Supraclavicular block with 0.5% levobupivacaine and 0.5% ropivacaine—
comparative study

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Abstract:
Two stereo enantiomers—Dextrobupivacaine and Levobupivacaine forms of bupivacaine combinely called as bupivacaine which is commonly used for supraclavicular block. As it got long duration of action it is come this side effects ropivacaine in the place of bupivacaine is useful. Levobupivacaine is another drug for epidural and brachial plexes blocks. This comparative study between levobupivacaine and ropivacaine is taken to know its onset and duration of sensory and motor block. Comparative study between 0.5% levobupivacaine and 0.5% ropivacaine is taken to know its onset and duration of sensory and motor block in upper limb surgeries with supraclavicular brachial plexus block was our aim.

Introduction:
In supraclavicular approach to the brachial plexus block provides regional anaesthesia for upper limb surgeries. In this with subclavian perivascular technic with single injection we can block entire three trunks of the brachial plexus even with lowest volume of drug. This local anaesthesia useful to even prolonged procedures with good overall recovery with minimal side effects.

Review of Literature:
After knowing the cocaine’s anesthetic properties Williams Steward described brachial plexus block in 1885. In 1911 introduced first percutaneous approach for brachial plexus. Later after several studies this supraclavicular block is following for upper limb surgeries. In 2004, Cline, Franz et.al, LISAVANTIL has the studies over this brachial plexus block. Later PIANGATELLI et.al (2006), PUDU et.al in 2009 made several studies on this. In 2010 MANGESWARAL et.al published comparative results.

Materials & Methods:
This was studied in the department of Anaesthesia, KIMS&RF Amalapuram, A.P from A Pilot study was also conducted after approval from IEC of this institute. Basing on this pilot study only 60 patients selected for the study based on inclusion and exclusion criteria.

Inclusion criteria:
1. Age 20-70yrs
2. ASA class I and II
3. Upper limb surgeries

Exclusion criteria:
1. Patient Unwilliness
2. Metabolic disorders
3. Cardiac, respiratory and neurological diseases
4. Hyper sensitivity to drugs
5. Pregnancy
6. Any other local or systemic diseases

History & General examination with Hb%, Dc,Tc, Platelets, Serum Urea & Creatinine, Electrolytes, ECG, Chest X ray- PA view, Bleeding time and Clotting time investigations performed.

An detailed informed written consent was taken from the patients before surgery.

30 people received 30ml of 0.5% Ropivacaine and another 30 with 30ml of 5% Levobupivacaine for block. For onset and duration of sensory and motor blockade all the patients reviewed for every 5 minutes for 1 hour. After completion of surgery every patient checked for sensory and motor blockade study for 6 hours with every 30 minutes interval.

**Observation & Results:**
Men & Women were equally taken for this study. Age, sex, weight, ASA Class, type & location, duration of surgery, Intraoperative Heart rate, Mean Arterial Pressure. Onset of sensory and motor blockade Intravenous Opioid Supplementation Comparison study was taken.

**Discussion:**
Supraclavicular brachial plexus blocked performed by subclavian perivascular technique. The duration of sensory blockade was considerably longer with levobupivacaine and also longer acting in terms of motor blockade. This supraclavicular block called as the spinal anesthesia of the upper limb as it provides complete analgesia and kinesis when compared to an opioid based general anesthesia this has several advantages. Less CVS and respiratory complications with rapid post operative recovery and good post operative analgesia. Also provides avoidance of airway manipulation, preservation of protective reflexes and gives better patients satisfaction.

Brachial plexus can be blocked at various levels right from the nerve roots to each isolated peripheral nerve. Interscalene block supra and infra clavicular block, and also axillary block. At the level of mid humerus, elbow and wrist the individual terminal nerves like ulnar, median and radial nerves can also be blocked very effectively. Lignocaine and Bupivocaine are commonly used for local anesthesia. Bupivocaine gives longer onset of motor and sensory blockade when compare to Lignocaine for prolonged surgeries and for post operative analgesia Bupivocaine preferred than Lignocaine. Brachial plexes area is close to several vascular structures absorption is more rapid and effective.

To avoid systemic toxicity by Bupivocaine other drugs tried which got less adverse effects. So Ropivocaine, as enantiomer of Bupivocaine is preferred some times intravascular injection of Bupivocaine and its high doses can cause severe CNS, CVS and arrhythmias. Ropivocaine 25% less toxic to Bupivocaine. Levobupivocaine which is less toxic is best choice for local Anesthesia, as it got less sodium channels affinity its CVS adverse effects are very less.

Several studies compare on Bupivocaine and Levobupivocaine, or Bupivocaine and Ropivocaine with various concentrations. In peripheral nerve
blocks Ropivocaine and Levobupivocaine relative potencies studies are going on, so it is decided the present study of supraclavicular block with 0.5% of these two drugs. This prospective, randomized, double blinded study was conducted to know their action as local anesthetics. The choice, dose, concentration and volume reveal onset, spread, quality and duration. Several studies reveals volume of this local anesthetic drug in small doses shows failure whereas a higher volume shows systemic toxicity in performing this block. We followed for this study with 30ml as per the studies by Illham at al in their studies they uptained best results. Hickey et al by using .25% Ropivocaine or Bupivocaine noticed high rate of supplementary analgesia. They recommended .5% concentration is enough for brachial plexus anesthesia and also told if the concentration is increased to 0.7% their was know improvement in onset or duration block. In 1998 a dose of 0.4ml/KG at two different concentrations of 0.25% and 0.5% of Levobupivocaine with 0.5% Bupivocaine by Cox et al. They found no much difference between the dose dependent effects of different concentrations except little shorter onset, duration of action with 0.25%. This study makes us to take 0.5% concentration for the present study.

Age group of 20-70 years patients belongs to ASA class I or II with supraclavicular block for this study. Patients with respiratory, hypertension, diabetes and other cardiac diseases and other severe uncontrolled systemic diseases were omitted for this study. An average of 50Kg body weight patient 0.5% used in 30ml as upper limit for the toxic dose for these two drugs is 3mg/Kg and maximum single dose is 150mg. Risk of pneumothorax in supraclavicular block noticed in some studies.

To avoid this subclavian perivascular technique followed For the sample study size 5 in each group, then initial pilot study was performed. According to Lehr’s equation sample size determine for mean duration of sensory and motor blockade with standard deviation in both the groups was calculated. As per the ASA guidelines to avoid chance of block failure or conversion to general anesthesia patients are advised nil by oral for 8hrs minimum preceeding the surgery the persons performing and evaluating the block were not aware of the drug composition as the drug solution was kept in a sterile bowl. Among 60 patients selected for this study block randomization was performed with 20 blocks of size 6 and an allocation ratio of 1:1 and the blocks were chosen at random by a person not involved in the study. By choosing Midazolam, for Sedation by a dose of 0.05mg/Kg body weight Ill ham et al localized 2 nerves median, ulnar, radial or musculocutaneous and administered 15ml at each site. Utilized by using the nerve stimulator administered the drug by subclavian perivascular technique. The observations and results tabulated and analyzed using the SPSS 16 software. All the patients in both the groups comparable in age, sex, weight distribution equally.

As the patients belonging into ASA class I and II, in both the groups equal number of patients belongs to both the classes found. The patients categorized and compared in terms of the location of surgery. The drugs used not shown any cardiac problems and stable also. The mean duration of surgery in all the patients also recorded. Both sensory and motor blockade was earlier in the patients given Levobupivocaine. In infraclavicular brachial plexus block Pinangatelli et al obtained the similar results and also noted in levobupivocaine faster onset of action. With stastically significant results.
Mangeswaran et al also noticed and obtained similar results. Finally our results shows that Levobupovocaine got longer duration of action in terms of both sensory and motor blockade and same with all the other results by various authors.

Summary:
This prospective, randomized, double blinded study was conducted in the department of Anaesthesiology in KIMS&RF. The aim of the study was to compare the onset and duration of sensory and motor blockade between levobupivacaine and ropivacaine when they are used in a concentration of 0.5% in supraclavicular brachial plexus blocks. 60 patients were recruited in the double blinded randomized prospective study after obtaining institutiuional ethical committee approval. These patients were aged between 20-70 years and belonged to ASA class I or II. They were randomly allocated into two groups-Group A and Group B to received either 30 ml of 0.5% ropivacaine or 30 ml of 0.5% levobupivacaine respectively via the supraclavicular brachial plexus block performed by the subclavian perivascular technique using a nerve stimulator. The patients were evaluated for the onset and duration of sensory and motor blockade. The two groups were similar in terms of all demographic parameters such as age, sex, weight,type and location of surgery. The results obtained are summarized.

Conclusion:
From this study, we conclude that:
- The onset of sensory and motor blockade was earlier with levobupivacaine when compared to ropivacaine.
- The duration of sensory and motor blockade was longer in levobupivacaine than ropivacaine.

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