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CASE REPORT

Peroneal Nerve Entrapment Neuropathy in a Patient With Right Hemiplegia Due to Posttraumatic Subdural Hematoma

ABSTRACT

Peroneal nerve injury develops as a result of trauma or mechanical or postural compression of the nerve at the fibular head. It frequently occurs due to trauma; however, tumor, intraneural ganglion, hematoma, cyst, or iatrogenic causes also play a role in its etiology. In the differential diagnosis of peroneal nerve involvement, which can lead to weakness in foot dorsiflexion, L5 radiculopathy, lumbosacral plexus lesion, partial lesions of the sciatic nerve, and motor neuron disease should be considered. In peroneal nerve entrapment neuropathy, the inversion of the foot is normal because the tibialis posterior muscle, which provides inversion of the foot, is innervated by the tibial nerve. In the differential diagnosis, examination and imaging methods such as direct radiographs, EMG, and MRI should be used in addition to clinical examination. In this article, we present peroneal entrapment neuropathy detected simultaneously in a right hemiplegic patient with a diagnosis of subdural hematoma after a vehicular traffic accident. In immobilized patients with loss of consciousness, prolonged intubation, and intensive care unit hospitalization, entrapment of peripheral nerves due to external compression may be observed. When planning our diagnostic and treatment algorithm, personal habits and possible etiologic factors should be evaluated together.

Keywords: Entrapment neuropathy, EMG, foot drop, peroneal nerve injury

Peroneal nerve injury is commonly seen as a result of surgical interventions, trauma, or postural compression of the nerve at the fibular head. Peroneal nerve injury due to tumor, intraneural ganglion, hematoma, cyst, or iatrogenic causes is rarely observed. The peroneal nerve is the most commonly injured peripheral nerve in trauma-related lower extremity injuries (1-3). The peroneal nerve separates from the sciatic nerve in the popliteal fossa and passes over the lateral head of the gastrocnemius muscle on the outer side of the fossa (4-6). The nerve, which runs very superficially around the fibular head below the knee, is protected only by skin and superficial fascia (6, 7). Here, it passes through a fascial fibrous arch surrounded by the peroneus longus muscle and intermuscular septum (2, 7). The peroneal nerve is most commonly injured in this 4 cm superficial course or compressed when the fibrous arch thickens and narrows the tunnel through which the nerve passes (4, 7). This fibrous arch causes dynamic-type compression during sportive activities and postural-type compression in positional situations such as squatting or crossing the legs (4). Traction and compression neuropathies play an important role in pathophysiology and cause ischemia in the nerve together or alone. Ischemia causes conduction blocks in the nerve. The duration and magnitude of traction and compression are directly related to the occurrence of nerve damage. Compression causes anoxic injury, which leads to increased permeability, increasing pressure in the fluid inside the fascicles. Prolonged pressure increase can lead to ischemia, protein breakdown, demyelination, and then irreversible fibrosis (4, 6).

L5 radiculopathy, lumbosacral plexus lesion, partial lesions of the sciatic nerve, and motor neuron disease should be considered in the differential diagnosis of peroneal nerve involvement, which may lead to weakness in foot dorsiflexion (5). In peroneal nerve entrapment neuropathy, inversion of the foot is normal because the tibialis posterior muscle that provides inversion of the foot is not innervated by the peroneal nerve. This helps to make a differential diagnosis between peroneal nerve palsy and sciatic nerve or lumbosacral root lesions. Since the peroneal nerve is more frequently and severely involved in sciatic

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nerve lesions than the tibial nerve, these lesions present with peroneal nerve signs. Absence of patella reflex, weakness and atrophy of hamstring and calf muscles, or loss of sensation in the sole of the foot are related to sciatic nerve involvement. Motor neuron disease is differentiated from peroneal neuropathy by the presence of fasciculations suggestive of upper motor neuron disease and preservation of sensation. When the common peroneal nerve is compressed, clinical features of both the deep and superficial peroneal nerve will be present. In the differential diagnosis, examination and imaging methods such as direct radiographs, EMG, and MRI should be used in addition to clinical examination (1, 3).

In this report, we present peroneal entrapment neuropathy detected simultaneously in a right hemiplegic patient with a diagnosis of subdural hematoma after a vehicular traffic accident.

CASE

On September 21, 2023, the patient was admitted to the intensive care unit for three weeks with a diagnosis of subdural hematoma following a vehicular traffic accident and was intubated and unconscious for two weeks. At the end of three weeks, when the patient was taken to the ward, a low foot on the right was noticed. After one week of hospitalization in the ward, the patient was discharged. Cranial MRI revealed a 2.5 mm subdural hematoma in the left frontoparietotemporal region. The patient had a 5 cm incision superior to the right knee and a 2 cm incision medial to the cruris. The incisions were primarily sutured by orthopedics. Neurologic examination could not be performed because the patient was intubated.

The patient was admitted to our service for rehabilitation in November 2023. Neurologic examination revealed that right lower extremity muscle strength was 3/5 in ankle dorsiflexors and big toe dorsiflexors and 5/5 in other muscles. No motor deficit was found in the left lower extremity. Patella and Achilles reflexes could not be obtained on the right. No pathologic reflex was found. In the right lower extremity, deep sensation was normal and superficial tactile deficit was observed. There were scars of post-traumatic fall-related wounds in the right knee region.

As a result of the ENMG examination performed for the peroneal nerve because of trauma in the knee region: In the electroneuromyographic study, there was found a moderate reduction in fibular CMAP amplitudes (ankle, below the lateral popliteal fossa or fibular head) of the peroneal nerve and nerve conduction velocity between the popliteal fossa and fibular head. The other side peroneal nerve CMAP amplitudes were normal. Needle ENMG was not performed because the patient did not give consent. Both tibial nerve CMAP and sural nerve sensory amplitudes and velocities were normal.

CONCLUSION

In immobilized patients with loss of consciousness, prolonged intubation, and intensive care unit hospitalization, entrapment of peripheral nerves may be observed due to external compression. In this case, the cause of peroneal nerve injury was thought to be external compression due to trauma or incorrect positioning. Peroneal nerve entrapment neuropathies should be kept in mind in cases of low foot due to central causes, especially if trauma is present. Personal habits and possible etiologic factors should be considered together when planning our diagnostic and treatment algorithm.

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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