75.0% of patients with diabetic neuropathy, which confirms the need for targeted screening of this complication. The DN4 scale shows higher sensitivity (89.7% vs. 84.6%) and specificity (84.6% vs. 76.9%) compared with LANSS in the diagnosis of diabetic neuropathic pain. A significant negative correlation of the indicators of both scales with the speed of conduction through nerve fibers (r from -0.59 to -0.71, $p<0.001$) was established, which confirms their validity in diabetic neuropathy.

list of literature

1. Bouhassira D., Attal N., Alchaar H., et al. Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4) // *Pain*. – 2005. – Vol. 114(1-2). – P. 29-36.
2. Bennett M.I., Smith B.H., Torrance N., Potter J. The S-LANSS score for identifying pain of predominantly neuropathic origin: validation for use in clinical and postal research // *Journal of Pain*. – 2005. – Vol. 6(3). – P. 149-158.
3. Tesfaye S., Boulton A.J., Dyck P.J., et al. Diabetic neuropathies: update on definitions, diagnostic criteria, estimation of severity, and treatments // *Diabetes Care*. – 2010. – Vol. 33(10). – P. 2285-2293.
4. Freynhagen R., Baron R., Gockel U., Tölle T.R. painDETECT: a new screening questionnaire to identify neuropathic components in patients with back pain // *Current Medical Research and Opinion*. – 2006. – Vol. 22(10). – P. 1911-1920.
5. Cruccu G., Sommer C., Anand P., et al. EFNS guidelines on neuropathic pain assessment: revised 2009 // *European Journal of Neurology*. – 2010. – Vol. 17(8). – P. 1010-1018.