



## Anaesthesiology

# COMPARISON OF DEXMEDETOMIDINE AND CLONIDINE AS ADJUVANTS TO ROPIVACAINE IN USG GUIDED POPLITEAL SCIATIC NERVE BLOCK FOR ANESTHESIA AND POSTOPERATIVE ANALGESIA IN PATIENTS UNDERGOING FOOT SURGERIES A RANDOMISED DOUBLE BLIND CLINICAL STUDY

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**ABSTRACT**

**Background:** Various adjuvants are added to local anaesthetics to increase the duration of block during peripheral nerve blocks. Dexmedetomidine, a newer and potent alpha 2 receptor agonist, has 10 times higher selectivity than clonidine. Many studies have already evaluated the efficacy of clonidine and dexmedetomidine as perineural adjuvants and have reported wide variations in the prolongation of postoperative analgesia. **Aims and objectives:** The study of adding dexmedetomidine and clonidine to Ropivacaine 0.75% in popliteal sciatic nerve block for foot surgeries has following objectives.

- 1) onset of sensory and motor blockade
- 2) duration of sensory and motor blockade
- 3) duration of analgesia
- 4) hemodynamic variables (HR, BP, MAP)

**Methodology:** During a one-year period, 50 patients posted for foot surgeries aged between 18-60 years were given ultrasound guided popliteal sciatic nerve block, by identifying bifurcation point of tibial & common peroneal nerve in prone position. Group RD (n = 25): popliteal sciatic nerve block received 20 ml of INJ 0.75% Ropivacaine with 50 mcg of dexmedetomidine Group Rc (n = 25): popliteal sciatic nerve block received 20ml of 0.75% Ropivacaine with 50mcg of clonidine **Results:** The results of our study showed that the both groups were comparable in demographic profile, ASA grade, duration of surgery and type of surgery statically not significant, but onset time of sensory and motor block both were slightly faster in RD group compare to RC group and duration of sensory and motor block and duration of analgesia were prolonged in RD Group as compare to RC group. **Conclusion:** The overall quality of anesthesia achieved with 50 mcg dexmedetomidine as an additive to 0.75% Ropivacaine is superior in terms of onset and duration of analgesia in comparison with clonidine

**KEYWORDS :** Analgesia, clonidine, Dexmedetomidine, Ropivacaine, ultrasound, popliteal sciatic nerve block

**Introduction:**

- The peripheral nerve blocks nowadays is a very commonly used regional anesthesia for lower limb procedures provides intraoperative anesthesia and postoperative analgesia without any systemic effects of central neuraxial block.
- Popliteal sciatic nerve block utilized for a variety of foot and ankle conditions which is safe, effective, low cost anesthesia with good postoperative analgesia.
- It is a Popular technique to decrease postoperative pain, decrease narcotic use, early discharge from post anesthesia care unit and increase patient satisfaction.
- The use of ultrasound is being widely used for nerve blocks because of more accuracy and lower volumes of local anesthetics.
- We choose local anesthetic agents on basis of onset of action, duration of action, and with minimum systemic side effects and better hemodynamic stability.
- Lignocaine, bupivacaine and ropivacaine, levobupivacaine all are amide derivatives, associated with CNS and Cardiovascular complications, bupivacaine is most cardiotoxic than other amide derivatives.
- we choose ropivacaine as a local anesthetic agents in our study because it is less cardiotoxic and with equal duration of analgesia as bupivacaine.
- Greater degree of sensory and motor differentiation was noted with ropivacaine as compare to bupivacaine because of it is less lipophilic so less penetration in large myelinated motor fibers.
- alpha 2 agonists are most commonly used Adjuncts to local anaesthetics for nerve block that enhances the quality and duration of analgesia.
- Clonidine and dexmedetomidine both are alpha 2 receptor agonist, an imidazoline and imidazole derivative respectively, clonidine use as centrally acting anti-hypertensive agent also.
- Dexmedetomidine is a highly selective alpha2 adrenergic receptor agonist with various properties such as analgesic, sympatholytic, sedative and amnesic
- Dexmedetomidine is 8 times more selective alpha 2 adrenoceptor agonist as compared to clonidine.
- many studies have compared clonidine and dexmedetomidine in upper extremity blocks.
- very few studies have done comparing clonidine and dexmedetomidine as adjunct to local anesthetics in ultrasound guided lower extremity nerve blocks
- hence we have conducted this study to compare clonidine and

dexmedetomidine, when added as adjuvant to ropivacaine, with respect to onset, duration of sensory and motor block along with duration of analgesia in popliteal sciatic nerve block in foot surgeries.

**Aims and Objectives:** The study of adding dexmedetomidine and clonidine to Ropivacaine 0.75% in popliteal sciatic nerve block for foot surgeries has following objectives

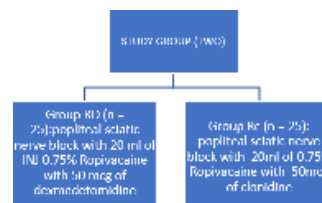
- a) onset of sensory and motor blockade
- b) duration of sensory and motor blockade
- c) duration of analgesia
- d) hemodynamic variables (HR, BP, MAP)

**Materials and methods**

- After obtaining approval from institutional ethics committee and informed consent.

**TYPE OF STUDY:**

A Prospective Randomised Double Blinded clinical study

**STUDY POPULATION : 50****Inclusion criteria:**

All the patients belonging to (ASA) I and II scheduled for foot surgeries in age group between 18-60 years under ultrasound guided popliteal sciatic nerve block in GOVERNMENT GENERAL HOSPITAL, KURNOOL.

**Exclusion criteria**

- Patients who refused the anaesthetic technique,
- whose BMI  $\geq 35$  kg/m<sup>2</sup>,
- unable to properly describe postoperative pain to investigator (dementia, delirium, psychiatric and neurological disorders),
- patients with coagulopathy, skin infection at the site of injection,

- preoperative use of opioid or non-steroidal antiinflammatory drugs,
- allergy or contraindication to studied medication

#### PROCEDURE:

Informed consent was taken from the patient patient was kept nil by mouth 6hrs before surgery

ASA standard mointors devices :pulse oximeter,NIBP,ECG were connected and baseline vitals noted

iv line secured with 20G IV cannula and Patients were premedicated with IV midazolam 0.05 mg /kg before performing block to allay anxiety.

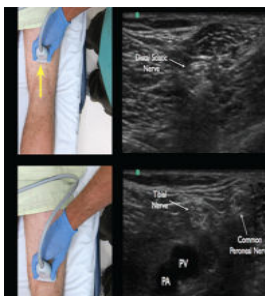
Ultrasound guided sciatic Nerve Block Technique via popliteal approach using a linear array 6 to15 M Hz ultrasonography probe patient was turned to prone position and skin preparation was done with povidone iodine.

Beginning from the popliteal crease, the tibial nerve was first identified just lateral and superficial to the popliteal artery, then traced proximally until it merged with the common peroneal nerve. The bifurcation point was identified where both branches (tibial and peroneal nerve) were situated contiguously.

The sciatic nerve was then traced proximally along the posterior surface of the thigh. After a survey scan, the injection target was chosen just proximal to the bifurcation point of the sciatic nerve. . After skin infiltration with local anaesthetic,A 23-gauge, 70-mm spinal needle was placed with a short-axis, in-plane, and lateral side approach to the sciatic nerve. After confirming the needle tip position, subparaneural injection was performed In the popliteal fossa.

The LA mixture was then deposited under direct ultrasonographic visualization (total volume of 20mL)inside the facial plane of the common paraneural sheath, below and above the sciatic nerve at the point where the tibial nerve and common peroneal nerve unite.

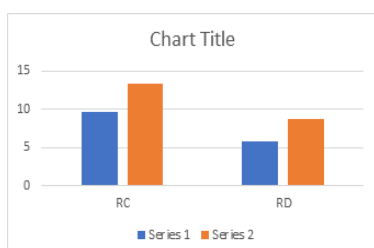
“Donut” signs indicated successful distribution of the study solution around the posterior tibial nerve and the common peroneal nerve



Group RD (n = 25):popliteal sciatic nerve block received 20 ml of INJ 0.75% Ropivacaine with 50 mcg of dexmedetomidine

Group Rc (n = 25): popliteal sciatic nerve block received 20ml of 0.75% Ropivacaine with 50mcg of clonidine

**STATISTICAL ANALYSIS:** To determine the association between the groups, The Student's t-test was used for comparing two groups. A comparison of qualitative variables was analyzed by the chi-square test. A P-value of 0.05 will be taken as the level of significance. Data were presented as mean +/- S.D. Data were entered in Microsoft Excel, and Data analysis was performed using windows MEDCALC software on a personal computer.



Duration of sensory and motor block and duration of analgesia :

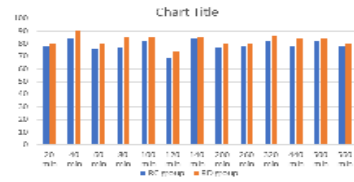
#### OBSERVATION & RESULTS:

Onset of sensory and motor block :

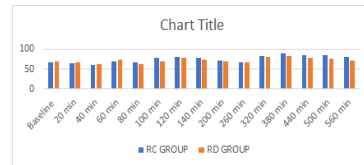
Onset of block	Group RC(mean+_SD)	GROUP RD (mean + _SD)	P VALUE
sensory	9.64+2.4	5.78+2.7	<0.001
motor	13.42+3.6	8.78+2.7	<0.001

Hemodynamic variables :

- Mean pulse rate during study period



- Mean arterial blood pressure in both the group



#### DISCUSSION:

The results of our study showed that the both groups were comparable in demographic profile, ASA grade,duration of surgery and type of surgery statically not significant, but onset time of sensory and motor block both were slightly faster in RD group compare to RC group and duration of sensory and motor block and duration of analgesia were prolonged in RD Group as compare to RC group.

Our study supported by Singh and Aggarwal[3]their study results was in favour of addition of clonidine as an adjuvant to bupivacaine in upper extremities block effectively prolong sensory and motor block duration and quality of block also.

Esmoglu A et al[4] study results was also in favour of addition dexmedetomidine to levobupivacaine for brachial plexus block effectively prolong the duration of motor and sensory block and quality of block also. Above both study suggested that clonidine and dexmedetomidine both increase quality of brachial plexus block.

Other studys also support our study that clonidine and dexmedetomidine both are central acting alpha 2 agonist when added to local anesthetic agents as an adjuvant in upper extremity block effectively prolong the duration of sensory and motor block and postoperative analgesia with minimum systemic side effects and with better quality of block than control group.(5,6)

Other study conducted by Seema S et al. in ear surgery, observed that dexmedetomidine is more effective compare to clonidine in view of duration of postoperative analgesia and sedation score, with no difference in terms of onset of analgesia, grade of bleeding an hemodynamic parameters.[7]

The results of our study are supported by all previous studies done comparing clonidine with dexmedetomidine as adjuvant to local anesthetics in various other blocks

#### CONCLUSION:

The overall quality of anesthesia achieved with 50 mcg dexmedetomidine as an additive to 0.75% Ropivacaine is superior in terms of onset and duration of analgesia in comparison with clonidine

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