



New Day in Medicine
Новый День в Медицине

NDM



TIBBIYOTDA YANGI KUN

Ilmiy referativ, marifiy-ma'naviy jurnal



AVICENNA-MED.UZ



ISSN 2181-712X.
EiSSN 2181-2187

5 (79) 2025

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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

*Илмий-рефератив, маънавий-маърифий журнал
Научно-реферативный,
духовно-просветительский журнал*

УЧРЕДИТЕЛИ:

**БУХАРСКИЙ ГОСУДАРСТВЕННЫЙ
МЕДИЦИНСКИЙ ИНСТИТУТ
ООО «ТИББИЁТДА ЯНГИ КУН»**

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А.В. Вишневского является генеральным
научно-практическим
консультантом редакции

Журнал был включен в список журнальных
изданий, рецензируемых Высшей
Аттестационной Комиссией
Республики Узбекистан
(Протокол № 201/03 от 30.12.2013 г.)

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5 (79)

2025

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Received: 20.04.2025, Accepted: 06.05.2025, Published: 10.05.2025

UDC 617.53+616.711.12+615.847.8

CERVICAL RADICULOPATHY AND MODERN METHODS OF ITS TREATMENT

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✓ Resume

Cervical radiculopathy is one of the most common causes of temporary disability. Acute neck pain in most cases regresses on its own within a few weeks to months, but in half of the cases, it recurs. As numerous studies show, diagnosis and subsequent differentiated treatment of neurological manifestations caused by vertebrogenic and discogenic lesions of the cervical spine are an extremely difficult task. The article presents clinical manifestations, pathomorphology, pathogenesis and various methods of treatment of cervical radiculopathy.

Key words: Cervical radiculopathy, spondyloarthritis, electromyography.

ШЕЙНАЯ РАДИКУЛОПАТИЯ И СОВРЕМЕННЫЕ МЕТОДЫ ЕГО ЛЕЧЕНИЯ

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✓ Резюме

Шейная радикулопатия является одной из частых причин временной утраты работоспособности. Острая боль в шее в большинстве случаев самостоятельно регрессирует в срок от нескольких недель до месяцев, однако в половине случаев она повторяется. Как свидетельствуют многочисленные исследования, диагностика и последующее дифференцированное лечение неврологических проявлений, обусловленных вертеброгенными и дискогенными поражениями шейного отдела позвоночника, представляют собой чрезвычайно трудную задачу. В статье изложены клинические проявления, патоморфология, патогенез и различные методы лечения шейной радикулопатии.

Ключевые слова: Шейная радикулопатия, спондилоартрит, электромиография.

SERVIKAL RADIKULOPATIYA VA UNI DAVOLASHNING ZAMONAVIY USULLARI

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✓ Rezyume

Servikal radikulopatiya mehnat qobiliyatini vaqtincha yo'qotishning keng tarqalgan sabablaridan biridir. O'tkir bo'yin og'rig'i ko'p hollarda bir necha haftadan bir necha oygacha o'z-o'zidan o'tib ketadi, ammo holatlarning yarmida u takrorlanadi. Ko'pgina tadqiqotlar shuni ko'rsatadiki, bachadon bo'yni umurtqasining vertebrogen va diskogen zararlanishi natijasida kelib chiqqan nevrologik ko'rinishlarni tashxislash va keyinchalik differentsial davolash juda qiyin vazifadir. Maqolada bo'yin radikulopatiyasining klinik ko'rinishlari, patomorfologiyasi, patogenezi va davolashning turli usullari keltirilgan.

Kalit so'zlar: Servikal radikulopatiya, spondiloartrit, elektromiografiya.

Relevance

Cervical (neck) radiculopathy (CR) is a clinical condition caused by the compression or irritation of one or more cervical nerve roots due to degenerative changes in the spine. CR is characterized by pain radiating into one or both arms, accompanied by motor, reflex, and sensory disturbances (including dysesthesia and paresthesia), without signs of spinal cord involvement [1–3].

CR is a disabling condition that significantly impacts physical functioning, mental health, and social activity of patients. Neck pain is one of the leading causes of disability worldwide [4]. In a systematic review (2020) on the epidemiology of CR among the adult population, the incidence was found to be 0.832–1.79 per 1,000 people per year, and the prevalence ranged from 1.21 to 5.8 per 1,000 people [5]. The peak incidence of CR occurs in the fourth and fifth decades of life [6]. Risk factors include episodes of lumbar radiculopathy, heavy lifting, diving, vibration exposure, and smoking [7].

Pathomorphology and Pathogenesis

Compression of the spinal nerve roots and root vessels is caused by a herniated disc or osteophytes (including disc-osteophyte complexes). Cervical intervertebral discs are structurally distinct from lumbar discs. In childhood and adolescence, the gelatinous nucleus pulposus of cervical discs is more pronounced, but by the age of 30, the disc mainly consists of a fibrocartilaginous plate that serves more as a stabilizing ligament than as a shock absorber [8]. Degenerative changes lead to the development of spondyloarthritis and uncovertebral arthritis in the corresponding spinal segments. Bone-fibrous overgrowths narrow the neural foramina, leading to foraminal stenosis. At the cervical level, unlike the lumbar level, spinal nerve roots are more often compressed not by the soft-tissue component of the disc herniation in the epidural space but predominantly at the root foramen due to spondylosis. In addition to compression, the factor of aseptic inflammation plays a significant role [9–12].

Clinical Picture and Diagnosis

Clinical symptoms in 2/3 of cases develop without obvious provoking events. Contrary to the prevailing belief, trauma to the cervical spine is rarely observed at the onset of cervical radiculopathy (CR), and in fact, it does not affect the severity of clinical manifestations of CR [7, 13].

CR manifests as pain of varying intensity, shooting, burning in nature, radiating from the neck into the scapular, shoulder, and arm regions following the innervation of the affected nerve root. Paresthesias are typical. The pain intensifies with movement, coughing, percussion at the site of compression, and is relieved by certain positions of the neck and arm. In cases of radicular pathology, abduction of the arm and bringing it behind the head reduces the pain, whereas in shoulder joint diseases, the pain is aggravated.

During clinical examination of a patient with suspected CR, the state of the muscles, reflexes, and sensitivity are evaluated. Muscle weakness and atrophy of the corresponding myotome, as well as the loss of reflexes (which are usually not observed in tunnel neuropathies), are characteristic. Sensory disturbances in the area of the corresponding dermatome are also detected. The signs of root involvement and their frequency are presented in Table 1 [14, 15].

Provocative tests, which have varying sensitivity and specificity, are also used in clinical evaluation. Some tests aim to increase root compression and exacerbate clinical symptoms, while others focus on pain relief. These tests are presented in Table 2.

In 80% of cases, the C6 or C7 roots are affected [6, 14, 15]. Clinically, it is practically impossible to distinguish between C6 and C7 root involvement, as the localization of pain and sensory symptoms, as well as the distribution of paresis, are nearly identical. This contrasts with the academic view that radicular symptoms are strictly linked to specific dermatome and myotome zones ("Netter's diagram") [13]. The correspondence between clinical symptoms of CR and the level of compression based on MRI and intraoperative findings occurs only in half of the cases. This is explained by the individual characteristics of spinal nerve roots, which originate from multiple levels, as well as the variability of clinical data upon repeated examinations of the same patient [16]. Root compression is unlikely in the absence of focal neurological symptoms. In this case, the diagnostic significance of individual symptoms and tests is limited, and the most informative approach to diagnosing CR is comprehensive examination, considering clinical symptoms and results from several tests [17].

Additional Diagnostic Methods

According to the 2019 recommendations of the American College of Radiology (ACR), **MRI** of the cervical spine without contrast is the method of choice for initial evaluation of neck pain in patients with newly onset or progressive non-traumatic **cervical radiculopathy (CR)**, in the absence of "red flag" warning signs [18]. MRI is most appropriate when conservative treatment is ineffective, to confirm compressive changes (disc herniation, spondylosis) in the cervical spine, especially before considering invasive or surgical interventions [17]. However, diagnosing CR solely on neuroimaging data is not possible due to the high frequency of degenerative changes in spinal structures in asymptomatic patients [19]. In a study of 122 patients with clinical signs of CR, MRI identified neuroimaging signs of cervical disc herniation or foraminal stenosis in only 85% of cases, and these correlated with symptoms [13]. In another study, clinically significant root compression in acute CR was confirmed by MRI in 73% of patients, with a false positive rate of 45% and a false negative rate of 26%, which significantly limits the diagnostic value of MRI [2]. Most studies emphasize that neuroimaging findings should be interpreted in the context of the clinical picture [1, 15].

Among the population, there are persistent misconceptions about the significance of MRI data in CR. According to a survey in several clinics in Germany and Norway, 67% of respondents believed that MRI results were more important than clinical data, 47% would consent to surgery based solely on MRI findings in the absence of symptoms or with minimal symptom severity, and 50% believed surgery was effective for treating axial neck pain without radiculopathy [20].

CT and Myelography

CT and **CT with myelography** are recommended when MRI is contraindicated, or when there is discordance between MRI findings and clinical signs (e.g., foraminal hernia). Soft tissues are better visualized with MRI, while CT is more suitable for assessing bony pathology and the condition of the disc-osteophyte complex [1, 15]. **X-rays** of the cervical spine are not recommended for diagnosing CR [21].

Electrophysiological Methods

The use of **needle electromyography**, **electroneurography**, **somatosensory potential testing**, and **quantitative sensory testing** for diagnosing CR has not been proven. Electrophysiological methods are primarily used for the differential diagnosis of CR from other disorders of the nervous system [1, 17]. Selective **nerve root block** may be used to clarify the level of involvement, particularly when an invasive intervention is planned [1].

Prognosis

The natural course of CR is favorable; in most cases, it is a spontaneously regressing condition [15]. Symptoms significantly reduce within the first 6 months, with complete recovery occurring within 36 months in 83–90% of patients. Furthermore, long-term follow-up has not shown progression of neurological symptoms or the development of myelopathy [22, 23]. Adverse prognostic factors include:

- CR duration longer than 6 months
- High pain intensity
- Psychosocial issues
- Factors related to surgery
- The worst prognosis for recovery is observed in patients with litigation issues related to compensation for damages [14, 23].

Treatment

When choosing between conservative or surgical treatment, it is essential to consider the emotional and cognitive status of the patients [1]. **Conservative treatment** is generally the preferred option, as the risk-benefit ratio for surgical intervention is less favorable [24].

Rehabilitation programs are considered the first line of treatment. According to the World Health Organization's definition, rehabilitation is "a set of interventions aimed at optimizing functioning and reducing disability in people with health conditions in interaction with their environment," and

"multimodal rehabilitation" is an "approach that includes at least two different therapeutic methods" [25].

A meta-analysis of 10 high-quality studies involving 871 patients with CR demonstrated the effectiveness of exercise compared to a control group in reducing pain and improving functional outcomes. Exercise, either alone or in combination with other treatments, can be beneficial for patients with CR. For each patient, the safest form of exercise should be carefully considered [26].

Interestingly, specialized neck exercises were found to be no more effective than general physical activity [27, 28].

Multimodal Rehabilitation and Pharmacological Treatment for Cervical Radiculopathy

Multimodal Rehabilitation

Multimodal rehabilitation may involve a combination of education, physical exercises, manual therapy, psychological interventions, and pharmacological treatments. In 2016, the **OPTIMA group** recommended the use of controlled strengthening exercises in combination with structured patient education for patients with acute CR (less than 3 months in duration). It was also advised to avoid the use of cervical collars, traction, and low-intensity laser therapy [29].

An updated systematic review (2022) indicated that multimodal interventions, including manual therapy for the cervical spine, specific exercises for the neck, patient education, and cognitive-behavioral therapy, are as effective as neurosurgical treatment [30]. Based on the aggregation of several European guidelines, two multidisciplinary groups in 2017 formulated recommendations for managing CR. According to these guidelines, patients should receive information about the favorable prognosis, advice on maintaining activity, and management should start with an assessment of "red flags." Exercise and manual therapy (or their combination), non-steroidal anti-inflammatory drugs (NSAIDs), or tramadol are indicated. Acupuncture is not effective for radiculopathy, although it may be considered for other types of neck pain [31].

In the only evidence-based guideline on the diagnosis and treatment of CR, prepared by the **North American Spine Society (NASS)**, it was noted that a systematic review of the literature found no high-quality studies that would conclusively define the role of pharmacotherapy in treating CR. The **National Institute for Health and Care Excellence (NICE)** in the UK recommends the use of simple analgesics (NSAIDs, paracetamol, codeine), and for neuropathic pain, anticonvulsants and antidepressants [14, 21].

Pharmacological Treatment

Pharmacological treatment for CR begins with the prescription of **NSAIDs**, considering possible complications and individual patient factors (age, comorbidities), using the minimum effective dose for the shortest possible time. The choice of NSAID and its administration method should be individualized. NSAIDs have similar analgesic and anti-inflammatory effects, but their side effects may differ.

One of the most commonly used NSAIDs in European countries for pain management is **aceclofenac (Aertal)**, which inhibits the synthesis of prostaglandins, providing rapid relief from pain, fever, and inflammation. Aceclofenac has high bioavailability (nearly 100%), and food intake does not affect its absorption. It is highly protein-bound (99.7%) and does not accumulate with prolonged use, which is important when prescribing it to elderly patients. Clinical studies in Russia have demonstrated the high efficacy of Aertal in reducing pain by more than 50% compared to baseline levels, with rare adverse effects (less than 3%). The European Medicines Agency (EMA) has approved aceclofenac as one of the safest NSAIDs for the gastrointestinal tract and cardiovascular system. The results of the **Safety Of nonSteroidal anti-inflammatory drugs (SOS)** program and both randomized clinical and observational studies support the wide use of aceclofenac as a first-line medication for common joint and spine conditions [32–36].

Aceclofenac is available in various forms:

- **Tablets** with a coating (the traditional form)
- **Cream** for topical use
- **Sachet form (powder for suspension)** – a convenient and effective form for rapid pain relief.

The powder is a fine crystalline white or light cream-colored powder with a slightly sweet taste, packaged in single-use sachets (3g each), with 20 sachets per package. After mixing with water, it forms a suspension that should be consumed immediately. The liquid form facilitates faster absorption in the tissues, and aceclofenac accumulates in the synovial fluid of the joints (the concentration in the synovial

fluid reaches 60% of the plasma concentration). Peak concentration in the body is reached within 1 hour of taking the suspension. This form is especially convenient for patients who have difficulty swallowing pills.

Aceclofenac's long-acting effect makes it suitable for patients with acute CR pain. Although it is not intended for long-term use, it is highly effective for rapid relief of pain during an acute episode of CR.

Epidural Injections

The use of **epidural steroid injections** with local anesthetics is also effective for treating CR, including in combination with glucocorticoids. However, potential complications should be considered [1, 17].

Surgical Treatment. Most patients with cervical radiculopathy (CR) do not require surgical intervention, although the effectiveness of various nonsurgical treatments compared to placebo or natural course remains unknown. Anterior cervical discectomy is one of the most commonly performed spinal surgeries. In the United States, nearly 550,000 patients underwent surgery between 2005 and 2008 [37]. A frequent surgical option is the combination of discectomy with stabilization [38]. At the same time, radiculopathy in most cases is a self-limiting condition [15], which directly contradicts the increasing frequency of surgeries. There is evidence that surgical interventions are effective in 80–95% of cases [39]. However, authors of two systematic reviews did not find clear advantages of surgical intervention compared to nonsurgical treatment [40, 41]. It is noted that selection criteria, researcher bias, natural course of the disease, and placebo mechanisms can affect the overestimation of the success rates of surgery. There is no consensus on the preferred choice of surgical intervention method. A recently published multicenter study from Norway found no advantage of disk prosthetics over the use of stabilizing systems [42].

Conclusion

Cervical radiculopathy (CR) is a condition caused by compression or irritation of cervical nerve roots, usually due to degenerative spinal changes. It is characterized by neck and radiating arm pain, along with sensory and motor disturbances, and significantly affects patients' quality of life. Diagnosis relies on a combination of clinical assessment and imaging, though symptoms often do not correlate directly with MRI findings. Most cases have a favorable natural course and respond well to conservative treatment, including multimodal rehabilitation, exercise, and NSAIDs—especially aceclofenac, which offers effective and safe pain relief. Surgical intervention is reserved for severe or treatment-resistant cases, but its superiority over non-surgical options remains unproven.

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Entered 20.04.2025