Title: COMBINED INTEROSSEOUS TIBIAL NERVE AND COMMON PERONEAL NERVE BLOCKS FOR FOOT SURGERY: A CLINICAL REPORT CORRELATED WITH RADIOGRAPHIC AND CADAVERIC STUDIES.

Authors: S. M. Shulman, M.D., A. T. C. Peng, M.D., K. Nyunt, M.D., J. J. Kepes, M.D., and L. S. Blancato, M.D.

Affiliation: Dept. of Anesthesiology, St. Lukes-Roosevelt Hospital Center, Columbia University, New York City, New York, 10025

Introduction. The common peroneal nerve (CPN) and the tibial nerve (TN) provide sensory innervation to the lower leg and foot. The TN and CPN provide cutaneous sensory branches below the knee. Blocks of the CPN and TN between the patella and the infrapatellar fat pad would provide anesthesia of the foot and lateral calf. We studied the anatomy of the TN and CPN relative to positions of various needles in a cadaver. The spread of radiopaque dye injected in a cadaveric leg was examined radiographically. We attempted to determine the clinical utility of combined CPN and interosseous TN blocks for foot and lateral calf surgery.

Methods. The anatomy of the TN and CPN were examined with cadaveric dissection. Various insertions of needles were examined relative to the tibial nerve. Conray dye was injected in intact cadaveric leg and radiographs were taken to determine the spread of dye. The effect of spread of the blocks were tested intraoperatively. Informed consent for the blocks was obtained. The supine patient was positioned with the knee (lateral to the block extended. EKG was continuously monitored and blood pressure was monitored at least every three minutes during the blocks. Intravenous sedation was routinely given before the blocks. The skin between the patella and the mid-calf was painted with Betadine solution and draped in sterile fashion. The blocks were performed with 2% lidocaine and a 22 gauge needle. The tibial nerve was blocked as follows: The site of needle penetration is five cm below the inferior edge of the patella and 2.5 cm lateral to the tibial ridge. The needle penetrates the skin perpendicularly and is advanced to the depth equal to two-thirds of the distance between the medial and lateral condyles of the tibia. Five ml of local anesthetic are injected and ten ml are injected while slowly withdrawing the needle. The CPN is blocked as follows: The skin is penetrated perpendicularly off the needle one inch inferior to the lateral part of the head of the fibula. When the needle touches the neck of the fibula five ml of anesthetic are injected. The needle is then removed.

Results. The cadaveric dissection examined the exact position of the TN and the CPN. The level at five centimeters below the inferior edge of the patella is important for two reasons. First, the lateral sural sensory branch of the CPN branches off the CPN at about this level and the medial sural sensory branch of the TN below this level. Secondly, at this level the popliteal artery bifurcates into the anterior and posterior tibial arteries. At this level, a needle entering anteriorly between the tibia and fibula in an attempt to block the tibial nerve may pierce the anterior tibial artery. The needle tip used in the TN block described here is about one cm lateral to the nerve and one cm anterior to the tibial artery and vein. The CPN is located along the lateral edge of the fibula. The needle of the CPN block is located axially at the CPN. The radiographic studies showed two distinct nerves. Injections radiographically appeared 8 x 3 cm and 7 x 1.5 cm, respectively. All of the dye remained posterior to the lateral margin of the fibula, assuming the spread of dye parallels the spread of local anesthetic, this radiographic result indicates the anesthetic spread is sufficient to also block the sural branches of the CPN and the TN, but the saphenous nerve which is anterior and medial to the tibia remains unblocked. Sixteen operative cases were performed with the TN-CPN blocks. In all cases, anesthesia occurred within 10 to 15 minutes below the block except along the anteromedial portion of the leg. No hypotension occurred during the cases. The anesthesia was graded with no pain = 0, mild pain = 1, moderate pain = 2 and severe pain = 3. Below the average score is listed for each type of operation.

Anesthesia
Type of operation (n) score
-------------
Phlegmatomy (3) 0.3
Ting amputation (5) 0.3
Skin graft (10) 0.3
Malleolus ulcer (2) 0.0
Foot debridement (2) 0.0
Transmetatarsal amputation (2) 0.5
Bunamcectomy (2) 0.5

Discussion. The combined CPN-TN blocks have several advantages over ankle block or spinal anesthesia for foot surgery. The two nerves are easily located and the blocks can be performed under local anesthesia. There is no need to move the patient to a special position. If the foot is infected, the sites of the blocks are far enough away that creating a sterile field is not difficult. Five ml of anesthetic is sufficient.

Acknowledgment. The interosseous TN block has not been described in the literature. The interosseous approach differs from a TN block at the popliteal fossa or a TN posterior to the foot as it is an anterior approach. This makes the block easier.

Conclusion. The combined interosseous TN-CPN blocks are a simple and safe technique that can be used to provide anesthesia for foot and lateral calf surgery.