

# Management of postoperative pain and comparison of duration of analgesia between Intrathecal Buprenorphine and peripheral nerve blockade (femoral & sciatic nerve blocks).

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## ABSTRACT

**Background:** This study was planned with an aim to compare duration of analgesia produced by intrathecal bupivacaine and intrathecal buprenorphine with intrathecal bupivacaine and femoral and sciatic nerve blocks. **Methods:** Patients were randomly divided in two groups, 25 in each and labelled Group – A (Buprenorphine ) and Group – B ( Nerve blocks ) duration of analgesia produced was compared. **Results:** The mean duration of post operative pain relief in Group A was  $5.70 \pm 0.90$  hours (342.00 Min  $\pm$  52 Min). While in Group B it was  $11.26 \pm 1.20$  hours, (675.60  $\pm$  72 min). **Conclusion:** Nerve blocks (femoral & sciatic) are extremely useful, safe, effective and reliable method for producing post operative pain relief.

**Keywords:** Buprenorphine, Femoral nerve block, Post-operative pain, Sciatic nerve block.

## INTRODUCTION

"Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Inadequate pain control, apart from being inhumane, may result in increased morbidity or mortality.<sup>[1,2]</sup> It is a major symptom in many medical conditions, and can interfere with a person's quality of life and general functioning. The main purpose of perioperative pain control is providing an adequate comfort level and acceptable side effects for patients. Effective postoperative analgesia improves patients' outcome as observed by early ambulation, decrease in side effects, and reduce the incidence of postoperative chronic pain<sup>[3-5]</sup>

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Management of postoperative pain has been done in two phases, one is the preventive aspect and the other is the actual treatment of the pain. In the present study, intrathecal 0.5% bupivacaine heavy & intrathecal buprenorphine and intrathecal 0.5% bupivacaine heavy and peripheral nerve blockade

(femoral & sciatic nerve blocks ) were used separately for postoperative pain relief. The main aim of above study is to compare the duration of postoperative analgesia . Even though postoperative pain management and its implications have gained a significant attention in health care during last three decades, it continues to be a major challenge that still remains disregarded.<sup>[6,7]</sup>

## MATERIALS AND METHODS

The study was conducted in 50 patients (25 in each group) of ASA Grade I and II aged between 20 – 50 years of either sex posted for lower limb surgeries ethical committee approval was obtained for the conduction of the study. All the patients had a preanaesthetic check up and patients who were not willing for regional technique, patients with history of anaphylaxis to local anesthetics, local sepsis, coagulation disorders, neurological disorders, were excluded from the study. Informed consent was obtained from all the patients.

### Preparation of the patient

On the day of surgery all the patients were premedicated with injection midazolam 0.05 mg/ kg body weight. Antibiotics were administered 30 min. before the procedure. Blood pressure was recorded by sphygmomanometer and respiratory rate, pulse rate and oxygen saturation by using pulse oximeter

prior to and every 10 min., 15 min, 30 min, following the spinal anaesthesia were recorded.

Stimuplex needles and nerve stimulator were used in the study. The skin sensitivity to the local anaesthetics was tested in all the groups. After thorough hand wash and wearing sterile gown and gloves and then cleaned the back of the patient in Group A & areas of femoral & sciatic block along with back in Group B patients with antiseptic lotion. All the precautions were taken to ventilate the patient in case if any complications occur.

#### Technique

##### Group A:

With the patient in either right or left lateral positions, 0.5% bupivacaine heavy ( 3 ml ) and Buprenorphine ( 2 µg / kg ) were injected in to the subarachnoid space of L3 - L4 space with a 24 gauge spinal whitacre needle.

##### Group B:

With the patient in supine position and with all aseptic precautions, with the help of peripheral nerve stimulator at 0.5 mA, femoral nerve located 10 cc of 0.5% bupivacaine plain injected through the injection port of the stimuplex needle. Sciatic nerve located by observing the dorsiflexion and eversion of the foot, with the needle in position, 15 cc of 0.5% bupivacaine plain is injected through the injection port. After positioning the patient for spinal anaesthesia, 3cc of 0.5% bupivacaine heavy is injected in to the subarachnoid space at L3 - L4 space with 24G spinal whitacre needle. Duration of analgesia was noted by using visual analogue scale and verbal pain score both at rest and movement. Pulse rate, systolic blood pressure, diastolic blood pressure and respiratory rate monitored.

## RESULTS

This study was planned with an aim to compare duration of analgesia produced by intrathecal bupivacaine and intrathecal buprenorphine with intrathecal bupivacaine and femoral and sciatic nerve blocks. Patients were randomly divided in two groups, 25 in each and labelled

#### Group - A (Buprenorphine) and Group - B (Nerve blocks).

**Group - A:** The mean pulse rate  $72.36 \pm 5.31$  per min., The mean systolic blood pressure in mm of Hg  $100.64 \pm 11.91$ , The mean respiratory rate  $13.52 \pm 1.19$  per min., The mean oxygen saturation  $95.08 \pm 1.3$ , The mean duration of Analgesia in hours  $5.70 \pm 0.90$ .

**Group - B:** Mean pulse rate  $83.2 \pm 8.59$ , Mean systolic blood pressure  $114.4 \pm 14.4$ , Mean respiratory rate  $15.50 \pm 0.99$ , Mean oxygen saturation  $98.20 \pm 1.04$ , The mean duration of analgesia  $11.26 \pm 1.20$  hours.

The mean duration of post-operative pain relief in Group A was  $5.70 \pm 0.90$  hours ( $342.00 \text{ min} \pm 52 \text{ min}$ ). While in Group B it was  $11.26 \pm 1.20$  hours,

( $675.60 \pm 72 \text{ min}$ ). The difference in two groups was statistically highly significant ( $p \text{ value} < 0.0001$ ).

**Table 1: Intra-Operative Parameters.**

Time (min)	PR (per min)	BP (mm of Hg)	RR (per min)	O2 Saturation (%)
10	$77.64 \pm 8.19$	$102.4 \pm 12.99$	$15.76 \pm 0.96$	$98.08 \pm 1.46$
15	$75.32 \pm 8.50$	$100.8 \pm 10.76$	$15.84 \pm 1.10$	$98.20 \pm 1.04$
30	$81.00 \pm 8.19$	$106.4 \pm 11.08$	$15.04 \pm 1.12$	$98 \pm 1.04$
End	$83.68 \pm 8.49$	$116 \pm 9.74$	$15.5 \pm 1.295$	$98.64 \pm 0.53$

**Table 2: Post-Operative Parameters.**

PR (per min)	BP (mm of Hg)	RR (per min)	O2 Saturation (%)
$83.2 \pm 8.59$	$114.4 \pm 14.4$	$15.56 \pm 0.99$	$98.20 \pm 1.04$

**Table 3: Comparison of Duration of Analgesia of Group-A with Group-B.**

Duration of Analgesia in Hours	
Group-A	Mean Duration of Analgesia $5.70 \pm 0.90$ hours ( $342 \pm 51 \text{ min}$ )
Group-B	Mean Duration of Analgesia $11.26 \pm 1.20$ hours ( $675.60 \pm 72 \text{ min}$ )
P value	$<0.0001$ highly significant

## DISCUSSION

Postoperative pain may result in psychological, physiological, neuro endocrinal, respiratory and cardiovascular changes which ultimately increase risk of post operative morbidity and mortality. Alleviation of pain has been a challenging task to all pain therapists and anesthesiologists. Evidence suggests that less than half of patients who undergo surgery report adequate postoperative pain relief.<sup>[8]</sup> Celleno D & Capogna G et al conducted a study using two doses of intrathecal buprenorphine for post operative analgesia<sup>[9]</sup> and concluded that the patients who received higher dose (0.045 mg) had a longer effect (420 min.) than those who received the lower dose (0.03mg) of buprenorphine (173min). Edkin BS et al 1999 conducted a retrospective study on analgesia with femoral nerve block for anterior cruciate ligament reconstruction and concluded that femoral nerve block provided excellent postoperative analgesia with no significant complications.<sup>[10]</sup>

The present study showed that The mean duration of post operative pain relief with intrathecal buprenorphine with 0.5 % bupivacaine for post operative analgesia was  $5.70 \pm 0.90$  hours ( $342.00 \text{ Min} \pm 52 \text{ min}$ ) combined femoral and sciatic nerve block with 0.5 % bupivacaine along with spinal anaesthesia provided prolonged post operative analgesia following knee or below knee surgeries

with a mean duration of 11.26 hours  $\pm$  1.20 hours (675.60 min  $\pm$  72 min.).

Always and almost increasing emphasis has been made to administer nerve blocks, which provide adequate anesthesia and excellent postoperative analgesia.<sup>[11]</sup> Peripheral nerve blocks greatly reduce the need for peri operative opioids and their unwanted postoperative nausea and vomiting.<sup>[12]</sup> In our study most of the patients who received femoral and sciatic nerve blocks did not require rescue analgesics until 10 hrs. Only 2 patients out of 25 required immediate postoperative analgesics due to partial effect.

## CONCLUSION

Nerveblocks (combined femoral & sciatic) provided a prolonged post-operative analgesia extending up to a mean duration of 11.256  $\pm$  1.20 hours (675.60  $\pm$  72 min) with minimal side effects which were not disturbing to the patient. No incidence of neuropraxia or haematoma formation was observed. Intrathecal buprenorphine produced post-operative analgesia for a mean duration of 5.70  $\pm$  0.90 hours (342.00  $\pm$  51 min). Thus we found the nerve blocks (femoral & sciatic) are extremely useful, safe, effective and reliable method for producing post-operative pain relief, there by avoiding multiple injection (im / iv) in post-operative ward and also extending anaesthesiologists, interest beyond the confines of the operation theatre and forms a vital trend of current anaesthetic practice.

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