

SPINAL ACCESSORY NERVE PALSY AND WINGED SCAPULA CAUSED BY REPETITIVE STRAIN: A CASE REPORT

Tekrarlayan Gerilme Sonucu Oluşan Spinal Aksesuar Sinir Felci ve Kanat Skapula: Bir Olgu Sunumu

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ABSTRACT

Scapular winging is a rare disorder that causes functional limitation of the upper extremity. It may develop due to many pathological conditions that can cause paralysis in the serratus anterior, trapezius and rhomboid muscles (which are innervated by the long thoracic nerve, spinal accessory nerve, and dorsal scapular nerve, respectively). Diagnosis is made by imaging and electrodiagnostic studies after physical examination. In this case, it is aimed to present the diagnosis and treatment stages of the patient who developed shoulder pain, muscle weakness, and scapular winging, due to injury to the spinal accessory nerve, which is the 11th cranial nerve and provides pure motor innervation to the trapezius muscle. Although scapular winging is not a condition we frequently encounter in clinical practice, it is important due to its potential for disability that may affect the quality of life.

Keywords: Scapular Winging; Spinal Accessory Nerve; Electrodiagnostic Assessment

ÖZET

Amaç: Skapular kanatlanma, üst ekstremitede fonksiyonel kısıtlılığa neden olan nadir bir hastalıktır. Serratus anterior, trapezius ve rhomboid kaslarında (sırasıyla long torasik sinir, spinal aksesuar sinir ve dorsal skapular sinir tarafından innerve edilir) felce neden olabilen birçok patolojik duruma bağlı olarak gelişebilir. Tanı, fizik muayene sonrası görüntüleme ve elektrodiagnostik çalışmalarla konulur. Bu olguda, 11. kranial sinir olan ve trapezius kasına saf motor innervasyon sağlayan spinal aksesuar sinirin yaralanması sonucu omuz ağrısı, kas güçsüzlüğü ve skapular kanatlanma gelişen hastanın tanı ve tedavi aşamalarını sunmak amaçlanmıştır. Skapular kanatlanma klinik pratikte sıklıkla karşılaştığımız bir durum olmasa da yaşam kalitesini etkileyebilecek sakatlık potansiyeli nedeniyle önemlidir.

Anahtar Kelimeler: Skapular Kanatlanma; Spinal Aksesuar Sinir; Elektrodiagnostik Değerlendirme

INTRODUCTION

Wing scapula (scapula alata) is a clinical condition characterized by the medial edge of the scapula moving away from the thorax, which often develops due to the dysfunction of the serratus anterior, trapezius, and rhomboid muscles, which are the scapulothoracic stabilizing muscles (1, 2). It may cause a decrease in shoulder muscle strength due to disruption of scapulohumeral rhythm, a decrease in joint range of motion, pain, and asymmetry due to tension and spasm in the periscapular muscles (3, 4). It is divided into three groups according to etiological factors: primary, secondary, and volutar. In the primary wing scapula, the factors are neurological, bony, and surrounding soft tissue pathologies in the scapulothoracic joint, and in the secondary wing scapula, the factors are glenohumeral and/or subacromial pathologies. Voluntary wing scapula is less common and is thought to have a psychological origin (5).

The spinal accessory nerve (SAN), which provides innervation to the trapezius, is superficial as it passes through the posterior cervical triangle. There is a high risk of injury during minor surgical interventions (biopsies) and radical neck dissections in this area. The nerve may also be exposed to blunt trauma and repetitive strain injuries in this region (6). After an accessory nerve lesion, patients develop periscapular pain in a short time. In chronic pathologies, pain can be felt in the forearm, hand, face, head,

and opposite upper extremities. The patient's scapula slides laterally and the inferior angle turns outward. The patient's functions in daily life begin to be restricted, and the pathological condition and clinical picture may not appear immediately due to overwork of the compensatory muscles at the beginning of the acute period. When muscle fatigue begins, the affected shoulder falls downward, and shoulder asymmetry is evident. There is trapezius atrophy and wing scapula appearance develops.

Functionally, elevation and abduction are limited. To make a diagnosis, anamnesis, physical examination, radiological examination and (Electromyography) EMG must be performed. In a study, it was observed that 71% of the cases with SAN injury were iatrogenic and 24% were trauma-related. Spontaneous or idiopathic cases are extremely rare (7). Here, the diagnosis and treatment stages of a case that developed SAN damage after excessively repetitive stretching exercises are presented.

CASE REPORT

A 25-year-old male patient applied to our outpatient clinic with complaints of right shoulder pain, drooping of the right shoulder and thinning of the right shoulder muscles. He stated that his shoulder pain increased, especially during abduction and activity. There was no complaint of numbness or tingling. There was no additional disease, trauma, medication use, surgical

history, or family history. In his history, it was learned that the patient had repeated this neck stretching movement to the left excessively, as he was relieved of neck pain that had been occurring intermittently for the last year, especially when he moved his neck to the left lateral flexion. In the physical examination of the patient, there was asymmetry between the shoulders, a drop in the right shoulder, atrophy in the upper part of the right trapezius muscle, and a winged scapula on the right side, which became evident with right shoulder abduction and disappeared at rest (Fig. 1 and 2).

Neurological examination revealed muscle weakness of 4/5 of the right shoulder abductor muscles and +3/5 of the right trapezius muscle. Cranial nerve examination, sternocleidomastoideus (SCM), and other muscle strengths were normal. Superficial sensory examination and deep tendon reflexes were within normal limits. Laboratory examinations and imaging methods were also evaluated as normal. (Routine hemogram, biochemistry tests, vitamin B12 level, thyroid function tests, shoulder, cervical, and lung radiographs were normal.) EMG showed normal right upper extremity median and ulnar nerve motor and sensory conduction studies. Right SAN - trapezius muscle recording - motor response could not be obtained. In needle EMG, the right SCM, deltoid, supraspinatus, infraspinatus, serratus anterior, levator scapula, and rhomboid major muscles were evaluated as normal. Spontaneous



Figure 1. There was asymmetry between the shoulders, a drop in the right shoulder, atrophy in the upper part of the right trapezius muscle, and a winged scapula on the right side.

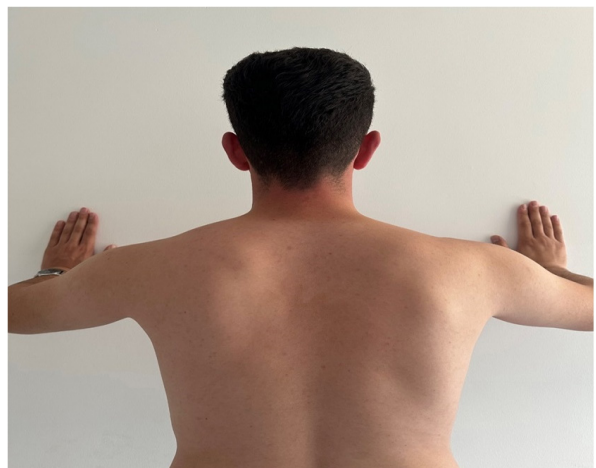


Figure 2. Winging of the scapula was more evident during wall push-up.

activity in the upper, middle, and lower parts of the right trapezius muscle, an increased polyphasic motor unit potentials in mild contraction, and a dilution in the interference pattern in full contraction were detected. These findings were interpreted as compatible with partial axon damage in the branch of the right accessory nerve leading to the trapezius muscle. In parallel with the rehabilitation program planned for the patient, a 15-minute hot pack application and conventional (Transcutaneous Electrical Nerve Stimulation) TENS application were performed on the right shoulder. Electrostimulation was applied to the trapezius muscle in atrophy mode. An active assistive and resistive exercise program was applied gradually. At the same time, a home exercise program was organized. After the 4-week rehabilitation program, a significant improvement in shoulder abductor muscle strength was observed. In the follow-up examination performed 6 months later, it was observed that the trapezius atrophy partially continued, muscle strength almost had fully recovered, and joint range of motion was normal. He had no complaints other than shoulder pain that occurred with strenuous activities.

DISCUSSION

The trapezius muscle is between the cervical and thoracic vertebrae and the spina scapula and acromion. The upper fibers of the trapezius muscle contribute to scapulothoracic movement by moving the shoulder downwards with scapula elevation, the middle fibers with scapula rotation, and the lower fibers with scapula retraction. The upper and lower fibers cause upward rotation and abduction of the scapula in the horizontal plane (8). After passing through the jugular foramen, the SAN gives branches to the sternocleidomastoid (SCM) muscle. It enters the posterior neck triangle space and stimulates the upper fibers of the trapezius muscle and the middle and lower fibers along with the branches of the cervical plexus (9,10). The superficial course of the nerve makes it more prone to injury during posterior cervical region traumas, cervical lymph node dissection, and mass excision. SAN damage occurring during neck surgery has decreased in recent years due to the development of new techniques. Although it is rarely seen spontaneously or idiopathically, there are cases described as an occupational disease in

carpenters, car mechanics, welders, and tailors (9). Trapezius muscle paralysis is often neurogenic and develops due to SAN damage. In SAN paralysis, with abduction of the arm, the wing scapula becomes prominent, and the scapula moves upward. In SAN damage, the trapezius muscle appears atrophic, there is a steep slope between the neck and the shoulder, and the shoulder falls down. The distance of the scapula to the vertebra decreases. If the SAN lesion site is proximal, difficulty is observed in turning the head and lifting the shoulder to the opposite side of the lesion. If the lesion is distal, the SCM is preserved, and weakness in shoulder elevation and abduction is observed. In our case, there was trapezius muscle failure due to SAN damage, shoulder drop, and lateral winging that became evident when the arm was in abduction. The preservation of the SCM muscle, the presence of trapezius muscle atrophy, and limitation of shoulder elevation and abduction indicate that the SAN is affected distally. In its physiopathology, it is thought that neuropraxia develops in the nerve due to repetitive trauma. Fibrosis, microvascular insufficiency, and resulting neuropathy develop in the fascia of the muscle (1).

Although wing scapula developing due to SAN damage is rare, it is a clinical condition that limits the patient's upper extremity functions and whose etiology can be very diverse. The fact that it can mimic many diseases can make diagnosis difficult and lead to a delay in diagnosis (11). For a correct diagnosis, a good clinical examination is first required. EMG is the gold standard in diagnosis and is very important in identifying different peripheral neurological conditions, including compressive syndromes, and in showing nerve damage (1). In the treatment, pain control, electrical stimulation, and early joint range of motion exercises, scapular stabilization exercises, and strengthening exercises (trapezius, rhomboids and levator scapula muscles) are given. A significant improvement was observed after rehabilitation in our case which developed wing scapula due to SAN damage caused by excessively repetitive exercises.

CONCLUSION

In conclusion, although this case report is extremely rare in the literature, it draws attention to the fact

that fibrosis and microvascular insufficiency in the fascia of the muscle due to repetitive trauma may cause neuropraxia in the nerve. Disability of patients can be prevented with early diagnosis and effective rehabilitation programs.

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