Case Report
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Adductor Canal Block combined with Popliteal SciaticNerve Block in Leg and Foot Surgeries: Case series of An Effective Anaesthesia Technique

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1. Introduction

The entire motor and sensory innervation of the leg and foot is provided by the sciatic nerve except for a small strip of sensory innervation on the medial aspect of the leg which is provided by the saphenous nerve. Hence undertaking sciatic and saphenous nerve blocks would provide anaesthesia for any surgery to be undertaken in the leg and foot.

The saphenous nerve is the terminal sensory branch of the posterior division of the femoral nerve (L2,3,4). It is a content of the adductor canal in the lower half of the thigh where it can be imaged by ultrasonography (USG) as a small, round, hyperechoic structure anterior to the femoral artery. It supplies innervation to the medial aspect of the leg down to the ankle and foot. It also sends infrapatellar branches to the knee joint. A saphenous nerve block is useful as a supplement to sciatic nerve block for foot and ankle procedures that involve the medial aspect of the malleolus and the foot[1,2].

The sciatic nerve (L4 to S3) is the largest branch of the sacral plexus and runs down from the hip joint along the posterior thigh to popliteal fossa. The sciatic nerve branches into the common peroneal nerve and the tibial nerve at variable location along its course in the thigh and provides sensory and motor innervation to leg with branches to knee and ankle joint[3,4]. On USG, at the popliteal crease, tibial nerve and common peroneal nerves are identified superficial and lateral to the popliteal vein as hyperechoic, oval or round structures with honeycomb pattern. On tracing the nerves proximally with USG guidance, the nerves unite to form the sciatic nerve enclosed in the common sciatic nerve (Vloka's) sheath[1]. The popliteal sciatic nerve block is popular for postoperative analgesia after fracture and dislocation reductions, exploration of foreign bodies, skin grafting, bedside incision and drainage and for wound debridement and dressing in pediatric patients[5,6,7] and has shown to be effective for 12-15 hours.

Popliteal sciatic nerve block though is a proven and hence a popular modality for post operative analgesia after foot and ankle surgeries[8], there are few studies describing their role as a primary intraoperative anaesthetic technique. Hence, this study was undertaken to administer the adductor canal block (subsartorial block of the saphenous nerve) and popliteal sciatic nerve block as the sole anesthetic technique for leg and foot surgeries and examine its feasibility. USG guidance was advocated to improve the success rates of the blocks.

2. Case Report

A series of five ASA I and II patients aged 25-50yrs posted for debridement involving foot and leg were selected to administer the blocks (Table 1). Pre anaesthetic evaluation of all the 5 patients was done and none of them had any preexisting neuropathy or any contraindication for nerve blocks. After obtaining informed consent, intravenous (IV) access was secured. Routine monitors (ECG, SpO2, NIBP) were connected and parameters recorded every 10 minutes. IV midazolam 1mg was administered for anxiolysis before administering the blocks. Linear USG probe of 6-13MHz was selected to administer the block.

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Table 1. Demographic parameters and OSP* - opening seal pressure

Sl no	Age(yrs)	Sex	Comorbidities	Surgery	Duration of surgery (min)	Duration of Analgesia (hours)
1	64	M	Hypertension,COPD	Amputation of great toe with debridement of wound over medial malleolus	65	12
2	**55**	M	Diabetes	Diabetic foot debridement	60	10.5
3	**60**	M	Hypertension, Diabetes	Diabetic foot debridement	70	14
4	**58**	F	Nil	Debridement of leg and foot	65	13
5	**56**	F	Hypertension	Debridement of leg and foot	60	12.5

For the adductor canal block, the patient was put in supine position. The ipsilateral limb was extended and externally rotated at the pelvis. Under aseptic precautions, the USG transducer was placed transversely on the medial thigh, at the midpoint between the inguinal crease and the medial condyle of femur and femoral artery, located deep to the sartorius muscle was visualised. Under USG guidance, the tip of a 23 gauge spinal needle was positioned anterolateral to the artery and deep to the posterior fascia of the sartorius muscle (in plane approach) and 15 ml of 0.5% bupivacaine with 4mg dexamethasone was injected.

For the popliteal sciatic nerve block, the patient remained in supine position with knee flexed and the foot rested on an elevated footrest (Figure 1). Under aseptic precautions, the USG transducer was placed in a transverse plane at the popliteal crease and traced proximally till the Vloka's sheath is identified. A 23 gauge spinal needle was inserted in plane in a horizontal orientation from the lateral aspect of the thigh and advanced towards the nerve. Once the needle tip was placed within the common sciatic nerve sheath15 ml of 0.5% bupivacaine with 4mg dexamethasone was injected.

Intraoperative period was uneventful and none of the patients required additional analgesia. Haemodynamic parameters were stable intraoperatively.

Visual analogue scale was monitored intraoperatively and post operatively every 30 minutes for 2 hours and then every hour till request for first rescue analgesia (Inj Paracetamol 1 g Infusion) at VAS>4. 24 hour post operative follow up of the patients revealed no residual neuropathy.

In all 5 patients, the surgeries (of mean duration 64+4.18 min) were performed successfully with no additional analgesic requirement. The mean sensory and motor block onset time was 3.45 ± 0.5 (mean ± standard deviation) and 5.05 ± 0.5 (mean ± standard deviation) minutes respectively. Haemodynamic parameters were stable throughout the procedures.

Figure 1. Position of the lower limb for Popliteal Sciatic nerve block.

3. Discussion

With ever increasing number of lower limb surgeries, e.g, total knee arthroplasty, arthroscopic knee surgeries, lower limb fracture fixations and ankle and foot surgeries etc., there is increased demand for better surgical and anaesthetic outcomes with minimal morbidity and mortality and early mobilization and discharge[2,3]. The central neuraxial and peripheral nerve block techniques significantly reduce perioperative morbidity and mortality compared to general anaesthesia with lower endocrine and metabolic responses to surgery, while avoiding airway manipulation and better hemodynamic stability without poly pharmacy. The peripheral nerve block techniques

are advantageous over central neuraxial blocks as they are associated with minimal haemodynamic distrubances, early ambulation and useful in all age groups. They are an attractive option in day care surgeries where early mobilisation can be painful. Placement of catheters in the vicinity of the nerve can provide continuous post operative analgesia. Peripheral nerve blocks can also be undertaken in patients with sepsis, low platelet counts or coagulation abnormailities or other patients medically unfit for general or spinal an aesthesia. The disadvantages being it requires expertise, occurrence of block failure especially when given without USG or nerve stimulator guidance,neuropraxia, infection, intravascular injection, and systemic toxicity of local anaesthetics[4,5].

The peripheral nerve block techniques used for knee and below knee surgeries have been extensively studied and proven to provide excellent options for perioperative analgesia. The advantage of the adductor canal block over the femoral nerve block is the motor sparing effect of the knee facilitating early ambulation[6,7].

Earlier studies have demonstrated that administration of popliteal sciatic nerve block alone or in combination with saphenous nerve block in patients undergoing ankle arthroplasties and other major ankle surgeries, is associated with significantly reduced pain scores in the recovery and post operative period in both rest and movement with marked decrease in post operative morphine requirement[9,10].

In the present case series it was observed that the average duration of post-operative analgesia was 12.4±1.3 (mean ± standard deviation) hours and all patients were mobilised at 6.05±02 (mean ± standard deviation) hours. Hajek *et al*[11] found that after continuous popliteal nerve block in hallux valgus surgeries, 1.26% patients complained of postoperative peripheral neuropathy, 4% had complete block failure and 10% partial block failure. We did not observe any complications in the intraoperative and post operative period and the success of the block was probably 100% due to the use of USG guidance.

4. Conclusion

The combination of adductor canal block and popliteal nerve block is feasible as a sole anesthetic technique with good post operative analgesia for leg and foot surgeries. Although further randomized and controlled trials are required to establish the superiority of peripheral nerve block over the central neuraxial block and general anaesthesia for leg and foot surgeries.

5. References

1. Hadzic s textbook of Regional anaesthesia and acute pain management 2nd edition; p. 615-635.
2. Needoff M, Radford P, Costigan P. Local anesthesia for postoperative pain relief after foot surgery: a prospective clinical trial. Foot Ankle Int. 1995; 16:11- 13. https://doi.org/10.1177/107110079501600103 PMid:7697147
3. Singelyn FJ, Aye F, Gouverneur JM. Continuous popliteal sciatic nerve block: an original technique to provide postoperative analgesia after foot surgery. Anesth Analg. 1997;84:383-386.https://doi.org/10.1213/00000539-199702000-00027 PMid:9024034
4. Memtsoudis SG, Sun X, Chiu YL, Stundner O, Liu SS, Banerjee S, *et al*. Perioperative comparative effectiveness of anesthetic technique in orthopedic patients. Anesthesiology, 2013; 118:1046-58. https://doi.org/10.1097/ALN.0b013e318286061d PMid:23612126 PMCid:PMC3956038
5. Bulka CM, Shotwell MS, Gupta RK, Sandberg WS, Ehrenfeld JM. Regional anesthesia, time to hospital discharge, and in-hospital mortality: A propensity score matched analysis. Reg Anesth Pain Med, 2014; 39:381-6. https://doi.org/10.1097/AAP.0000000000000121 PMid:25025697
6. Di Benedetto P, Casati A, Bertini L, Fanelli G, Chelly JE. Postoperative analgesia with continuous sciatic nerve block after foot surgery: a prospective, randomized comparison between the popliteal and subgluteal approaches. Anesth Analg, 2002; 94:996-1000. https://doi.org/10.1097/00000539-200204000-00041 PMid:11916811
7. Taboada M, Lorenzo D, Oliveira J, Bascuas B, Pe 'rez J, Rodrı 'guez J, *et al*. Comparison of 4 techniques for internal saphenous nerve block. Rev Esp Anestesiol Reanim, 2004; 51:509-514.
8. Canales *et al*. The Popliteal Nerve Block in Foot and Ankle Surgery: an Efficient and Anatomical Techique, J Anesth Clin Res 2015; p. 6:8. https://doi.org/10.4172/2155-6148.1000553
9. Dalia E. Eissa Combined popliteal sciatic and subsartorial saphenous nerve block analgesia in ankle surgery, 2013; 6:158-163.
10. Gallardo J, Lagos L, Bastias C, Henriquez H, Carcuro G, *et al*. Continuous popliteal block for postoperative analgesia in total ankle arthroplasty, 2012; 33:208-212. https://doi.org/10.3113/FAI.2012.0208 PMid:22734282
11. Hajek V, Dussart C, Klack F, Lamy A, Martinez JY, *et al*. Neuropathic complications after 157 procedures of continuous popliteal nerve block for hallux valgus surgery. A retrospective study, Orthop Traumatol Surg Res 2012; 98:327-333. https://doi.org/10.1016/j.otsr.2011.11.004 PM id:22459100