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A case of Soleal Sling Syndrome Initially Misdiagnosed as Complex Regional Pain Syndrome

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CASE REPORT

A 37-year-old woman presented with a 4-month history of stabbing pain involving the right posterior calf and great toe. Initial evaluations at another institution suggested right L5–S1 radiculopathy and L4–5 herniated nucleus pulposus, and a single nerve block was performed without clinical improvement. Due to persistent symptoms, the patient visited department of orthopedic surgery outpatient. On physical examination, she presented with intermittent pain at the posterior aspect of the knee, accompanied by intermittent skin color changes and a tight sensation. Furthermore, compression of the posterior aspect of the knee provoked sharp pain radiating to the great toe. Magnetic resonance imaging(MRI) on lower leg revealed edema-like signal changes in the posterior compartment muscles, including the gastrocnemius and soleus. Duplex ultrasonography of the lower extremities showed no evidence of deep vein thrombosis(DVT) or varicose veins. Based on clinical suspicion of complex regional pain syndrome(CRPS), she was transferred to the Department of Rehabilitation Medicine for further evaluation. However, a three-phase bone scan demonstrated no abnormal uptake.

Despite normal findings on the three-phase bone scan, CRPS was clinically suspected. Oral prednisolone (Solondo®, 30 mg once daily for 3 days, followed by 20 mg once daily for 3 days and 10 mg once daily for 3 days) was administered, resulting in approximately 70% pain reduction; however, symptoms recurred immediately after completion of therapy. Follow-up electromyography showed partial axonotmesis of the right L5 nerve root. Reduced recruitment was noted on needle electromyography in the tibialis anterior and peroneus longus muscles, and soleus nerve conduction studies were within normal limits. These findings showed poor correlation with the patient's clinical presentation. Given the possibility of focal nerve entrapment, needling of the soleus muscle was performed, and reduced recruitment was observed. Further evaluation with Dynamic Doppler ultrasonography revealed focal compression of the tibial nerve at the soleal arcade during calf flexion, confirming the diagnosis of soleal sling syndrome. For conservative management, a local steroid injection with dexamethasone (Dexamethasone®, 5 mg, single injection) and triamcinolone (Triamcinolone®, 40 mg, single injection) was performed but failed to provide clinical benefit. Oral medications, including gabapentin, tramadol/acetaminophen, celecoxib and naftazone, resulted in temporary symptom relief. Surgical decompression of the tibial nerve was therefore performed. Postoperatively, the Tinel's sign resolved and the pain intensity decreased from NRS 10 to 4.

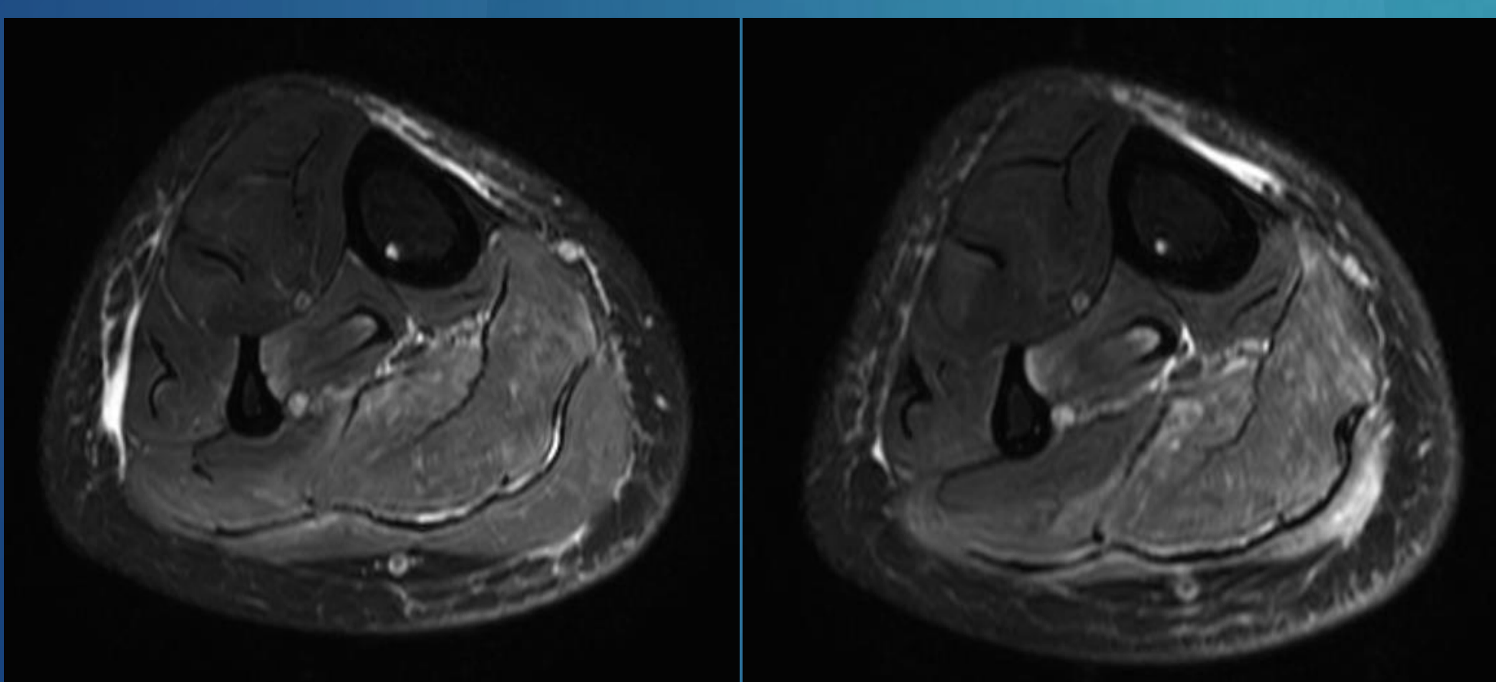

Figure 1.
Axial T2-weighted MRI of right lower extremity(enhance). T2-weighted water-sensitive image shows diffuse feathery edema-like signal changes and perifascial edema in the posterior compartment muscles (soleus and gastrocnemius)

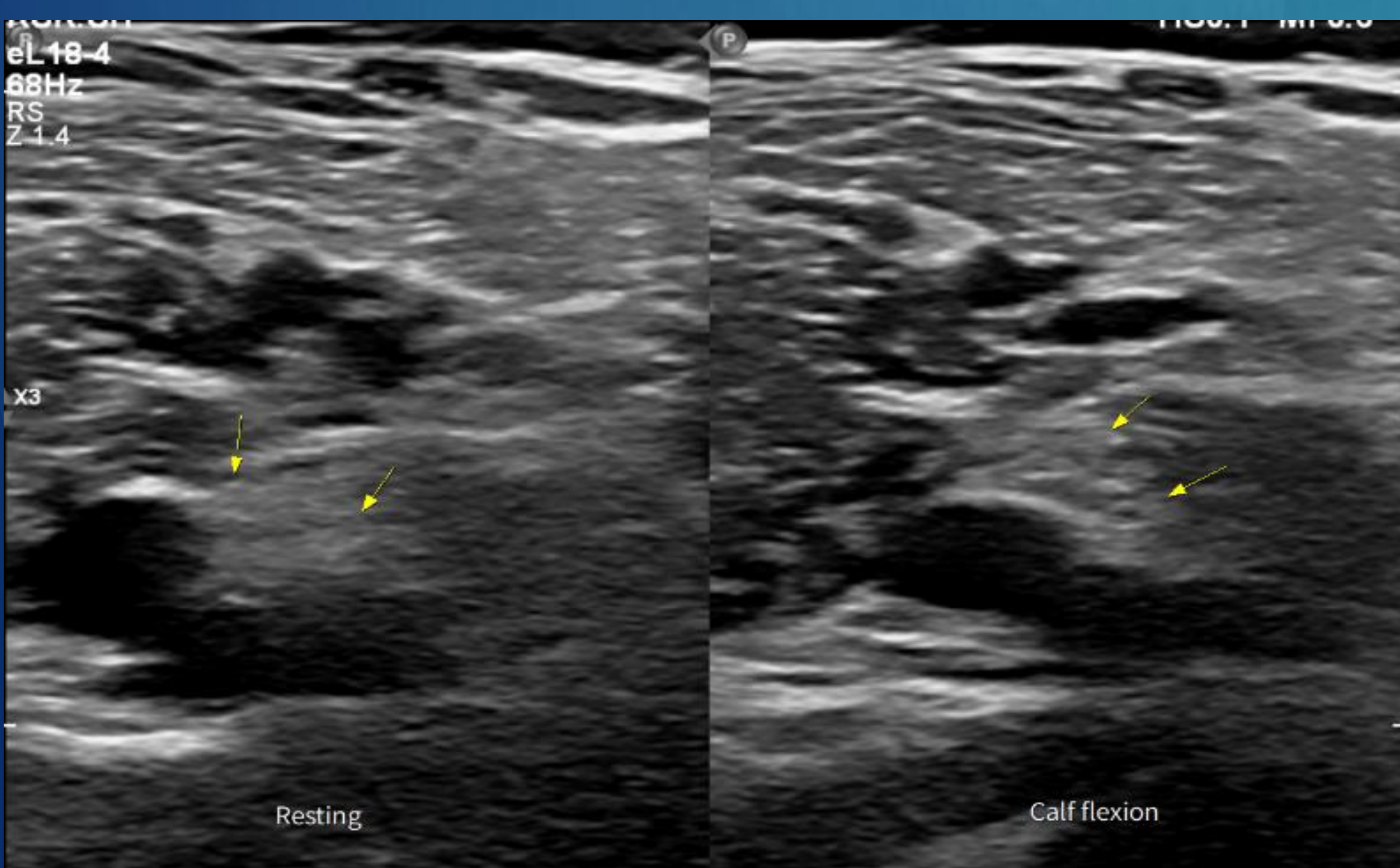

Figure 2. Dynamic doppler ultrasonography of the right lower extrimities. During calf muscle flexion, dynamic focal constriction of the tibial nerve caused by the soleal arcade and vascular structures.

EMG Summary Table												
	Insertional	Spontaneous Activity			Volitional MUAPs					Maximum Volitional Activity		
	Insertional	Fibs	+ Wave	Fasc	Duration	Ampli-tude	Poly	Con-fig	Recruit-ment	Ampli-tude	Pattern	Effort
Tibialis anterior	WNL	-	-	-	WNL	WNL	WNL	WNL	WNL	WNL	Redu-ced	Max
Peroneus longus	WNL	2+	2+	-	WNL	WNL	WNL	WNL	WNL	WNL	Redu-ced	Max
Gastroc-nemius (Medial head)	WNL	-	-	-	WNL	WNL	WNL	WNL	WNL	WNL	R/C	Max
Tensor fasciae latae	WNL	-	-	-	WNL	WNL	WNL	WNL	WNL	WNL	R/C	Max
Soleus	WNL	2+	2+	-								

Table 1. Needle electromyography demonstrated a few abnormal spontaneous activities in the peroneus longus and soleus muscles, as well as reduced recruitment in the peroneus longus and tibialis anterior muscles.