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CASE REPORT

FEMORAL NEUROPATHY AFTER DIAGNOSTIC CORONARY ANGIOGRAPHY

ABSTRACT

Femoral neuropathy has been reported with different conditions including hip replacement, obstetric and gynecological procedures, and abdominal and urological explorative laparotomies. Isolated lesions of the femoral nerve is rare; most cases of femoral neuropathy result from positioning or compression during abdominal or pelvic surgery. Femoral neuropathy can be seen as a consequence of hematoma formation from misguided femoral catheterizations. We report a 65 year old case with severe femoral neuropathy following diagnostic angiography caused by the sandbag placed on the groin for homeostasis. This condition should be kept on mind when a patient presents with difficulty in walking with a recent history of diagnostic catheterization.

Key Words: Aged; Coronary Angiography; Femoral Neuropathy.



OLGU SUNUMU

TANISAL ANJİOGRAFİ SONRASINDA GELİŞEN FEMORAL SİNİR NÖROPATİSİ

Öz

Femoral sinir nöropatisinin kalça protezi uygulanması, obstetrik ve jinekolojik işlemler, abdominal ve ürolojik eksploratris laparatomiler gibi farklı koşullar sonrası geliştiği bildirilmiştir. Femoral sinirin izole lezyonları nadir olmakla beraber femoral sinir nöropatisi olgularının büyük çoğunluğu abdominal ve pelvik cerrahiler sırasında hastanın pozisyonlanmasına veya kompresyon uygulanmasına bağlı olarak görülmektedir. Anjiografi sırasında ya da sonrasında kateterizasyon komplikasyonu sonucunda hematoma bağlı olarak da femoral sinir nöropatisi gözlenebilir. Bu sunumda 65 yaşındaki bir hastada diagnostik koroner anjiografi sonrası kasık bölgesine hemostaz amacıyla kum torbası uygulanması sonucunda gelişen femoral sinir nöropatisi olgusu sunulmuştur. Bu durum, yürüme güçlüğü şikayeti ile başvuran hastalarda akılda bulundurulmalıdır ve hastalar yakın geçmişte diagnostik kateterizasyon öyküsü açısından da akılda tutulmalıdır.

Anahtar Sözcükler: Yaşlı; Koroner Anjiografi; Femoral Nöropati.



INTRODUCTION

Femoral neuropathy (FN) has been reported with different conditions including hip replacement surgery, and abdominal and urological explorative laparotomies (1-4). Isolated lesions of the femoral nerve are rare, whereas FN arising from lesions of the lumbar plexus or L2-4 nerve roots is more common. Most cases of FN result from prolonged positioning in the lithotomy position during labor, gynecologic or urologic procedures (5). FN can be seen as a consequence of retroperitoneal hemorrhage, often from excessive anticoagulation or hematoma formation from misguided femoral catheterizations (6-8). We report a case of FN at the inguinal level after diagnostic angiography and discuss the clinical evaluation of a patient with a femoral nerve lesion, in the context of a review of the literature.

CASE

A 65 year old female referred with the complaint of buckling of the knee during walking. Her medical history revealed that she had had a diagnostic coronary angiography and stayed in the intensive care unit (ICU) for 3 weeks after the procedure. Her difficulty in walking was discovered when she was mobilized in the ICU. She was evaluated by an orthopedic surgeon and magnetic resonance imaging (MRI) of her left knee was planned. MRI revealed rupture in the anterior cruciate ligament and degenerative changes in the knee joint. She was referred to physical medicine and rehabilitation for treatment. She had no prior history of difficulty in walking before the angiography. She had diabetes mellitus type 2, which was under control by the oral antidiabetic drugs. She had no other systemic or metabolic illness. Besides the oral antidiabetics, she was on antihypertensive (losartan) and lipid lowering (atorvastatin) medication. She denied any kind of infection before or after the procedure. On physical examination, mild quadriceps atrophy was noticed in her left leg. On manual muscle testing, left hip flexion was 5/5, knee extension was 2/5, knee flexion, ankle dorsiflexors and plantar flexors were 5/5. Muscle testing on the right leg was normal. On sensory examination, diminished sensation on the left anterior thigh and medial calf was detected. Deep tendon reflexes were otherwise normal except for absent knee jerk on the left. Physical examination findings suggested a femoral nerve lesion.

EMG examination revealed subacute axonal femoral neuropathy at the inguinal ligament on the left. Compound mus-

cle action potential (CMAP) amplitude recorded from the left rectus femoris muscle was reduced when compared to the right side. There was also marked reduction in the sensory nerve action potential (SNAP) amplitude of the left saphenous nerve. Bilateral peroneal and tibial motor and sural sensory nerve conduction studies were in normal range. Needle EMG revealed marked fibrillation potentials and positive sharp waves in vastus medialis and vastus lateralis with reduced recruitment of normal configuration motor unit potentials. Iliopsoas muscle, adductors and tibialis anterior muscles were normal. Normal nerve conduction study of peroneal, tibial and sural nerves excluded the diagnosis of polyneuropathy. EMG findings were confined to the femoral innervated vastus medialis and lateralis so L2-4 radiculopathy was also excluded. No spontaneous activity was recorded at the iliopsoas muscle and normal recruitment was observed so lesion was localized to the inguinal ligament, above which femoral nerve gives supply to iliopsoas muscle. Findings were interpreted as subacute axonal femoral neuropathy at the inguinal ligament.

There had been no hemorrhagic complications after the angiography nor catheterization misguidance during the procedure. Ultrasonography examination revealed that there was no hematoma or pseudoaneurysm formation in the groin region. Sandbag application in the groin region was thought to have caused compression of the femoral nerve at the inguinal ligament. Electrical stimulation was applied to the quadriceps muscle and patient was enrolled in a rehabilitation program for 6 weeks and kept on the quadriceps strengthening exercises. At the third month EMG evaluation, no spontaneous activity was recorded at the quadriceps muscle and there's only slight reduction in the recruitment with high amplitude, polyphasic and long duration MUAPS. The patient was able to walk independently.

DISCUSSION

The femoral nerve is derived from the lumbar plexus and receives innervation from L2, L3 and L4 nerve roots. In the pelvis, the femoral nerve emerges from behind the psoas muscle; it sends muscular branches to the iliopsoas muscle and then runs beneath the inguinal ligament. In the thigh, the femoral nerve sends muscular branches to the sartorius and pectineus muscles and is the most important supply to the quadriceps femoris muscle. The femoral nerve continues along the medial border of the calf as the saphenous nerve. It supplies sensation to the anterior and medial thigh as well as



the medial calf, which is the sensory territory of the saphenous nerve (9).

Patients with FN present with difficulty in walking due to quadriceps weakness and dragging of the leg due to iliopsoas weakness. The quadriceps is a strong muscle with four heads, so it is sometimes difficult to detect subtle weakness in mild lesions of the femoral nerve. Asking the patient to arise from the floor from a kneeling position may be helpful in detecting mild cases. In more severe cases, quadriceps atrophy may be seen. Weakness of hip flexion is an important sign of FN; it indicates involvement of the iliopsoas muscle, localizing the lesion proximal to the inguinal ligament (10). Sensory disturbance in the anterior and medial thigh is seen. Sensory disturbance in the medial calf, extending to the medial malleolus in the saphenous nerve territory may also be encountered. Examination of deep tendon reflexes is important, as the patellar reflex is depressed or absent in FN. EMG examination is important in diagnostic evaluation. EMG reveals the extent and severity of the neuropathy and aids in differentiating it from lumbar plexopathy and L2-4 radiculopathy.

Most femoral neuropathies result from gynecologic, urologic and orthopedic surgery, or are due to retroperitoneal or groin hematomas after catheterization (1-8). Compressive femoral neuropathy after diagnostic transfemoral angiography is a rarely reported condition that has serious implications, especially in elderly patients to whom diagnostic angiographies are frequently applied. Probably having type 2 diabetes mellitus for years gave rise to the susceptibility in our patient to nerve compression syndromes. Although no polyneuropathy was detected on EMG examination we know that diabetic patients are more vulnerable to any kind of nerve lesions. Findings in only femoral innervated muscles and normal peroneal and tibial nerve conduction studies lead us to the diagnosis of FN. Because there was no history of viral infection or any other condition leading to neuropathy and because of the localization and time course of the pathology we accused the sandbag applied to the inguinal region as the causative agent of FN in our case. Severe lesions of the femoral nerve lead to walking disability. Sometimes mild femoral nerve lesions with subtle muscle weakness may present only with frequent falls, which lead to additional serious problems like fractures, especially in elderly patients.

In a study of 9585 cardiac catheterizations, Kent et al. (11) reported 20 patients (0.21%) with femoral neuropathy, which were mostly due to local hematoma or pseudoaneurysm. Pressure applied to the puncture site for hemostasis is reported as a rare cause. The reason for FN in our case was

pressure applied by the sand bag over the groin. Ultrasonographic examination revealed that there was no hematoma or pseudoaneurysm formation in the groin region. Reported cases are mostly mild demyelinating lesions; however, severe cases leading to walking difficulty and requiring long periods of rehabilitation, as in our case, may also be encountered.

This condition should be kept in mind when a patient presents with difficulty in walking and a recent history of diagnostic catheterization. Initiation of an early rehabilitation program is as important as the early diagnosis of neuropathy for the prevention of muscle atrophy and joint damage due to knee instability. These aspects are particularly important in the elderly, in whom sarcopenia and degenerative changes in the joints coexist. Electrophysiological evaluation is important for diagnosis and follow-up. Confounding factors, such as the anterior cruciate ligament rupture and gonarthrosis in our case, should be evaluated carefully. EMG is one of the most useful tools in differential diagnosis.

In conclusion, FN should be kept in mind when a patient presents with difficulty in walking and a recent history of diagnostic catheterization. Early initiation of a rehabilitation program is important for recovery and for the prevention of unwanted additional problems like falling and its consequences, especially in elderly patients.

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