

Isolated foot drop due to cerebral infarction: A rare presentation mimicking peroneal neuropathy

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ABSTRACT

Foot drop is a common neurological condition characterized by weakness in dorsiflexion of the foot, often resulting from peripheral nervous system disorders. However, isolated foot drop due to central nervous system lesions is exceedingly rare. This case report described a 52-year-old male with isolated foot drop due to a subacute cerebral infarction. The patient's initial presentation suggested peroneal neuropathy; however, further diagnostic workup, including nerve conduction studies, electromyography, and brain imaging, revealed a cortical infarction in the right frontal parasagittal area. This case emphasized the importance of considering central nervous system causes in cases of isolated foot drop and highlighted the need for timely diagnosis to prevent diagnostic delays.

Keywords: Cortical infarction, foot drop, peripheral neuropathy.

Foot drop is a common neurological condition characterized by weakness in foot dorsiflexion most commonly resulting from peripheral nervous system damage.^[1] It is often associated with peroneal neuropathy, L5 radiculopathy, lumbosacral plexopathy, or sciatic nerve injury and may also be an early sign of amyotrophic lateral sclerosis or hereditary neuropathy.^[2] While typically a manifestation of peripheral nervous system disorders, foot drop can result from central nervous system (CNS) lesions in rare instances.^[3] Isolated foot drop due to stroke, particularly in the absence of other signs of central dysfunction, such as the Babinski sign, paresthesia, ankle clonus, or hyperreflexia, can pose a diagnostic challenge.^[4] In such cases, the clinical presentation may mimic a peripheral nerve injury, leading to potential diagnostic confusion and delays in appropriate treatment.

Stroke, a leading cause of neurological disability, is most commonly ischemic in origin, resulting

from embolism, thrombosis, or small vessel disease. Major risk factors include hypertension, atrial fibrillation, and diabetes. Timely diagnosis is essential, with treatment options such as thrombolysis, thrombectomy, and secondary prevention strategies.^[5]

Herein, we reported a case of isolated foot drop caused by a cortical ischemic stroke, initially resembling a peroneal neuropathy.

CASE REPORT

A 52-year-old male was admitted to the Neuromuscular Department with a sudden onset of left-sided foot drop five days earlier, without any history of trauma. The patient was referred to our neuromuscular department at Ben Aknoun Hospital, Algiers, for electromyography (EMG) and nerve conduction studies (NCSs) to evaluate for possible peroneal nerve injury. The patient's medical history included untreated diabetes

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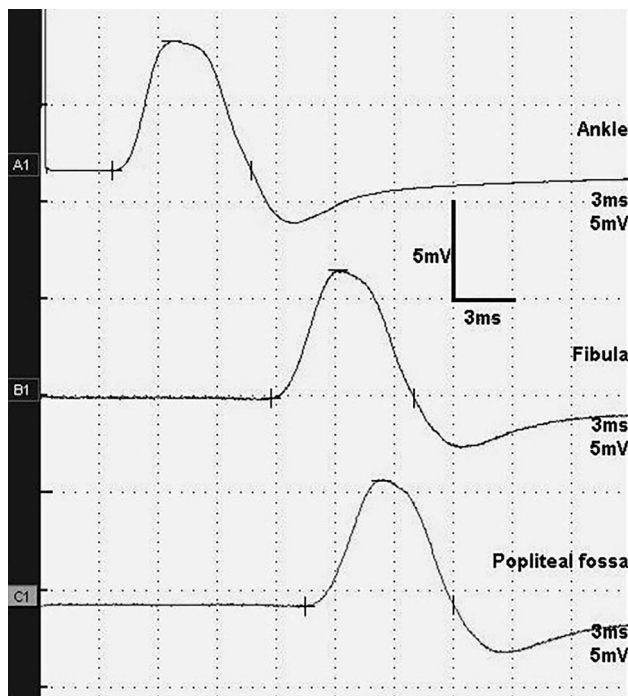


Figure 1. Motor nerve conduction study of the peroneal nerve.

mellitus and well-controlled hypertension. The patient denied any recent trauma and did not experience back pain or sciatica.

On examination, there were no signs of bowel or bladder dysfunction, fever, pain, dizziness, or ataxia. Neurological examination revealed normal cranial nerve function, and muscle strength testing was normal, except for a deficit in dorsiflexion of the left ankle and toes. The patient could walk

on tiptoe but was unable to walk on his left heel. Deep tendon reflexes were weak in the upper and lower limbs, except for the left knee-jerk reflex, which was normal. There were no pathological reflexes, such as Babinski sign. No sensory abnormalities were noted.

The electrophysiological assessment was performed 10 days after symptom onset and showed no abnormalities for the left and right peroneal and tibial motor nerves on NCSs (Figure 1). The sensory action potential amplitude of the sural and peroneal nerves were at the lower limit of normal on both sides (Figure 2). However, there was delayed F-wave latency in both peroneal and tibial nerves (Figure 3), as well as delayed H-reflex latency in the left soleus muscle. Needle EMG performed on the left anterior tibialis muscle showed no spontaneous activity at rest. During voluntary contraction, the number of motor unit action potentials (MUAPs) were reduced, which corresponded to a reduced level of activation. Brain and spinal cord magnetic resonance imaging (MRI) performed two weeks after symptom onset revealed a subacute infraction in the right frontal parasagittal cortical region. No abnormalities were observed in the spinal cord, and no signs of disc herniation or compression were found (Figure 4). Written informed consent for publication was obtained from the patient.

DISCUSSION

Foot drop is commonly caused by peripheral neuropathies, with peroneal neuropathy being the

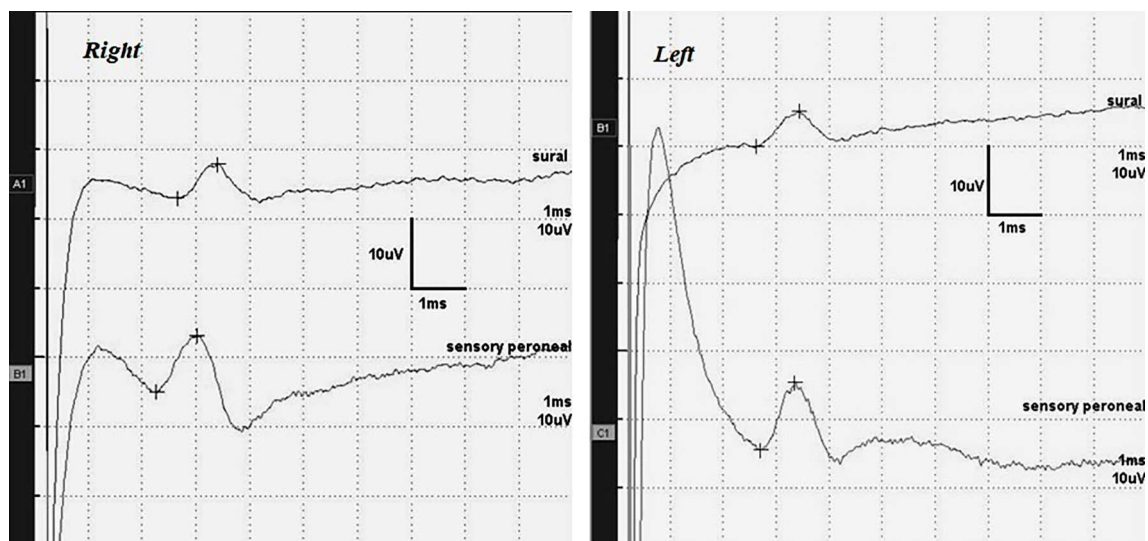


Figure 2. Nerve conduction studies of the left and right sural and superficial peroneal nerves.

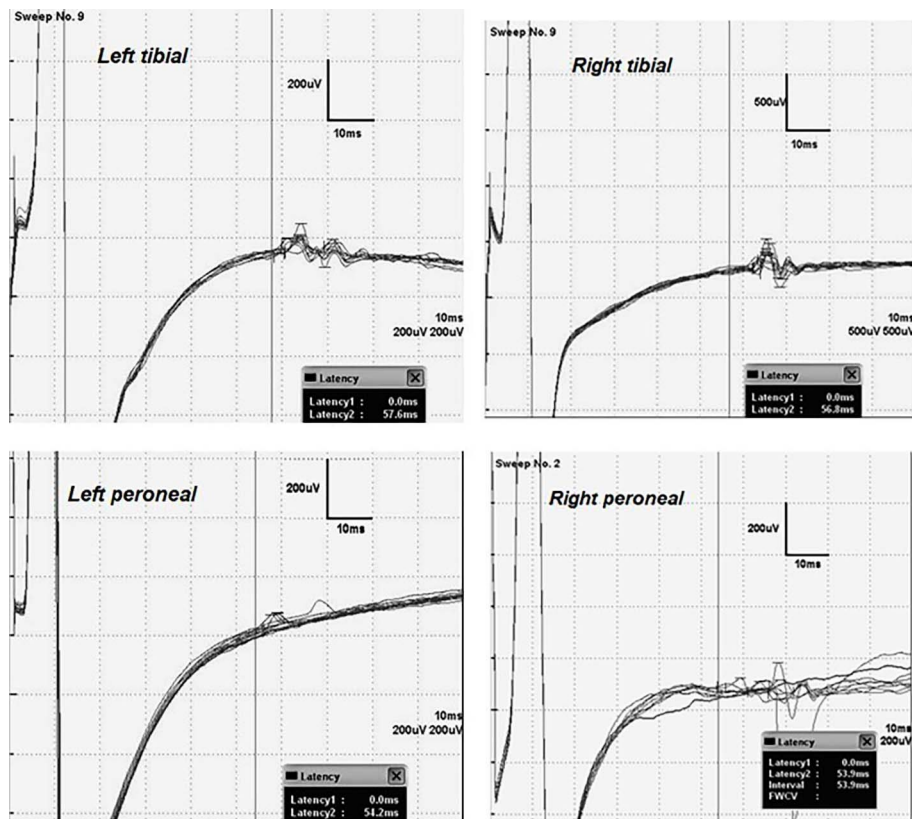


Figure 3. F-wave latency of the left and right tibial (top) and peroneal (bottom) nerves.

most frequent etiology.^[6] Other peripheral causes include L5 radiculopathy, lumbosacral plexopathy, and sciatic nerve injury.^[2] However, isolated foot drop due to CNS involvement, such as stroke, is a rare and underappreciated differential diagnosis.^[7] Central causes of foot drop are often associated

with other signs of CNS involvement, such as Babinski sign, ankle clonus, or hyperreflexia.^[3,8] In this case, the absence of these central signs and the patient's limited presentation of isolated foot drop led to an initial consideration of peripheral causes, such as peroneal neuropathy.

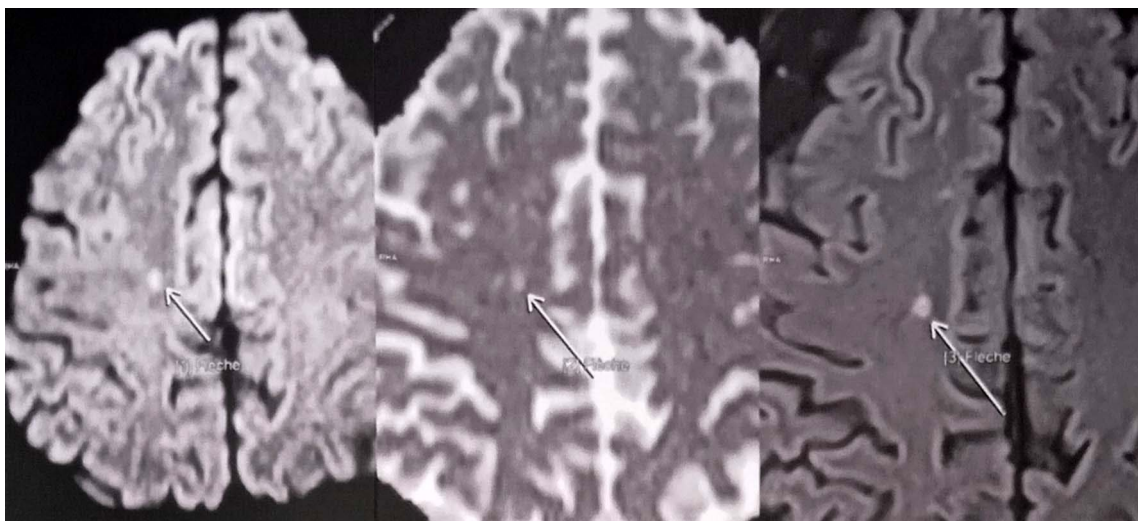


Figure 4. Brain MRI with and without contrast showing right frontal parasagittal cortical infarction (arrow). MRI: Magnetic resonance imaging.

Our patient's clinical presentation was unusual, as he exhibited no signs of a central lesion. This is an extremely rare case.^[9] In addition, his reflexes were weak in the upper and lower limbs, suggesting a potential peripheral neuropathy and the delayed F-wave and H-reflex latencies on NCSs, coupled with the patient's longstanding untreated diabetes mellitus, suggested a possible peripheral neuropathy secondary to diabetes. However, this did not explain the isolated foot drop.^[10] The normal amplitude of the left motor peroneal nerve responses to both distal and proximal stimulation, recorded 10 days after symptom onset, effectively rules out a significant axonal lesion or conduction block.^[11]

Electromyography showed a reduced number of MUAPs with reduced activation levels, while MUAP morphology remained normal. These findings are indirect indicators of a central lesion, as previously described by Yan et al.^[12] This prompted us to perform a brain MRI, which revealed a subacute cortical infarction in the right frontal parasagittal area. This infarction corresponded to the motor cortical somatotopy of the foot and toes, as previously established by Penfield and Boldrey,^[13] and further confirmed by more studies.^[14,15] The infarct likely disrupted motor control of the foot and toes, leading to the isolated foot drop.

This case underscored the importance of careful neurological examination and EMG/NCS tests for evaluating foot drop to avoid misdiagnosis. A needle EMG may reveal indirect electrophysiological evidence suggestive of a central lesion. In such instances, brain MRI should be considered to confirm central nervous system involvement.

In conclusion, foot drop is a common clinical presentation, most often caused by peripheral nerve disorders. However, central causes, although rare, must also be considered even in the absence of overt central neurological signs. This case highlighted the diagnostic challenges posed by isolated foot drop due to a cortical infarction and emphasized the need for careful clinical and EMG/NCS assessment, including imaging studies, to ensure timely and accurate diagnosis and management.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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