

Clinical Approach to Diagnosing and Treatment of Neck Pain

Yusak Mangara Tua Siahaan^{1,2,*}¹ Neurology Department of Medical Faculty Universitas Pelita Harapan, Indonesia² Neurology Department of Siloam Hospital Lippo Village, Indonesia

*Correspondence: Yusak Mangara Tua Siahaan (yusak.siahaan@lecturer.uph.edu)

Abstract: Background: Neck pain is one of the most common reasons patients seek treatment in the hospital. The causes of neck pain vary widely, trigger misdiagnosis, and often result in mistreatment. Misdiagnoses and mistreatment-related neck pain diagnoses are often associated with a diagnosis of cervical herniated disc. The implication of the misdiagnosis is the use of excessive investigations and inappropriate therapy. This review aims to determine the causes of neck pain often obtained in daily practice and how to diagnose and treat it. **Method:** Search relevant articles on clinical diagnosis of neck pain with the keywords neck pain diagnostic therapy using Medline and PubMed databases. **Results:** Neck pain can be in the form of axial pain, which is mostly related to disorders of the joints and muscles of the neck, or in the form of pain in the roots and spinal cord. Investigations and therapy must be related to the clinical diagnosis of neck pain experienced by patients with a history of neck pain. **Conclusion:** Neck pain is one of the most common complaints encountered in outpatient department settings, associated with reduced quality of life. Patients may come with differing degrees of pain, various symptoms, and aetiologies making it quite challenging to treat them into complete remission. Despite being frequently encountered, some patients with neck pain are underdiagnosed and undertreated due to failure to understand the clinical symptoms before deciding possible aetiologies.

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1. Background

- Neck pain is the fourth leading cause of disability, with an annual prevalence rate of approximately 15-30% [1-4]. Most episodes of acute neck pain will resolve within six months, but nearly 50% of them will continue to experience pain or more frequent occurrence [3-6]. The prevalence of neck pain is higher in women and reaches a peak in middle age. Several comorbidities, including headache, back pain, arthralgias, and depression, are associated with neck pain [5]. Some risks, such as trauma, sports injuries, and a sedentary lifestyle, are also related to neck pain [4-7]. Despite the frequency of neck pain complaints, a clear understanding of the cause and the choice of treatment is often elusive [8]. History and physical examination can provide important clues to identify “red flags” to decide on proper treatment or refer for consultation as indicated [2, 3]. This review is aimed at primary care providers evaluating patients comprehensively.

2. Neck Pain and Associated Cervical Spine Disorders

When evaluating a patient with neck pain during an episode of treatment, a physician should note the patient's impaired bodily functions so that he can monitor the progress of therapy over time and assist in making decisions based on the latest clinical developments [2].

The clinical manifestations experienced by the patient must be the main concern because it can be a tool for diagnosing and determining the anatomical area that causes the patient's complaint. Axial neck pain, radicular pain, and myelopathy are the three most common clinical manifestations experienced by patients with neck pain. By exploring these three clinical manifestations, we can already make a differential diagnosis for almost all cases of neck pain.

2.1. Radiculopathy

Cervical radiculopathy is a disease process marked by nerve compression from herniated disk material or arthritic bone spurs [9]. Causes of radiculopathy originating from compression or irritation of the cervical nerve root. Most cases of cervical radiculopathy are primarily due to cervical spondylosis. Cervical spondylosis refers to the degenerative changes in the cervical spine with age [10]. These changes can lead to radiculopathy through bony hypertrophy of the vertebral joints. Less commonly, the zygapophyseal joints may cause intervertebral foramen narrowing and spinal nerve compression [4].

Some factors, including inflammatory mediators, changes in vascular response, and intraneural edema, contribute to the development of radicular pain [9].

Unlike patients with axial neck pain, patients with radiculopathy usually present with unilateral pain associated with radiation into the ipsilateral arm in a dermatomal distribution; the patient may complain of loss of sensation along the same dermatomal distribution or have weakness along the corresponding myotome [11].

2.2. Myelopathy

Cervical myelopathy describes spinal cord compression at the cervical level of the spinal column, the most common spinal cord disorder in persons older than 55 [12,13]. It is predominantly due to pressure on the anterior spinal cord with ischemia due to deformation of the cord by anterior herniated discs, spondylitis bone spurs, an ossified posterior longitudinal ligament, or spinal stenosis [14]. Cervical myelopathy can also occur due to static and dynamic stressors related to developmental canal stenosis, intervertebral disc bulging, and hypertrophy of the ligamentum flavum [16]. In contrast to radiculopathy, the physical examination hallmarks of myelopathy are primarily upper motor neuron findings in a distribution below the compression level. The important finding is spasticity, hyperreflexia, pathologic reflexes, and gait disturbance [12].

2.3. Axial Neck Pain

Axial neck pain can arise from various conditions, primarily from muscular or ligamentous factors and joint pain. The etiology of neck pain arising from a muscular origin is unclear. However, it has been shown that in patients with primary muscular pain, a lower level of high-energy phosphates is found in the affected muscle than in normal muscle [17].

Axial neck pain also arises as a referred pain from the other joint pain around the neck, such as temporomandibular joint, craniocervical junction, and facet joints [18].

Axial neck pain may be labeled as cervical muscle strain, myofascial pain, cervical spondylosis, cervical facet joint pain, and discogenic pain [19]. Patients with axial neck pain typically present with pain or soreness in the posterior neck muscles, with frequent radiation to the occiput or shoulder regions that do not usually follow a dermatomal distribution. Pain in the posterior neck is exacerbated by neck extension mainly from a discogenic source and, if aggravated by flexion, is typically a myofascial source [3]. Research has concluded that zygapophyseal joints may be a source of pain in some subsets of patients with chronic neck pain caused by minor trauma or degenerative changes. One important sign as a symptom is that the zygapophyseal joint may also produce referred pain in the head and upper extremities [1]. The prevalence of neck pain increases with

age, declining later in life. It frequently co-exists with other comorbidities such as low back pain, headache, and poor self-related health—most people who present to primary care clinics with neck pain experience recurrent or persistent problems. In a population-based study of primary care patients with neck pain, only one-third of patients reported resolution of symptoms after a 1-year follow-up [4].

3. Laboratory Tests and Imaging

Although laboratory tests are widely used to help determine the cause of pain, in cases of neck pain, laboratory tests do not provide much significant meaning. Blood tests are rarely helpful in evaluating neck pain, except in patients with red flag symptoms suggestive of cancer, infection, and others [1].

The radiologic examination is intended for patients with persistent pain and not responding well to conservative therapy. It is helpful to look for fractures or dislocations of cervical vertebrae. Cervical radiography is needed when structural damage is suspected. Cervical X-ray in non-traumatic neck pain is indicated in patients >50 years of age or with neck pain with signs and symptoms of infection. In cases of discitis, endplate destruction can be seen at the infection level [20]. Most studies cited the use of radiography, particularly to diagnose spondylosis, degenerative disk disease, or posttraumatic malalignment [21].

The recommended cervical X-ray examination is in 5 positions: anterior-posterior, lateral, open mouth, and right and left oblique. An oblique X-ray examination is especially requested if there are symptoms of radiculopathy [22]. Cervical spondylosis or degenerative changes in the cervical spine almost always occur in elderly patients and have a weak association with neck pain symptoms [21].

MRI is now widely acknowledged as the imaging modality of choice to demonstrate diseases and abnormalities of the spinal column and the intervertebral discs. Its superior soft tissue differentiation and ability to visualize and detect lesions within the bone marrow, the spinal cord, and the intervertebral disc (IVD) give it this advantage over other imaging modalities [23].

MRI, computed tomography (CT) myelogram, and CT scan: Patients with neurologic signs/symptoms should proceed with MRI without contrast to assess for possible causes, such as cervical disc herniation and cervical stenosis, and to rule out serious causes, such as spinal tumor and infection.¹ MRI has a high sensitivity for visualizing disc herniation and spinal/neuroforaminal stenosis [24].

An MRI (magnetic resonance imaging) scan is recommended to view soft tissue components and cerebrospinal fluids. The MRI result should correspond with clinical findings because the degenerative disc is a part of the degeneration process and can be asymptomatic.

MRI is the imaging of choice if we consider severe underlying diseases, such as infection or cancer. Degenerative changes, herniated discs, and compression of neural structures on MRI are common, age-related findings [1].

A cervical MRI is a definitive examination for evaluating patients with a history of cervical radiculopathy or myelopathy symptoms [25]. In cases of radiculopathy, the results of the MRI examination should be related to the physical examination, considering that protrusion or extrusion of the disc can reach > 30% of patients [26].

Neck pain and cervical radiculopathy are common reasons for requesting an MRI of the cervical spine to evaluate spondylitis, trauma, and less frequent neoplastic disease processes of the neck to achieve better patient outcomes [27].

The electrodiagnostic examination is an extension or continuation of a clinical examination. A neurological deficit that accompanies cervical pain, or pain that persists for more than four weeks, indicates electrodiagnostic or imaging studies. Another thing considered is the need for an electrodiagnostic examination of cervical pain [28]. Suspected radiculopathy is one of the most common indications for electrodiagnostic

examination of cervical pain. However, this examination can not only determine the presence or absence of radiculopathy but can also rule out differential diagnoses such as brachial plexopathy and neuropathy [29].

Electrodiagnostic examination as an extension/continuation of the clinical examination can provide objective evidence of nerve fiber dysfunction in the peripheral nervous system. A combination of findings from the electrodiagnostic examination, physical examination, and imaging is required to confirm the diagnosis and plan therapy [30].

4. Treatment

Understanding the etiology of neck pain is essential in deciding on appropriate therapy, including interventional management. Treatment response may vary depending on the presence of symptomatic radiculopathy and myelopathy or a history of comorbid factors such as psychiatric illness. The management of neck pain has shown differences in cases with symptoms of mechanical neck pain, neck pain with radiculopathy or myelopathy, and neck pain accompanied by a history of other diseases, such as malignancy [1].

5. Conservative Treatments

Conservative therapy is the first treatment option if there are no clinical manifestations of motor weakness or signs of myelopathy [31].

Education plays an important role in managing neck pain, especially when the pain is related to poor posture. This may be the most critical and challenging part of the treatment. The physician or physiotherapist must explain carefully to reassure the patient that no severe disease or injury has been found [32].

Avoiding painful positions for several days before returning to an average activity level is a reasonable option, but focus on the importance of early mobilization. Rest and continuous use of cervical positions or activities are not required, but the patient should identify and correct the predisposing factors for recurrent episodes [33].

Exercise is recommended as an effective way of managing mechanical neck pain. It is more effective than strengthening or endurance and has superior benefits over other forms of activity, such as stretching programs [34].

Some medications are needed, not only for analgesic use but also as an anti-inflammatory. Non-steroidal anti-inflammatory drugs (NSAIDs) combined analgesic and anti-inflammatory properties make them common and effective first-line agents [35]. Acetaminophen, Topical analgesic agents, and topical NSAIDs have recently become available. [36,37] Another medication already used widely for chronic soft tissue pain but has not been validated in patients with acute or chronic neck pain is muscle relaxants [38]. The steroid is often prescribed for acute radicular pain and has been reported to be beneficial; however, the evidence for this is limited [39]. Anticonvulsants and tricyclic antidepressants have been used adjunctively to reduce chronic neck and radicular pain, even though no studies support their use in acute neck pain [40]. Opioids, such as tramadol and oxycodone, may be tried if other medications fail to provide adequate relief or are contraindicated [41].

Manual therapy encompasses a range of hands-on interventions, one type of manual therapy is joint mobilization. Multiple systematic reviews show a manual therapy may not be effective. Gross and colleagues concluded that mobilization or manipulation when used with exercise, is beneficial but only when performed with others [42].

Multiple investigators also concluded that passive modalities are not associated with functional improvements. Traction for cervical radiculopathy is intuitively believed to decrease pressure on the existing spinal nerve, but a recent study shows that the use of

mechanical and manual traction, in addition to other physical therapy procedures for pain reduction, but yielding lesser effects on function/disability [43].

6. Invasive Treatments

Interventional Pain Management is a comprehensive approach to managing chronic pain and one of the effective methods to relieve the severity and continuous pain. An invasive technique can be performed independently or simultaneously with medication and other treatments [44]. Steroid injections are a common procedure for neck pain and may be considered for radiculopathy, with evidence of short-term symptom improvement. An epidural injection with steroids or other agents is the most commonly used for nonsurgical intervention. Radicular pain is caused by mechanical compression and chemical irritation in the nerve root resulting in inflammation. To reduce inflammation, epidural injections (ESIs) can be used [45]. The injections use anti-inflammatory agents, such as steroids which can reduce the rate of prostaglandin synthesis by blocking A2 phospholipase [46].

Facet joint injection is also one of the interventional procedures widely used to manage neck pain. Radiofrequency techniques have replaced most intraarticular facet joint injections to reduce pain associated with facet joints. Most practitioners have now used cervical medial branch block on the pathological level to determine whether someone needs to receive radiofrequency treatment [47].

7. Surgery

There is no convincing evidence to support the role of surgery in mechanical neck pain, and there is wide variation in current practice regarding the type of neck pain that should be referred for surgery. Surgery is appropriately considered for patients with severe or progressive radiculomyelopathy [48]. In mild-to-moderate radiculopathy, short-term outcomes of pain relief and decreased weakness and numbness are better with surgery compared with conservative management; however, it disappears with a longer-term follow-up [49].

8. Rehabilitation

The rehabilitation approach for patients with acute neck pain differs from those with chronic neck pain. Conventional therapy, such as strength training and muscle stretching, can increase the range of motion and neck muscle elasticity. Active release technique, a training technique used at home, is an effective therapy and is recommended to be performed [50].

There is a strong recommendation to use manipulation, manual therapy, and training, combined with other modalities, regarding chronic neck pain. There is also a strong recommendation for stretching, strengthening, and endurance training [51].

Cervical spine manipulative therapy positively reduces pain and improves nonspecific mechanical neck pain function, including mobilization, manipulation, and clinical massage. Other techniques like electroacupuncture, strain-counter strain, relaxation massage, and passive physical modalities (heat, cold, diathermy, hydrotherapy, and ultrasound) are ineffective. They should not be used to manage neck pain [51, 52].

9. Conclusions

Neck pain still becomes one of the most common complaints; the clinical diagnosis of neck pain varies and highly depends on the symptoms and clinical diagnosis. An appropriate follow-up and comprehensive treatment to mitigate the pain and treat underlying aetiologies is essential to ensure complete remission with a low relapse rate.

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