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A Rare Case of Focal Neuropathy: Posterior Interosseous Neuropathy due to Lipoma

Nadir Görülen Bir Fokal Nöropati Olgusu: Lipomaya Bağlı Posterior İnterosseöz Nöropati

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Abstract

The posterior interosseous nerve is a pure motor branch of the radial nerve after passing the supinator muscle. It especially innervates the extensor muscles of fingers in the forearm. Injury of the posterior interosseous nerve is most commonly seen in Monteggia fractures, which results from a combination of ulna fracture and proximal radius head dislocation. Idiopathic-inflammatory disease, impingement of the nerve at supinator muscle, neuralgic amyotrophy, and space-occupying lesions are other non-traumatic causes of posterior interosseous neuropathy (PIN). Motor deficits of finger extensors is the main clinical manifestation in the posterior interosseous nerve injury and sensory loss is never seen. A woman aged 49 years presented due to weakness that began 4 years ago in the right 3rd and 4th fingers, which had spread to other fingers. On neurologic examination, paresis of finger and wrist extensors without sensory loss was detected. The patient underwent surgery due to carpal tunnel syndrome and later, cubital tunnel syndrome because of her symptoms. After the operations, her symptoms did not regress and she was evaluated again by us. With her clinical and electrophysiological findings, PIN was diagnosed and on radiologic imaging, a focal lesion and lipoma was found. A rare cause of PIN due to lipoma was diagnosed and she underwent surgery again. A physiotherapy program was started after the operation but after 5 months, there was no significant regression of paresis. We want to report this case because early diagnosis and treatment is important in regaining motor functions in this rare clinical entity.

Keywords: Posterior interosseous nerve, lipoma, compression

Öz

Posterior interosseöz sinir; radiyal sinirin supinator kası geçtikten sonra ayrılan saf motor dalıdır. Özellikle ön kolda parmak ekstansörlerini inerve eder. Posterior interosseöz sinir tutuluşu en çok ulna kırığı ile proksimal radius başı çıkığının kombinasyonu olan monteggia kırıklarında görülür. Travmatik olmayan nedenleri arasına idiyopatik, enflamatuvar hastalıklar, supinator kas geçişinde sıkışma, nöraljik amiyotrofi, yer kaplayan oluşum gibi nedenler yer almaktadır. Hastaların özellikle parmak ekstansörleri etkilenmektedir. Duyu kusu yoktur. Kırk dokuz yaşında kadın hasta, 4 sene önce sağ el üçüncü, dördüncü parmaklarından başlayıp diğer parmaklara yayılan güçsüzlük nedeniyle başvurdu. Nörolojik muayenesinde duyu kusuru olmaksızın parmak ve bilek ekstansiyonunda zafiyet saptandı. Özgeçmişinde aynı yakınma ile başvurduğu hekimler tarafından önce karpal tünel sendromu ardından kubital tünel sendromu tanısı konularak ameliyat öyküsü mevcuttu. Şikayetlerinde düzelme olmaması nedeniyle bize başvuran hastaya yapılan tetkikler sonucunda nadir olarak görülen lipoma bağlı gelişen posterior interosseöz nöropati (PİN) tanısı konuldu. Operasyon sonrası rehabilitasyon programına alınan hastada 5 ay sonra belirgin düzelme saptanmadı. Nadir görülen PİN'li hastalarda erken tanı ve tedavi yaklaşımının prognoz açısından önemli olması nedeniyle olgumuzu sizlerle paylaşmak istedik.

Anahtar Kelimeler: Posterior interosseöz sinir, lipom, kompresyon

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Introduction

The radial nerve divides into two main branches just prior to the supinator muscle at the level of the lateral epicondyle. One of these branches is the superficial branch, and the other is the posterior interosseous nerve, a pure motor nerve. With injuries to the posterior interosseous nerve, paresis of finger extensors is detected on neurologic examination. When the patient extends their arm, radial deviation of the wrist is seen. This position is associated with the function of extensor carpi radialis longus, it is not effected due to more proximal innervation. Sensory loss is not seen. Nerve conduction study of radial sensory branch and needle electromyographic findings of the triceps, brachioradialis, and extensor carpi radialis longus must be normal on electromyographic diagnosis. With these findings, neurogenic motor unit potentials are seen on extensor digitorum communis (EDC) and/or extensor indicis proprius (EIP) muscles innervated with posterior interosseous nerve. Nerve conduction studies reflect prolonged motor conduction time or loss of motor response by the stimulation at the elbow and recording motor response from these muscles. Posterior interosseous nerve injury is most commonly seen in Monteggia fractures after trauma. Idiopathic-inflammatory disease, impingement of the nerve at supinator muscle, neuralgic amyotrophy, and space-occupying lesions are the other non-traumatic causes of posterior interosseous neuropathy (PIN). Magnetic resonance imaging (MRI) and fat supression with T2-weighted sequences may show the masses compress radial nerve. From these masses, lipomas are rarely seen and they are generally located around radius neck (1).

Case Report

A woman aged 49 years was admitted to our clinic with paresthesias in the right 3rd and 4th fingers, which began four years ago. After that, weakness appeared in the same fingers, which was diagnosed as carpal tunnel syndrome and the patient underwent surgery 2 years ago. After the operation, there was no regression on her symptoms, and also her weakness spread to the other fingers of the same side and she underwent surgery again with a diagnosis of cubital tunnel syndrome. After these interventions, she was referred to another center and she was diagnosed as having total brachial plexopathy with significant involvement of the middle trunk, but no pathology was detected in the cervical spinal and brachial plexus MRI. She was evaluated by us due to progressive weakness of the fingers of the right hand.

On her neurologic examination, there was no sensory loss, muscle power on motor examination, forearm extension was 5/5, wrist extension was 4/5, 3rd, 4th and 5th fingers extension were 0/5, and 1st and 2nd finger extensions were 1/5 according to Medical Research Council (Figure 1). Slight radial deviation was seen on her wrist. Other findings in the neurologic examination were normal.

In nerve conduction studies of the right upper extremity, reduced compound muscle action potentials of the radial nerve was detected and radial nerve motor conduction velocity was mildly prolonged. Radial and median antebrachial sensory conduction studies, and motor and sensory conduction studies of the median and ulnar nerve were normal bilaterally. In needle electromyography, motor unit potentials recorded from the triceps, brachioradial, and extensor carpi radialis longus innervated by radial nerve were normal, but spontaneous activity with chronic neurogenic motor unit potentials and motor unit loss were recorded in the extensor carpi ulnaris, EDC, and EIP. With these findings, she was diagnosed as having PIN. In the physical examination, there was a palpable mass on the extensor surface of right forearm below the elbow. Ultrasonography and subsequenty MRI were performed and a mass lesion (lipoma?) surrounding the radius neck and posterior interosseus nerve was detected (Figure 2).

An excisional biopsy was performed an orthopedic surgeon and lipoma was diagnosed in a pathologic examination. One month after the operation, there were no changes on electroneuromyography (ENMG) findings, and the follow-up neurologic examination, which was performed five months after the surgery, was the same

Figure 1. Dropped fingers on right hand during resting and wrist extension

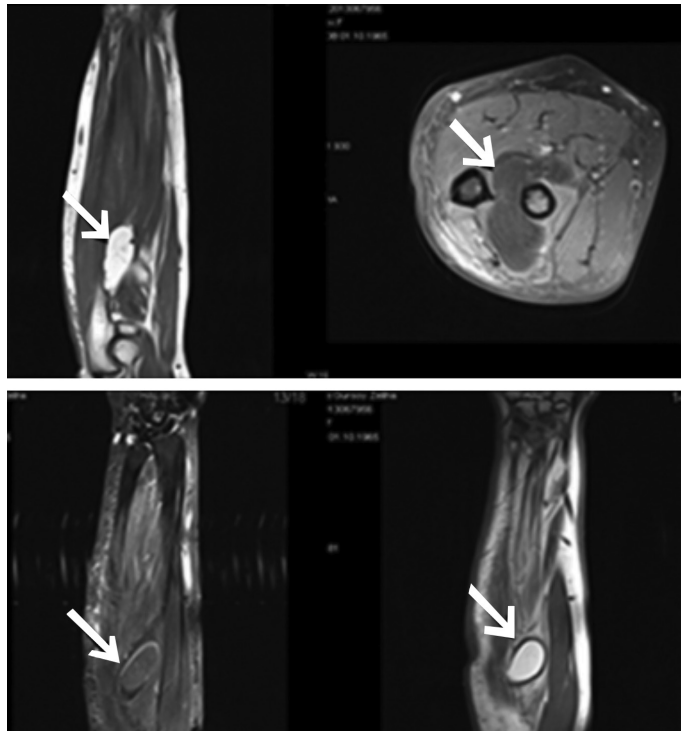

Figure 2. The mass (lipoma), between radius and supinator muscle (arrow)

at at the beginning. Therefore, chronic nerve injury was the main cause of her symptoms.

Discussion

PIN is diagnosed through clinical history, neurologic examination findings and ENMG. It was first described by Angew in 1963, and it is an entrapment neuropathy that results from compression of a deep branch of the radial nerve beneath the elbow joint. It causes paresis or paralysis of finger extensors without sensory loss. Radial entrapment neuropathy is rarely seen compared with median and ulnar nerves, and injury of this nerve commonly results from acute traumatic compression.

During the evaluation of paresthesias and paresis of fingers, detailed neurologic examination and suitable electrophysiologic studies must be performed. PIN must be differentiated from cervical 7 radiculopathy and brachial plexopathy with the neurologic examination and ENMG. Lesions in the axilla cause weakness of the triceps, dropped hand, and sensory loss over the forearm with median and ulnar nerve dysfunction. Triceps muscle is spared in the lesions at the level of the spiral groove and at this level, pathologic electrophysiological findings are detected in brachioradialis with distal elbow and wrist extensors. To diagnose PIN, as seen in our patient, electromyographic findings of brachioradialis and action potantials of superficial radial sensory branch must be normal (2). Non-traumatic causes of PIN are idiopathic-inflammatory disease, impingement of the nerve at the supinator muscle, neuralgic amytrophy, and space-occupying lesions. As seen in our patient, lipomas surrounding the radius neck and located in the supinator muscle are a rare cause of chronic PIN (1). Lipomas are benign tumours that originated from mesenchyme. Intramuscular lipoma is infiltrative and generally invades into the muscle beneath. The prognosis of PIN depends on early diagnosis and surgical excision. For this reason, clinical manifestations of PIN must be kept in mind, suitable electrophysiological studies must be performed, and the location of entrapment must be defined. In addition, when the reason of this syndrome is not clarified, physical examination and MRI of the nerve entrapment region can give an idea about the cause and also surgical release of the nerve from compression. Prognosis after surgical excision is good, but healing cannot be seen when there is long-term complete paralysis. In a study by Jürgens and Haupt (3) performed with 20 patients, it was reported that prognosis after surgery depended on the duration of symptoms and in long-term paralysis, the probability of reinnervation was lower. The longest duration of symptoms to obtain complete healing after surgery is defined as 18 months in the literature (5).

Performing insufficient electrophysiological studies, incorrect diagnosis with unnecessary surgeries, as in our case, is the result of this rare undiagnosed clinical entity, PIN. For this reason, clinical presentations of PIN and diagnostic criterias of this syndrome on ENMG should be recognized. When this syndrome is diagnosed, detection of structural pathologies such as lipoma with imaging is important in terms of early diagnosis, treatment and prognosis.

Ethics

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ayşen Süzen Ekinci, İbrahim Aydoğdu, Concept: Ayşen Süzen Ekinci, Şeyma Çiftçi, Design: Ayşen Süzen Ekinci, Şeyma Çiftçi, Data Collection or Processing: Ayşen Süzen Ekinci, Analysis or Interpretation: Ayşen Süzen Ekinci, Şeyma Çiftçi, İbrahim Aydoğdu, Literature Search: Ayşen Süzen Ekinci, Writing: Ayşen Süzen Ekinci.

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