A CASE OF NEUROGENIC THORACIC OUTLET SYNDROME ACCOMPANIED BY ARTERIAL THORACIC OUTLET SYNDROME

Kyoung Min Kwon¹, Yeo Hyung Kim¹, Jung Soo Lee¹

¹Department of Rehabilitation Medicine, College of Medicine, The Catholic University of Korea - Uijeongbu, Gyeonggi-do, Republic of Korea

Introduction: Among three main entities of thoracic outlet syndrome (TOS), the most common type is neurogenic TOS (nTOS). Venous and arterial TOS (aTOS) are rare. We report a case of nTOS, accompanied by aTOS, and compartment syndrome in forearm caused by ischemia resulting from thromboembolism.

Case report: A 25-year-old man complained of left arm tingling sensation, and after several days grip power weakness, swelling, and cold sensation in left hand developed abruptly. Computed tomography scan and plain radiography of chest showed cervical rib (Fig.1). Subclavian angiography revealed delayed blood flow in subclavian artery, and occlusion of brachial artery. After direct thrombolysis, brachial artery was recanalized, but radial artery was still occluded. Symptoms persisted, and severe swelling developed in forearm, which were suspicious findings of compartment syndrome. Emergency fasciotomy was performed, revealing diffuse hematoma. Weakness persisted, and he was referred to electrodiagnostic (EDX) laboratory 4 months after the onset of symptoms. Sensory nerve action potential (SNAP) was not evoked in median and ulnar nerves. Decreased amplitudes of SNAPs in superficial radial and medial antebrachial cutaneous nerves were shown. Compound motor action potential (CMAP) showed no response in median nerve, and small amplitudes in ulnar and radial nerves (Table 1). Needle EMG showed abnormal spontaneous activities at rest in forearm and hand muscles innervated by ulnar, median, and radial nerves (Table 2). The results indicated left brachial plexopathy involving lower trunk, and median and radial neuropathy around forearm, combined with compartment syndrome.

One month after, he had left cervical rib excision and regular rehabilitation program. At 6 weeks and 5 months after cervical rib excision, follow-up EDX studies and motor functions showed improved status.

Discussion: Symptoms of nTOS include pain, paresthesia, and weakness in affected upper limb. aTOS can lead to upper limb ischemic symptoms. Our case presents the clinical features of aTOS and nTOS and functional improvement through optimal intervention.

Nerve	Stimulation site	Right			Left		
		LAT (ms)	AMP	CV (m/s)	LAT (ms)	AMP	CV (m/s)
Sensory							
Median	Wrist	3.00	51.8		Not evoked		
Ulnar	Wrist	2.80	50.3		Not evoked		
Superficial radial	Forearm	2.05	53.7		2.10	3.3	
Med. Antebrachial Cutaneous	Forearm	1.95	9.8		2.00	3.5	
Motor							
Median (recording on APB)	Wrist	3.60	11.3		Not evoked		
	Elbow	7.40	10.3	60.5	Not evoked		
Ulnar (recording on ADM)	Wrist	2.35	7.5		3.60	3.1	
	Below Elbow	6.00	7.3	64.4	7.95	3.1	50.6
Radial (recording on EIP)	Wrist	1.65	4.4		3.45	1.1	
	Elbow	4.30	3.8	60.4	6.05	0.9	59.6
	Spiral groove	6.35	3.6	65.9	8.00	0.8	61.5

LAT, latency (sensory, peak latency; motor, onset latency); AMP, amplitude (sensory, μ V; motor, mV); CV, conduction velocity; APB, abductor pollicis brevis; ADM, abductor digiti minimi; EIP, extensor indicis proprius

Table 1. Results of the nerve conduction study

	Spontaneous			MUAP	Interference Pattern
	IA	Fib	PSW		
L. C5-T1 PARASPINALIS	N	None	None		
L. DELTOID	N	None	None	Normal	Full
L. BICEPS	N	None	None	Normal	Full
L. TRICEPS	N	None	None	Normal	Full
L. EXT CARPI R BREV	N	None	None	Normal	Reduced
L. EXT DIG COMM	N	None	2+	Normal	Discrete
L. EXT INDICIS	N	None	1+	Normal	Reduced
L. FLEX CARPI ULN	Inc.	None	None	Normal	Reduced
L. FLEX DIG PROF IV-V	N	None	2+	Normal	Reduced
L. ABD DIG MIN (UL)	N	None	2+	Normal	Discrete
L. FIRST D INTEROSS	N	2+	4+	Normal	Discrete
L. FLEX CARPI RAD	Inc.	None	None	Normal	Reduced
L. FLEX DIG PROF II-III	N	None	2+	Normal	Reduced
L. ABD POLL BREVIS	N	2+	3+	Normal	No MUAP

PSW, positive sharp wave; Fib, fibrillation potential; MUAP, motor unit action potential.

Table 2. Results of the needle electromyography

Figure 1. Cervical rib shown on chest x-ray