

PATTERN OF CERVICAL RADICULOPATHY AS DIAGNOSED BY ELECTRODIAGNOSTIC STUDIES

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ABSTRACT

Objectives: To determine the pattern of cervical radiculopathy presenting to a military care set up using electro diagnostic techniques.

Study Design: Descriptive cross sectional study.

Place and Duration of Study: The study was conducted at the Armed Forces Institute of Rehabilitation Medicine Rawalpindi from July 2012 to December 2012.

Subjects and Methods: Seventy three patients who were diagnosed as cases of cervical radiculopathy on electro diagnostic testing were included in the study. Demographics and frequency of involvement of different levels were noted.

Results: Of the total 73 patients, 51 (69.9%) were males and 22 (30.1%) females, with a mean age of 48.01 ± 13.5 years. Left side predominated with 46.6% involvement whereas 39.7% of the patients had right sided radiculopathy and 13.7% had bilateral involvement. The most common radiculopathy encountered in this study was C7 which affected 25 (34.2%) patients, followed by C6 affecting 17 (23.3%) patients. Radiculopathy affecting multiple upper segments like C5, C6 and C7 were a close third presenting in 15 (20.5%) patients. C8, T1 radiculopathy of the lower segments was diagnosed in 13 (17.8%) patients whereas the least common upper limb radiculopathy was C5, present in only 3 (4.1%) patients.

Conclusion: Cervical radiculopathies affecting C7 and C6 roots were the most common ones encountered in our study, similar to international data. The cervical spine allows for greater movement and therefore is more prone to such developments. The reasons why C7 and C6 roots are most affected need to be studied further.

Keywords: Radiculopathy, C7, Electro diagnostic study.

INTRODUCTION

Since radiculopathies can cause debilitating pain and numbness, they can cause a dent in the working efficiency of our population. The complex structural alignment and high mobility of the cervical spine makes it vulnerable to undue mechanical stresses predisposing the spinal elements to degenerative change, which in turn may lead to spondylosis, radiculopathy or myelopathy¹. Spinal nerve root pathology and radicular syndromes may arise from an acutely offending disc injury or more gradually evolving and degenerative neural foraminal compromise. Historically, cervical nerve root compression has even been described as a cause of anginoid pain

in the 1920s². The cervical disc allows for a greater degree of motion than do the discs in the lumbar region, as the disc to vertebral body height ratio in the cervical region is 2:5, compared with a 1:3 ratio in the lumbar spine. The cervical nerve root compression in the neural foramen by a herniated disc is more common than from degenerative foraminal stenosis³.

Disc herniations can be intraforaminal, posterolateral or central. Intraforaminal herniations are the most common⁴ and may result in an acute radiculopathy affecting the nerve root exiting through the respective foramen e.g an intraforaminal herniation of disc material at the C5/C6 level might result in a C6 radiculopathy.

The annual incidence of cervical radicular pain is 5.5 per 100,000. These injuries represent 5.3% of all nerve root injuries caused by disc pathology. The nerve roots most commonly involved by cervical radiculopathy are C-7 and

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C-6, with most studies suggesting C-7 syndromes as the most common, followed by radiculopathy of C-6 and C-8⁵.

Symptoms of cervical radiculopathy include pain, weakness, paresthesias, or a combination of sensorimotor deficits that begin without trauma or a particular inciting event⁶. Coughing, sneezing, or a Valsalva maneuver may lead to symptomatic worsening. Muscle girth should be carefully inspected for any evidence of atrophy that might be consistent with a more chronic radiculopathy. Although C-5 and C-6 involvement can lead to wasting of the biceps and periscapular musculature, loss of triceps girth can be observed in the setting of a C-7 radiculopathy. Atrophy of the hand intrinsic muscles might be observed in patients with C-8 or T-1 pathology. Active cervical range of motion especially, extension and ipsilateral side-bending are more likely to result in a reproduction of radicular symptoms⁷.

Reflex testing of the upper extremity should include the biceps, triceps, brachioradialis, and Hoffman's response. Spurling's maneuver incorporates rotation and side-bending of the head toward the affected side, and this can be combined with axial compression. The goal of this maneuver is to diminish the foraminal area and reproduce radicular symptoms⁸. The shoulder abduction relief sign is as the patient places the affected hand on the top of the head. This position of upper-extremity abduction reduces stress on the nerve root affected by a disc herniation and relieves pain⁹.

Electro diagnostic examination of paraspinal and limb muscles have been used for over 50 years and cervical radiculopathy remains among the most common referrals to the electro diagnostic clinic. Electromyography (EMG) studies can help to localize the level of a cervical radiculopathy and differentiate such a presentation from a brachial plexopathy, more distal entrapment, or peripheral neuropathic process. Electro diagnostic studies are useful in individuals with multiple levels of radiographic

pathology whose physical examination findings are less conclusive in identifying the segmental pathology of clinical significance. In these cases, electro diagnostic studies prove useful. The earliest abnormality that might be observed in the setting of motor root compromise is reduced voluntary recruitment observed during needle exam. EMG abnormalities have been shown to correlate well with myelographic abnormalities and operative pathology^{10,11}.

The objectives of this study were to use electro diagnostic measures to determine the pattern of cervical radiculopathy presenting to our set up by observing the frequency of involvement of different disc levels.

PATIENTS AND METHODS

This cross sectional descriptive study was carried out at the Armed Forces Institute of Rehabilitation Medicine Rawalpindi between July 2012 and December 2012 after approval of the hospital's ethical committee. This institute possesses state of the art electro diagnostic facilities where these tests are conducted by qualified and experienced rehabilitation physicians. Of the hundreds of patients who reported for electro diagnostic tests during this time, those who were diagnosed as having cervical radiculopathy were included in the study and the cervical level which was involved e.g C5 or C7 was noted. Patients suffering from conditions like diabetes mellitus, hypothyroidism were excluded from the study. Since electro diagnostic studies are a direct extension of clinical examination, a thorough history and neurological examination of the patients was conducted. Once a provisional diagnosis was made on the basis of this exam, the procedure was started after explaining it to the patient. Electro diagnostic parameters for diagnosing cervical radiculopathy were observed; normal compound muscle action potential for the motor nerves; normal potentials for the sensory nerves and electromyographic findings of large neuropathic potentials with a discrete interference pattern on muscle examination. Key

muscles supplied by different nerve roots were studied along with cervical paraspinal muscles for confirmation. The results were analyzed using SPSS version 17. Descriptive statistics were used to describe the results.

RESULTS

The results showed that the minimum age was 16 years and the maximum 78 years, with the mean age being 48.01 ± 13.5 years. Out of the total 73 patients, 51 (69.9%) were males and 22 (30.1%) females. Left side predominated with 46.6% involvement whereas 39.7% of the patients had right sided radiculopathy (Figure-1). The most common radiculopathy encountered in this study was C7 which affected 25 (34.2%) patients, followed by C6 affecting 17 (23.3%) patients. Radiculopathy affecting multiple upper segments like C5, C6, C7 were a close third presenting in 15 (20.5%) patients. C8, T1 radiculopathy of the lower segments was diagnosed in 13 (17.8%) patients whereas the least common upper limb radiculopathy was C5, present in only 3 (4.1%) patients (Figure-2).

DISCUSSION

Cervical radiculopathy is often under diagnosed and misconstrued as a simple neck pain or tension myalgia. Patients may present with a variety of symptoms ranging from the classical signs of neck pain radiating to the upper limbs with paresthesias or as a simple headache refractory to routine treatment¹². Where clinical examination and radiological findings have a strong correlation with its presentation, cervical radiculopathies can be most effectively diagnosed with the help of electro diagnostic studies. An MRI is able to tell us if a disc is pressing onto a nerve root or not, but it is these electro diagnostic studies which can ascertain if the nerve root is being affected, and to what extent. Moreover, they can help in monitoring the progress of the treatment course prescribed. Nerve conduction study and electromyography (NCS/EMG) have moderate sensitivity and high specificity for diagnosing radiculopathies and peripheral nerve entrapments¹³. The efficacy of electro diagnostic

studies has also been validated by Iqbal W and colleagues¹⁴.

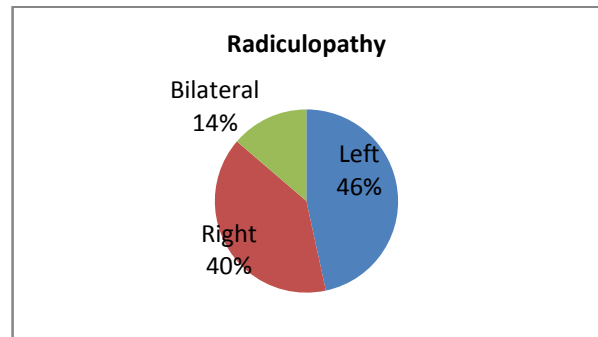


Figure-1: Radiculopathy involvement of side of the patient.

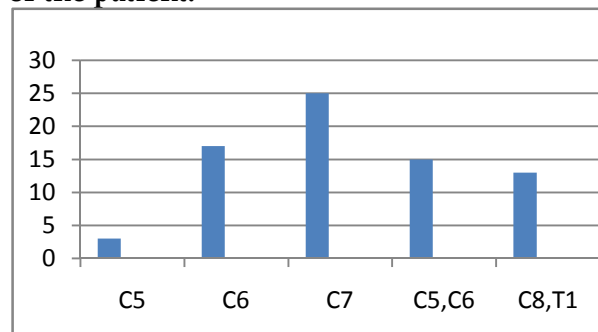


Figure-2: Frequency of different types of radiculopathy affecting cervical spinal segments.

Our study showed that the average age of the patients presenting with cervical radiculopathy was 48 years, with the minimum being 16 years. This is comparable with the mean age of 47 years as cited by Wainner and colleagues¹³. Our study was dominated by male subjects who constituted almost 70% of the sample size. This is quite easily explained by the fact that most of our patients belonged to the military, therefore males dominated the study. The most common radiculopathy in our study was C7 affecting 33% of the patients followed by C6 affecting 23%, which is similar to what is reported in international data¹⁵. Combined compression of the upper roots i.e. C5, C6 and C7 was also observed pointing towards the commonality of multiple disc involvement. Radiculopathy of the lower roots C8 and T1 followed by C5 deviates from statistics showing

C5 radiculopathy as being more common than that of the lower roots. However, Raja RA reports in his study that C5/C6 radiculopathy is more common than the others¹⁶. The C7 and C6 segments of the vertebral column are considered to have the smallest foramina from where the nerve root can exit and thus are more prone to compression from osteophytes or an inflammatory process¹¹.

CONCLUSION

Middle aged patients presenting with neck pain should evoke a high suspicion of radiculopathy. They need to be investigated using electro diagnostic tools to reach a confirmatory diagnosis. More studies need to be carried out locally to study the reasons for involvement of a particular nerve root and strategies to remedy it.

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