



COMPARATIVE EVALUATION OF 0.5%LEVOBUPIVACAINE AND 0.5% ROPIVACAINE WITH AND WITHOUT 50 MCG FENTANYL FOR SUPRA CLAVICULAR BRACHIAL PLEXUS BLOCK

Anaesthesiology

Dr. Sesham Sonu

Junior Resident, Department Of Anaesthesiology, Kurnool Medical College, Kurnool.

Dr.venkateswarlu Sanem*

Junior Resident, Department Of Anaesthesiology, Kurnool Medical College, Kurnool.
* Corresponding Author

ABSTRACT

Aims and Objectives: Aim of study is to evaluate effect and quality and duration of analgesia by adding Fentanyl 50mcg to 0.5%Levobupivacaine and 0.5% Ropivacaine for supraclavicular brachial plexus block.

Method: Following approval by the institutional grant committee 160 patients posted for elective upper limb surgeries were included in this double-blind control randomized trial, the result for the 160 patients allocated to 4 groups were analyzed. After giving Supraclavicular block by using 0.5%Levobupivacaine and 0.5% Ropivacaine with or without 50mcgFentanyl, all parameters will be observed and compared as onset and duration of analgesia using Visual Analog Scale.

Results: Mean onset of sensory block for Ropivacaine was 8min and Ropivacaine with fentanyl was 8.1min. Levobupivacaine was 8.4min and levobupivacaine with Fentanyl was 8.6min. Mean onset of motor block for Ropivacaine was 12.9min and Ropivacaine with fentanyl was 13.2min. Levobupivacaine was 13.2min and levobupivacaine with Fentanyl was 13.5min. Mean duration of analgesia for Ropivacaine was 6hrs and Ropivacaine with fentanyl was 9hrs. Levobupivacaine was 10.5hrs and levobupivacaine with Fentanyl was 13hrs.

KEYWORDS

Levobupivacaine, Ropivacaine, Fentanyl, Supraclavicular Brachial Plexus Block

INTRODUCTION

Supra clavicular brachial plexus block is done more commonly for upper limb surgeries and to this various adjuvants are added to alter quality of intra operative blockade and prolongation of duration of analgesia. Fentanyl is a synthetic opioid agonist when given as adjuvant with 0.5% Ropivacaine and 0.5% Levobupivacaine. It inhibits release of acetylcholine from nerve endings producing analgesia. This is double blind randomized study conducted in 160 patients for upper limb surgeries. where Fentanyl is used as adjuvant for Levobupivacaine and Ropivacaine in supra clavicular brachial plexus block to observe

- 1) Onset, duration, quality of intraoperative analgesia.
- 2) Onset and duration of sensory block
- 3) Onset and duration of motor block

AIMS & OBJECTIVES OF THE STUDY

The aim of study for adding fentanyl 50mcg to 0.5% Levobupivacaine and 0.5% Ropivacaine for supraclavicular brachial plexus block was to evaluate

- 1) Onset, duration, quality of intraoperative analgesia
- 2) Onset and duration of sensory block
- 3) Onset and duration of motor block

METHODOLOGY

Source of data:- This is comparison study A minimum 160 patients ASA I, II patient of either sex between 18-65 years of age, patient undergoing elective upper limb surgeries will be selected at Government General Hospital, Kurnool, Andhra Pradesh.

Method of collection of data:-

Study population are randomly divided into 4 Groups with 40 Patients each

Study groups A (RF) – 0.5 % Ropivacaine(29ml) with 50mcg Fentanyl(1ml).

Study groups B (R) – 0.5 % Ropivacaine(30ml)

Study groups C (LF) – 0.5% Levobupivacaine(29ml) with 50mcg Fentanyl(1ml).

Study group D (L) – 0.5% Levobupivacaine(30ml).

After giving supraclavicular block by using 0.5% Levobupivacaine and 0.5% Ropivacaine with or without 50mcg Fentanyl all parameters will be observed and compared as onset and duration of analgesia using Visual Analog Scale

INCLUSION CRITERIA

Patients undergoing orthopedic upper limb surgeries in the age group of 18 -65 years of both sexes will be included with ASA grade I and grade II and patients with valid consent.

EXCLUSION CRITERIA

ASA Grade-III and IV patients

- Bleeding disorders
- Cardiovascular disorders, respiratory disorders, renal disease, and liver diseases.
- Circulatory instability
- Patients with known hypersensitivity to local anaesthetics
- Pregnant women
- Morbidly obese patients
- Patients with injury to any of the nerves of the upper limb
- Presence of infection at the site of block.
- Patients refused for study.

PRE ANAESTHETIC ASSESSMENT

Patient's demographic data like age, height, weight, history, and findings of the examination of the airway, cardiovascular and other systems were recorded. A routine investigation like Haemoglobin, urine sugar, Blood Urea, Creatinine, Chest X-ray, ECG are done in all patients. Patients are explained in detail about the anaesthesia procedure and drugs. All the patients were kept nil by mouth 6-8 hours Pre-induction. Written and informed consent was taken.

STATISTICAL ANALYSIS

All the values observed were analyzed and were expressed as mean $\pm$ SD. Statistical comparisons were performed by students 't' test. A probability value (P) less than 0.05 was regarded as statistically significant. Level of significance : $P > 0.05$ - statistically not significant $P < 0.05$ - statistically significant.

DISCUSSION

Brachial plexus block has emerged as a popular technique among the anaesthetists for upper limb surgeries. This type of anaesthesia avoids the untoward effects of the general anaesthesia. Advantages of brachial plexus block are:

- (a) Patients are usually awake and communicating during brachial plexus block. Patients are usually awake and communicating during brachial plexus block.
- (b) decreased incidence of postoperative nausea and vomiting. decreased incidence of postoperative nausea and vomiting.
- (c) Is effective in terms of cost and performance. Is effective in terms of cost and performance.
- (d) There is an increased margin of safety. There is an increased margin of safety.
- (e) Also provides good postoperative analgesia

Also provides good postoperative analgesia.

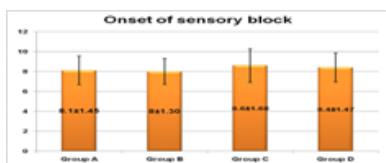
Also provides good postoperative analgesia. Many approaches of brachial plexus block were also described, and the available literature

has shown that supraclavicular block is the superior and easiest method for anaesthesia and postoperative pain management and most consistent method for anaesthesia in surgeries below the shoulder joint. Adding narcotics to local anaesthetics agent improves the intraoperative analgesia quality and prolongs the analgesic effect 2-3 times compared to LA providing alone. There are three postulates that have been proposed to explain the improved quality of anaesthesia by fentanyl-

Fentanyl can act directly on PNS. Primary afferent tissues (dorsal horn) have been found to contain opioid binding sites. Fentanyl may penetrate the nerve membrane and act at dorsal horn leading to prolonged analgesia. Fentanyl can potentiate local anaesthetic action via central opioid receptor-mediated analgesia by peripheral uptake of fentanyl to the systemic circulation. Studies showing effects of adding fentanyl to ropivacaine and levobupivacaine in brachial plexus block is limited, so this present study was undertaken.

MEAN ONSET OF SENSORY BLOCK:

Mean onset of sensory block for ropivacaine was 8min and mean onset of sensory block for ropivacaine with fentanyl was 8.1 min. Here mean onset of sensory block with ropivacaine with fentanyl was delayed when compared with ropivacaine, but it was statistically not significant. Delay in the onset of sensory block with fentanyl in brachial plexus block was also seen in studies conducted by Nishikawa¹ K et al., Chavan² SG et al., Tejwant Rajkhowa³ et al., Boniface Hembrom⁴ et al. Mean onset of sensory block for levobupivacaine was 8.4min. and levobupivacaine with fentanyl was 8.6 min. Mean onset of sensory block for levobupivacaine was early than the mean onset of sensory block for levobupivacaine with fentanyl. Mean onset of sensory block for levobupivacaine is similar to a study done by kulkarni⁵ et al.

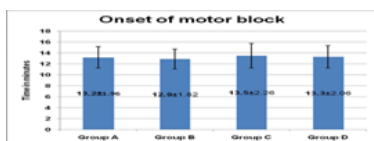


Graph 1: Bar diagram showing Time for the onset of sensory block

Mean onset of sensory block for levobupivacaine with fentanyl was similar to study done by Manbir kaur⁶ et al. It was observed that addition of fentanyl to ropivacaine and levobupivacaine causes a delay in onset of the sensory block due to change in pH, but it was not statistically significant.

ONSET OF MOTOR BLOCK:

Mean onset of the motor block for Ropivacaine was 12.9 min. and Ropivacaine with fentanyl was 13.2 min. Mean onset of the motor block for Ropivacaine was earlier than the mean onset of the motor block for Ropivacaine with fentanyl, but it was statistically not significant, which was similar to the study done by Tejwant Rajkhowa³ et al. Mean onset of the motor block for levobupivacaine was 13.2 min. and levobupivacaine with fentanyl was 13.5 min. Mean onset of the motor block for levobupivacaine was earlier than the mean onset of the motor block for levobupivacaine with fentanyl. Mean onset of the motor block for levobupivacaine was similar to the study done by kulkarni⁵ et al. Mean onset of the motor block for levobupivacaine with fentanyl was similar to the study done by Manbir kaur⁶ et al.

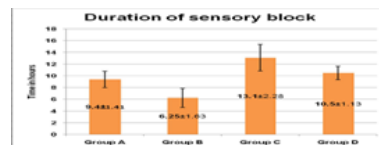


Graph 2: Bar diagram showing mean time for onset of motor block

MEAN DURATION OF SENSORY BLOCK(DURATION OF ANALGESIA):

Mean duration of Analgesia for ropivacaine was 6hrs and ropivacaine with fentanyl was 9hrs. Duration of analgesia for ropivacaine with fentanyl was greater than the duration of analgesia for ropivacaine, which was statistically significant and it was similar to the study was done by Ravi madhusudhan⁷ et al. It shows that addition of opioids like

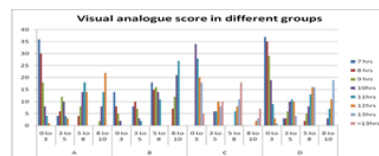
fentanyl increases the duration of analgesia. Duration of Analgesia for levobupivacaine was 10.5 hrs, and levobupivacaine with fentanyl was 13hrs. Duration of Analgesia for levobupivacaine with fentanyl was greater than the duration of Analgesia for levobupivacaine, and it was statistically significant. Duration of Analgesia for levobupivacaine in our group was 10.5 hrs, which was similar to study conducted by Prerna⁸ et al. Duration of Analgesia for levobupivacaine with fentanyl was 13hrs, which was similar to study conducted by Manbir kaur⁶ et al.



Graph 3: Bar diagram showing the mean duration of sensory block(hrs)

VASS SCORE:

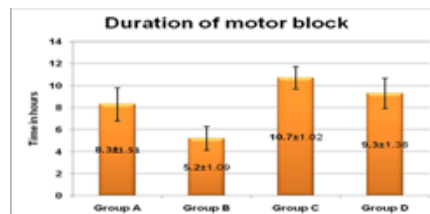
The duration of effective analgesia was calculated from the time between the end of local anaesthetic administration to the time when VAS was less than 4, and rescue analgesic was administered when VAS score was equal to or greater than 4. Most patients in group ropivacaine attained a VAS score of 4 at 7 hours and most patients in group ropivacaine with fentanyl attained a VAS score of 4 at 10 hours. More rescue analgesics were needed in the ropivacaine group than ropivacaine with fentanyl group, and it was statistically significant in our study. Most patients in group levobupivacaine with fentanyl attained a VAS score of 4 at 13 hours, and most patients in group levobupivacaine attained a VAS score of 4 at 11 hours. More rescue analgesics were needed in the levobupivacaine group. When compared to levobupivacaine with fentanyl group it was statistically significant in our study. It was similar to a study conducted by Prerna⁸ et al. and Manbir kaur⁶ et al.



Graph 4: Bar diagram showing VAS scoring and rescue analgesia

DURATION OF MOTOR BLOCK

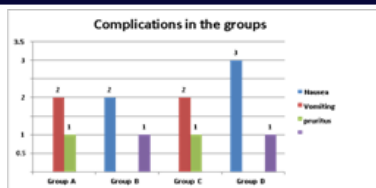
Duration of the motor block for Ropivacaine was 5.2 hrs, and Duration Ropivacaine with fentanyl was 8.3hrs. Duration of the motor block for Ropivacaine with fentanyl was greater than the duration of the motor block for Ropivacaine, and it was statistically significant. This was similar to a study conducted by Ravi Madusudhan⁷ et al. Duration of the motor block for levobupivacaine was 9hrs, and levobupivacaine with fentanyl was 10 hrs. Duration of the motor block for levobupivacaine with fentanyl was greater than the duration of the motor block for levobupivacaine which was significant in our study. It was similar to the study done by prerna⁸ et al. Duration of the motor block for levobupivacaine with fentanyl in our study was similar to the study done by Boniface Hembrom⁴ et al.



Graph 5: Bar diagram showing mean duration of motor block (hrs)

COMPLICATIONS

The complications that were seen in our study were nausea, vomiting, and pruritis. Pruritis was seen in 2 patients receiving fentanyl as an adjuvant. These were not statistically significant. Similar side effects were seen in a study conducted by Soma Cham⁹ et al. No signs of the central nervous system and cardiovascular toxicity were reported in any patients.



Graph 6: Bar diagram showing the complications observed in the groups

CONCLUSION

Duration of analgesia was longer in Levobupivacaine with fentanyl group. Duration of motor block was longer in Levobupivacaine with fentanyl group. Ropivacaine 0.5% and Levobupivacaine 0.5% produce similar quality of motor and sensory blockade. Hence we conclude that 30 ml 0.5% Levobupivacaine with additives like fentanyl for supraclavicular brachial plexus block produces a longer duration of sensory and motor blockade than ropivacaine with fentanyl.

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