Idiopathic Brachial Neuritis with Distal Involvement: A Case Report

Distal Tutulumlu İdiopatik Brakial Nörit: Olgu Sunumu

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ABSTRACT

Brachial neuritis is a rare disease with unknown etiology characterized by pain and muscle weakness especially around shoulder region. This case is presented due to presence of distal muscle weakness, and absence of clinical and electrophysiological sensory loss.

Keywords: Brachial neuritis, electroneuromyography, shoulder pain, rehabilitation

ÖZET

Brakial nörit daha çok omuz çevresinde ağrı ve kas güçsüzlüğü ile karakterize olan etiyolojisi belli olmayan nadir görülen bir hastalıkdır. Distal kas güçsüzlüğünün olması , klinik ve elektrofizyolojik duyu bozukluğunun olmaması nedeni ile bir olgu literatür eşliğinde tartışıldı.

Anahtar sözcükler: Brakial nörit, elektronöromiyografi, omuz ağrısı, rehabilitasyon

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Introduction

Brachial neuritis is also known as neuralgic amyotrophy, Parsonage-Turner syndrome, acute brachial plexitis. It was firstly defined at the end of 19th century. It is a rare disease characterized by neuropathic pain at upper extremities followed by patchy motor loss. Although some viral diseases, vaccination, trauma, surgery and autoimmune disease are considered as possible causes of the disease, the exact etiology remains unknown. Brachial neuritis is a rare disease which has 2-4/100.000/ year incidence. It is mostly seen in 3rd and 7th decades. Males are affected more frequently than females (1,2). Disease has two forms: autosomal dominant hereditary form and idiopatic form (3,4). The clinical features of the disease are severe unilateral acute onset shoulder pain, and the radiation of pain to arm and neck. Following 1-15 days of painful period, the pain resolves slowly, and paresis and atrophy of muscles which are innervated by nerves belong to brachial plexus occur. It may appear as multiple mononeuropathy, plexopathy or mononeuropathy around brachial plexus (5).The most common affected nerves are axillary nerve, suprascapular nerve, long thorasic nerve and musculocutaneous nerve. Especially weakness on proximal shoulder muscles can be observed, however, reducing of muscle strenght on upper extremity distal muscles rarely can accompany with the clinical signs (4,9,11).

In this case report, a case with idiopathic brachial neuritis, a rare disease, presented with significant motor loss in distal muscle group of arm, and without clinical and electrophysiological sensory loss.

Case Report

Sixty-nine years old man patient consulted to our outpatient clinics with the symptom of sudden onset of severe right shoulder pain radiating to arm and these symptoms has been for 4 months. The patient noticed weakness at his right hand and fingers one week after the onset of pain.

Our case was describing the shoulder pain as burning severe ache woken up the patient in the nights and the pain was increasing with shoulder motions. Shoulder pain continued approximately one week and patient used paracetamol and NSAI in this period. Reducing muscle strenght in right hand and fingers accompanied with gradual decrease in shoulder pain. In his physical examination, he was concious, cooperated, the vital signs were normal, the examination of respiratory, cardiovasculer systems and abdomen were normal. In musculoskeletal system examination of both lower extremities and left upper extremity, no pathological findings were detected. The movements of neck were fully opened and painless, no paravertebral muscle spasm was detected. Remarkable interosseos atrophies at right hand was present (Figure 1A-B). In motor examination of left upper limbs and both of lower extremities, all of the muscle groups have normal muscle strength. At the right side, the muscle strengths of shoulder abduction and flexion, elbow flexion and extension, wrist extension, finger extension were 5/5, 4/5, 3/5 and 2/5, respectively. Both of the right wrist and finger flexor muscle strenghts were 5/5. The sensory examination was normal. The triceps, biceps and brachioradialis deep tendon reflexes were hypoactive at rigth side. No pathologic reflex was present. In labratory examination, complete blood count, routine biochemical tests, C-reactive protein, erythrocyte sedimentation rate, urine sample tests and chest X-ray graphy were normal.

Ultrasonographic examination of shoulder joint revealed no pathological finding. Mild degenerative changes were detected on servical X-ray graphy, and then the magnetic resonance imaging (MRI) of servical spine and brachial plexus were performed. There were no significant compressions on spinal cord and nerve roots at servical MRI (Figure 2). However, the right brachial plexus MRI at STIR (Short TI Inversion Recovery) sequence revealed thickening and increased intansity of brachial plexus at middle trunk level (Figure 3,4).

Electrophysiological examination was made using Medtronic Keypoint 4C Electromyography (EMG) in constant room temperature at 22ºC. Stimulus time was 0,1 millisecond and frequency was 1Hz for sensory and motor conduction studies. Sweep rate was set up as 2 msn/division for sensory conduction studies and

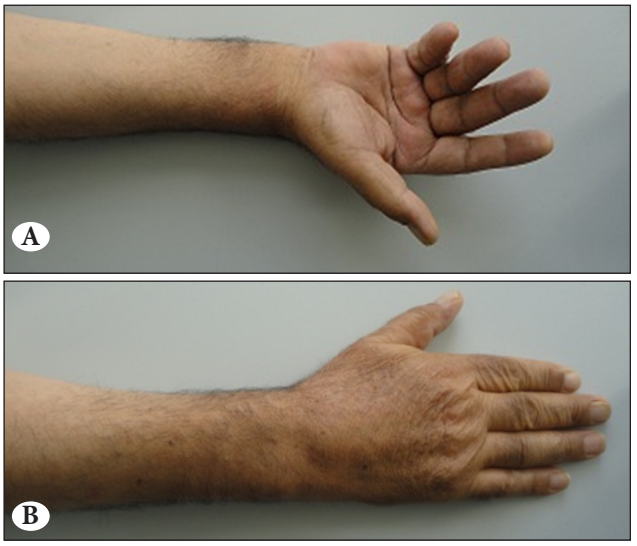

Figure 1. (A) Spontaneous position of right hand, (B) Interosseos atrophies at the right hand.

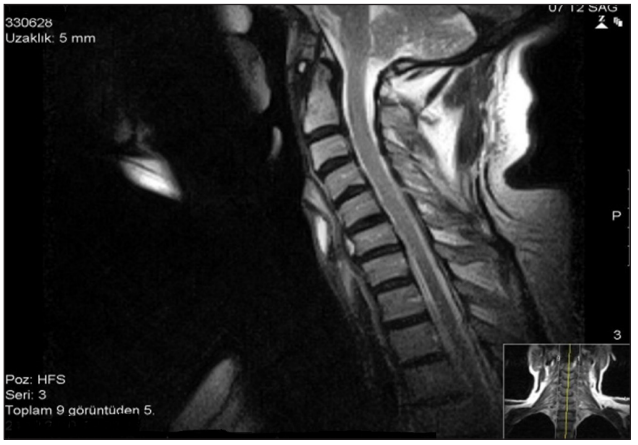

Figure 2. There was no distinct compression on spinal cord in sagital plane of T2-weighted sequence MRI.

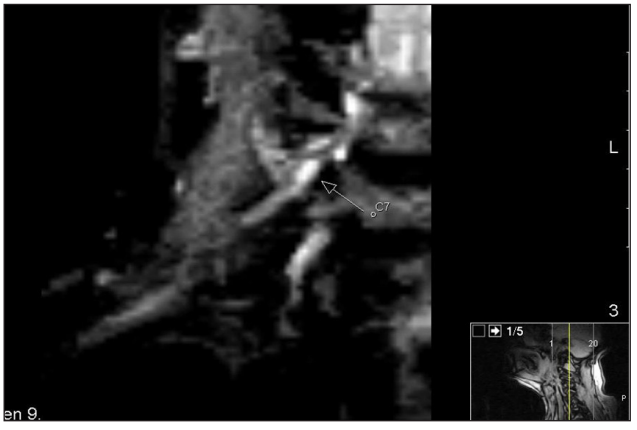

Figure 3. In coronal plane of STIR sequence MRI, increased in intansity and irregularity at right middle trunk level of brachial plexus are seen.

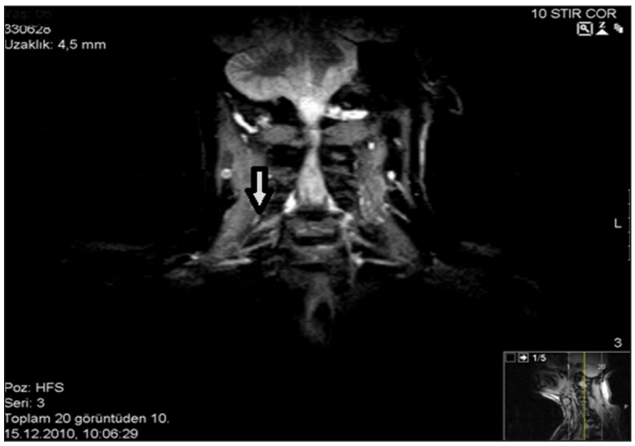

Figure 4. In coronal plane of STIR sequence MRI, there is increased thickness at the middle trunk level of right brachial plexus.

was 5 msn/division for motor conduction studies. Sural nerve, superficial radial nerve, median nerve and lateral antebrachial cutaneous sensory nerve conductions were studied using antidromic method, while other sensory nerve conductions were studied by orthodromic method. Radial nerve motor conduction was studied by Jebsen method. Using this method, needle recording electrode was inserted into right extensor indicis muscle and 4 cm proximally of recording electrode, 6 cm proximally of elbow at spiral groove and Erb's point were stimulated (12).

In electrophysiologic examination, the terminal latencies of median nerves were prolonged and sensory conduction velocity of median nerves were decreased. These findings were compatible with carpal tunnel syndrome. Although the sensory and motor conductions volecity were bilaterally normal in ulnar nerves, SNAP was bilaterally mildly low (Table 1). Sensory and motor conductions were bilaterally normal in radial nerve. However, when needle recording electrode was inserted into triceps muscle and Erb's point was stimulated, CMAP latency of right radial nerve was mildly long (7,1 msn). In needle EMG, spontaneous activity was present at right side abductor pollicis brevis, extansor indicis proprius, first dorsal interosseos, extansor digitorium communis, flexor digitorium and extansor carpi radialis longus muscles. Large motor unit potentials (MUP) were observed in the right triceps muscle. The needle EMG study of cervical paraspinal, left biceps, left vastus lateralis, bilaterally abductor digiti minimi and orbicularis oris muscles were normal (Table 2).

Discussion

After the clinical evaluation of our case, we put prediagnosis of servical radiculopathy, idiopathic brachial neuritis and motor neuron disease. Although the results of first electrophysiologic evaulation of the patient was compatible with poliradicular involvement,

Table 1. The electrophysiological sensory and motor conduction studies of our case.

MUSCLE (innervation)	Fib	PSW	Amplitude (mV)	Duration (ms)	IP
Right ext indicis	++	++	Normal	Normal	Severe Reduction
Right İnteross Dors I	++	++	Normal	Normal	Mild Reduction
Right ext carpi rad long	++	++	4	+	Mild Reduction
Right ext Dig Communis	++	++	4	Normal	Mild Reduction
Right Triceps	0	0	5,4	+	Mild Reduction
Right Biceps	0	0	Normal	Normal	Normal
Right Flex dig superfic	+	+	5,6	+	Reduction
Right Flex carpi ulnaris	0	0	Normal	Normal	Normal
Right and Left Abd dig min	0	0	Normal	Normal	Normal
Right Brachioradialis	0	0	Normal	Normal	Normal
Right Abd Pollicis Brev	++	++	Normal	Normal	Mild Reduction
Left Abd Pollicis Brev	0	0	Normal	Normal	Normal
Left Biceps	0	0	Normal	Normal	Normal
Right Paravert C5,C6,C7,C8	0	0	Normal	Normal	
Orbicularis oris	0	0	Normal	Normal	Normal
Left Vastus Lateralis	0	0	Normal	Normal	Normal
Left Tibialis Anterior	0	0	Normal	Normal	Normal

Fib: Fibrillation potentials, **PSW:** Positive sharp waves, **IP:** Interferens

Table 2. The electrophysiological sensory and motor conduction studies of our case.

Nerve	Normal value	Right	Left
SNAP (μV)			
Median	>10	17	27
Ulnar	>7	6,1	5,4
Sural	>5	5,9	7,7
SCV (m/sn)			
Medianus(PalmWrist)	>35,2	28,3	31,7
Medianus(DigIIWrist)	>39,4	35,9	36,0
Medianus(DigIIIWrist)	>39,6	39,7	39,8
Ulnaris	>37,3	39,4	38,6
Suralis	>33,8	34,1	34
Med anteb Cut	>41,1	46,3	42,2
Lat anteb Cut	>57,8	58,2	57,9
CMAP(μv)			
Medianus	>4,3	9,1	13,4
Ulnaris	>7	8,9	16,7
Tibialis	>3,6		6,4
Peroneus	>3,6		6,8
Radialis	>4,2	4,5	
MCV(m/sn)			
Medianus	>49,7	46,6	54,3
Ulnaris	>49,9	51	53,2
Tibialis	>39,6		46,9
Peroneus	>40,9		48,6
Radialis	>41,6	65,8	
Latency(ms)			
Medianus	<3,8	4,3	4,2
Ulnaris	<3,3	2,2	3
Tibialis	<5,8		5
Peroneus	<5,8		5,5
Radialis	<2,1	3,8	
F Latency(ms)			
Medianus	<32	32,2	30,2
Ulnaris	<32	31	29,6
Tibialis	<52		51,2
Peroneus	<52		50,5

SNAP: Sensory nerve action potential , **SCV:** Sensory conduction velocity, **MCV:** Motor conduction velocity, **CMAP:** Compound muscle action potential.

normal neddle EMG of paraspinal muscles, absence of poliradicular involvement in MRI, and absence of sensory loss in physical examination made us to think for other diagnosis. Motor neuron disease was excluded because of normal needle EMG results of paravertebral, orbicularis oris and counter side extremities muscles, absence of fasiculations, presence of severe shoulder pain before the onset of weakness at hand muscle.

Idiopathic brachial neuritis is charecterized by patchy motor loss of muscles especially around the shoulder and isolated involvement of peripheric nerves of upper extremity. Long thoracic nevre, axillary nevre, anterior interosseos nevre and lateral antebrachial cutaneous nerve are more commonly involved in the course of disease (6). In our case, there was no isolated nerve involvement. The terminal latencies of median nerve of both side were prolonged, and sensory conduction velocity of median nerves at palm-wrist and digit II-wrist segments were decreased. As well as these findings are competable with bilateral carpal tunnel syndrome, presence of denervation potentials in needle EMG of right APB muscle and normal findings in needle EMG of left APB muscle supports the presence of turuncus lesion at the right side. Ulnar entrapment neuropathy was excluded because of normal right ulnar nerve motor and sensory conduction volecity and normal findings of needle EMG of innervated muscle by ulnar nerve. Radial entrapment neuropathy was also excluded because of normal findings of motor and sensory conduction studies of radial nerve. Neurogenic thorasic outlet syndrome was eliminated due to normal findings of right ulnar nerve and medial antibrachial cutaneous nerve sensory conduction studies, normal amplitude of CMAP of right median nerve and absence of sensory symptoms at medial forearm.

Although the electromyographic finding are variable in the patients with brachial neuritis, the most significant feature is presence of spontaneous activities showing axonal neuropathy in needle EMG at involved muscles (7,8). In our case, there were spontaneous activities at right abductor pollicis brevis, extansor indicis proprius, first dorsal interosseos, extansor digitorium communis and flexor digitorium muscles. Therefore, chronic MUP changes were present at right triceps muscle.

It is not possible to determine the MRI findings of brachial neuritis every time. The mechanism and time course of MRI signal intensity changes in denervated skeletal muscle are not understood completely. In the acute phase of denervation, the signal intensity of the muscles may become normal with MRI. In the subacute and chronic phases o denervation, T2-weighted signal abnormalities persist and muscular atrophy may develop

(13). Any pathological findings were not observed in MRI examination of muscles around shoulder. It is known that increased intansity and thickening of brachial plexus in T2 and STIR sequences of MRI may be detected in some cases. In our case, there was an increased intansity and thickening especially at middle trunk level of right brachial plexus at MRI.

The involvement of all brachial plexus and hand muscles were seen at 10-40% of patients with brachial neuritis. Sensorial pathologies may be detected at 80 % of patients. The amplitudes of sensorial potentials may be decreased in electrophysiologic examination and sensory abnormalities may be seen dermatome of affected nerves. However, presence of muscle weakness and absence of sensorial abnormalities only in distal muscles are very rare (4). Van Alfen N et all showed in their study in which 112 patients were evaluated that the absence of sensory abnormalities in electrophysiological studies can not exclude the diagnosis of brachial neuritis (9).

The diagnosis of our patient was determined as idiopathic brachial neuritis according to evaluation of clinical, electrophysiological and MRI findings. However, absence of motor loss in shoulder muscles, presence of motor loss in distal hand muscles, and absence of clinical and electrophysiological sensory loss were unusual findings for brachial neuritis. Jan A.L. Vanneste et all. published 4 cases with distal involvement and no sensory loss which were similar to our case. They had followed these 4 patients for 3 years and they did not detect development any different diagnosis (10).

Finally, brachial neuritis have to be considered in the patients with severe shoulder and arm pain and followed by sudden onset of muscle weakness. The differential diagnosis of the patients with distal motor loss of arm for servical disc disease have to be performed in order to prevent unnecessary surgical interventions.

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