

Electrodiagnostics

Differential Diagnosis of Foot Drop: A Case Report

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Differential diagnoses of ankle dorsiflexion weakness or foot drop are numerous and may include common fibular mononeuropathy, L5 and/or L4 nerve root lesion, partial sciatic neuropathy, acquired or hereditary peripheral polyneuropathy, central nervous system pathology, cervical or thoracic myelopathy and motor neuron disease.

This case details the subjective and objective clinical exam, electrophysiological testing and interventions for a 54-year-old female with a referring diagnosis of a right foot drop deformity. The clinical exam identified distal, bilateral lower extremity (BLE) weakness and necessitated further evaluation of bilateral upper extremities (BUE) and cranial nerves. Electrophysiological testing, including nerve conduction studies (NCS) and needle electromyography (EMG), demonstrated findings consistent with motor neuron disease (MND) in all muscles tested in BUE, BLE, bilateral low lumbar paravertebral muscles and right tongue.

A neurologist confirmed the presence of MND and determined this disease process was most likely amyotrophic lateral sclerosis. The patient was referred to the Neuromuscular Disease Clinic at a university hospital for further evaluation. Two months following the electrophysiological testing, the patient reported worsening weakness in BLE that had caused her to fall several times. She denied progression of BUE weakness or development of bulbar symptoms but relied on family members for assistance with some activities of daily living.

1. BACKGROUND

Weakness in ankle dorsiflexion, often known as foot drop, is a common condition evaluated in electrodiagnostic laboratories. Differential diagnoses of foot drop are numerous and may include fibular mononeuropathy, L5 and/or L4 nerve root lesion, partial sciatic neuropathy, acquired or hereditary peripheral polyneuropathy, central nervous system pathology, cervical or thoracic myelopathy and motor neuron disease.¹⁻⁴

Evaluation of the patient with foot drop requires a thorough history and clinical exam and may require expansion of the exam to the upper extremity and cranial nerves.¹⁻⁴ Careful consideration of all relevant structures and possible causes of the clinical presentation are critical aspects of the clinical reasoning process, helping the clinician form prioritized diagnostic hypotheses and reducing cognitive bias.^{4, 5} While motor neuron disease is an uncommon cause of foot drop, it is an important differential diagnosis to consider.¹⁻⁴

Nervous system dysfunction is complex and requires critical reasoning that combines both diagnostic and prognostic assessment to enhance patient treatment and outcomes.¹⁻³ This case report will highlight subjective, clinical examination, and electrophysiological testing in a patient initially referred for a right foot drop deformity with a subsequent diagnosis of amyotrophic lateral sclerosis (ALS).

2. CASE REPORT

SUBJECTIVE

A 54-year-old female was referred by her orthopaedic surgeon for electrophysiological testing of bilateral lower extremities (BLE) with a referring diagnosis of “right foot drop”.

The patient reported a history of chronic, intermittent LBP without symptoms in BLE since her early 20’s. Five months prior to the electrophysiological testing, the patient noted an insidious onset of weakness in the right foot and ankle. At that time, she denied any pain, numbness or