CASE REPORT

Ultrasound-guided Continuous Infusion Popliteal Nerve Block with Single Injection Adductor Canal Block: A Superior Technique for Ankle Surgeries

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Abstract

This study shows that when providing ropivacaine analgesia *via* a popliteal sciatic perineural catheter after moderately painful foot or ankle surgery, a continuous infusion is required to maximize infusion benefits. Furthermore, the addition of patient-controlled bolus doses allows for a lower continuous basal rate and decreased local anesthetic consumption, extending the duration of infusion benefits in an ambulatory setting with a limited local anesthetic reservoir. A continuous popliteal sciatic nerve block (PSNB) with a perineural local anesthetic infusion has been shown to provide multiple benefits after moderately painful orthopedic procedures of the foot, including decreased pain, opioid use, and opioid-related adverse effects.

Keywords: Below knee surgeries, Case report, Perineural catheter, Popliteal block, Ropivacaine.

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Clinical Picture

Patients undergoing ankle surgeries are at a high-risk of perioperative morbidity and mortality, especially in those with cardiovascular and respiratory compromise. The administration of central neuraxial blockade or general anesthesia may have adverse hemodynamic effects.[1] Thus, with the advent of peripheral nerve blocks, sciatic nerve blocks are frequently utilized for both surgical anesthesia and postoperative analgesia in patients undergoing ankle surgeries. The success rate of the popliteal nerve block with prolonged duration is increased, and the frequency of complications related to peripheral nerve blocks is decreased with good knowledge of the dermatomes, myotomes, and osteotomes of the lower limb and the use of ultrasound for precise perineural deposition of local anesthetics.[1] Because the sciatic nerve is superficially situated and relatively simple to detect when the popliteal artery is used as an anatomical reference, a popliteal sciatic nerve block (PSNB) is most frequently employed.[2,3] The saphenous nerve can become compressed right above the medial malleolus, below the level of the knee, or above the level of the knee. The medial, anteromedial, and posteromedial lower leg, ankle, and foot receive sensory innervation from the saphenous nerve in a range of sizes. It completely anesthetizes the foot and ankle when combined with a PSNB. The saphenous nerve should be selectively blocked in ambulatory patients to prevent quadriceps muscle weakness, which could increase the risk of postdischarge falls.[4,5] A popliteal block combined with an adductor canal block prevents limb weakness. This leads to the patient's early postoperative mobilization. Our male patient, aged 65 years, with a history of hypertension and not on regular medications, was undergoing ankle surgery (wound debridement and flap cover). His basic preoperative anesthetic examinations were completed, and he was kept fasting for 8 hours before surgery. Intraoperatively, the patient was connected to standard American Society of Anesthesiologists (ASA) monitors, which included noninvasive arterial blood pressure, continuous

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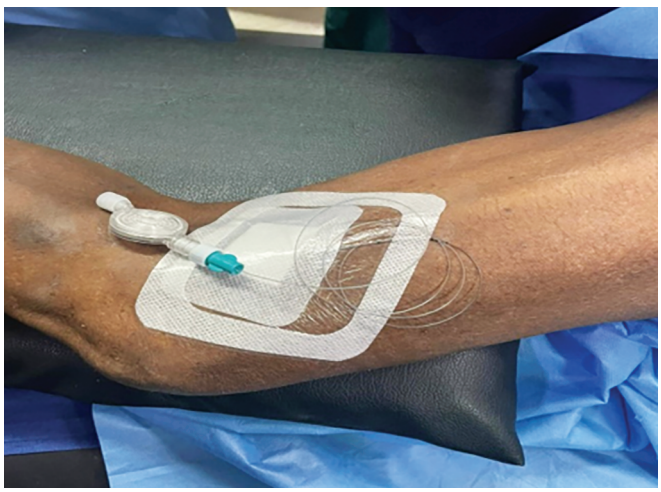

Fig. 1: Popliteal nerve catheter placed successfully on the right side of the knee for the patient

electrocardiogram (ECG), and pulse oximetry, and baseline values were recorded.

Technique

An 18- or 20-gauge intravenous cannula was inserted into the arm of the patient, and fluids were infused. Under all aseptic precautions and preparation, and with the patient in the lateral position, a skin wheal of local anesthetic was raised 1 cm in the caudal direction to the apex of the popliteal fossa. With a 16-gauge Tuohy epidural needle connected to a two-way catheter, the bevel of the needle was directed toward the sciatic nerve bifurcation. The preferred insertion point was 5 cm proximal to the bifurcation. After confirming the needle tip position superficial to the perineurium of the popliteal nerve and deep to the surrounding muscles, an epidural catheter was inserted until resistance was felt. After confirming the placement of the catheter tip in the perineurium, the Tuohy needle was removed, and the catheter was fixed at the skin level (Fig. 1). The other end of the epidural catheter was connected to the bacterial filter and adapter. Local anesthetic was administered continuously with an infusion pump after a single injection of local anesthetic was given as an adductor canal block under ultrasound guidance. For the infusion, bupivacaine 0.125% (50 mL) with 100 mcg of clonidine was used at an infusion rate of 6 mL/hour. For the single-shot block, bupivacaine 0.25% with 20 mcg of clonidine was administered as a bolus dose. After the block, the patient was continuously monitored with noninvasive blood pressure every 5 minutes, continuous ECG monitoring, and pulse oximetry, and for signs of local anesthetic toxicity for 30 minutes. The patient was hemodynamically stable and pain-free throughout the surgery. The patient was followed up postoperatively for 24 hours until the catheter was removed, and the blue tip was noted to be intact. Postoperatively, the patient was monitored in terms of the number of episodes of breakthrough pain, amount of rescue analgesia, postoperative pain, and limb weakness.

Discussion

Continuous infusion of local anesthetic through an epidural catheter into the popliteal nerve has many advantages. The main advantage is that it avoids breakthrough pain, which is possible with a single injection technique. The pain score [numeric rating scale (NRS)] was consistently below 3 throughout the postoperative period. Thus, the requirement for other rescue analgesics is low or minimal with the continuous infusion technique. Patients had satisfactory postoperative analgesia. When combined with the adductor canal block, we found that the patient did not present with limb weakness and was mobilized earlier. Hence, we recommend a continuous infusion of the popliteal nerve block with a single-injection adductor canal block. Keeping in mind that catheter site infection may be possible during mobilization in the ward, this could be a limitation of the case study.

To conclude, a continuous infusion popliteal nerve block with a single-injection adductor canal block can be considered a safe technique and superior to the popliteal nerve block with a saphenous nerve block single-injection technique for postoperative analgesia in ankle surgeries by minimizing the risk of breakthrough pain, reducing the requirement for rescue analgesics, and facilitating early mobilization.

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