Original Article
Nerve Conduction Studies on Patients of Sciatica

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Abstract

Low-back pain (LBP) is a major health problem around the world and a major cause of medical expenses, absenteeism and disability. [1, 2, 3] Although LBP is usually a self limiting and benign condition that tends to improve spontaneously over time, a large variety of therapeutic interventions is available for treatment. [4] Sciatica can result when the nerve roots in the lower spine are irritated or compressed. Most often, sciatica is caused when the L5 or S1 nerve root in the lower spine is irritated by a herniated disc. Degenerative disc disease may irritate the nerve root and cause sciatica, as can mechanical compression of the sciatic nerve, such as from spondylolisthesis, spinal stenosis or arthritis in the spine.

Introduction

Few studies specifically examine sciatica, but some low back pain studies include data on sciatica prevalence, risk factors, and natural history. Low back-related leg pain, or sciatica, is one of the most common variations of low back pain. [5] Sciatica is known by a range of terms in the literature, such as lumbosacral radicular syndrome, radiculopathy, nerve root pain, and nerve root entrapment or irritation. Controversy exists in clinical and research circles about the use of sciatica as a term. [6] Although definitions of sciatica used in epidemiological surveys vary, sciatic pain is generally defined as pain radiating to the leg, normally below the knee and into the foot and toes. As with low back pain, sciatica is a symptom rather than a specific diagnosis, but lumbar disk herniation and lumbar canal or foraminal stenosis are typical pathologies that may cause sciatic pain.

Patients with sciatica usually have a more persistent and severe type of pain than patients with low back pain, have a less favorable outcome, consume more health resources, and have more prolonged disability and absence from work. [7, 8]

Sciatic neuropathy is the one of the most common neuropathies of the lower extremities, second only to common fibular (peroneal) neuropathy. One of the most common presentations of sciatic neuropathy is foot drop. Because ankle dorsiflexion weakness, with or without lower extremity sensory impairment, may also be associated with several other clinical syndromes, a careful evaluation is necessary before confirming a diagnosis of sciatic neuropathy. Electrodiagnostic testing is of great value in confirming the diagnosis of suspected sciatic neuropathy and assessing the potential for recovery of nerve function. [9]

Sciatica is a clinical condition characterized by severe pain started from the low back region and radiating down along the course of the leg. This is common entity encountered in clinical practice. Most often this is due to lumbar disc prolapse. It can be due to lifting heavy weights or injury to the vertebral column and different disease of vertebral column. The most important symptom of sciatica is lumbosacral radicular leg pain that follows a dermatomal pattern radiating below the knee and into the foot and toes. [10]
Nerve conduction study is an important test used to test the functioning of nerves, especially the ability of conduction of electrical stimulus. NCV studies can acknowledge the degree of demyelination and axonal loss in the segments of nerve examined. Demyelination of a nerve results in prolongation of conduction time, whereas axonal loss generally leads to the loss of nerve fiber.[11]

The development of neuropathic pain is a complex mechanism, which clinicians and researchers are continually working to better understand. To determine the conduction velocity of deep-seated nerves and those supplying big muscles have been introduced; however, they have not met with wide acceptance. The purpose of this study is therefore to establish a method for the determination of motor nerve conduction velocity of deep-seated nerve and to evaluate the problem of patient of Sciatica.

Material and method:

This study has been carried out in the Department of Physiology MGM Medical College Hospital, Aurangabad. While working in the OPD and IPD of physiotherapy, Medicine Department & orthopedic department many patients have been found suffering from Sciatica. The patients were referred to Nerve conduction study in the Neurophysiology laboratory in Physiology Department from MGM Hospital. The patients were subjected to detailed History, physical examination, and clinical examination in the department of Physiology.


Study Design – Case - Control.

Sample Size – 50

Period of Study – two year

Study Population – OPD / IPD Patients LBP willing for investigation.

Study Area- M.G.M. Medical College Hospital & Department of Physiology.

Inclusion criteria:

- Reproductive age group 21 to 60 years
- Patients having signs and symptoms of Sciatica like Tingling sensation, numbness, difficulty in walking.
- Back ache
- SLR (straight Legs Rising) test Positive

Exclusion Criteria

- Patient not giving regular follow up
- Those requiring emergency surgical intervention
- Fracture in pelvic
- Systemic disorder T.B.,
- Psychological disorders.

Observation and results:

The present study was carried out in the department of Physiology at Mahatma Gandhi Medical College Hospital to analyze the Nerve conduction study in the Patients’ of Sciatica.

Table No 1- shows MNCV Latency (ms) of normal and affected side

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Normal Latency</td>
<td>3.152</td>
</tr>
<tr>
<td>Affected Latency</td>
<td>2.975</td>
</tr>
</tbody>
</table>

Figure No 1 – shows comparison of Latency in normal and affected side.

Table No 2 - shows Nerve conduction velocity (m/s) of normal and affected side.

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Normal Velocity</td>
<td>4.7040</td>
</tr>
<tr>
<td>Affected Velocity</td>
<td>4.5744</td>
</tr>
</tbody>
</table>

Figure No 8 – shows comparison of Nerve conduction velocity of normal and affected leg.
Discussion:

This was the comparative study carried out in the department of physiology Mahatma Gandhi Medical College & Hospital Aurangabad. In this study all patients come in OPD & IPD for neurological disorders specially gives complaint related to pain radiating towards leg i.e. sciatica were recruited. Nerve conduction study is an important test used to test the functioning of nerves, especially the ability of conduction of electrical stimulus. NCV studies can acknowledge the degree of demyelination and axonal loss in the segments of nerve examined. Demyelination of a nerve results in prolongation of conduction time (decreased conduction velocity), whereas axonal loss generally leads to the loss of nerve fiber and muscle potential amplitude. The evaluation of electrophysiological study of nerve conduction is assessed by four criteria, i.e., latency and velocity of the evoked response.

In our study, Table 1 shows mean value of latency was significantly decreased in the patients of sciatica as compared to the non affected side.

Similar finding was found in the Nerve conduction assessment revealed gross impairment of conduction velocities, latencies, and amplitude in all the patients consistent with the clinical findings of Hansen's disease[12].

Similar finding was observed in the other studies that, fiber loss in peripheral nerves, affecting predominantly the thick myelinated fibres; changes in inter-nodal length and diameter with demyelinating remyelinating processes [13, 14].

In our study on Sciatic nerve conduction in affected side found that conduction velocity significantly decreases. NCV studies can acknowledge the degree of demyelination and axonal loss in the segments of nerve examined. Demyelination of a nerve results in prolongation of conduction time.

Similar finding was observed in Saeed et al. in their study on sural nerve conduction in healthy subjects found that conduction velocity decreases with advancing age. [15] Asymptomatic neuropathy is common in obese patients independent of glucose control, and impaired distal nerve function. [16]

Conclusion:

In this study we concluded that, this will be helpful for the early detection of demyelination as well as it may be helpful for the detection of nerve injuries in the patient of Sciatica. This also gives normative data and data of the patients suffering from sciatic pain in the marathwada region.

REFERENCES:


