

## **Femoral Neuropathy After Vaginal Hysterectomy Under Spinal Anaesthesia : A Rare Case Report**

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### **Abstract:**

The femoral nerve is the largest branch of the lumbar plexus and arises from the posterior branches of L2 to L4 roots. Femoral neuropathy after pelvic operation has occasionally been reported in the literature, but femoral neuropathy after vaginal hysterectomy is very rare. The possible causes of femoral neuropathy include overtraction of the femoral nerve during surgery, direct compression of the femoral nerve by the surgical instrument, or entrapment of the femoral nerve at the inguinal ligament. This report describes a case of bilateral femoral neuropathy after hysterectomy and discusses the anatomic relations of the femoral nerve, possible mechanism of injury, diagnosis, management, and measures for prevention.

**Key Words:** Femoral nerve, lithotomy, spinal anaesthesia, vaginal hysterectomy.

### **Introduction:**

Vaginal hysterectomy is one of the common elective surgeries performed by the gynaecologist. The most common indication of patient undergoing such surgery is genital prolapse. For the anesthesiologist the most feared complication of regional anesthesia is a neurologic deficit. Fortunately, neurologic deficits are very rare. Lithotomy is the second most common surgical position<sup>1</sup>. Lithotomy is the most extreme of the supine position. Positioning the patient in lithotomy has a great risk for causing injury to patient, if not performed appropriately. Femoral neuropathy after pelvic operation has occasionally been reported in the literature, but femoral neuropathy after vaginal hysterectomy is very rare, with only 29 cases reported in the literature<sup>2</sup>.

We here by report a case in which improper lithotomy position for prolonged duration resulted in postoperative femoral neuropathy in a patient who underwent vaginal hysterectomy.

### **Case Report:**

A 60years old female patient weighing 50kg having third degree uterovaginal prolapse was posted for vaginal hysterectomy and pelvic floor repair. History and clinical examination were unremarkable, and her other investigations were within acceptable limits. She was hypertensive, and was on Tab. Atenolol 50mg OD;

her blood pressure was within normal limits. On the day of surgery she was preloaded with IV 500ml Ringer's lactate. She was premedicated with Inj. Ranitidine 50mg and Inj. Ondansetron 4mg IV. All mandatory monitors were attached and subarachnoid block was achieved with 3.6 ml of 0.5% Inj. Bupivacaine heavy in sitting position. Patient was put in supine position, her highest sensory level was at T<sub>6</sub> with complete motor block i.e. Bromage grade III. Patient was given lithotomy position for vaginal hysterectomy with her knees and hips flexed on swing stirrups. During the procedure patient was given sedation with Inj. Midazolam 1mg and Inj. Pentazocin 15mg. She received 1000ml of Ringer's lactate and 500ml of Dextrose normal saline. During surgery, her intraoperative vitals were within normal limits. Surgery lasted two and a half hours.

On the 3<sup>rd</sup> postoperative day, patient complained of acute weakness of the right lower limb with tingling and numbness. Neurologic examination revealed her higher functions to be normal, no cranial nerve palsy, her upper limb sensory and motor functions were normal bilaterally. She had numbness over the anteromedial part of thigh and medial part of lower leg on both sides. Muscle testing was done for a) Hip flexion, extension, adduction and abduction, b) Knee flexion and extension and c) Foot dorsiflexion<sup>3</sup>. It revealed O/5 power in right lower limb. The knee and ankle jerks were absent in the right lower limb. Sensory examination revealed decreased sensitivity to light touch, pinprick, pain, and temperature over anteromedial part of thigh and medial portion of the right leg. Left lower limb examination was within normal limits.

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A definitive diagnosis could not be arrived at and MRI of lumbar spine and CSF examination was carried out. MRI revealed age related degenerative disc changes at L2 to L5 levels. Cerebrospinal fluid examination was within normal limit, and meningitis was ruled out. These finding were consistent with bilateral femoral neuropathy affecting more on right side. Nerve conduction studies were considered inconclusive at this stage and therefore, not performed.

Patient was reassured and managed with oral Multivitamin and Inj Dexamethasone 4mg thrice daily along with physiotherapy. Patient started improving and was discharged on the 15<sup>th</sup> postoperative day. She was followed up weekly; complete recovery was seen after 8 weeks. So the hypothetical diagnosis of bilateral femoral neuropathy was confirmed.

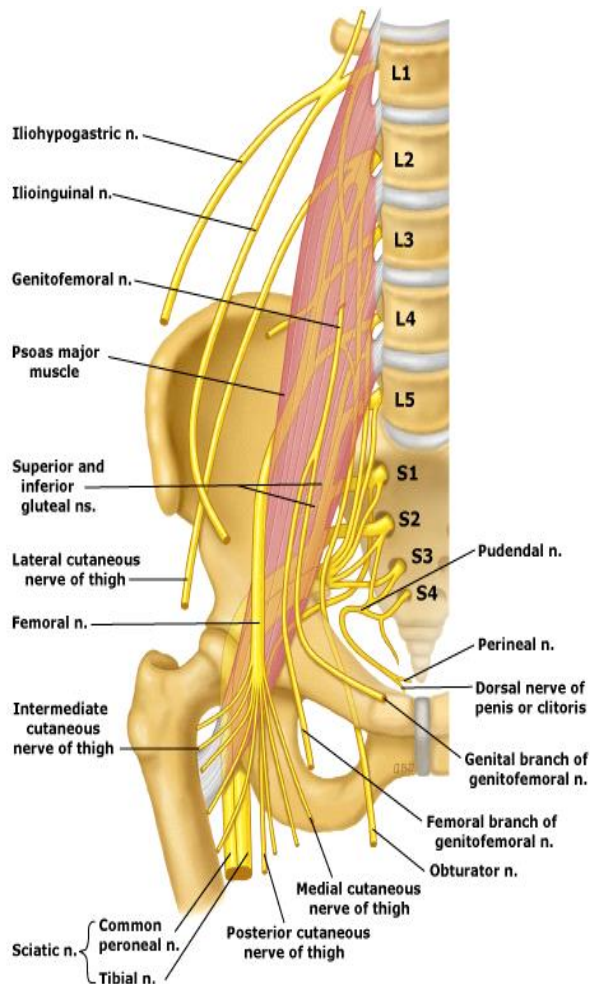


Fig.1 Anatomical relations of Femoral Nerve

**Discussion:**

Vaginal hysterectomy is performed in the lithotomy position and apart from the complications of regional anaesthesia, cases are reported in the literature

that prolonged and improper lithotomy position results in complications like femoral neuropathy.

The femoral nerve is the largest branch of the lumbar plexus<sup>4</sup>. Muscles innervated by the femoral nerve are prime movers for leg extension at the knee joint, flexion at hip joint and critical for standing and stepping function.

The femoral nerve originates from the second, third, and fourth lumbar spinal nerves and innervates the anterior thigh muscles, hip and knee joints, and skin on the anteromedial thigh. Immediately after its formation the nerve penetrates the Psoas major muscle and continues downward within the substance of that muscle. It leaves it at the lower portion of its lateral border where it passes between the psoas and iliacus muscles. It exits from the abdominal cavity just below the inguinal ligament and lateral to the femoral artery. Below the ligament it divides into several branches to provide the motor supply to the quadricep muscles of the thigh, pectineus and sartorius muscles and occasionally to the long adductors<sup>4</sup>.

Femoral nerve injury decreases sensation over the anterior and medial part of thigh and impairs the strength of quadriceps, hip flexion and patellar reflex. Proximal lesions at the level of the lumbosacral plexus may also decrease flexion of hip due to weakness of iliopsoas.

If the Femoral nerve is involved then the knee reflex may be decreased or absent, leading to a marked limp.

It is a general tendency to blame any neuropathy after subarachnoid block as being caused by the block. Hence, in the presence of any neurologic deficit, especially when an epidural or spinal anesthesia has been used, we should rule out the etiologies directly related to the neuraxial block, like spinal cord ischemia, direct trauma to a spinal nerve root or the spinal cord, chemical contamination of the local anesthetic solution, toxicity of the local anesthetic, or space-occupying lesion such as a hematoma or abscess. The causes which are not related to the neuraxial block include pre existing neurologic disease, neurologic injury due to malpositioning, and over stretching of the limbs during operative procedures. After proper history, the patient must be thoroughly examined and investigated to establish the exact cause of the neurologic deficit. A consultation with the neurologist is useful to confirm the correct diagnosis for medicolegal implications<sup>5</sup>.

The intense analgesia and profound muscle

relaxation obtained by subarachnoid block make it possible to produce extremes of positioning. The single straight rod with swing stirrups helps to avoid sciatic and peroneal nerve palsies, but allows exaggerated abduction of the thighs with marked external rotation at the hip. This causes the femoral nerve to enter the thigh acutely angulated and twisted beneath the tough and inelastic inguinal ligament leading to compression of its vasa nervosa, thus producing local ischaemia of the nerve trunk. The duration for which this position is maintained is an important factor because, use of the same position for perineal operations lasting for less than one and a half hours is seldom associated with this neuropathy. This is in accordance with the case reported by Roblee<sup>6</sup>.

One more factor which helps to increase the abduction of thigh and its external rotation, is that surgical assistants often lean against the inner aspect of the thighs. With the understanding of the pathogenesis, prevention becomes easy<sup>4</sup>. The excessive abduction of the thigh with rotation at hip needs to be prevented by lateral supports to the thigh. The reduced abduction of the thighs is inconvenient to the assisting surgeon, but this must yield to patient safety.

A lumbosacral spine magnetic resonance image was performed to rule out an epidural hematoma. Nerve conduction studies were considered inconclusive at this stage and were not available at our set up, therefore, not performed. Nerve conduction and electromyographic studies remain normal for 1 to 3 week after injury, and therefore, are not helpful in the initial diagnosis and therefore, should not be performed<sup>7</sup>.

EMG can help to document the time and location of injury. After denervation, muscle fibers begin to discharge spontaneously, but changes are not seen until 2-3 weeks after injury. Thus, an abnormal EMG obtained within the first week following a regional anesthetic is useful for determining pre existing disease. Injury at the level of the nerve root should affect both the anterior and the posterior rami. If the paraspinous area (supplied by the posterior ramus) is not affected, then the level of nerve injury is distal to the nerve root and not caused by central neuraxial anesthesia<sup>9</sup>.

In the present case, in the lithotomy position with swing stirrups, for more than two and a half hours could have resulted in femoral nerve ischaemia causing neuropathy of femoral nerve. This is the most unphysiological position resulted in the exaggerated abduction and external rotation at the hip, leading to

kinking and twisting of the femoral nerve beneath the tough inguinal ligament and thus producing ischaemia of the nerve trunk resulting in the loss of function. The recovery and the overall prognosis is excellent in these cases. The recovery is spontaneous and starts within three to four weeks and gets completed in six to eight weeks. The present case started recovering and was able to walk after 8 weeks..

To prevent femoral nerve injury during vaginal hysterectomy, one should avoid extremes of hip flexion abduction, and external rotation in the lithotomy position. Roblee<sup>6</sup> constructed lateral thigh supports to limit excessive abduction and external rotation of the hips. These supports have been used in 34 patients in the lithotomy position and have been found to be comfortable. During the operation, surgeons should avoid leaning against the patient's thighs. Based on the few previous reports, femoral neuropathy after vaginal hysterectomy usually occurs when the patient is in the lithotomy position with swing stirrups for more than two & a half hours<sup>9,10</sup>. Other preventive measures include: minimizing operative time; if it is longer than one & a half hours, change the patient's posture to relieve the pressure on the femoral nerves. Palpate the femoral artery below the inguinal ligament before, during, and after the operation. If the femoral pulse is diminished, it is necessary to adjust the patient's posture. Check possible risk factors (eg, diabetes mellitus, low BMI, etc) that might cause femoral neuropathy and offer preventive measures.

### Conclusion:

Proper patient positioning focusing on pressure management requires not only a knowledge of anatomy and physiology but also familiarity with appropriate positioning devices and solid teamwork. Every member of the team must continually assess the patient throughout the procedure to ensure that appropriate positioning is a focal point of patient care. Positioning must be carefully planned and executed to minimize risks and maintain optimal patient safety.

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