Bilateral femoral nerve neuropathy following blunt trauma

Case report

LOUIS F. D'AMELIO, M.D., DAVID J. MUSSE, M.D., AND MICHAEL RHODES, M.D.
Lehigh Valley Hospital Center, Allentown, Pennsylvania

A unique case of bilateral compressive injury of the femoral nerves is reported in a 19-year-old man. Traumatic femoral nerve neuropathy following operative injury, penetrating injury, anticoagulant therapy with hemorrhage, and stretch injury has been described previously, and the literature concerning this unusual clinical problem is reviewed. Bilateral traumatic femoral nerve neuropathy resulting from compressive injury has not been previously reported.

KEY WORDS • neuropathy • compression injury • femoral nerve

TRAUMATIC femoral nerve neuropathy is a well-described phenomenon. It most frequently occurs as a complication of operative procedures affecting the course of the nerve. Other reported etiologies include penetrating trauma, hemorrhage secondary to anticoagulation, and stretch injuries due to extreme hip extension in dancers and gymnasts. We report a unique case of closed bilateral femoral neuropaxia following compression injury.

Case Report

This 19-year-old white man was transported to our institution after sustaining a compression injury to the pelvis in an industrial accident. He had been trapped for 3 minutes between a table-saw mount and a computer-controlled gear-fed device (Fig. 1). Upon extrication, he became pale and diaphoretic. There was a momentary loss of consciousness. On admission, he described weakness, tingling, and numbness in the anterior aspect of both thighs which began immediately following the accident.

On arrival, the patient's vital signs were: blood pressure 110/70 mm Hg, pulse 110 beats/min, and a respiratory rate of 24/min. He complained of pain in the left inguinal region and denied any neck or back pain. Physical examination of the head, neck, chest, abdomen, and pelvis was unremarkable, while a horizontal bilateral contusion was noted across the inguinal region at the level of entrapment. Physical examination of the femoral vessels and distal branches was normal. Neurological examination revealed a striking inability to flex the thighs or extend the knees bilaterally. Bilateral paresthesias were present in the anterior aspect from the thighs to the ankles. Two-point discrimination, position sense, and pinprick sensation were intact bilaterally. The patellar reflex was absent bilaterally; all other reflexes were normal. The patient exhibited ankle dorsiflexion and plantar flexion of normal strength bilaterally.

Routine laboratory studies were unremarkable, and the serum creatine phosphokinase level was within normal limits. Radiographic examination of the cervical spine, chest, and pelvis was negative. A computerized tomography (CT) scan through the region of injury was obtained to delineate the neurovascular structures in both femoral canals (Fig. 2). No hematoma was visualized in either the retroperitoneum or the femoral canals.

Rehabilitative therapy was instituted and the patient was followed with repeated physical examinations. Thigh flexion against gravity had returned by the 3rd day postinjury. The patient was discharged on the 5th day, at which time his knee extension remained 0/5; however, there was trace activity in the quadriceps. He was able to ambulate with the assistance of a walker. Daily outpatient rehabilitation therapy was instituted and by the 3rd week he was able to stoop and climb.
Traumatic bilateral femoral nerve neuropathy

Discussion

The femoral nerve emerges from the L-2, L-3, and L-4 nerve roots and subsequently courses through the body of the psoas muscle. It continues through the iliopsoas groove where it is tightly enveloped by the iliac fascia, and runs beneath the inguinal ligament onto the anterior surface of the iliac muscle lateral to the femoral sheath. Ultimately, the femoral nerve continues to provide motor innervation to the sartorius, pectineus, and quadriceps muscle groups. Sensory innervation is provided to the anteromedial thigh and medial calf. Injury anywhere along the course of the femoral nerve may lead to sensorimotor deficits in this distribution. The most common lesion, typified by that of our patient, is weakness of the quadriceps group. The patellar reflex is absent or diminished, and anterior thigh or medial leg paresthesias can often be appreciated.

Femoral nerve injury has been reported as a complication of many operative procedures including appendectomy, renal transplantation, tubal reconstruction, vaginal hysterectomy, and transurethral endoscopic surgery. Both direct trauma and stretch injury secondary to retraction have also been reported as etiologies.

Spiegel and Meltzer, among others, have reported cases of femoral neuropraxia following anticoagulation. Compression from iliopsoas muscle hematoma was the operative mechanism in these instances. Stretch injuries of the femoral nerve have been reported following hip hyperextension. Miller and Benedict reported the case of a 20-year-old dancer who suffered bilateral femoral neuropraxia following repetitive exercises with extreme hip extension and knee flexion. The so-called "hanging leg syndrome" has been described in alcoholics who develop femoral neuropathy while sleeping with the leg hyperextended. As suggested by Miller and Benedict, the superior pubic ramus acts as a fulcrum over which the femoral nerve is stretched. Knee flexion compounds the tension on the femoral nerve in these instances, increasing the chance of stretch injury. Isolated femoral nerve contusion secondary to inguinal compressive injury has not, to our knowledge, been reported previously. The absence of local hematoma observed by CT scanning implicates focal nerve stretch or microhemorrhage within the epineurium as potential mechanisms of injury in our patient.

The diagnosis of traumatic femoral nerve neuropathy is largely based on the clinical findings noted earlier. Computerized tomography can be useful in the demarcation of associated retroperitoneal or inguinal hemorrhage. In general, however, the direct imaging of peripheral nerve lesions remains in its infancy. Recent advances in magnetic resonance imaging technology may lead to improved definition of these lesions in the future.

Therapy of blunt peripheral nerve injury is dictated by associated findings. In our patient, the absence of surgically drainable hematoma mandated conservative therapy. In cases where iliopsoas muscle hematoma is implicated, incision of the iliac fascia has been associated with improved outcome. Interruption of anticoagulation and placement of a vena caval filter may be appropriate in some patients. As with all peripheral nerve injuries, traumatic femoral nerve neuropathy is benefited by prompt institution of appropriate rehabilitative measures.
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References


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Address reprint requests to: Michael Rhodes, M.D., 1210 South Cedar Crest Boulevard, Suite 3900, Allentown, Pennsylvania 18103.