

## SURGERIES OF LOWER LIMB UNDER COMBINED FEMORAL AND SCIATIC NERVE BLOCK

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### Abstract

**INTRODUCTION:** Peripheral nerve blocks (PNB) can provide surgical anesthesia with better cardiorespiratory stability and is the best option for life-saving procedures where both general and central neuraxial anesthesia are risky, and no fasting, or preoperative optimization is required. One of the most useful anesthetic technique is the combination of sciatic and femoral nerve block (3:1) for lower limb surgery. Peripheral nerve blocks are generally suitable for lower limb surgeries because of the peripheral location and the potential to block pain pathways at multiple levels. Also PNBs avoid hemodynamic instability and, facilitate postoperative pain management, and assure a timely discharge of the patient.

**MATERIAL AND METHODS:** In this prospective observational study 50 patients of 22 to 67 years age group of both sexes were included who were posted for lower limb surgeries. Patients were randomly divided into two groups of 25 each. In Group A: 20 ml of 0.5% ropivacaine for femoral nerve block and 20 ml of 0.5% ropivacaine for sciatic nerve block was given to the patients. In group B: 20 ml of 0.5% ropivacaine plus 25 µg fentanyl for femoral nerve block and 20 ml of 0.5% ropivacaine plus fentanyl 25 µg for sciatic nerve block was given. Visual analog scale (VAS) with 0 – 10 cm line was used to see the level of anesthesia in the postoperative period and interpreted as “0” means “no pain” and mark “10” means “severe pain.” Pain score was assessed every 30 min during surgery. If pain is experienced during surgery injection ketamine 0.5 mg/kg intravenously.

**RESULTS:** This study was carried out on 50 patients divided into two groups of 25 each of age group of 22 to 67 years posted for lower limb surgeries. In group A mean age of the patients was  $43.78 \pm 12.47$  and in group B it was  $42.33 \pm 13.29$ . Out of total 25 patients operated in group A 21 (84%) were male and 4 (16%) female, while in group B male and female were 22 (88%) and 3 (12%) respectively. Mean onset of sensory block (Minutes) in group A and Group B was  $11.94 \pm 3.54$  and  $12.19 \pm 2.67$  respectively. Mean onset of motor block in group A was  $17.59 \pm 3.47$  minutes and in group B was  $17.87 \pm 2.78$  minutes. Total duration of sensory block in group A was  $13.96 \pm 0.27$  hours and in group B  $13.05 \pm 0.98$  hours. Total duration of motor block in group A was  $11.58 \pm 1.56$  hours and in group B  $12.88 \pm 0.96$  hours. VAS score was 0 till 8 hours of the study period then it started increasing in both the groups. Patients demanded the first dose of rescue analgesia at 16<sup>th</sup> hour.

**CONCLUSION:** Combined femoral-sciatic nerve block is one of the most useful anesthetic procedures and can be used without any major complications, it can also be used in critically ill patients.

### INTRODUCTION

Peripheral nerve blocks (PNB) can provide surgical anesthesia with better cardiorespiratory stability and is the best option for life-saving procedures where both general and central neuraxial anesthesia are risky, and no fasting, or preoperative optimization is required<sup>i, ii</sup>. As new techniques are invented such as ultrasound and peripheral nerve stimulator, the scope of anesthesia has shifted from general anesthesia (GA) and central neuraxial blockade for isolated limb surgery to peripheral nerve blocks<sup>iii</sup>.

One of the most useful anesthetic technique is the combination of sciatic and femoral nerve block (3:1) for lower limb surgery<sup>iv</sup>. Most of the lower limb surgeries are orthopaedic emergency and fractures occur in an elderly population, and patients with hip fractures frequently have various co-morbidities attributable to the normal process of ageing<sup>v</sup>. Pain both before and after surgery can be reported as severe by most patients and patients have longer hospital stays and greater delays before mobilization<sup>vi</sup>. The opiate drugs can be administered commonly for pain relief but they have complications such as central respiratory centers, drowsiness,

hypotension, and mental confusion. Anti-inflammatory agents such as non-steroidal anti-inflammatory drugs (NSAIDs) may increase the risk of bleeding, gastrointestinal haemorrhage and affect renal function. Thus in order to reduce pain regional nerve blocks can be given<sup>5</sup>

Peripheral nerve blocks are generally suitable for lower limb surgeries because of the peripheral location and the potential to block pain pathways at multiple levels. Also PNBs avoid hemodynamic instability and, facilitate postoperative pain management, and assure a timely discharge of the patient. When long-acting local anesthetics are used, peripheral nerve blocks can be used to provide excellent anesthesia and postoperative analgesia in patients undergoing lower limb surgical procedures. This study was therefore carried out to assess the suitability of Peripheral nerve blocks for various lower limb surgeries and also to assess the hemodynamic stability of the patients.

## MATERIAL AND METHODS

This study was conducted in the department of anaesthesiology at K.M. Medical College and Hospital, Mathura (UP). In this prospective observational study 50 patients of 22 to 67 years age group of both sexes were included who were posted for lower limb surgeries. Patients having morbid obesity, pregnancy, and allergy to the study drug were excluded from the study. Informed written consent of patients was taken. Patients were randomly divided into two groups of 25 each. Techniques the procedure was explained to the patient and the procedure was done only if the patient agreed to it. Institution's Ethical committee approval was taken. Written informed consent from all the participants were obtained. Patients were randomly divided into two groups of 25 each. Sciatic block was given by the anterior approach as described by Chelly et al<sup>vii</sup> or by the posterior approach as described by Labat.<sup>viii</sup>

In Group A :20 ml of 0.5% ropivacaine for femoral nerve block and 20 ml of 0.5% ropivacaine for sciatic nerve block was given to the patients. In group B: 20 ml of 0.5% ropivacaine plus 25 µg fentanyl for femoral nerve block and 20 ml of 0.5% ropivacaine plus fentanyl 25 µg for sciatic nerve block was given. The range and concentration of the dose used depending on the weight of the patient and up to maximum safe dose. Visual analog scale (VAS) with 0 – 10 cm line was used to see the level of anesthesia in

the postoperative period and interpreted as “0” means “no pain” and mark “10” means “severe pain.” Intravenous line was secured with 18-gauge intracath also patients were preloaded with Ringer lactate solution over 15–20 min. Patient was kept in supine position, with leg extended and the table flattened for femoral nerve block for maximum access to the inguinal region. Under all aseptic precautions, the femoral block was given 1.5–2 cm lateral to the femoral artery and 1–2 cm distal to an inguinal ligament in a cephalic direction at 30–45° angle using nerve stimulator. For sciatic nerve block, the patient was kept in lateral decubitus position with the normal leg kept straight and the hip joint of the upper leg in the 40° of flexion, 20–30° of adduction and neutral as to rotation. Motor blockade was evaluated based on modified Bromage scale<sup>ix</sup>. Pain score was assessed every 30 min during surgery. If pain is experienced during surgery injection ketamine 0.5 mg/kg intravenously.

The data from this study was systematically collected; compiled and statistically analyzed using software SPSS 17.0. Data was expressed as a mean and standard deviation, number, and percentages. The patient characteristics were analysed using the “Chi-square tests” and the inter group comparison of the parametric data was carried out using the unpaired *t*-test. The *P* value was finally determined to evaluate the level of significance. *P* < 0.05 was considered significant

## RESULTS

This study was carried out on 50 patients divided into two groups of 25 each of age group of 22 to 67 years age group of both sexes were included who were posted for lower limb surgeries. Demographic data of the patients was collected

**Table 1: Demographic data of the patients in group A and B**

	Group A (n=25)	Group B (n=25)
Age (in years)	43.78± 12.47	42.33± 13.29
Male	21 (84%)	22 (88%)
Female	4 (16%)	3 (12%)
Duration of Surgery (min)	82.21±16.43	89.69±11.23

In group A mean age of the patients was 43.78± 12.47 and in group B it was 42.33± 13.29. Out of total 25 patients operated in group A 21 (84%) were male

and 4 (16%) female, while in group B male and female were 22 (88%) and 3 (12%) respectively.

**Table 2: Sensory and motor block after induction of anaesthesia**

Onset/ duration in minutes/ hours	Group A (n=25)	Group B (n=25)	P value
Mean onset of sensory block (Minutes)	11.94 ± 3.54	12.19 ± 2.67	NS
Mean onset of motor block (Minutes)	17.59 ± 3.47	17.87 ± 2.78	NS
Total duration of sensory block ( hours)	13.96 ± 0.27	13.05 ± 0.98	NS
Total duration of motor block ( hours)	11.58 ± 1.56	12.88 ± 0.96	NS

NS: Not significant

Mean onset of sensory block (Minutes) in group A and Group B was 11.94 ± 3.54 and 12.19 ± 2.67 respectively. Mean onset of motor block in group A was 17.59 ± 3.47 minutes and in group B was 17.87 ± 2.78 minutes. Total duration of sensory block in group A was 13.96 ± 0.27 hours and in group B 13.05 ± 0.98 hours. Total duration of motor block in group A was 11.58 ± 1.56 hours and in group B 12.88 ± 0.96 hours.

VAS score was used to monitor the patients for postoperative pain. VAS was 0 till 8 h of the study period then it started increasing in both the groups. Patients demanded the first dose of rescue analgesia at 16<sup>th</sup> hour.

## DISCUSSION

In the present study method of PNB is an extremely useful and effective alternative technique for lower limb operative procedures in which lower limb can be anesthetized by using the two-puncture technique. This can be applied to any patient undergoing lower limb surgery irrespective of whether he is fit for spinal or general anesthesia. Earlier, general anaesthesia was preferred in lower surgery. But general anaesthesia disrupts the sympathoadrenal compensatory reflexes and physiological balance in traumatized patients. Also, fasting status of patients recruited for emergency surgeries is not confirmed to give general anaesthesia safely without any complication therefore regional anaesthesia is the safest option to provide anaesthesia to these patients. Studies were conducted for the safety of combined femoral and sciatic nerve block over general and central neuraxial blocks for lower limb surgeries. Mehroutra

compared 3 in 1 femoral with sciatic nerve block over general anaesthesia in lower limb surgery in the trauma patient<sup>x</sup>. Akkaya *et al.* compared ultrasound guided femoral and sciatic nerve block and spinal anesthesia for I knee arthroplasty and found peripheral nerve block a simple, safe, and effective method of anaesthesia<sup>xi</sup>.

In our study mean onset of sensory block (Minutes) in group A and Group B was 11.94 ± 3.54 and 12.19 ± 2.67 respectively. Mean onset of motor block in group A was 17.59 ± 3.47 minutes and in group B was 17.87 ± 2.78 minutes. Total duration of sensory block in group A was 13.96 ± 0.27 hours and in group B 13.05 ± 0.98 hours. Total duration of motor block in group A was 11.58 ± 1.56 hours and in group B 12.88 ± 0.96 hours. Combined femoral and sciatic nerve block provides longer duration of postoperative analgesia of about 12–13 hours as compared to a central neuraxial block of about 4–5 hours, so low doses or less doses of analgesics are required in femoral and sciatic nerve block. In this study duration of postoperative analgesia was around 13 hours which is in concordance with results by Papper *et al*<sup>xii</sup>. Mean onset time of sensory and motor block, mean duration of sensory and motor block and postoperative analgesia in our study shows similar results that with the study of Tang *et al*<sup>xiii</sup>.

Tagariello V, in a study on sciatic nerve block concluded that success rate with the posterior approach was found to be almost 99% over 15,000 patients<sup>xiv</sup>. In our study, patient's characteristics such as demographic variables age, sex, were comparable in both the groups. The mean duration of surgery was comparable in both groups.

VAS score perioperatively for 24 h, incidence of side effects and complications were comparable in both the groups in our study. Similar results were found by Magistris *et al*<sup>xv</sup>.

## CONCLUSION

Combined femoral-sciatic nerve block is one of the most useful anesthetic procedures and can be used without any major complications. It can be used in critically ill patients with comorbid conditions. Adding fentanyl, technique can be used for prolonged analgesia

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