



Persistent distal sciatic neuropathy following popliteal nerve block in foot and ankle surgery

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Popliteal nerve blocks are becoming more popular in patients undergoing foot and ankle surgery. The procedure potentially carries fewer complications and is frequently successful while allowing for earlier mobilization when compared with spinal or epidural anesthesia. Reported complications include paresthesias, pain during needle entry and blood aspiration without risk of dural injury or post procedure headache. We present two patients who underwent a popliteal nerve block for a foot and ankle surgery who developed mixed sensory and motor neuropathy that did not fully resolve within their follow up period.

Key words: popliteal nerve block, foot and ankle surgery, sciatic nerve

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Operative and postoperative analgesia has been provided in varying forms which include general anesthesia, spinal or epidural anesthesia, local anesthesia with IV sedation, and peripheral nerve block [1]. Popliteal nerve blocks are becoming more popular in patients undergoing foot and ankle surgery, allowing for earlier mobilization compared with spinal or epidural anesthesia. As a matter of fact, they are being increasingly performed by foot and ankle surgeons rather than by an anesthesia service [5]. The popliteal nerve block was first described by Gaston Labat in 1922 and can be administered from a posterior or lateral approach, with or without the assistance of ultrasound or nerve stimulation. It is believed that the anesthetic interferes with the sodium and potassium channels thus interfering with the action potential [1].

Borgeat et al retrospectively evaluated 1001 patients and reported on complications such as paresthesias, pain during anesthetic administration and blood aspiration [2]. They concluded the procedure is frequently successful and causes few complications.

In 2014, a study reviewing 143 popliteal blocks performed by podiatric surgical residents showed no postoperative complications but an overall success rate of only 76.2% [5]. The purpose of this paper is to present two patients who developed persistent mixed sensory and motor neuropathic syndromes from a popliteal nerve block following a foot and ankle surgical procedure that were still present at final follow up.

Case 1

A 46 year old female presented to our foot and ankle clinic in regards to a right foot drop. She underwent a peroneal tendon repair 8 months prior at an outside facility. She was able to walk with a limp before her surgery however, is now unable to put her foot flat on the ground. During her procedure a calf tourniquet was used for 30 minutes at a setting of 350 mmHg. She received a popliteal nerve block without the use of ultrasound or nerve stimulation. The patient reported the block did not work and she was able to feel her leg and foot before surgery.

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Figure 1 Clinical photograph of 25 degrees plantarflexion.

Upon presentation to our clinic, she complained of paresthesias including tingling in her entire foot and numbness in the S1 nerve distribution. She tried multiple custom made ankle and foot orthotics with no relief. She has past medical history of psoriatic arthritis. Past surgical history includes right finger soft tissue mass excision and hysterectomy. Medications include meloxicam and gabapentin.

Physical examination revealed an alert and oriented female with a BMI of 25. Overall her pain was 6 out of 10. She had palpable pedal pulses. Light touch and vibratory sensation were intact. Achilles and patellar deep tendon reflexes were also intact. Her ankle was fixed at 25 degrees of plantarflexion which was non-reducible and did not improve with knee flexion (Figures 1 and 2). Manual muscle testing demonstrated 3/5 inversion and eversion, 4/5 digital plantarflexion and dorsiflexion and 3/5 ankle dorsiflexion. Mid-calf circumference was six centimeters less than the non-affected side. Electromyography (EMG) and nerve conduction velocity (NCV) studies showed acute axonal degeneration in muscles innervated by the tibial, superficial peroneal, lateral plantar and deep peroneal nerves consistent with a distal sciatic neuropathy. A 3T MRI scan was completed which showed signal intensity of the posterior tibial muscle and soleus muscles indicating atrophy. She underwent a Z lengthening of the triceps surae and posterior ankle joint capsule release to correct the equinus deformity (Figure 3). At 4-month follow up, the patient's foot remained at 90 degrees relative to the leg, however, had continued neuropathic symptoms. She was referred to peripheral nerve surgery for possible neurolysis and nerve grafting.



Figure 2 Clinical photograph illustrating equinus deformity during weightbearing.

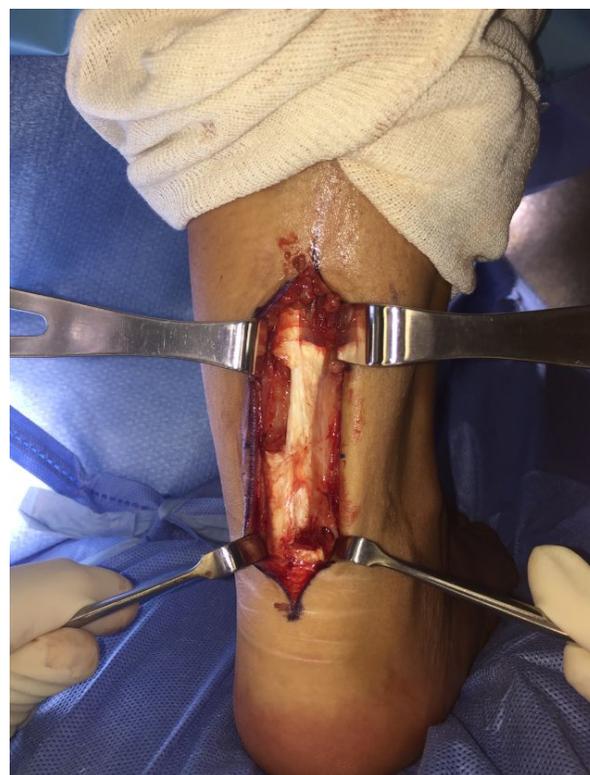


Figure 3 Intraoperative photograph of Z lengthening with posterior ankle joint capsule release.

Case 2

A 17-year-old male sustained a 5th metatarsal zone 2 injury of his right foot and was treated with percutaneous intramedullary screw fixation. He received a preoperative regional nerve block by the anesthesia service. Ultrasound or nerve stimulation was also not used. During his procedure a calf tourniquet was used for 45 minutes at 250 mmHg. During his postoperative course, he developed ipsilateral calf and intrinsic foot muscle atrophy along with pain he described as “pins and needles.” He had an unremarkable past medical history. He had no other past surgical history.

The patient’s BMI was 26.9. Physical examination revealed impaired sensation in the peroneal and tibial nerve distributions at the pedal level. Strength testing revealed 4/5 strength of the tibialis anterior and gastrocnemius muscles. Extensor hallucis longus was 4/5 with full strength to hamstrings, quadriceps, and adductors. EMG/NCV studies showed chronic right sciatic neuropathy distal to the biceps femoris and semimembranosus muscles at 12 months following surgery as well as severe axon loss to intrinsic foot muscles. He was referred to physical medicine and rehabilitation. He was recommended custom orthotics and exercises as well as a home transcutaneous electrical nerve stimulation unit. He was also given B12 vitamin complex and fish oil. His symptoms improved with the exception of intrinsic muscle function and tone, which was persistent at 2 year follow up.

Discussion

Motor and/or sensory neuropathy from a popliteal nerve block is uncommon for patients undergoing foot and ankle surgery with reported incidence of between 1.26% and 5% [1-2]. In a recent retrospective study of 1014 patients who had a popliteal block for foot and/or ankle surgery, the overall success rate was 97.3%. 135 patients reported varying manifestations of neuropathic complications. Eight of these patients retrospectively reviewed developed exclusively motor deficits, 118 exclusively sensory deficits and the remaining nine patients reported mixed sensory and motor deficits.

At final follow up, 14 patients had residual neuropathic symptoms. No statistical significance was found between tobacco use, diabetes, tourniquet location or time, block procedure techniques, single or continuous blocks, or ultrasound or nerve stimulation [1].

A retrospective study of popliteal nerve blocks for hallux valgus surgery showed an incidence of 1.91% for 157 consecutive hallux valgus surgeries. 44% of the blocks were performed with ultrasound in conjunction with nerve stimulation [4].

In 2012, Gartke et al prospectively studied the effects of continuous rather than single shot popliteal blocks in foot and ankle surgery [3]. The study showed a 41% incidence at 2 weeks that decreased to 24% at 8 months. In this study, only 4% of the patients manifested symptoms to warrant referral to a neurologist or pain specialist.

Although regional nerve blocks prior to foot and ankle surgery are generally effective and obviate the negative side effects of opioids or other sedation, careful patient counseling should be planned prior to the procedure. Continuous popliteal nerve blocks may have a higher incidence of transient postprocedural neuropathy versus single shot blocks. Although the majority of neuropathies are isolated sensory deficits that resolve in a period of months, we present two cases of mixed sensorimotor deficits that persisted beyond final follow up. Interesting, both patients that developed distal sciatic neuropathy did not have guidance from either an ultrasound or nerve stimulator during the nerve block. Moving forward, all patients at our institution undergoing a popliteal nerve block have either ultrasound guidance and/or nerve stimulation which is performed by the anesthesia service.

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