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A COMPARATIVE STUDY OF THE EFFECT OF CLONIDINE ADDED TO ROPIVACAINE AND PLAIN ROPIVACAINE IN SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

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ABSTRACT **Objectives:** Aim of the study was to compare duration of sensory block, motor block, analgesia, haemodynamic parameters, perioperative complications of Ropivacaine with clonidine to plain Ropivacaine in Supraclavicular Plexus block.

Methods: Total of 60 patients, aged 15-65 years,ASA I/II scheduled to undergo elective or emergency unilateral upper limb surgery included in prospective randomized controlled study.Preoperative assessment with routine investigation done for all the patients. After taking informed and written consent patients were divided into Group RC and Group RP. Inj.Clonidine added to Ropivacaine in group RC. All patients were premedicated with Inj.Ondansetron 4mg.Inj. Midazolam 2mg given as per need. Supraclavicular plexus block was given using classical Kulenkampff's technique.NIBP,pulse rate,Spo2,ecg were monitored till complete recovery.

Result: Group RC patients had shorter onset time for both sensory and motor blockade as compared to group RP. Total duration of both sensory and motor blockade was prolonged in Group RC as compared to Group RP. There was no significant difference in haemodynamic parameters in both the groups. No any perioperative complications observed in both the groups.

Conclusion: Ropivacaine along with clonidine has faster onset and prolonged duration of both motor and sensory blockade. Ropivacaine with clonidine has good safety profile with minimal hemodynamic disturbances.

KEYWORDS : Inj.Ropivacaine0.5%, Inj.Clonidine, Supraclavicularplexusblock, Unilateral upper limb surgery.

INTRODUCTION:

Peripheral neural blockade remains a well-accepted component of comprehensive anesthetic care. Brachial plexus blocks are amongst the most commonly performed peripheral neural blocks for upper extremity owing to their high success rate and their ability to provide prolonged postoperative pain relief.

The SUPRACLAVICULAR approach to brachial plexus blockade was introduced in clinical practice in Germany by Kulenkampff in 1911. The supraclavicular route of brachial plexus blockade provides anesthesia of the entire upper extremity in the most consistent, time efficient manner of many brachial plexus block techniques. It is performed at the trunk level where plexus is presented most compactly. Out of various local anesthetics used for Brachial plexus block, Bupivacaine is the most commonly administered long acting drug but in large doses, it causes cardiac depression and central nervous system toxicity. A newer long acting local an aesthetic drug Ropivacaine was approved for clinical use in 1996. It has better safety profile compared to Bupivacaine as it has less cardiac depression and central nervous system toxicity; potential clinical advantage during neural blockade when large volumes are used.

Effect of plain local anesthetics is short lived and often lasting only for 6-8 hours. So Nowadays different drugs have been used as Adjuvant with local anesthetics in brachial plexus block to achieve quick, dense and prolonged block. Drugs like epinephrine, clonidine, dexmedetomidine, dexamethasone, butorphanol, buprenorphine are commonly used along with local anesthetics for this purpose.

MATERIALS AND METHOD:

After obtaining institutional ethical committee approval and written informed valid consent, a randomized, prospective and controlled study on 60 patients of either sex, ASA-I/II in the age group of 15-65 years was conducted in Civil hospital, Ahmedabad.

All the patients underwent a pre anaesthetic checkup before surgery and all the routine and specific investigations were noted. The patients were kept electively nil per oral for 6 hours before surgery. On the day of surgery, written informed valid consent was taken and prior to operation patients were explained about the procedure. Standard monitors like ECG, NIBP, and pulse oximeters were applied and patient's baseline parameters like pulse, blood pressure, respiratory rate, SpO_2 were recorded. Intravenous line secured in all the patients and intravenous fluid started. Inj.Midazolam 0.05mg/kg i.v. (As per need) inj. Ondansetron 0.15mg/kg i.v. (In all patients) as premedication.

For performing brachial plexus blockade through supraclavicular approach, we used classical technique (Kulenkampff's), After placing the patient in dorsal recumbent position with head turned away from site of injection with strict aseptic and antiseptic precautions midclavicular point, external jugular vein and subclavian artery pulsation were identified. About 2 cm above the mid clavicular point just lateral to subclavian artery pulsation, a 22-gauge 1.5-inch hypodermic needle attached with 2 ml saline filled syringe was introduced and directed caudal and medially until paresthesia or motor response was elicited or the first rib was encountered. After brachial plexus was located the drug was injected and before every incremental dose negative aspiration for blood was performed to avoid any intravascular placement. Injection would be stopped immediately if early signs of toxicity appear.

According to the drug administered the patients were randomly allocated to 2 groups-

Group RC: Ropivacaine 0.5% 35cc + Clonidine (150 µg) 1cc =Total volume 36 cc

Group RN: Ropivacaine 0.5% 35cc + Normal Saline (0.9%) 1cc=Total volume 36 cc

During the conduct of block and thereafter, the patients were observed vigilantly for sensory blockade, motor blockade, hemodynamic parameters, intraoperative and post-operative complications and postoperative analgesia at 5 minutes interval for 15 minute, then 15 minute interval for 30 minutes , then 30 minute interval for 60 minutes, then 1 hourly interval for 2 hour, then 2 hourly interval for 12 hrs. and then at 16 hour.

All the data was filled in proforma and was statistically analyzed by using

"UNPAIRED STUDENT t- TEST". P value was calculated with the help of ©2013 GRAPH PAD SOFTWARE.

p VALUE was applied as follows:

If $p>0.05$, it means that there is no significant difference between means of two groups studied.

If p=0.05, it indicates that there is a significant difference at 5% level of significance (i.e. out of 100, in 95 cases there is a significant difference) If p<0.05, it indicates that the data is significant at 5% level of significance (i.e. out of 100, in 95 cases there is a significant difference)

RESULT

Table -1 Onset Time For Sensory And Motor Block

	Sensory Block Onset Time (mins) Mean ± SD	Motor Block Onset Time (mins) Mean ± SD
Group RC	7.23±0.81	9.066±0.82
Group RN	8.03±1.06	10.03±1.24
p-value	0.002(<0.05)	0.001 (<0.05)

- Table 1 shows mean onset time of sensory blockade and motor blockade with standard deviation in minutes in both groups. Sensory onset time was calculated from time taken from drug injection to complete ablation of sensation (sensory score 2). Motor onset time was calculated from Time taken from drug injection to complete motor block (motor grade score 2). **Onset time for Sensory and Motor blockade was shorter in group RC as compared to group RN** with P value < 0.05 which was statistically significant.

Table -2 Duration Of Sensory And Motor Block

	Duration of Motor block (Mean ± SD)	Duration of Sensory block (Mean ± SD)
Group RC	429.00±76.08 mins	553.00 ±81.66 mins
Group RN	391.33±19.10 mins	470.00±24.08 mins
p-value	0.0023 (<0.05)	0.0002(<0.05)

- Table 2 shows duration of sensory block and motor block with standard deviation in mins and hrs. **Duration of sensory block** was calculated from the Time taken from onset of block to complete return of paresthesia (sensory score 0) It **was longer in group RC** as compared **to group RN** and it was statistically highly significant(P value <0.05).**Duration of motor block** was calculated from the Time taken from complete motor blockade to restoration of movements of forearm (grade 0). It **was longer in group RC** as compared to **group RN** and it was statistically highly significant (P value <0.05)

Table 3 Duration Of Analgesia

	Duration of Analgesia (Mean SD)	P Value
Group RC	785.33±96.53 mins	0.0002 (<0.05)
Group RN	628.00±33.61 mins	

- Table 3 shows Duration of post-operative analgesia which was calculated from the "Time from onset of sensory blockade to time when patient VAS score > 4 (four)." Post-operative analgesia was **significantly longer in group RC as compared to group RN** and was statistically significant (P value < 0.05).
- There were no significant hemodynamic differences and complications observed between two groups.

DISCUSSION:

Although General anesthesia continues to be used for most of the surgical procedures, Regional anesthesia has been increasing in popularity in recent years. Regional anesthesia provides improved satisfaction and cause less cognitive impairment and immunosu ppression compared to general anesthesia (particularly in elderly patients). Peripheral nerve blocks offer an excellent alternative for patients in whom postoperative nausea and vomiting are a problem, who are at risk for development of malignant hyperthermia, who are hemodynamically compromised or too ill to tolerate general anesthesia.

The brachial plexus block consists of injecting local analgesic drugs in the fascial spaces surrounding the nerve plexus, there by blocking the autonomic, sensory and motor fibers supplying the upper extremity. There are different approaches to block the brachial plexus

- The Supraclavicular approach
- The Axillary approach
- The Interscalene approach

we had selected supraclavicular approach because It is performed at the trunk level where plexus is presented most compactly. Ropivacaine has better safety profile compared to Bupivacaine .Out of various adjuvants we had selected Clonidine because it was reported that the addition as adjuvant in brachial plexus block improve success rate and post-operative analgesia. Clonidine is a selective α_2 receptor agonist.

In study by Usha Bafna et al[1],there was rapid onset of sensory blockade (10.18±2.48 min with Ropivacaine+ Clonidine as compared to 11±3.4 min with Ropivacaine+ saline.) and also rapid onset of motor blockade (12.9±3.24 min with Ropivacaine+ Clonidine and 13.9±3.66 min with Ropivacaine+ saline.)

In the studies conducted by Asad Mohammad et al[2],Hina Gadani et al[3] ,Usha Bafna et al[1] also there is duration of motor block and sensory block both were prolonged for Ropivacaine + Clonidine as compared to Ropivacaine alone with statistical significance. Result of our study is same as study by Birbal, Vandana Tyagi al[4]. They observed that duration of analgesia was prolonged with Ropivacaine + Clonidine (576.96±84.36 mins) than with Ropivacaine (442.14±86.14 mins). Same result was also found in study by Asad Mohammad et al[2] ,Hina Gadani et al[3].

CONCLUSION:

Ropivacaine – a new local anaesthetic agent along with Clonidine, having better profile in terms of

- Rapid onset of sensory and motor block,
- Prolonged duration of sensory block and post-operative analgesia;
- Has better safety profile as it has less cardiac depression and central nervous system toxicity (especially when large volumes are used)
- Remarkably safe and cost-effective method of providing postoperative analgesia for upper limb surgeries.
- Offers an alternative like Bupivacaine along with clonidine
- For brachial plexus block in upper limb surgeries

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