Complete Sciatic Nerve Palsy following Pericapsular Infiltration during Total Knee Replacement—An Unusual Complication

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Abstract

Multimodal analgesia is the key to optimizing postoperative pain following total knee replacement surgery. In our institute, we follow a protocol of periarticular infiltration prior to implant, femoral/adductor canal single shot block immediate post-surgery combined with buprenorphine transdermal patch for the first 2 weeks for analgesia.

In this particular patient, we observed that the patient had complete absence of power at ankle joint, as well as toe dorsiflexors and plantar flexors involving operated limb. Ankle reflex was absent. Also, there was complete analgesia and anesthesia in the L2 to L5 territory as compared with the contralateral limb that recovered completely by the end of 48 hours.

We have discussed three possibilities for the same: first, accidental injection around the sciatic nerve during periarticular infiltration; second, sciatic nerve block due to migration of drug following femoral nerve block; third, tourniquet-related nerve injury.

Keywords
- total knee replacement
- sciatic nerve palsy
- capsular infiltration
- femoral nerve block

Introduction

Total knee replacement (TKR) is associated with moderate-to-severe postoperative pain. Multimodal analgesia[1] is the regimen of choice to combat the many mechanisms of pain associated with the surgery, enhance recovery, and assure patient satisfaction. Present protocols include opioid and/or nonopioid oral analgesics, intraoperative periarticular infiltration of local anesthetic and anti-inflammatory drugs, as well as postoperative regional analgesic techniques in an effort to decrease the use of intravenous opioids while providing adequate pain relief. Complete sciatic nerve block or injury has been rarely reported in literature following knee replacement surgeries.

Case Report

A 60-year-old female patient weighing 64 kg, with American Society of Anesthesiologist grade II anesthesia risk, underwent unilateral right-sided TKR under spinal anesthesia. Tourniquet was inflated at 300 mm Hg for 90 minutes. Intraoperative periarticular cocktail injection was given consisting of 0.125% levobupivacaine with adrenaline 1:200000, 150 µg of clonidine, 80 mg of methyl prednisone (depot preparation), 30 mg of ketorolac, 100 µg of fentanyl, 500 mg of tranexamic acid, and 750 mg of cefuroxime (total volume 100 mL). The injection was given in the medial and lateral retinaculum, medial and lateral collateral ligaments, meniscal capsular attachment, posterior capsule and the cut

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quadriceps muscle prior to placement of implants. For postoperative analgesia, as per protocol, patient was given a single shot femoral nerve block with the help of a peripheral nerve stimulator with a volume of 25 cc of 0.375% ropivacaine injected following negative aspiration for blood.

In the immediate postoperative period, patient was observed in recovery for 2 hours. After complete recovery from spinal anesthesia, prior to shifting to room, it was observed that the patient had complete absence of power at ankle joint, as well as toe dorsiflexors and plantar flexors involving operated limb as compared with the contralateral limb. The right-sided ankle reflex was also absent. Also, there was complete analgesia and anesthesia in the L2 to L5 territory. Findings were suggestive of complete palsy of the ipsilateral sciatic nerve (involving both the tibial and peroneal branches). Dorsalis pedis and posterior tibial artery pulsations were well felt. Capillary filling in the toes was satisfactory. Involved limb showed no edema or color changes to suggest circulatory insufficiency. Hence, it was decided to observe the patient in the wards.

Local examination of the limb was done every 4 hours for the first 12 hours, then every 8 hours till complete neurologic recovery. Sensory testing was done for touch and pin prick, and motor testing was done for power and reflexes.

By 12 hours postoperatively, patient had recovered full sensations and motor power in the thigh area. However, below knee patient persisted to have lack of sensation and motor power. By 24 hours, sensations in the L4 to 5 regions recovered. By 36 hours, patient had complete recovery of sensations from L2 to 5 and partial motor recovery with weak ankle reflex. At the end of 48 hours, patient had grade 5 powers in thigh and calf flexors as well as extensors, ankle dorsiflexors, and plantar flexors. The patient was mobilized out of bed and could weight bear without difficulty or any residual neurodeficit.

Rest of the hospital stay over next 4 days was uneventful. The patient was able to do good physiotherapy. Pain control was also satisfactory.

Discussion

We suggest three probable causes for the complication.

First, possibility was that the mixture used for posterior capsular infiltration could have migrated cephalad in the popliteal fossa causing inadvertent block of sciatic nerve prior to bifurcation; thus, blocking both tibial and peroneal branches cannot be ruled out. In an effort to understand why this could have happened, we did a postoperative ultrasound of the popliteal fossa to look for anatomic variations. However, the ultrasound was negative for any gross anatomic abnormality.

Second, we considered a possibility of sciatic nerve block posterior and medial to the lesser trochanter. The landmarks for the anterior approach to sciatic nerve block were described by Beck.[2] The land marks for the anterior approach to Sciatic nerve block as described by Beck et al[2] and Chelly et al[3] demonstrated in ►**Figure 2** are pretty similar and close to the landmarks for the femoral nerve block (►**Figure 1**). for femoral nerve block. As the block was given under nerve stimulator guidance, and not ultrasound, there is a possibility of drug injection posterior and/or medial to the femoral nerve, thus migrating to the sciatic nerve territory. As the volume used for pericapsular block was higher than recommended volume, the drug could have tracked beyond the femoral canal and blocked the sciatic nerve. However, this

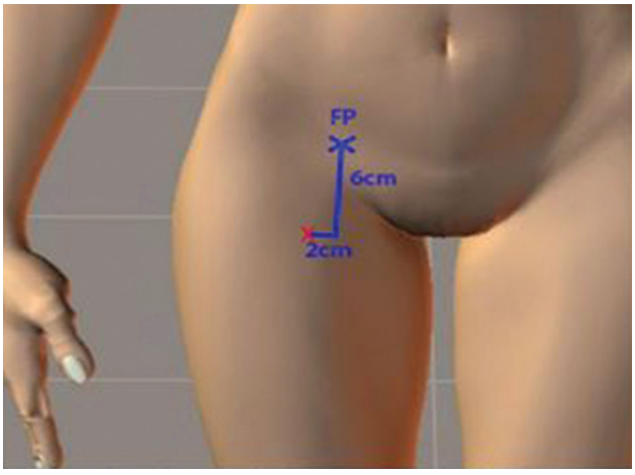

Fig. 1 Landmarks for the femoral nerve block: Point 6 cm distal and 2 cm lateral to the femoral pulse (FP) palpated in the inguinal crease.

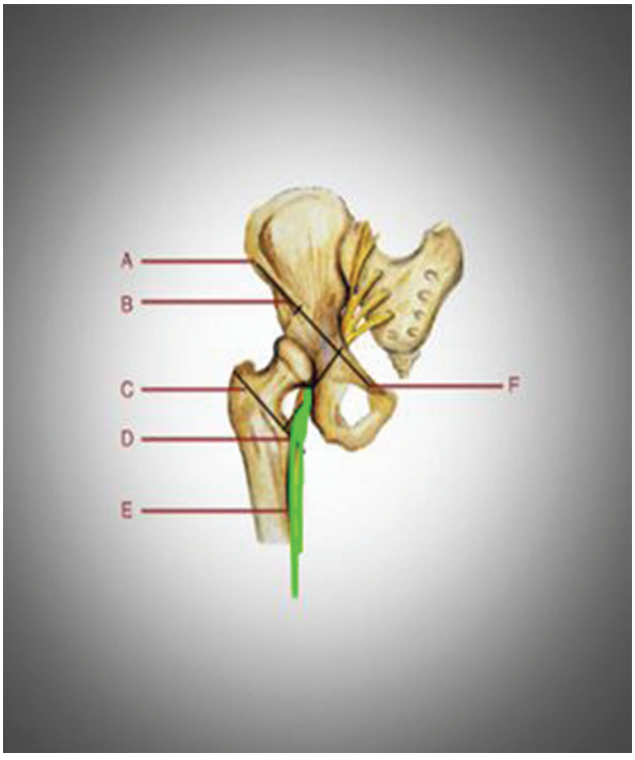

Fig. 2 Landmarks described by Beck for Sciatic nerve block (Anterior approach using nerve stimulator) aim at localizing the lesser trochanter. (**A**) Anterior superior iliac spine ASIS. (**B**) Line joining ASIS and the pubic tubercle. (**C**) Greater trochanter. (**D**) Lesser trochanter. (**E**) Sciatic nerve. (**F**) Pubic tubercle.

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possibility is unlikely due to the fact that hamstring muscle power was not compromised.

Third remote possibility is tourniquet-related nerve injury. A study by Horlocker et al[4] demonstrated nerve palsies of peroneal and/or tibial nerves secondary to tourniquet inflation for more than 120 minutes with overall incidence of 7.7% and near complete recovery by the time of discharge. Though our tourniquet time was 90 minutes and pressures were also within acceptable limits, this rare possibility should also be kept in mind.

Conclusion

Hence, we caution the orthopaedic surgeons and anesthesiologists of this unusual complication. We recommend careful infiltration of posterior capsule with limited volume. Also, we recommend that the femoral nerve block be given under ultrasound guidance and the volume of anesthetic be limited between 10 and 15 mL.

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Conflict of Interest
None declared.

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