

## Cervical Radiculopathy: Focused on Primary Care

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### Abstract

**Background:** Cervical radiculopathy is an entity which frequently presents with upper extremity pain associated with neurologic symptoms caused by compression of nerve roots.

**Purpose:** This piece was made in order to understand better how this entity is produced and therefore how its symptoms develop.

**Method:** The ScienceDirect and ClinicalKey database were searched looking for articles which were selected and reviewed separately by both authors.

**Results:** Cervical radiculopathy has an increasing incidence, more common in man than in women. The most common symptom that makes patient to consult is movement impairment of the upper limb, followed by paresthesia, among others. Degenerative changes associated to a proinflammatory cascade are the mechanism by which it develops that leads to the narrowing of the foraminal spaces and pain. Although diagnostic imaging improves every day, the diagnosis is made after a complete medical history and physical exam, including all the provocative maneuvers. Non-pharmacologic treatment must be done at first using different options and lastly surgery when in needed.

**Keywords:** Cervical radiculopathy; Cervical pain; Disc hernia

### Introduction

The cervical radiculopathy (CR) it is defined as the presentation of neck pain that irradiates to the upper limbs, it is associated with movement impairment of the upper limbs in 68% of the cases, scapular pain in 52.5% of cases, paresthesia in 45.5% of the cases, chest pain in 17.8% of the cases and headache in 9.7% of the cases, among others [1,2]. It's also associated with diminish Musculoskeletal reflexes [3]. The most common cause of CR is the result of degenerative changes that affect the anatomy of the cervical spine including the vertebral bodies, the intervertebral discs, the facet joints and the ligament component of the cervical spine [4]. This causes compression of the nerve root that could be due to a herniation of the disc material or the creation on bony osteophytes [3]. The CR is a common cause of consultation to the general physician or the emergency room, it is estimated that in the United States exist an CR incidence of 83 cases per 100.000 people [2,5]. The literature describes various risk factors associated with the presence of CR, which include: white race, smoking, prior lumbar radiculopathy, lifting heavy objects and playing golf, among others [3,5-7].

### Etiology

The changes in the radiculopathy and myelopathy are divided in dynamic and static changes, that later are enhance by ischemic mechanism [1,4]. As the intervertebral disc ages, the nucleus pulposus loses hydrostatic pressure, and the annulus fibrosus loses cellularity, this causes its rupture and the herniation of the nucleus pulposus,

which leads to the compression and localized ischemia, together this changes lead to the activation of a proinflammatory cascades mediated by the tumor necrosis factor alpha, interleukin 6 and matrix metalloproteinase [3,8]. There are also degenerative changes in the cervical spine that lead to a decrease of the disc height and therefore foraminal narrowing [9], this increases the load through the intervertebral joints that finally lead to the hypertrophy of the joint causing the narrowing and foraminal stenosis [10]. Frequently this changes are accompanied with the ossification of the longitudinal posterior ligament, and the flavum ligament, together this represents the static changes. The extreme or abnormal movements of the cervical spine that tent to the worsening of the preexisting factors are considered to be dynamic changes [4].

### Clinical Evaluation

The clinical presentation depends on various factors, such as the severity of the compression on the medullar roots, the levels that are compromised and the age of the patient [1,5]. Besides looking for common symptoms, already discussed, it's important to explore and enquire the presence of the so called red flags of myelopathy, which are; the loss of the motor skills, signs of upper motoneuron anomaly such as the presence of asymmetrical Hoffman sign, also known as Babinski sign of the upper limb, or the presence of hyperflexes or clonus [1].

The Spurling test is the key to diagnosis of CR, this consist in the load on the vertical axis over the head with the rotation of the head to the limb that is symptomatic, it is positive if the maneuver reproduces the pain, this is explained by the narrowing of the foramen at the

cervical spine when doing this manipulation. This test when combined with rotation and extension has a sensitivity of 30-100% and a specificity of 75-100% [11]. The shoulder abduction test checks for the relief of symptoms when shoulder is abducted as the nerve is taken off tension. Investigators have found the sensitivity of this test to range from 17-78% with a specificity ranging from 75-92% [3,11]. Some possible differential diagnosis is cardiac pain, herpes zoster, Parsonage-Turner syndrome, intra and extraspinal tumors, and thoracic outlet syndrome which should be ruled out depending on the scenario in which the patient comes in [1].

## Diagnostic Imaging

The diagnostic images should be performed when the patient has red flags, as described before, that may indicate the presence of myelopathy, or when the evolution of the diseases is not as expected. The simple radiography of the cervical spine is the first study that must be performed. This allows the evaluation of the spine alignment, possible tumors, among others [12]. The extension and flexion projections allow us to determine the instability of the cervical spine when it is not appreciated on the PA and lateral projections [13]. The computed tomography of the cervical spine, in axial, sagittal, and coronal planes, it's used in the assessment of the bone mainly, if it is used with myelography it can be useful in the evaluation of the nerve roots and the dural sack [12,13]. Finally, the magnetic resonance imaging provides good resolution images of the soft tissue such as the intervertebral disk, the dural sack and the ligaments of the cervical spine; for this purposes the images of T1 and T2 should be obtained [12]. It has been suggested that the sagittal and axial images, are the most useful ones to determine either disc herniation or foraminal stenosis [12].

In case of neurologic deficit without clear explanation it is recommended the use of the electromyography of the upper limbs (EMUL), however its use has showed to be a poor tool for localization of the lesion [3,13]. The use of EMUL is only recommended as complement of clinical and imaging findings, this is supported by the fact that when compared to the findings at the time of surgery only 42% of the findings in EMUL correlate [14].

## Treatment

The treatment of cervical radiculopathy is divided into surgical, which won't be discussed in this article, and non-surgical. Likewise, non-surgical treatment is divided into pharmacological and non-pharmacological treatment.

Oral pharmacological therapy includes nonsteroidal anti-inflammatory drugs (NSAID) usually associated to physical therapy as a first-line therapy, followed by muscle relaxants (only when indicated), and finally opioids such as tramadol which had shown to be effective in providing pain relief of neurologic origin according to literature, but reserved only as second line of treatment in those patients, that do not improve with first line analgesic [1,5]. On the other hand, in cases where the patient undergoes surgery and persists with pain after it, the literature suggests that the use of tricyclic antidepressants or serotonin reuptake inhibitors such as venlafaxine can make an improvement on pain relief, with good evidence [1,15]. The use of corticosteroids, although there are several small studies with adequate short-term results, usually lack of a good design and long-term follow up which could be potentially harmful to the patient's health in a long-term basis, therefore their use is not frequent [1,5].

Furthermore, the use of steroid injections had no benefit when compared to injection of local anesthetic, for the relieve or symptoms [16].

Non-pharmacological treatment consists in several methods like cervical immobilization and cervical traction, both of which have proven to be useful mainly in acute episodes and should be accompanied by physiotherapy [3,14]. Physical therapy interventions focus usually on strength and stretch training of the neck and chest muscles, also it should include postural and ergonomic training, and is recommended to be initiated with gentle range motion exercises and work from light through heavier and more demanding exercises as symptoms subside [3,16,17]. Non-surgical treatment has been reported to have a good outcome in up to 90% of patients, however this benefits tend to disappear in the next 6 months to a year [3,17,18].

Other non-pharmacological therapies are acupuncture and biofeedback. Acupuncture has been used mainly for the treatment of lower-level radiculopathy, and it is recommended when the patient wants or needs to decrease the intake of analgesics, or if the patient is interested in the technique despite the little evidence it has [19]. Biofeedback as its name indicates is a technique in which the patient is taught how to self-care since the patient must learn how to use various techniques to manage pain and to lead a functional life even with pain [19,20].

## Conclusion

Cervical radiculopathy is quite a common pathology in every days' consult, but its presentation is not always the commonest, which could represent a diagnostic challenge when is not suspected, which is why is so important to make a complete medical history and physical exam, and when in doubt suggest complementary studies before the disease continues to damage more the spinal nerve root and worsen the pain [21,22]. There are several different treatment options, from the less to the most invasive (not included here), but most of them lack of well-designed studies which could support better the decision making for the physician and be more accurate when prescribing a therapy or indicating surgery.

## References

1. Eubanks JD (2010) Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. *Am Fam Physician* 81: 33-40.
2. Bono C, Ghiselli G, Gilbert T, Kreiner D, Reitman C, et al. (2011) An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *Spine J* 11: 64-72.
3. Iyer S, Kim HJ (2016) Cervical radiculopathy. *Curr Rev Musculoskelet Med* 9: 272-280.
4. Etheridge J, Babak S (2014) The pathophysiology and biological mechanism of cervical Spondylotic Myelopathy. *Seminars in spine surgery* 26: 62-67.
5. Corey DL, Comeau D (2014) Cervical radiculopathy. *Med Clin North Am* 98: 791-799.
6. Wong JJ, Côté P, Quesnele JJ, Stern PJ, Mior SA (2014) The course and prognostic factors of symptomatic cervical disc herniation with radiculopathy: a systematic review of the literature. *Spine J* 14: 1781-1789.
7. Woods B, Hilibrand AS (2015) Cervical radiculopathy: epidemiology, etiology, diagnosis, and treatment. *J Spinal Disord Tech* 28: 251-259.
8. Van Boxem K, Huntoon M, Van Zundert J, Patijn J, van Kleef M, et al. (2014) Pulsed radiofrequency: a review of the basic science as applied to the pathophysiology of radicular pain: a call for clinical translation. *Reg Anesth Pain Med* 39: 149-159.

9. Kang JD, Stefanovic-Racic M, McIntyre LA, Georgescu HI, Evans CH (1997) Toward a biochemical understanding of human intervertebral disc degeneration and herniation. Contributions of nitric oxide, interleukins, prostaglandin E2, and matrix metalloproteinases. *Spine (Phila Pa 1976)* 22: 1065-1073.
10. Näkki A, Battié MC, Kaprio J (2014) Genetics of disc-related disorders: current findings and lessons from other complex diseases. *Eur Spine J* 23 Suppl 3: S354-363.
11. Rubinstein SM, Pool JJ, van Tulder MW, Riphagen II, de Vet HC (2007) A systematic review of the diagnostic accuracy of provocative tests of the neck for diagnosing cervical radiculopathy. *Eur Spine J* 16: 307-319.
12. Kim KT, Kim YB (2010) Cervical radiculopathy due to cervical degenerative diseases: anatomy, diagnosis and treatment. *J Korean Neurosurg Soc* 48: 473-479.
13. Caridi JM, Pumberger M, Hughes AP (2011) Cervical radiculopathy: A review. *HSS J* 7: 265-272.
14. Alrawi MF, Khalil NM, Mitchell P, Hughes SP (2007) The value of neurophysiological and imaging studies in predicting outcome in the surgical treatment of cervical radiculopathy. *Eur Spine J* 16: 495-500.
15. Saarto T, Wiffen PJ (2007) Antidepressants for neuropathic pain. *Cochrane Database Syst Rev* : CD005454.
16. Kuijper B, Tans JT, Beelen A, Nollet F, de Visser M (2009) Cervical collar or physiotherapy versus wait and see policy for recent onset cervical radiculopathy: randomised trial. *BMJ* 339: b3883.
17. Dreyer SJ, Boden SD (1998) Nonoperative treatment of neck and arm pain. *Spine (Phila Pa 1976)* 23: 2746-2754.
18. Manchikanti L, Nampiaparampil DE, Candido KD, Bakshi S, Grider JS, et al. (2015) Do cervical epidural injections provide long-term relief in neck and upper extremity pain? A systematic review. *Pain Physician* 18: 39-60.
19. Colorado (2014) Department of labor and employment division of workers' compensation. *Cervical Spine Injury Medical Treatment Guidelines*.
20. Burneikiene S, Nelson EL, Mason A, Rajpal S, Villavicencio AT (2015) The duration of symptoms and clinical outcomes in patients undergoing anterior cervical discectomy and fusion for degenerative disc disease and radiculopathy. *Spine J* 15: 427-432.
21. Davis RJ, Nunley PD, Kim KD, Hisey MS, Jackson RJ, et al. (2015) Two-level total disc replacement with mobi-C cervical artificial disc versus anterior discectomy and fusion: a prospective, randomized, controlled multicenter clinical trial with 4-year follow-up results. *J Neurosurg Spine* 22: 15-25.
22. Bydon M, Mathios D, Macki M, de la Garza-Ramos R, Sciubba DM, et al. (2014) Long-term patient outcomes after posterior cervical foraminotomy: an analysis of 151 cases. *J Neurosurg Spine* 21: 727-731.