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Peroneal neuropathy by a metal material after internal fixation operation: A case report

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Introduction

The common peroneal nerve derives from the sciatic nerve which origins from the posterior divisions of the L4, L5, S1, and S2 nerve roots. The sciatic nerve bifurcates into the tibial nerve and the common peroneal nerve at the posterior lower thigh, and the latter passes around the neck of the fibula, finally terminating by dividing into the superficial peroneal nerve and the deep peroneal nerve. Common peroneal neuropathy is frequently caused by the direct structural injury of itself, for instance, due to fracture of the fibula or external compression of the nerve under the condition such as applying tight cast. In addition, autoimmune diseases or some genetic disorders can also lead to common peroneal neuropathy. We present a case of common peroneal neuropathy caused by a metal material after the internal fixation operation.

Case Report

A 23-year-old female, without any underlying disease except for the history of coronavirus disease 2019 infection about 6 months ago, visited the emergency medical center because of bilateral knee pain after a car accident. At the time of arrival, there was no sensory deficit and her muscle strength of bilateral lower extremities was intact. Computed tomography showed fractures of the left proximal tibia and the head of the fibula. She was admitted to the department of the orthopedic surgery and open reduction and internal fixation operation was done for tibial fracture (Figure). After the operation, numbness of the medial side of the left foot and the motor weakness about 1/5 Medical Research Council (MRC) grade of left foot dorsiflexion and big toe extension was newly developed. Electrodiagnostic examination was done about 3 weeks after the operation and it showed an incomplete lesion of left common peroneal nerve at or around knee level (Table). The patient undergone the rehabilitation therapy including left ankle and toe strengthening exercise, electrical stimulation therapy, and physical modalities for pain on the lower extremities, with oral steroid medication for 2 weeks. After 6 months from the initial injury, muscle strength of the left foot dorsiflexor improved to 3/5 MRC grade and the residual pain was mostly subsided.

Motor NCS			
Nerve / Sites	Latency ms	P-P Amp mV	Velocity m/s
R Peroneal - EDB			
Ankle	3.15	9.95	
Knee	8.58	8.61	47.82
Popliteal fossa	10.40	8.47	55.17
L Peroneal – EDB			
Ankle			No response
Knee			
Popliteal fossa			
R Tibial - AH			
Ankle	3.56	27.77	
Knee	10.60	22.33	47.57
L Tibial - AH			
Ankle	4.10	26.33	
Knee	11.29	22.53	46.61
R Peroneal – TA			
Fibular head	2.42	13.74	
Popliteal fossa	4.06	13.71	60.76
L Peroneal – TA			
Fibular head	2.52	3.39	
Popliteal fossa	4.42	2.98	52.75

Sensory NCS		
Nerve	Latency ms	P-P Amp μV
R Sural		
	1.72	23.2
L Sural		
	1.82	22.1
R Superficial peroneal		
	2.40	13.0
L Superficial peroneal		
	2.24	6.6

Table. Electrodiagnostic examination result shows incomplete lesion of the left common peroneal nerve at or around knee level.

EMG Summary Table								
	Spontaneous				MUAP			Interference
Muscle	IA	Fib	PSW	Fasc	Amp	Dur.	PPP	Pattern
L. Tibialis anterior	N	None	1+	None	N	N	N	No activity
L. Peroneus longus	N	1+	2+	None	N	N	N	Partial
L. Extensor hallucis longus	N	None	1+	None	N	N	N	No activity
L. Gastrocnemius (Medial head)	N	None	None	None	N	N	N	Complete
L. Vastus medialis	N	None	None	None	N	N	N	Complete
L. Biceps femoris (short head)	N	None	None	None	N	N	N	Complete
L. Gluteus maximus	N	None	None	None	N	N	N	Complete

Figure. The plain radiograph taken after open reduction and internal fixation operation of the left tibia.

Conclusions

We report a case of common peroneal neuropathy after the surgical treatment. Despite there was no evidence of nerve injury at the very first, the patient finally diagnosed with peroneal neuropathy by the electrodiagnostic examination. Through this case, we suggest that physicians should keep in mind that any conditions which a nerve can be physically affected can lead to a neuropathy, even if it is an uncommon situation, and should progress on early workup and proper evaluation.