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Acute Cervical Nerve Root Injury after Anterior Scalene Muscle Massage: A Case Report

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INTRODUCTION

Cervical nerve root injury, a type of brachial plexus injury, is a neurological condition frequently leading to significant physical disability, psychologic distress and socioeconomic hardship. The common causes of injury include traffic accidents, penetrating injuries, birth injuries and falls. Deep tissue massage (DTM) is a form of therapeutic massage therapy, and it is often used to treat musculoskeletal pain. We report uncommon case of cervical nerve root injury that developed after DTM of the anterior scalene muscle (ASM).

CASE

A 47-year-old Asian woman visited our clinic with complaints of unilateral paralysis and radiating pain in the left shoulder that occurred after a 3-minute DTM of the ASM. She had no past history of chronic diseases or medication use; she was 154 cm tall and weighed 41 kg. The patient experienced contralateral right side shoulder pain one month prior to visiting our clinic and visited the musculoskeletal pain clinic. She was diagnosed with myofascial pain syndrome and underwent bilateral scalene muscle massage. After a 3-minute DTM in the left ASM, sudden radiating pain and shoulder, elbow and wrist weakness occurred. Manual muscle test was performed and revealed grade 2 weakness of left shoulder abduction, elbow flexion and grade 3 weakness of wrist extension (2, active movement with gravity eliminated; 3, active full movement against gravity, but not resistance); other motor grades showed absence of weakness. She presented with radiating pain and paresthesia along the cervical 5 and 6 (C5 and C6) dermatome. The deep tendon reflexes of the left biceps brachii and brachioradialis tendons showed hyporeflexia. Spurling tests showed negative results and there was no evidence of upper neuron signs, such as Babinski's and Hoffman's sign. Cervical spine magnetic resonance imaging (MRI) was performed and showed a non-symptomatic right-sided mild subarticular protrusion in the C5-6 disc without nerve compression. Definite lesion related to the left side weakness and pain was not revealed (Figure 1). Four weeks after symptom onset, nerve conduction studies (NCS) and electromyography (EMG) were performed. On needle EMG, the muscles innervated by left C5 and C6 nerve roots including the flexor carpi radialis, extensor carpi radials, biceps, deltoid, and infraspinatus showed fibrillation potentials, positive sharp waves and reduced recruitment. The motor NCS showed a decreased (less than 40%) amplitude at the left axillary nerve (deltoid recording) and left musculocutaneous nerve (biceps recording) compared with that at the right side (Table 1). The patient was diagnosed with acute left C5 and C6 nerve root injury and underwent ultrasound-guided C5 and C6 selective nerve root block with 0.25% lidocaine and 20mg dexamethasone. She regularly participated in a rehabilitation program biweekly and a home exercise program. After a 6 month follow-up, the patient's shoulder and wrist strength had recovered to almost normal levels, and the electrodiagnostic findings had improved.

Table 1. Baseline Nerve Conduction Study

Nerve	Latency (ms) / (NL)	Amplitude (mV) / (NL)	Velocity (m/s)
Motor			
Left axillary	3	**17.2**	
Right axillary	3.1	26.5	
Left musculocutaneous	3.5	**16.9**	
Right musculocutaneous	3.5	24	
Sensory			
Left median	2.7 (≤ 4.4)	93.3 (≥ 20)	51.9
Left ulnar	2.8 (≤ 3.1)	81.3 (≥ 17)	49.1
Left radial	2.5 (≤ 2.9)	53.5 (≥ 15)	56

Note: All sensory and mixed latencies are regarded as peak latencies. All sensory and mixed nerve conduction velocities were calculated using onset latencies.
Abbreviations: NL, normal.

Table 2. Baseline Needle Electromyography

	Abnormal spontaneous activity		Voluntary MUAP	
Muscle	Fibs	PSWs	Ampulitude	Recruitment
Lt. FCR	**3+**	**1+**	N	**Reduced**
Lt. ECR	0	**2+**	N	N
Lt. BB	0	**2+**	N	N
Lt. DELTOID	0	**1+**	N	**Reduced**
Lt. IS	**2+**	**2+**	N	**Discrete**
Lt. SA	0	0	N	N
Lt. C5 PS	0	0	**1+**	**Discrete**
Lt. C6 PS	0	0	**1+**	**Reduced**

Abbreviations: MUAP, Motor unit action potential; Fibs, fibrillation potentials; PSWs, positive sharp waves, LT, left; APB, abductor pollicis brevis; ADM, abductor digiti minimi; EP, Erb's point; FCR, flexor carpiradialis; ECR, extensor carpi radialis; BB, biceps brachii; IS, infraspinatus; SA, serratus anterior; PS, paraspinalis.

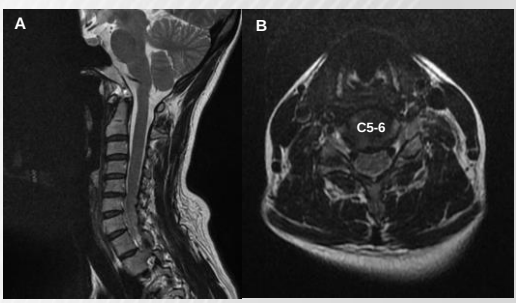

Figure 1. Spine MRI : Sagittal T2 weighted image (A); Axial T2 image (B) at C5-6 level showing right-sided mild subarticular protrusion.

CONCLUSION

This is the case report on cervical nerve root injury associated with anterior scalene DTM. DTM of the ASM should be carefully performed to avoid cervical nerve root injury , especially when performed in underweight women.