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## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/19421

DOI URL: <http://dx.doi.org/10.21474/IJAR01/19421>



### RESEARCH ARTICLE

#### STUDY OF COMPARISON BETWEEN BUPIVACAINE 0.5% & ROPIVACAINE 0.5% IN ULTRASOUND GUIDED AXILLARY BRACHIAL PLEXUS FOR ELECTIVE UPPER LIMB SURGERIES

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#### Manuscript Info

##### Manuscript History

Received: 30 June 2024

Final Accepted: 31 July 2024

Published: August 2024

##### Key words:-

USG Guided Axillary Block, Motor Blockade, Sensory Blockade, Duration of Analgesia, VAS Score

#### Abstract

**Background:** This study contains comparison between Bupivacaine 0.5% & Ropivacaine 0.5% in ultrasound guided axillary brachial plexus block in elective upper limb surgeries. It is safer technique compared to GA. Study aims comparison of both local anaesthetic drugs in terms of volume, onset of motor & sensory blockade, duration of motor & sensory blockade & duration of analgesia.

**Methods:** This randomized, controlled, double blinded study at tertiary care center compared effect of bupivacaine 0.5% and ropivacaine 0.5%. Adults meeting specific inclusion criteria were divided in 2 equal groups 30 patients in each. All patients were given USG guided axillary block. Group A received Inj. Bupivacaine 0.5% 2.5-3 mg/kg (20-30 ml) while group B received Inj. Ropivacaine 0.5% 2-3 mg/kg (20-30 ml). Outcome measured included volume of drug, onset of motor & sensory blockade, duration of motor & sensory blockade. Hemodynamic parameters, VAS score, requirement of rescue analgesic (VAS >4) observed during perioperative period at different intervals. Sensory & motor block were assessed by 3-point scale. VAS score is evaluated by asking the patients to describe their pain between 0 to 10. p-value  $\leq 0.05$  was considered statistically significant.

**Results:** Comparison between both groups showed that onset of motor blockade ( $11.3 \pm 1.48$  min) & sensory blockade ( $7.46 \pm 1.40$  min) was slower in group A, whereas onset of motor blockade ( $6.91 \pm 1.39$  min) & sensory blockade ( $3.13 \pm 0.84$  min) was faster in group B. While duration of motor blockade ( $681.16 \pm 15.23$  min) & sensory blockade ( $745 \pm 25.12$  min) was prolonged in group A compared to shorter duration of motor blockade ( $480.83 \pm 31.67$  min) & sensory blockade ( $550.16 \pm 39.62$  min) in group B. Duration of Analgesia was longer in group A ( $1388.83 \pm 162.85$  min) compared with group B ( $856.16 \pm 139.51$  min).

**Conclusion:** Ropivacaine 0.5% is associated with faster recovery of sensory & motor function with better safety profile compared to Bupivacaine 0.5%.

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#### Introduction:-

Pain is "an unpleasant sensory & emotional experience associated with actual or potential tissue damage or described in terms of damage". Pain is mainly protective phenomenon and complex perceptual experience.<sup>1</sup>

Adequate pain relief can modify surgical stress response (endocrine, metabolic and inflammatory) which contribute to reduce incidence of perioperative organ dysfunction.<sup>2</sup> Management of perioperative pain relieves suffering and increases patient's satisfaction, shortens hospital stay and reduces hospital cost and leads to early mobilization.<sup>3</sup> The quest for effective pain management techniques with minimal adverse effect has led to the exploration of regional anesthesia as a promising alternative.

Peripheral nerve block provides excellent anesthesia & postoperative analgesia with fewer side effects, when compared to general anesthesia. The use of nerve block also leads to prolonged postoperative analgesia, reduced use of postoperative opioids, decreased postoperative complications and early discharge.

There are different approaches of brachial plexus block that is interscalene, supraclavicular, infraclavicular and axillary. Axillary brachial plexus block are techniques in upper extremity surgeries. It provides optimal surgical conditions and prolonged postoperative analgesia.

Axillary brachial plexus block is one of the most commonly used regional anesthesia technique for surgical procedures involving forearm, wrist and hand. There are three techniques to block the brachial plexus. First one is anatomical (blind technique using paraesthesia), Second one is peripheral nerve stimulator (twitching of respective muscle) and third one is ultrasound guided (A real time image, identifying the nerve and surrounding structure).

For a successful block local anesthetic solution should be injected into the nerve sheath.<sup>4</sup> According to De Jong,<sup>5</sup> the estimated volume of brachial plexus sheath is 42ml. In regional block anesthetic solution such as Bupivacaine 0.5%, Ropivacaine 0.5%, Lidocaine 2% and Mepivacaine 1.5% can be used.

The study was conducted to compare between Bupivacaine 0.5% v/s Ropivacaine 0.5% in ultrasound guided axillary brachial plexus block for upper limb surgeries.

Bupivacaine belongs to amide group of local anesthetic drug. It binds to sites on voltage gated Na<sup>+</sup> channels and prevents opening of the channels. It blocks the sodium influx into the nerve cells which prevents generation of conduction of nerve impulses. Bupivacaine is lipid soluble, highly protein bound. It has slower onset of action (15 minutes), highly potent and has longer duration of action (240-280 minutes). In clinical practices it was noted that use of racemic mixture of bupivacaine resulted in cardiac and central nervous system toxicity in few patients<sup>3,15</sup>.

Ropivacaine is a long-acting amide local anesthetic. It reversibly inhibits sodium ion influx in nerve fibers. Amides preferentially bind and inactivate sodium channels in the open state—thereby blocking propagation of action potentials. Dose-dependent inhibition of potassium channels potentiates this action. Ropivacaine is having less lipophilicity than other local anesthetics, such as bupivacaine, and is less likely to penetrate large myelinated motor fibers. So, it selectively acts on the nociceptive A, B, and C fibers over the AB (motor) fibers. Ropivacaine is manufactured as a pure S(-) enantiomer which has significantly less cardiotoxicity and neurotoxicity.<sup>2,6</sup>

Many studies suggested that ropivacaine produces less cardiac & central nervous system toxic effects, less motor block and a similar duration of action of sensory analgesia as bupivacaine<sup>6,7</sup>.

The objectives of our study was to compare the effect of Bupivacaine 0.5% and Ropivacaine 0.5% in ultrasound guided axillary brachial plexus block in terms of:

1. Time of onset & duration of motor & sensory block
2. Perioperative hemodynamic stability
3. Perioperative complications
4. Duration of analgesia (Time at which 1<sup>st</sup> rescue analgesic was given)

## **Method:-**

### **Study Design**

This study was a randomized, controlled, double-blinded study conducted to study comparison between bupivacaine 0.5% and Ropivacaine 0.5% in Ultrasound guided axillary block in elective upper limb surgeries. The study was

approved by the Institutional Review Board (IRB) and was registered with a clinical trials registry. All participants provided written informed consent before participation.

**Study Location**

This study was done at a tertiary care centre's Anaesthesia department, enrolling adult patients scheduled for elective upper limb surgeries. Study was conducted during year 2020-2022 following approval by the Institutional Review Board.

**Study Duration**

The study duration included the time from initial patient recruitment to the completion of the final postoperative assessment at 24 hours post-surgery. This timeframe allowed for a detailed evaluation of the onset of motor and sensory blockade, duration of motor and sensory blockade, duration of analgesia and requirement of first rescue analgesic in both group of drugs.

**Participants**

Participants were recruited from a tertiary care center's orthopaedic department.

**Inclusion Criteria**

1. Aged between 18 to 60 years of either sex posted for upper arm surgeries.
2. Belonging to ASA grade 1 and 2
3. Patient's weight should be more than 50 kgs.

**Exclusion Criteria**

1. Unwillingness of patients
2. Hypersensitivity to study drugs
3. Local infection
4. Patients with bleeding disorder and altered coagulation
5. Neurological deficit involving brachial plexus

**Intervention**

All patients were randomly allocated to either of 2 Groups of 30 each.

**Group A:** Inj. Bupivacaine 0.5% - 2.5-3mg/kg (20-30 ml)

**Group B:** Inj. Ropivacaine 0.5% - 2.0-3mg/kg (20-30 ml)

Thorough pre-anaesthetic evaluation including history taking, local examination and systemic examination were carried out on day before surgery. Informed written consent for procedure was taken. All patients were advised nil by mouth as per standard fasting guidelines in case of elective surgeries. Patients were explained about the procedure day before surgery and about visual analogue score. Tab Alprax 0.5 mg one night before surgery.

An intravenous line was secured and intravenous fluids started. After shifting the patient in operation theatre all monitors attached. All patients were pre-medicated with Inj. glycopyrrolate 0.004 mg/kg iv, Inj.ondansetron 0.08 mg/kg iv, Inj. midazolam 0.02 mg/kg iv. Vitals were noted before and after pre-medication.

The patient was placed in the supine position, with the head turned away from the side to be blocked and the ipsilateral arm adducted. The operative arm was abducted and externally rotated, and the elbow flexed to 90 degrees. Ultrasound examination of the axilla was performed using a ultrasound machine with a 38-mm high frequency (7–10 MHz) linear array transducer. Transducer was placed at the level of anterior axillary fold and identification of median, ulnar and radial nerve complexes around axillary artery done. The musculocutaneous nerve was then identified in a connective tissue plane between the biceps and the coracobrachialis muscles. A 23G 3.75 cm sterile block needle was introduced percutaneously at the center of the transducer, directly parallel to the scanning beam using in plane approach. The needle was advanced to positions adjacent to the median, ulnar, and radial and musculocutaneous nerves in this order. The study volume of drug was injected adjacent to each nerve after negative aspiration of blood.

**Outcome measures**

Following block patients were assessed for

1. Onset and duration of sensory block

2. Onset and duration of motor block
  3. Vitals
  4. Time at which 1<sup>st</sup> rescue analgesic was given
  5. Perioperative complications
- Sensory block was assessed by pin prick test using a 3 point scale:  
 0 = normal sensation  
 1= loss of sensation of pin prick (analgesia)  
 2=loss of sensation of touch (anesthesia).

Motor block assessed by using 3-point scale:  
 0=normal motor function  
 1=reduced motor strength but able to move fingers  
 2=complete motor block.

Onset time of sensory blockade was defined as the time interval between the end of total local anesthetic administration and complete sensory block. Complete sensory block was defined by anesthetic block (score 2) on all nerve territories.

Duration of sensory block was defined as the time interval between the end of local anesthetic administration and the complete resolution of anesthesia on all nerves.

Onset of motor block was defined as the time interval between the end of total local anesthetic administration and absence of voluntary movements on hand and forearm (score 0).

Duration of motor block was defined as the time interval between the end of local anesthetic administration and the recovery of complete motor function of hand and forearm.

Duration of analgesia: total duration of analgesia was defined as the time duration from onset of Grade 1 sensory block to requirement of first rescue analgesia. The duration of analgesia was counted till VAS > 4. If the effect was inadequate, general anesthesia was given and those patients were excluded from study.

Patients were observed for peri-operative vitals at the time of induction, at the time of incision then, then 2,4,6,8,10,15,20,25,30,45,60,75,90,105,120, minutes, 2.5hrs, 3 hrs, 3.5 hrs, 4 hrs, 6 hrs, 8 hrs, 10 hrs, 12 hrs, 16 hrs, 20hrs and 24hrs. Patients were asked to describe their pain from 0 to 10, where 0 means no pain and 10 means worst pain. When VAS > 4 rescue analgesia was given intravenously.

### Statistical Analysis

Data were analyzed on an intention-to-treat basis. Continuous variables were compared using independent t-tests or Mann-Whitney U tests, depending on their distribution. Categorical variables were analyzed using the Chi-square test or Fisher's exact test as appropriate. A p-value of less than 0.05 was considered statistically significant. All analyses were performed using statistical software.

### Results:-

**Table 1:-** Comparison Of Demographic Data.

	Group A (n=30)	Group B(n=30)	p value	Inference
<b>Gender</b>				
Male	16 (53.33%)	16 (53.33%)	-	-
Female	14 (46.66%)	14 (46.66%)		
<b>ASA Grade (1/2)</b>	18/12	19/11	-	-
<b>Age (Years)</b>	36.96±12.50	36.83±7.68	0.9670	NS
<b>Weight (Kgs)</b>	61.03±7.68	62.93± 8.98	0.3821	NS

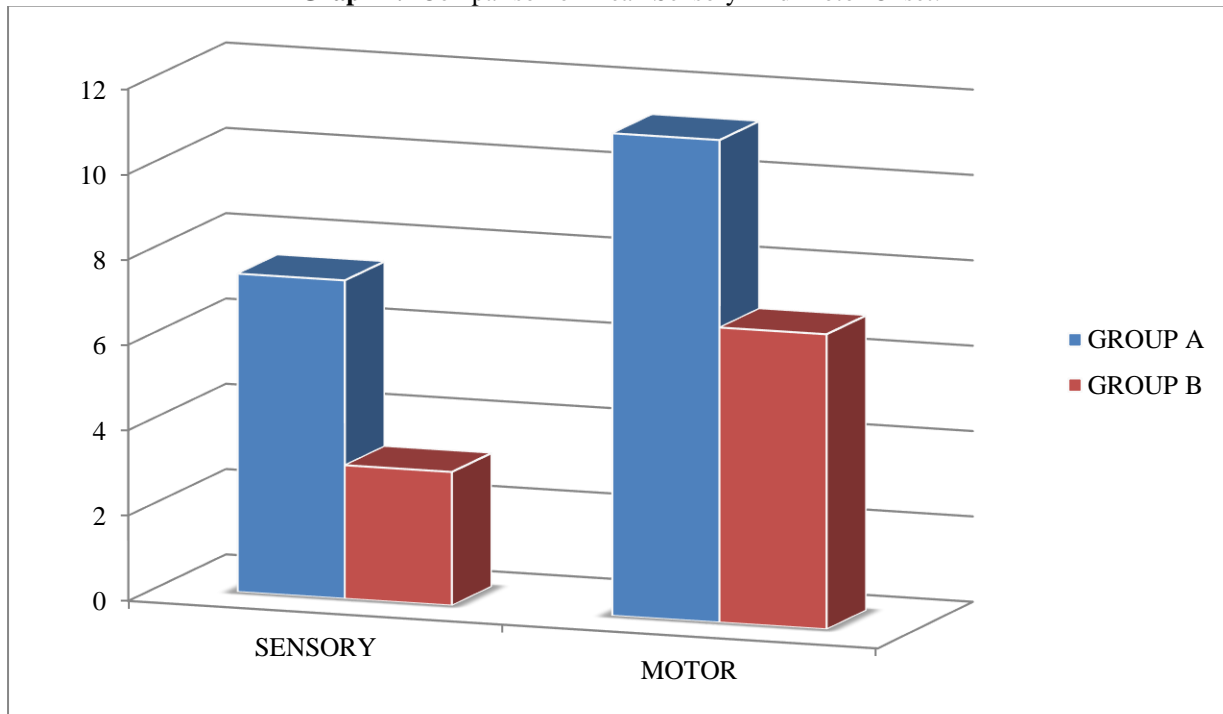
<b>Duration of Surgery (min)</b>	97.66±14.12	100.66±8.98	0.3302	NS
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The study participants are equally selected from both groups including 16 male (53.33%) & 14 female (46.66%) in each group. Average age is 36.96 years (SD=12.50) Average weight is 61.03 kg (SD=7.68) Average duration of surgery is 96.66 min (SD=14.12). ASA 1 patients are sequentially 18 and 19 from group A & group B. ASA 2 patients are sequentially 12 and 11 from group A & group B.

**Table 2:- Mean Sensory And Motor Onset.**

<b>Onset (in minutes)</b>	<b>Group A (N=30)</b>	<b>Group B (N=30)</b>	<b>p value</b>	<b>Inference</b>
<b>Sensory onset (Mean ± SD)</b>	7.46±1.40	3.13±0.84	<0.0001	HS
<b>Motor onset (Mean ± SD)</b>	11.3±1.48	6.91±1.39	<0.0001	HS

**Graph 1:- Comparison of Mean Sensory And Motor Onset.**

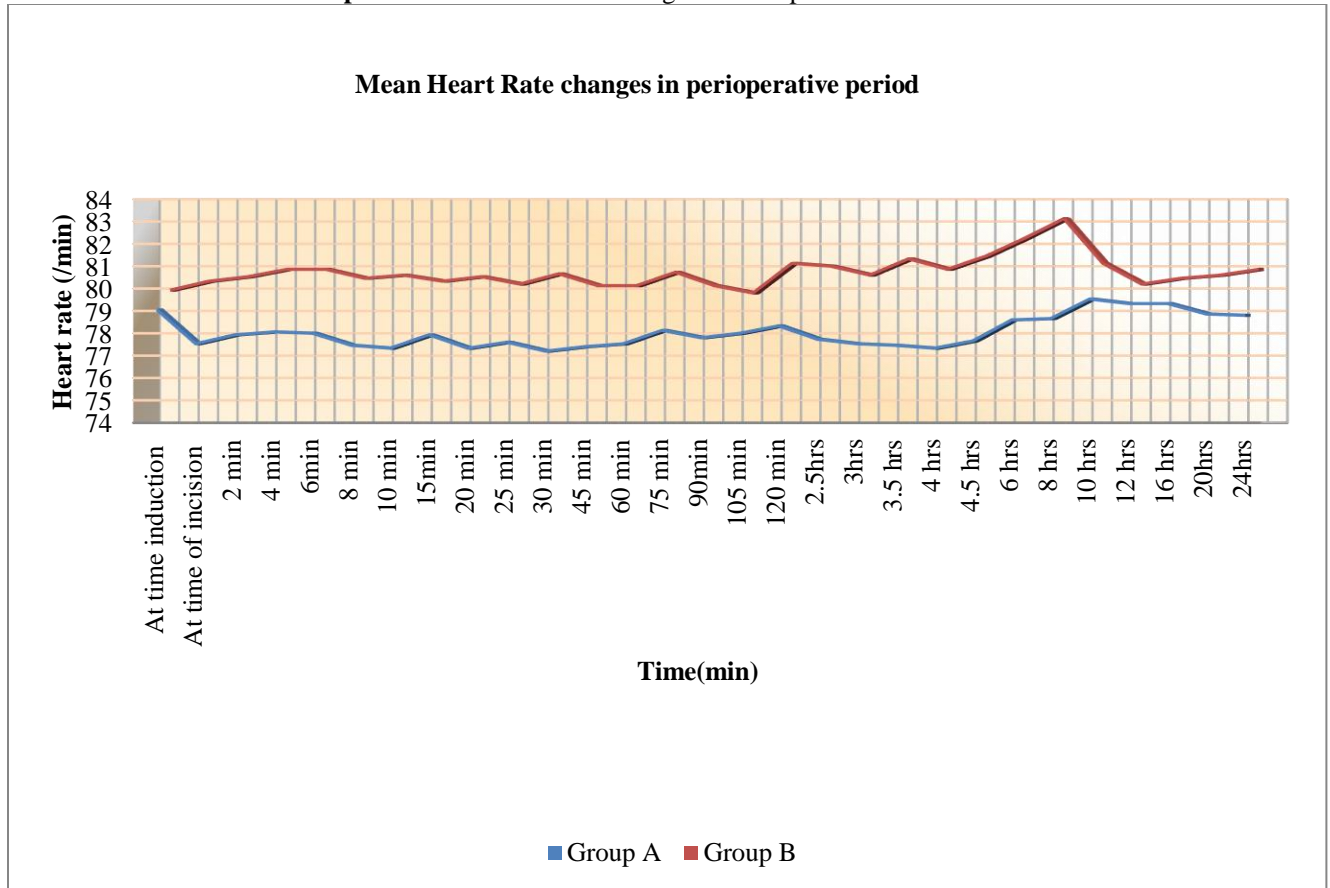


From table 2 and graph 1, it shows faster mean onset of sensory and motorblock in Group B compared to Group A. (p < 0.0001)

**Table 3:- Mean Heart Rate Changes In Perioperative Period.**

Time	Group A (n=30)	Group B (n=30)	P value	Inference
	Heart rate (per min) (mean $\pm$ SD)	Heart rate (per min) (mean $\pm$ SD)		
Preoperative Mean HR	77.40 $\pm$ 8.32	80.60 $\pm$ 10.30	0.1908	NS
<b>Perioperative period</b>				
At time induction	79.06 $\pm$ 7.97	79.93 $\pm$ 9.28	0.9042	NS
At time of incision	77.53 $\pm$ 7.47	80.33 $\pm$ 9.21	0.2010	NS
2 min	77.93 $\pm$ 7.26	80.53 $\pm$ 9.81	0.2480	NS
4 min	78.06 $\pm$ 7.28	80.86 $\pm$ 10.04	0.2212	NS
6 min	78 $\pm$ 7.75	80.86 $\pm$ 9.94	0.2189	NS
8 min	77.46 $\pm$ 7.71	80.46 $\pm$ 9.75	0.1914	NS
10 min	77.33 $\pm$ 7.43	80.6 $\pm$ 9.64	0.1465	NS
15 min	77.93 $\pm$ 7.79	80.33 $\pm$ 9.49	0.2888	NS
20 min	77.33 $\pm$ 8.00	80.53 $\pm$ 9.76	0.1702	NS
25 min	77.60 $\pm$ 8.70	80.20 $\pm$ 9.25	0.2667	NS
30 min	77.20 $\pm$ 8.49	80.66 $\pm$ 9.56	0.1437	NS
45 min	77.40 $\pm$ 7.95	80.13 $\pm$ 10.42	0.2586	NS
60 min	77.53 $\pm$ 7.87	80.13 $\pm$ 10.29	0.2762	NS
75 min	78.13 $\pm$ 8.30	80.73 $\pm$ 9.56	0.2653	NS
90 min	77.80 $\pm$ 8.73	80.13 $\pm$ 9.30	0.3212	NS
105 min	78.00 $\pm$ 7.93	79.80 $\pm$ 9.61	0.4320	NS
120 min	78.33 $\pm$ 8.30	81.13 $\pm$ 9.69	0.2342	NS
2.5 hrs	77.73 $\pm$ 8.13	81.00 $\pm$ 9.62	0.1604	NS
3 hrs	77.53 $\pm$ 7.82	80.60 $\pm$ 9.67	0.1816	NS
3.5 hrs	77.46 $\pm$ 8.48	81.33 $\pm$ 9.32	0.0979	NS
4 hrs	77.33 $\pm$ 8.35	80.86 $\pm$ 10.27	0.1495	NS
4.5 hrs	77.66 $\pm$ 8.50	81.46 $\pm$ 10.19	0.1222	NS
6 hrs	78.60 $\pm$ 8.35	82.26 $\pm$ 9.98	0.1289	NS
8 hrs	78.66 $\pm$ 8.22	83.13 $\pm$ 9.40	0.0547	NS
10 hrs	79.53 $\pm$ 8.81	81.13 $\pm$ 9.73	0.5070	NS
12 hrs	79.33 $\pm$ 8.31	80.20 $\pm$ 9.71	0.7106	NS
16 hrs	79.33 $\pm$ 7.63	80.46 $\pm$ 9.82	0.6206	NS
20 hrs	78.86 $\pm$ 8.56	80.60 $\pm$ 9.62	0.4622	NS
24 hrs	78.80 $\pm$ 8.11	80.86 $\pm$ 9.89	0.3813	NS

**Graph 2:- Mean Heart Rate Changes In Perioperative Period.**



From table 3 & Graph 2 , it is evident that there was stable mean heart rate in each group perioperatively. (p>0.05).

**Table 4:- Variations In Map In Perioperative Period.**

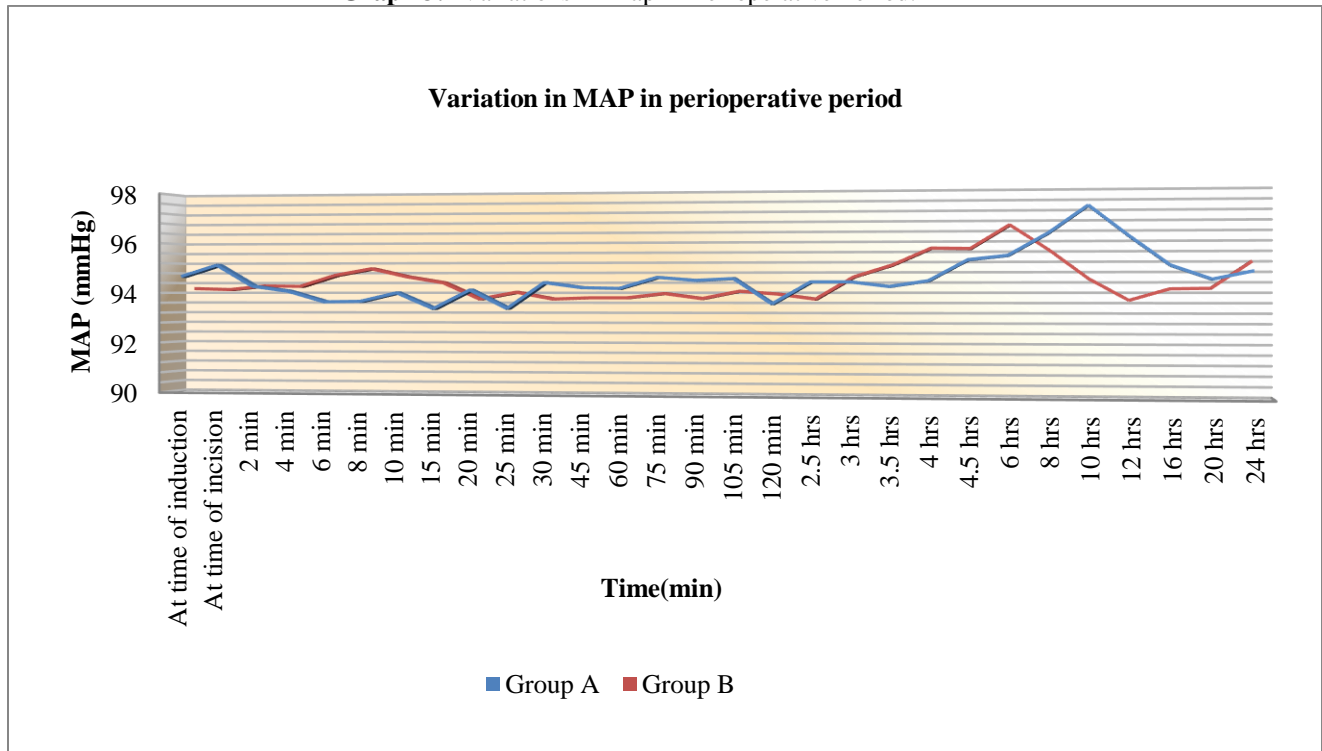
Time	Group A (n=30)	Group B (n=30)	P value	Inference
	MAP (mmHg) (mean ± SD)	MAP (mmHg) (mean ± SD)		
Preoperative Mean HR	94.42±7.10	93.68±7.96	0.7053	NS
<b>Perioperative period</b>				
At time induction	94.66±6.83	94.17±7.22	0.7881	NS
At time of incision	95.11±6.49	94.13±7.31	0.5850	NS
2 min	94.26±6.43	94.28±6.71	0.9906	NS
4 min	94.06±7.06	94.26±6.28	0.9081	NS
6 min	93.64±6.96	94.71±6.37	0.5369	NS
8 min	93.66±6.16	94.97±6.67	0.4326	NS
10 min	94.00±6.49	94.64±6.55	0.7052	NS
15 min	93.37±6.28	94.40±6.46	0.5337	NS
20 min	94.11±6.73	93.75±6.92	0.8389	NS
25 min	93.88±7.22	94.02±6.93	0.9392	NS
30 min	94.40±6.87	93.75±6.92	0.7164	NS
45 min	94.20±7.17	93.80±6.82	0.8256	NS

60 min	94.17±7.16	93.80±6.57	0.8355	NS
75 min	94.60±6.90	93.97±6.25	0.7123	NS
90 min	94.48±6.50	93.77±6.32	0.6696	NS
105 min	94.55±6.65	94.06±7.09	0.7835	NS
120 min	93.57±7.20	93.95±7.03	0.8369	NS
2.5 hrs	94.42±6.48	93.75±6.85	0.6986	NS
3 hrs	94.42±6.43	94.62±6.26	0.9033	NS
3.5 hrs	94.24±6.67	95.08±6.11	0.6129	NS
4 hrs	94.46±6.58	95.73±6.30	0.4482	NS
4.5 hrs	95.26±6.78	95.71±6.99	0.8011	NS
6 hrs	95.42±7.01	96.62±6.84	0.5048	NS
8 hrs	96.26±6.84	95.64±6.92	0.7283	NS
10 hrs	97.31±6.85	94.53±6.52	0.1128	NS
12 hrs	96.15±6.86	93.71±6.73	0.1696	NS
16 hrs	95.04±6.86	94.15±6.48	0.6074	NS
20 hrs	94.51±6.61	94.17±6.77	0.8447	NS
24 hrs	94.82±6.55	95.20±6.25	0.8190	NS

**Table 5:-** Duration Of Sensory And Motor Block.

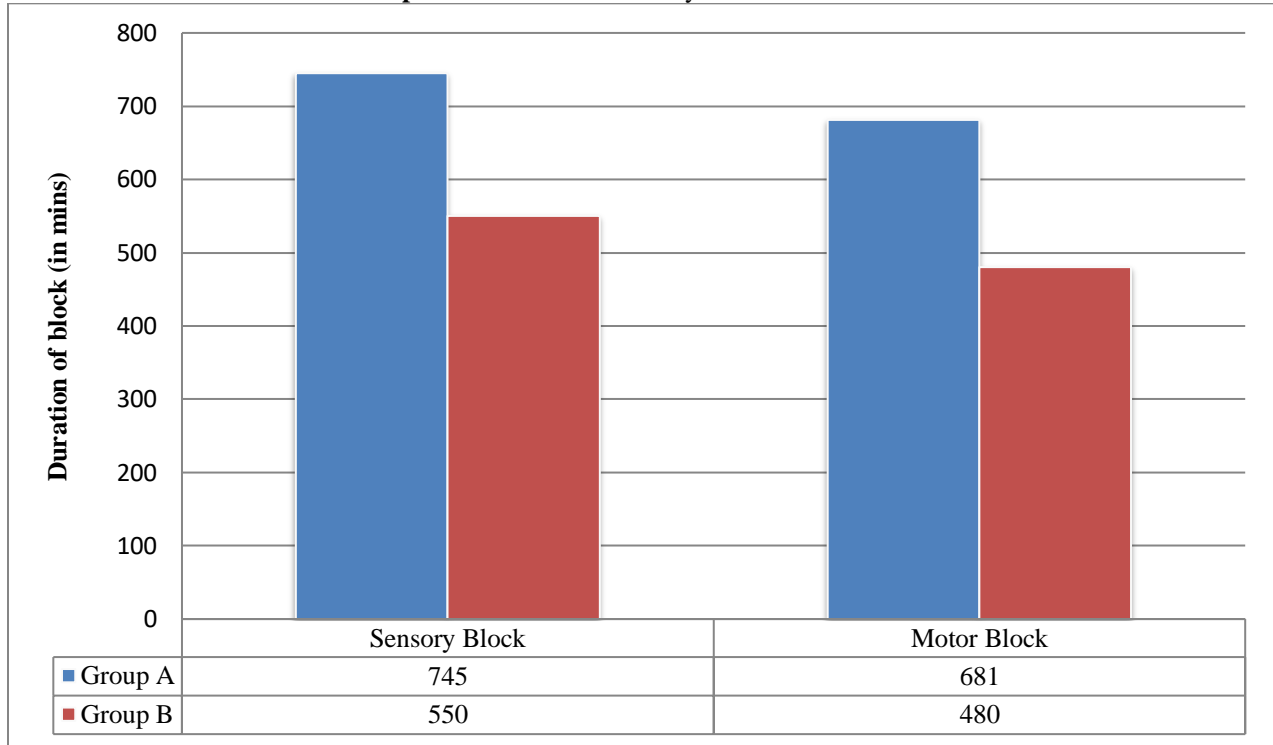
Duration (in minutes)	Group A (N=30)	Group B (N=30)	p value	Inference
Sensory block (Mean ± SD)	745±25.12	550.16±39.62	<0.0001	HS
Motor block (Mean ± SD)	681.16±15.23	480.83±31.67	<0.0001	HS

**Graph 3:-** Variations In Map In Perioperative Period.



From table 4 & Graph 3 , it is evident that there was no significant statistical changes in mean MAP in perioperative periods in each group. (p>0.05)

**Graph 4:- Duration Of Sensory And Motor Block.**



From Table 5 & Graph 4 it shows that duration of sensory & motor block was longer in Group A compared to Group B. (p<0.0001)

**Table 6:- Duration Of Analgesia.**

DURATION OF ANALGESIA	GROUP A (n=30)	GROUP B (n=30)
0-100	0	0
101-200	0	0
201-300	0	0
301-400	0	0
401-500	0	0
501-600	0	0
601-700	0	5
701-800	0	6
801-900	0	8
901-1000	1	6
1001-1100	1	3
1101-1200	4	2
1201-1300	2	0
1301-1400	5	0
1401-1500	9	0
1501-1600	8	0

The table above is suggesting that Ropivacaine 0.5%(Group B) is having lesser duration of analgesia than Bupivacaine 0.5%. (Group A).

**Table 7:-** Mean Perioperative Vas Score.

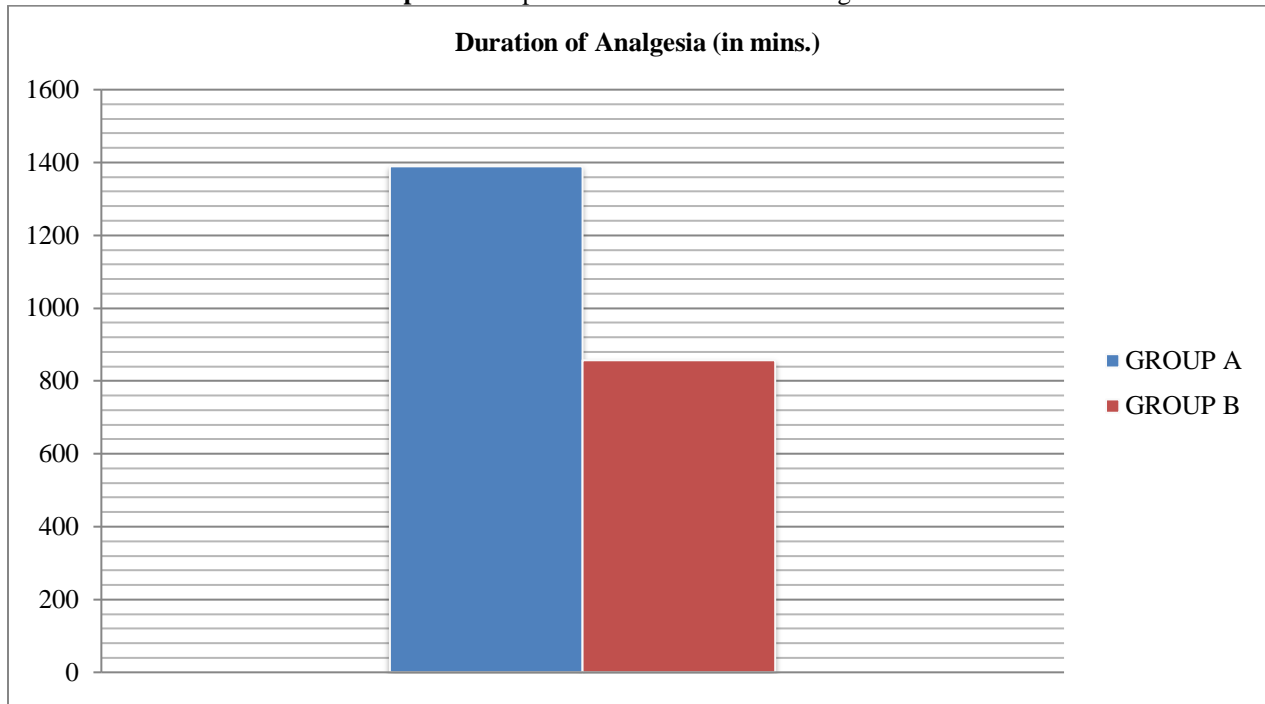
Time	Group A	Group B
2 min	0	0
4 min	0	0
6 min	0	0
8 min	0	0
10 min	0	0
15 min	0	0
20 min	0	0
25 min	0	0
30 min	0	0
45 min	0	0
60 min	0	0
75 min	0	0
90 min	0	0
105 min	0	0
120 min	0	0
2.5 hrs	0	0
3 hrs	0	0
3.5 hrs	0	0
4 hrs	0	0
4.5 hrs	0	0
6 hrs	0	0
8 hrs	0	0.96±0.71
10 hrs	0	2.73±0.86
12 hrs	0.73±0.86	3.68±0.47
16 hrs	2.00±1.25	4±0
20 hrs	3.08±0.77	0
24 hrs	4±0	0

Table 7 shows mean perioperative VAS score in each group.

**Table 8:-** Duration Of Analgesia.

	Group A (N=30)	Group B (N=30)	p value	Inference
<b>Duration of Analgesia (in Min) (Mean ± SD)</b>	1388.83±162.85	856.16±139.51	<0.0001	HS

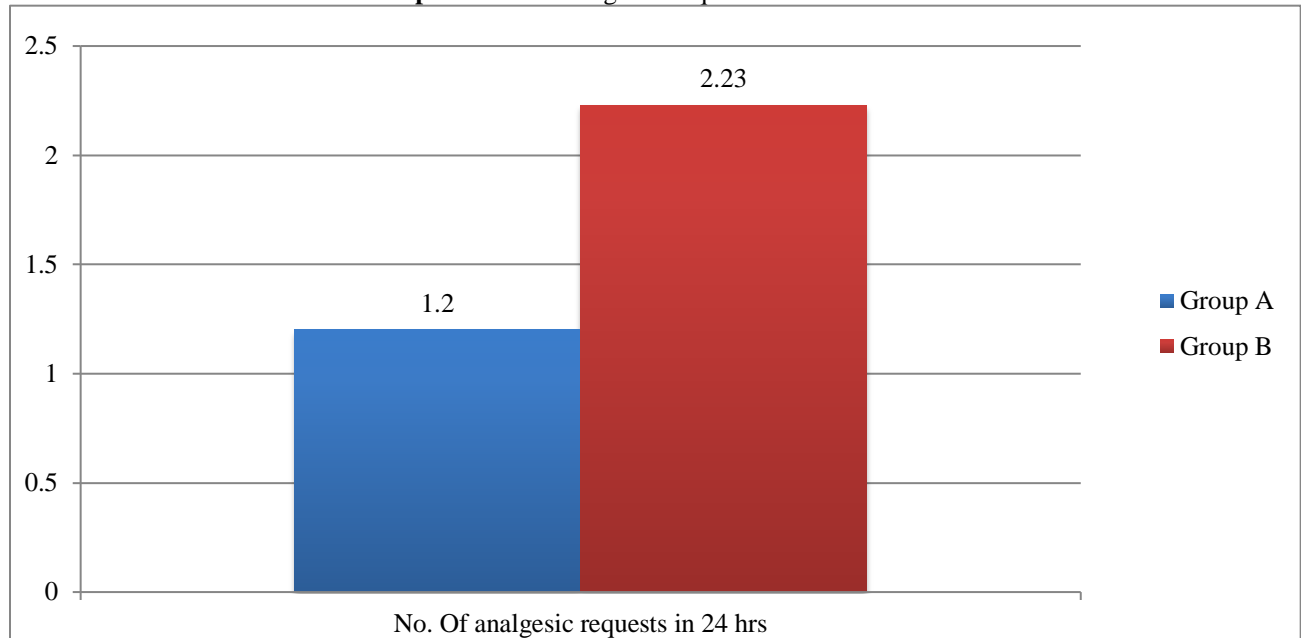
**Graph 5:-**Comparison Of Duration Of Analgesia.



From table 8 & graph 5 it is evident that duration of analgesia was prolonged in group A as compared to group B. (p<0.0001)

**Table 9:-** Total Analgesic Requets In 24 Hours.

	Group A (N=30)	Group B (N=30)	p value	Inference
<b>Total No. of Analgesic Requests in 24 hrs (Mean ± SD)</b>	1.2±0.40	2.23±0.43	<0.0001	HS

**Graph 6:- Total Analgesic Requets In 24 Hours.**

From Table 9 and Graph 6, Total number of analgesic requests in Group A were less compared to Group B (p value <0.0001).

### Discussion:-

Brachial plexus blockade for ambulatory upper limb surgeries can significantly reduce pain and allow faster discharge from hospital when compared with general anesthesia. Advantages of brachial plexus block compared with general anesthesia are early discharge of outpatients, smooth transition to pain control, increased blood flow to extremity, less nausea, vomiting, drowsiness, avoids stress of laryngoscopy and tracheal intubation. It is beneficial for the patient with various cardio-respiratory comorbidities.<sup>13</sup> Many approaches of brachial plexus block are also described and the available literature has consistently shown that axillary block is superior and easiest method for anesthesia and postoperative pain management in various upper limb surgeries.<sup>14</sup>

The present study is being undertaken to evaluate the onset of sensory and motor block, duration of motor and sensory block, duration of analgesia, requirement of rescue analgesia, in first 24 hour with bupivacaine 0.5% compare to ropivacaine 0.5% for usg guided axillary brachial plexus block.

Reviewing the various previous study 2.5-3mg/ kg Bupivacaine 0.5% and 2-3mg/kg Ropivacaine 0.5% was chosen as optimal dose for our study.

In our study the technique for giving axillary block is ultra sound guided.

Demographic data comparing age, gender, weight shows no statistically significant differences between two groups as shown in results.

Haemodynamic parameters (heart rate, MAP and spo2) remain stable in the perioperative period in both groups.

### Dose and volume:

In our study we have used bupivacaine 0.5% 2.5-3mg/kg (20-30ml) and ropivacaine 0.5% 2-3mg/kg(20-30ml) in our study of usg guided axillary block. In a similar study done by AnupreetKaur,RajBahadursingh,corresponding author R.K.Tripathy, and Sanjay Choubey(2015)<sup>6</sup> have taken 30ml 0.5% bupivacaine and 30ml 0.5%ropivacaine in axillary brachial plexus block for forearm surgeries.Rosemary Hickey, M.D. Joan Hoffman, R.N., M.S.N.Somayaji Ramamurthy, M.D. (1991)<sup>10</sup> studied effectiveness of bupivacaine 0.5%(175mg) and Ropivacaine 0.5%(175mg),both without epinephrine

**Onset of motor & sensory block:**

In our study table 2 and graph 1, we observe that in group A (bupivacaine 0.5%) mean onset of sensory block was  $7.46 \pm 1.40$  min while in group B (ropivacaine 0.5%) it was  $3.13 \pm 0.84$  min, which is highly significant ( $p < 0.0001$ ) mean onset of motor block was faster in group B is  $6.91 \pm 1.39$  min compared to group A  $11.73 \pm 1.48$  min which is also statistically highly significant ( $p < 0.0001$ ) from this it is clear that group B – ropivacaine 0.5% has faster onset of sensory and motor block than group A .

Anupreet Kaur, Raj Bahadursingh, corresponding author R.K. Tripathy, and Sanjay Choubey (2015)<sup>6</sup> studied 0.5% bupivacaine and 0.5% ropivacaine (30ml each) in axillary block. Onset of motor blockade was earlier in ropivacaine group (5 min) compare to bupivacaine group (20 min). onset of motor block was significantly shorter in ropivacaine group ( $14.88 \pm 3.35$  min) compare to bupivacaine group ( $22.92 \pm 3.79$  min)

Also a clinical study done by D Tripathi, K Shah, C Shah, S Shah, E Das. (2012)<sup>12</sup> compared equal volume (30 ml) 0.5% bupivacaine and 0.75% ropivacaine in supraclavicular brachial plexus block. results were suggestive of earlier onset and peak sensory blockade with comparable duration of post operative analgesia in ropivacaine 0.75% group. ropivacaine 0.75% group also provides earlier onset of motor blockade there is statistically significant delay in achieving peak effect compare to bupivacaine 0.5%

**Duration of motor & sensory block:**

In our study table 5 and graph 4 the duration of sensory block was longer in group A ( $745 \pm 25.12$  min) than group B ( $555.16 \pm 39.62$  min) which was statistically significant with p value  $< 0.0001$ . duration of motor block was longer in group A ( $681.16 \pm 15.23$  min) than group B ( $480.83 \pm 31.67$  min) which was statistically significant with p value  $< 0.0001$ .

A randomized controlled study done by Ranjan R Venkatesh (2016)<sup>11</sup> was suggestive that duration of sensory block with bupivacaine 0.5%, ropivacaine 0.5% and ropivacaine 0.75% was 11.58 hrs, 9.02 hrs and 8.87 hrs. the duration of motor block with bupivacaine 0.5%, ropivacaine 0.5% and ropivacaine 0.75% was 12.9 hrs, 8.29 hrs and 7.89 hrs subsequently.

Another study done by Dr. Ushabadi Dr. Akshay Salunk<sup>8</sup>, who compared 30ml of 0.5% bupivacaine and 0.5% ropivacaine (100mg each) the mean duration of motor block was significantly longer in bupivacaine ( $513 \pm 63.67$  min) compared to ropivacaine group  $432 \pm 67.88$  min ( $p < 0.05$ ). duration of sensory block was significantly longer in bupivacaine group ( $532.8 \pm 59.56$  min) compared to ropivacaine group  $451 \pm 70.21$  min .

Anupreet Kaur, Raj Bahadursingh, corresponding author R.K. Tripathy, and Sanjay Choubey (2015)<sup>6</sup> conclude that mean duration of motor block was significantly longer in bupivacaine group ( $408.40 \pm 50.39$  min) compare to ropivacaine group ( $365.60 \pm 34.29$  min). Duration of sensory block was significantly longer in bupivacaine group ( $450.40 \pm 54.50$  min) compare to ropivacaine group ( $421.20 \pm 38.33$  min). It showed faster recovery of motor function in ropivacaine group.

**Duration of analgesia:**

Intensity of postoperative pain was evaluated using VAS. The scale consists of a ruler with marking from 0-10. The patient is asked to grade their present perception of pain from (denoting no pain at all) to 10 (denoting worst possible pain they felt). The duration of post operative analgesia was assessed in terms of first analgesic requirements. ( $VAS \geq 4$ ).

In our study table 8 and graph 5 is suggestive that duration of analgesia was prolonged in group A ( $1388.83 \pm 162.85$  min) compare to group B ( $856.16 \pm 139.51$  min) which is statistically significant with p value  $< 0.001$ .

Similar study of Prerana P Mankand, Jayendra C Makwana, Bharat J shah<sup>9</sup>, & Anupreet Kaur, Raj Bahadursingh, corresponding author R.K. Tripathy, and Sanjay Choubey (2015)<sup>6</sup> were subsequently suggestive that duration of analgesia was prolonged with levobupivacaine 0.5% & bupivacaine 0.5%

**Complication:**

No complications or significant adverse effects were observed in Ropivacaine study groups. But 2 cases of nausea and 1 case of vomiting was noted in Bupivacaine Group.

**Conclusion:-**

From this study , comparison between Bupivacaine 0.5% and Ropivacaine 0.5% in USG guided Axillary Brachial Plexus Block , it can be concluded that Onset of sensory and motor block is faster in Group B compared to Group A , which is highly significant.

The use of USG not only improves success rate but it necessarily reduces complications. Duration of sensory and motor block is prolonged in Group A than Group B. so that Ropivacaine 0.5% is associated with faster recovery of sensory and motor function with better safety profile compared to Bupivacaine 0.5%

**Acknowledgement:-**

We are sincerely thankful to all the participants who took part in our study

**Funding:**

No funding sources.

**Conflict of interest:**

None declared.

**Ethical approval:**

The study was approved by the Institutional Review Board.

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