JOURNAL-BASED CME ARTICLE

Sonographic Evaluation of Sciatic Nerves in Patients With Unilateral Sciatica

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Statement of Need

Sciatica is one of the most common complaints in the clinical practice of musculoskeletal medicine with a lifetime incidence varying from 13% to 40%.[1] Especially in patients with low back problems, it is usually considered to stem from irritation of the lumbosacral nerve roots by a herniated disc and thus the imaging protocol (ie, computed tomography or magnetic resonance imaging [MRI]) is usually confined to the low back region.[2,3] Following an extensive literature search of pertinent databases, it is believed that imaging of the sciatic nerve itself has not been performed in patients with sciatica.

Due to its several advantages (wide availability, high spatial resolution, lack of ionizing radiation and easy applicability), ultrasound (US) has proven beneficial in displaying peripheral nerves.[4-8] Further, in entrapment syndromes, it has been reported that the peripheral nerves might undergo swelling on the distal areas as well as the proximal sites or the sites of entrapment.[8-10] Accordingly, it was reasoned that in patients with sciatica, the nerve size would be different than that of normal subjects and that US evaluation of the sciatic nerves might shed light into better understanding the relationship between the pathophysiology and the symptomatology in this group of patients.

This study will evaluate the sciatic nerves of patients with unilateral sciatica by using US and will investigate whether sciatic nerve measurements were related to the pain and symptom duration.

Accreditation Statement

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Educational Objectives

To support the attainment of knowledge, competence, and performance, the learner should be able to achieve the following objectives:

1. Describe the use of ultrasound technology in the assessment of sciatic nerves in patients with unilateral sciatica.
2. Explain how the calculated swelling ratios correlated with symptom duration.
3. Compare the use of ultrasound and MRI technology in the assessment of sciatic nerves in patients with unilateral sciatica.

Planning Committee

Murat Kara, MD; Levent Özçakar, MD; Tülay Tiftik, MD; Bayram Kaymak, MD; Sumru Özel, MD; Selami Akkuş, MD; Ayşen Akıncı, MD; PESG staff.

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This continuing education activity is active starting September 1, 2012 and will expire August 31, 2013.

Estimated Time to Complete This Activity: . . . . . **1.0 hours**

ABSTRACT. Kara M, Özçakar L, Tiftik T, Kaymak B, Özel S, Akkuş S, Akıncı A. Sonographic evaluation of sciatic nerves in patients with unilateral sciatica. Arch Phys Med Rehabil 2012;93:1598-602.

Objectives: To evaluate the sciatic nerves of patients with unilateral sciatica by using an ultrasound, and to determine whether ultrasonographic findings were related to clinical and electrophysiologic parameters.

Design: Cross-sectional study.

Setting: Physical medicine and rehabilitation departments of a university hospital and a rehabilitation hospital.

Participants: Consecutive patients (N=30; 10 men, 20 women) with complaints of low back pain and unilateral sciatica of more than 1 month of duration were enrolled.

Interventions: Not applicable.

Main Outcome Measures: All patients underwent a substantial clinical assessment, and they were also evaluated by electromyogram and magnetic resonance imaging. Pain was evaluated by a visual analog scale and the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Scale. A linear array probe (7.5–12MHz) was used to scan sciatic nerves bilaterally in the prone position. Sciatic nerve diameters—thickness (short axis) and width (long axis)—and cross-sectional areas were measured bilaterally at the same levels, proximal to the bifurcation and midthigh. The values pertaining to the unaffected limbs were taken as controls.

Results: When compared with the unaffected sides, mean values for sciatic nerve measurements—long axis at bifurcation level (P=.017) and cross-sectional area at midthigh level (P=.005)—were significantly larger on the affected sides. Swelling ratios negatively correlated with symptom duration (r=–.394, P=.038) and LANSS scores (r=–.451, P=.016) at only midthigh level.

Conclusions: Sciatic nerves seem to be enlarged on the side of sciatica in patients with low back pain. Our preliminary results may provide insight into better understanding the lower limb radiating pain in this group of patients.

Key Words: Electromyography; Rehabilitation; Sciatica; Ultrasonography.

SCIATICA IS 1 OF THE most common complaints in the clinical practice of musculoskeletal medicine, with a lifetime incidence varying from 13% to 40%.[1] Especially in patients with low back problems, it is usually considered to stem from irritation of the lumbosacral nerve roots by a herniated disk and thus the imaging protocol (ie, computed tomography or magnetic resonance imaging [MRI]) is usually confined to the low back region.[2,3] After an extensive literature search of pertinent databases, we believe that imaging of the sciatic nerve itself has not been performed in patients with sciatica until now.

Because of its several advantages (wide availability, high spatial resolution, lack of ionizing radiation, and easy applicability), ultrasound (US) has recently proven beneficial in displaying peripheral nerves.[4-8] Further, in entrapment syndromes, it has been reported that the peripheral nerves might undergo swelling on the distal areas as well as the proximal sites or the sites of entrapment.[8-10] Accordingly, we reasoned that in patients with sciatica, the nerve size would be different than that of healthy subjects and that US evaluation of the sciatic nerves might shed light into better understanding the relationship between pathophysiology and symptomatology in this group of patients. In this regard, the purpose of our study was 2-fold; first we aimed to evaluate the sciatic nerves of patients with unilateral sciatica by using US, and second, we aimed to discover whether sciatic nerve measurements were related to pain and symptom duration.

METHODS

Thirty consecutive patients referred to the electromyography laboratory (10 men, 20 women) with complaints of low back pain and unilateral sciatica longer than 1 month were enrolled. All patients underwent a substantial medical history taking, physical examination (low back and lower extremity range of motion, straight leg raise test [SLRT], and neurologic [motor, sensory, and deep tendon reflex] evaluations), nerve conduction studies, needle electromyogram (EMG), and MRI. Pain was evaluated by a 10-cm visual analog scale (VAS) and the Turkish version of the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) scale.[11] It has been reported that neuropathic pain is a major contributor to chronic low back pain/sciatica and that the LANSS pain scale (scores 0–24) is a useful instrument to distinguish patients with neuropathic pain from those with nociceptive pain.[12-15] Scores of 12 or higher were considered neuropathic pain.

Patients with any concomitant disease affecting the peripheral nerves (eg, diabetes mellitus, any type of polyneuropathy, entrapment syndromes in the lower limbs, and piriformis syndrome) or patients with previous back surgery were excluded. The procedure was discussed with every subject and each patient signed a written informed consent form. The study protocol was approved by the local ethics committee.

A physiatrist experienced in musculoskeletal US (L.Ö.) performed all the sciatic nerve US evaluations. A linear array probe (7.5–12MHz, Logiq 5[a]) was used to visualize the sciatic nerves on both sides, while patients lied in a prone position. The probe was placed axially on the nerve (perpendicular to its course) and moved in a craniocaudal direction starting from the subgluteal fold to the popliteal fossa. Sciatic nerve diameters (thickness [short axis] and width [long axis]) and cross-sectional area [CSA]) were measured bilaterally by the manual tracking at the same level proximal to the bifurcation and at

List of Abbreviations

CSA	cross-sectional area
EMG	electromyogram
LANSS	Leeds Assessment of Neuropathic Symptoms and Signs
MRI	magnetic resonance imaging
SLRT	straight leg raise test
US	ultrasound
VAS	visual analog scale

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