



PRIMARY FEMORAL NERVE ENTRAPMENT: A CASE REPORT

PRIMER FEMORAL TUZAK SENDROMU: OLGU SUNUMU

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SUMMARY

Entrapment neuropathies of the femoral nerve are uncommon clinical conditions. The symptoms of femoral mononeuropathy could manifest as acute or subacute severe pain in the inguinal region, weakness of the function of quadriceps femoris muscle and a decreased patellar reflex. We present a case with a 40-year-old woman suffering from pain, numbness and progressive weakness in her lower right limb due to an uncommon femoral nerve compression. The case were successfully treated with surgery. The femoral nerve was discovered to be trapped at the level of the inguinal ligament by a scar tissue. This scar tissue was incised and the femoral nerve was relieved. After the operation, her neurological deficits improved completely. Femoral nerve entrapment should be taken into consideration in such patients in order to prevent unnecessary surgical interventions.

Keywords: Femoral nerve, nerve entrapment syndrome, surgical decompression.

Level of evidence: Case report, Level IV.

ÖZET

Nervus femoralis'in tuzak nöropatisi, nadir rastlanan klinik bir durumdur. Femoral nöropati semptomları, inguinal bölgede akut veya subakut olarak oluşabilen ağrı, m. quadriceps femoris'te güç kaybı ve patellar reflekste zayıflamadır. Bu yazıda, femoral sinirin inguinal ligament seviyesinde sıkışması sonucu ortaya çıkan sağ alt ekstremitede ağrı, duyu kaybı ve progresif güçsüzlük şikayetleri ile kliniğimize başvuran, 40 yaşında kadın hasta sunuldu. Hastaya uygulanan cerrahi girişim sırasında, nervus femoralis'in, ligamentum inguinale seviyesinde, skar dokusu ile sıkışmış olduğu görüldü. Skar doku insize edildi ve nervus femoralis serbestleştirildi. Uygulanan cerrahi girişim sonrasında, hastanın nörolojik defisitleri tamamen düzeldi. Bu bölgede cerrahi girişim gerektiği durumlarda, postoperatif granülasyon dokusu ve fibrosise bağlı femoral sinir sıkışma olasılığını gözardı edilmemelidir.

Anahtar Kelimeler: Femoral sinir, tuzak sendromu, cerrahi gevşetme.

Kanıt Düzeyi: Olgu sunumu, Düzey IV.

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INTRODUCTION

The femoral nerve (FN) arises from the posterior divisions of the ventral rami of the second, third, and fourth lumbar nerves (L2-L4). It descends through the psoas major, emerging low on its lateral border and then passes between the psoas and iliacus, deep to the iliac fascia and behind the inguinal ligament^(6,9,12). The femoral nerve is most commonly injured within the retroperitoneal space or under the inguinal ligament. Damage to the femoral nerve can be the result of a direct injury, a tumor or other growth blocking or trapping part of the nerve and prolonged pressure on the nerve^(5,7). Additionally, pelvic fractures, therapeutic radiation in the pelvic region, hemorrhage in the retroperitoneal space and catheters placed during certain surgical procedures into the femoral artery have also been known to cause femoral nerve damage^(6,10). Iatrogenic injury during intra-abdominal and pelvic surgical procedures such as gynecological and urological operations still remains the most frequent cause of femoral neuropathy^(3,8).

Our report describes a patient, who underwent an unnecessary right hip arthroscopy, harboring a primary right femoral nerve entrapment that remained undiagnosed for four years.

CASE REPORT

A 40-year-old woman suffering from pain, numbness and progressive weakness in her lower right limb for four years was admitted to our clinic. The patient also complained about difficulty walking and running. During the four years, she had been followed up for lumbar disc herniation in another clinic; however, her complaints had worsened in the last eight months. Last year, an orthopedic surgeon due to her pain had also performed a right hip arthroscopy but nothing could be identified.

Upon detailed questioning, she reported that 20 years ago, she received a steroid injection due to right groin pain she suffered while she was running. Although her pain subsided after the injection, she still feels the same pain intermittently.

Neurologic examination of the patient revealed motor weakness during right hip flexion (3+/5) and adduction and extension of the right knee (4/5), numbness of L2 and L3 dermatomes, and a hypoactive right patellar reflex. Tinel's sign was positive. Also, there was atrophy in the right quadriceps femoris (4 cm circumferential difference was 4 cm between right and left side).

Magnetic resonance imaging of the lumbosacral and pelvic regions was normal except for the bulging at L4-L5 intervertebral disc level.

Electrophysiological evaluation of the right lower extremity revealed significant decrease of the compound muscle action potential of the right femoral nerve when compared with the

left side and the findings were consistent with the entrapment of the right femoral nerve at the level of the inguinal region.

Based on the clinical, radiologic and laboratory findings, she was offered surgery under neuromonitorization, to release the nerve trapped in the inguinal region. Following informed consent from the patient, she was operated under general anesthesia in the supine position. The incision was made in the inguinal region just lateral to the femoral artery, extending vertically from the inguinal ligament level to the junction of upper and middle thigh. As the incision deepened, femoral artery and femoral vein became apparent. The femoral nerve was trapped at the level of the inguinal ligament by scar tissue. This tissue was incised to expose the distal part of the intrapelvic portion of the nerve. After relaxation of the femoral nerve the motor unit potential was obtainable. Following the operation, her neurological deficits fully improved (**Figure-1,2**).

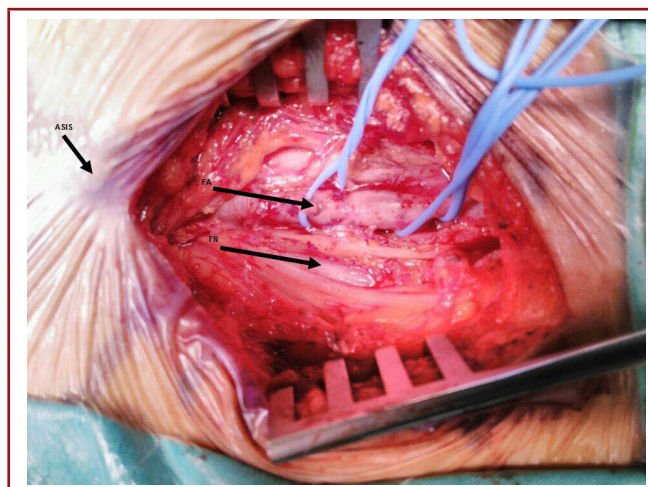


Figure-1. The photograph shows the ASIS, FA and the FN which belong to the right side of the patient. (ASIS: Anterior Superior Iliac Spine, FA: Femoral Artery, FN: Femoral Nerve)

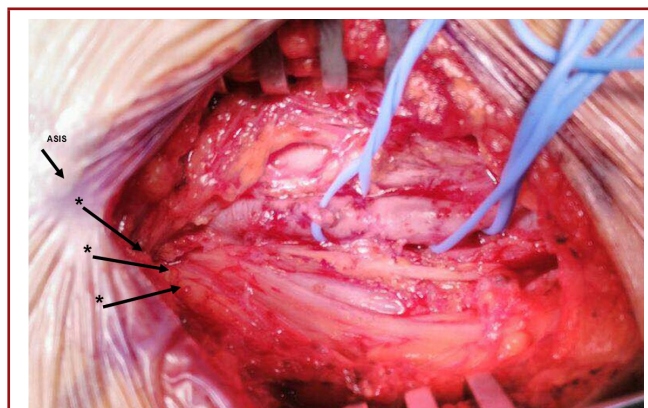


Figure-2. The photograph shows the ASIS, and the remnant of fibrosis tissue in surgical area. (ASIS: Anterior Superior Iliac Spine, *: Scar tissue remnant)

During the follow-up period her pain completely disappeared and she regained her full motor strength. Her electrophysiological evaluation of the right femoral nerve

performed one month later after the operation revealed improvement which was also supported by the clinical findings (**Figure-3**).

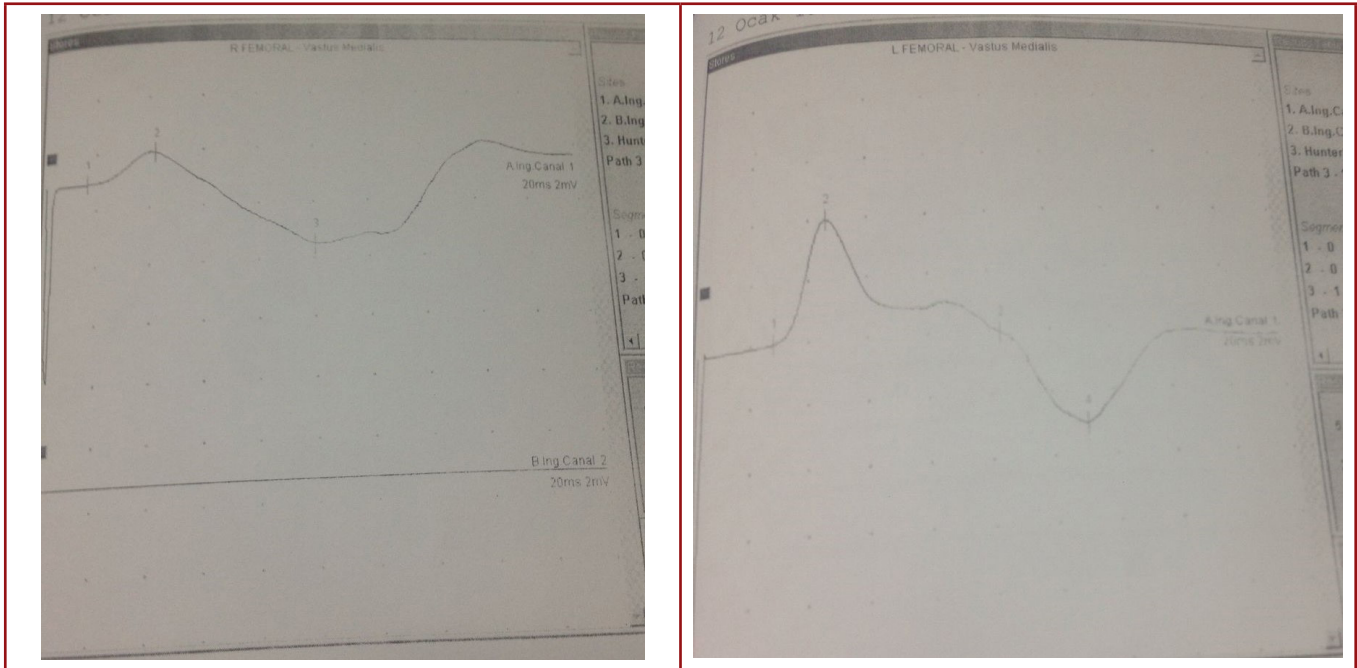


Figure-3. a) Electrophysiological evaluation of the right lower extremity performed before and **b)** one month after the operation revealed normal compound muscle action potential of the right femoral nerve.

DISCUSSION

Femoral nerve compression is an uncommon form of mononeuropathy⁽⁵⁾. There are many reasons for this type of nerve compression such as mechanical, pathological, traumatic, iatrogenic or metabolic issues^(2,5).

Pneumatic tourniquet applied during the surgical procedures for lower extremities, psoas hematoma and abscess, diabetic amyotrophy, hip or pelvic fractures, thigh lacerations (these are often partial lesions, affecting nerve supply to the quadriceps), hip arthroplasty, abdominopelvic operations (particularly compression or stretching during these procedures) and coronary angiography are some examples to the reasons behind femoral nerve injury⁽³⁻⁶⁾. Besides this compressive femoral nerve neuropathy from a fibroid tissue is unusual presentation.

The symptoms of femoral mononeuropathy could manifest as acute or subacute severe pain in the inguinal region and tenderness in the iliac fossa^(1,5). The main symptoms of FN compression are weakness of the function of quadriceps femoris muscle and a decreased patellar reflex^(4,12).

Weakness of the quadriceps femoris and sartorius muscle can cause reduced hip flexion and external rotation forces as well as diminished knee extension force^(5,7). All this pathology may present as difficulty in ambulation⁽⁵⁾. In addition to these

motor symptoms, paresthesia of the anteromedial aspect of the thigh, extending to saphenous nerve distribution down to the hallux, may also exist in patients^(5,8). In the chronic type, denervation of quadriceps femoris may result in wasting or atrophy of the muscle⁽¹¹⁾. Furthermore, Tinnel's sign, pain created by percussion over the area of the femoral nerve, may be positive over the inguinal ligament and it is this symptom that confirms the femoral nerve involvement^(1,10).

Muscle denervation can be detected using electromyography which detects waves and fibrillation potentials in a muscle at rest. Nerve conduction velocity studies can also be used to evaluate nerve integrity^(5-6,11).

Nerve conduction studies (NCS) of the femoral nerve can be obtained by stimulating the femoral nerve at the inguinal ligament and recording over the quadriceps femoris. Comparison should be made with the clinically normal opposite side. Obtaining a compound action potential of at least 50% of the other side suggests good prognosis for recovery within 1 year. The needle examination should include both the quadriceps femoris and iliopsoas muscle^(5,11).

Our patient's clinical findings (weakness of the quadriceps femoris, a decreased patellar reflex, and positive Tinnel's sign) were in accordance with right femoral nerve entrapment. The

possible mechanism of entrapment by fibrosis could have been the injection performed in the inguinal region and additional micro trauma that occurred during sports activities.

However, she was misdiagnosed with a hip pathology and had to experience an unnecessary hip arthroscopy. Atrophy of the quadriceps femoris points to a chronic pathology but her young age would help her improve quickly ^(5,7).

Femoral nerve entrapment mononeuropathies are uncommon conditions. Our case is a rare example showing that fibrosis can occur by injection performed in the inguinal region, additional microtrauma by sports activity and induce associated pressure neuropathy. However, to prevent unnecessary surgical interventions such as hip arthroscopy, we should be aware of their existence, especially in the presence of positive Tinel's sign at the inguinal region and weakness of the hip flexion and knee adduction, which may be misdiagnosed as L2-4 radiculopathy.

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