Original Research Article

Comparative study of ropivacaine with clonidine versus ropivacaine alone in supra clavicular brachial plexus block for upper limb surgery, study of 60 cases

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Abstract

Background: Supraclavicular brachial plexus block is most commonly preferred anaesthesia for upper limb orthopaedic surgeries. Various adjuvants to local anaesthetics were studied to prolong the duration of analgesia of brachial plexus block. In the present focuses on adjuvant therapy of Ropivacaine(0.75%) and Clonidine in supraclavicular brachial plexus block and studied its effect on onset and duration of sensory and motor block. **Material and Methods:** Sixty patients aged between 19 to 60 years with ASA grade 1 or 2 posted for elective upper limb orthopedic surgeries were included in the study. The study patients were randomly divided into 2 groups with 30 patients in each group. GROUP R: 0.75%Ropivacaine (30cc) +1ml Normal Saline, GROUP RC: 0.75%Ropivacaine (30cc)+Clonidine 150µg. Time for onset of sensory and motor block, duration of analgesia and duration of motor block and sensory block were noted. **Results:** The mean duration of surgeries undertaken in Group R was 62.33 ± 19.85 min and in Group R+C was 69 ± 17.83 min. The mean onset time for complete sensory block in group R was 17.76 ± 1.10 min. and in group R+ C was 22.76 ±1.86 min. The data from study reveals that the time required for onset of complete sensory blockade was longer in case of Ropivacaine with Clonidine compared to Ropivacaine alone. the mean onset time for complete motor block in group R was 23.03 ± 1.42 min and in group R+C was 26.63 ± 2.73 min. the mean duration of sensory block in group R was 557.66 ± 51.17 min and in group R+C was 705.33 ± 39.69 min. the mean duration of motor block in group R was 507.83 ± 53.07 min and in group R+C was 652.5 ± 39.62 min. the mean duration of analgesia in group R was 590.66 ± 52.12min and in group R+C was 735 ± 39.78 min. **Conclusion:** Clonidine as an adjuvant to Ropivacaine in supraclavicular brachial block for upper limb surgery delays the onset time for sensory and motor block and prolongs the duration of sensory and motor blocks with longer duration of postoperative analgesia, causes decrease in need of rescue analgesia in patients with no side effects.

Key Word: Ropivacaine, Clonidine, brachial plexus, Upper Limb Surgery

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INTRODUCTION

Anaesthesia has evolved into a speciality subject over decades with lot of improvement in methods employed and drugs used to provide anaesthesia with least complication. General anaesthesia was one of the most common method employed to provide anaesthesia for upper limb surgeries. With introduction of newer and safer local anaesthetics and better advantage, regional anaesthesia has taken over as principle technique for upper limb surgeries. Local anaesthesia by chemical means has come to play a great role in surgery, today no part of body is inaccessible to this form of pain relief.

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Supraclavicular plexus block provides anaesthesia for surgeries of lower third of humerus, around elbow joint, forearm and hand. This block also relieves tourniquet pain. Supraclavicular plexus block technique was chosen for upper limb surgeries in our study. Advantages of supraclavicular brachial plexus block over General anaesthesia are - ease of administration, lower incidence of major intraoperative or postoperative complications, avoidance of the toxic effects of some general anaesthetic agents, provision of excellent operating conditions, pleasant recovery, and less difficulty in the recovery room.It is preferred in emergency surgery, in geriatric patient surgery, hot and dry climates or high altitude surgery, outpatient surgery and surgery in the prone position. There are less hemodynamic changes in the intra operative period and it also provides postoperative analgesia. Role of supraclavicular block has expanded from operation theatre into an area of postoperative and chronic pain management. Ropivacaine is a long-acting amide local anaesthetic agent and first produced as a pure enantiomer. It produces effects via reversible inhibition of sodium ion influx in nerve fibres. Ropivacaine is a new amide-type, long acting, pure S-enantiomer, local anaesthetic. It has differential blocking effect on motor and sensory nerve fibers. When compared to Bupivacaine, motor block is often slower in onset, shorter in duration and less intense. It has lower cardiotoxicity than Bupivacaine. Clonidine is a mixed alpha-1 and alpha -2 adrenoceptor agonist with predominant alpha-2 action. It causes decrease in sympathetic nervous system outflow from central nervous system to peripheral tissues. Along with this it is having properties of analgesic effects, sedative and thermoregulatory effects.

AIM OF THE STUDY

The aim of study is to evaluate efficacy of Ropivacaine with Clonidine versus Ropivacaine alone in supraclavicular brachial plexus block for upper limb surgeries.

MATERIALS AND METHODS

After getting approval from the institutional ethical committee this prospective, double blind, randomised study was conducted from July 2018to December 2018 in GMERS Medical College and civil hospital, Gandhinagar. Sixty patients aged between 19 to 60 years with ASA grade 1 or 2 posted for elective upper limb orthopedic surgeries were included in the study. Normal adult patients of either sex, without any co-morbidity, admitted for elective upper limb orthopedic surgeries with **Patient age**: 19 to 60 years, **ASA grade**: 1 or 2, **Weight**: 50 to 70 kg and **Duration of surgery**: 2 Hours were employed as inclusion criteria. Infection at site of block, H/O any previous reaction to local anesthetic, Patients with injury to any of nerves of upper limb, Patient with hemorrhagic disorder, Patient below 19 or above 60 years, Pregnancy, Patient with neurological disorder, Patients with alcohol abuse and H/O Underlying cardiovascular, psychiatric disease, renal or hepatic disease were employed as exclusion criteria.

The following **investigations**were done in all patients.

- Haemoglobin (gm%).
- Blood sugar (fasting).
- Blood urea and serum creatinine.
- Standard 12 lead ECG.
- Chest X-ray PA view.

All patients were kept electively nil per oral 6-8 hours before surgery and prior to operation patients were explained about procedure and a written informed consent taken. Intravenous line secured. Standard monitors like ECG, Pulse oximeter, BP cuff were applied and patient's baseline parameter like pulse, blood pressure, respiratory rate, SpO2 were recorded. All patients were premedicated with: (on operation table) Inj. Glycopyrrolate 0.2mg i.v. Inj. Ondansetron 4mg i.v. Inj. Midazolam 1mg i.v. The study patients were randomly divided into 2 groups with 30 patients in each group.

GROUP R: 0.75%Ropivacaine (30cc) +1ml Normal Saline

GROUP RC: 0.75%Ropivacaine (30cc)+ Clonidine 150µg

The anesthesia machine, emergency oxygen source, pipeline oxygen supply, 2 working laryngoscope, appropriate size endotracheal tubes and connectors, working suction apparatus with suction catheter, oropharyngeal airways, intravenous fluids, basic anesthetic drugs, emergency drugs tray were kept ready.For performing brachial plexus blockade through supraclavicular approach classical technique was employed. The patients were placed in the dorsal recumbent position with the head turned away from the site of brachial block, under all aseptic and antiseptic precautions midclavicular point, external jugular vein and subclavian artery pulsation were identified. About 1cm above the midclavicular point just lateral to subclavian artery pulsation, a 23×1½" G needle was introduced and directed caudal, downward and medially toward the first rib until paraesthesia was noted along radial and ulnar distribution or motor response was elicited. Here anaesthetic solution is injected before every incremental dose negative aspiration for blood was performed to avoid any intravascular injection. Immediately after block, patients were evaluated for the assessment of onset of sensory and motor blockade. Vitals were recorded before and after the procedure, at 5min, and there after every 10min till end of procedure and postoperatively at

every 1 hour till 7 hours. If block was considered to be adequate, surgeons were allowed to apply tourniquet and start the surgery. If the block was considered to be inadequate for surgery, the patient was given general anaesthesia. Patients were monitored for nausea, vomiting, hypersensitivity reaction, any sign of cardiovascular or central nervous system toxicity, evidence of pneumothorax, hematoma, post block neuropathy during the study [68].In postoperative period, when patient complained of pain at operative site, inj. Diclofenac sodium 1.5mg/kg intravenously and the time for rescue analgesia noted (VAS≥4).

Study Parameters:

1. **Onset of sensory complete block**- Onset of sensory block was assessed by pin prick test, in areas innervated by radial, ulnar and median nerve. Sensory block was graded as:-
   Grade 0- Normal sensation to pin prick.
   Grade 1- Dull response to pin prick (onset).
   Grade 2- No response to pin prick (peak)
   Onset time of complete sensory block was defined as time taken from the end of injection of study drug to the complete development of anaesthesia in all three sensory nerve of upper limb.
2. **Onset of complete motor block**-Onset of complete motor block was the time from end of injection of study drug to loss of motor power at the shoulders. Motor block at shoulder was assessed by asking the patient to hand raise above head with movement of arm and forearm.
   Bromage scale for motor block:-
   Grade 0- Normal motor function (no effect)
   Grade 1-Decrease motor strength compared to contra lateral limb.
   Grade 2- Complete motor block.
3. **Duration of motor block**-It is the time from the onset of motor block to complete recovery of motor block (able to hand raise above head with movement of arm and forearm).
4. **Duration of sensory block**-It is the time from onset of sensory block to onset of pain at surgical site with pin prick.
5. **Duration of analgesia**-It is the time from onset of sensory blockade (grade 1) to pain at surgical site. Tourniquet inflation and deflation time and duration of surgery were noted. Both groups were compared for complete onset time and total duration of sensory blockade, complete onset time and total duration of motor blockade and total duration of analgesia. All the data were filled in proforma and were statistically analysed by students 't' test and probability less than 0.05($p<0.05$) was considered statistically significant.

RESULTS

The present prospective, randomized, comparative, clinical study was conducted in 60 patients of either gender of ASA grade 1 or 2 in age Group between 19 to 60 years, weighing between 50 to 70 kg posted for elective upper limb orthopedic surgeries under supraclavicular brachial plexus block using local anaesthetics agents. The study patients were randomly divided into 2 Groups with 30 patients in each Group. GROUP R - Ropivacaine 0.75% (30ml) + 1 ml NS GROUP R+C- Ropivacaine 0.75% (30ml) + Clonidine (150µg, 1 ml)

Table 1: Mean demographic data in Group R and Group R+C

Variable	Study Group				t-Test	Significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Age (Yrs)	32.53	10.76	35.63	12.93	0.31	>0.05 (NS)
Weight (Kg)	56.20	04.15	57.23	04.44	0.3562	>0.05 (NS)
Gender (M/F)	22/8		23/7			

The mean weight of the patients in Group R was 56.2±4.15 kg and in Group R+C was 57.23±4.44 kg. In Group R there was 22 males (73.3%) and 8 females (26.6%) with male: female ratio of 2.7:1 in Group R+C there was 23 males (90%) and 7 females (10%) with male: female ratio of 3.2:1. Table 1 shows demographic profile, There was no statistically significant difference between both Groups of patients in terms of age, weight and male/female ratio ($p>0.05$).

Table 2: Comparison of complete onset time of sensory block in patients of Group R and Group R+C

Variable	Study Group				t-Test	Significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Onset of complete sensory block (in min.)	17.76	1.10	22.76	1.86	0.00001	<0.001 HS

The mean onset time for complete sensory block in Group R was 17.76±1.10 min. in Group R+C was 22.76±1.86 min. After applying paired t-Test the difference was statistically highly significant (p<0.001). (Table 2).

Table 3: Comparison of complete onset of motor block in patients of Group R and Group R+C

Variable	Study Group				t-Test	Significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Onset of complete motor block(in min.)	23.03	1.42	26.63	2.73	0.00001	<0.001 HS

The mean onset time for complete motor block in Group R was 23.03±1.42 min and in Group R+C was 26.63±2.73 min. After applying paired t-Test, the difference was statistically highly significant (p<0.001). (Table 3).

Table 4: Comparison of mean duration of sensory block in patients of Group R and Group R+C

Variable	Study Group				t-Test	Significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Duration of sensory block(in min.)	557.66	51.17	705.33	39.69	0.00001	<0.001 HS

The mean duration of sensory block in Group R was 557.66±51.17 min and in Group R+Cwas 705.33±39.69 min. After applying paired t-Test, the difference was statistically highlysignificant (p<0.001). (Table 4).

Table 5: Comparison of duration of motor block in patients of Group R and Group R+C

Variable	Study Group				t-Test	Significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Duration of motor block(in min.)	507.83	53.07	652.5	39.62	0.00001	<0.001 HS

The mean duration of motor block in Group R was 507.83±53.07 min and in Group R +C was 652.5±39.62 min. After applying t-Test, the difference was statistically highly significant (p<0.001). (Table 5).

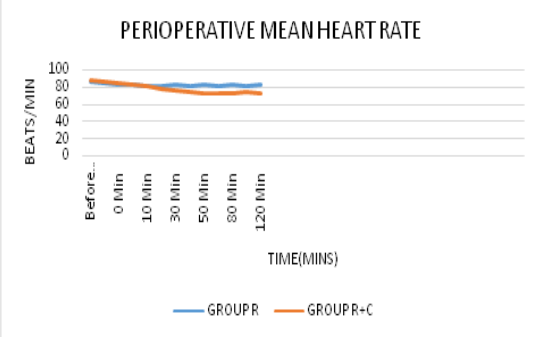
Table 6: Comparison of duration of analgesia of patients in Group R and Group R+C

Variable	Study Group				t-Test	significance
	Group R		Group R+C			
	Mean	SD	Mean	SD		
Duration of analgesia given(min.)	590.66	52.12	735	39.78	0.00001	<0.001 HS

The mean duration of analgesia in Group R was 590.66±52.12min and in Group R+C was 735±39.78 min. After applying paired t-Test the difference was statistically highly significant (p<0.001). (Table 6)

Table 7: Comparison of perioperative mean heart rate status of patients in Group R and Group R+C

Time(min)	Group R		Group R + C		t-Test	Significance
	Mean	SD	Mean	SD		
Before Premed	86.46	8.44	88.86	8.9	0.288	P>0.05 (NS)
Before Induction	84.33	8.51	87.73	8.38	0.124	P>0.05 (NS)
0 Min	82.46	8.44	85.33	8.39	0.192	P>0.05 (NS)
5 Min	81.86	7.78	83.26	8.59	0.511	P>0.05 (NS)
10 Min	81.06	8.01	81.5	8.78	0.842	P>0.05 (NS)
20 Min	81.66	8.63	78.93	8.62	0.224	P>0.05 (NS)
30 Min	81.86	8.28	77	8.31	0.026	P<0.05 (S)
40 Min	80.73	8.34	74.93	8.31	0.0091	P<0.05 (S)
50 Min	82.62	7.89	73.4	7.26	0.00001	P<0.001(HS)
60 Min	81.36	7.29	73.0	6.90	0.00007	P<0.001(HS)
80 Min	81.87	7.71	73.72	7.57	0.0017	P<0.05 (S)
100 Min	80.85	7.28	74.58	6.07	0.072	P>0.05 (NS)
120 Min	82.66	6.42	73.5	4.98	0.111	P>0.05 (NS)

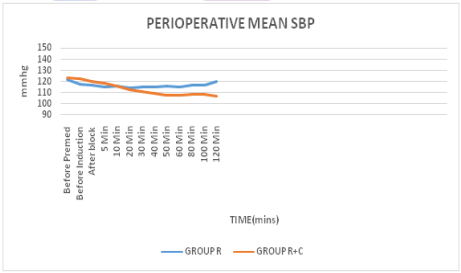


Graph 1:

The table 7 and chart 1 shows the changes in mean pulse rate at different time interval (pre-operative and intra-operative). After applying t-Test the difference was statistically insignificant most of the time (p>0.05).

Table 8: Comparison of Perioperative SBP status of patients in Group R and Group R+C

Time	Group R		Group R+C		t-Test	Significance
	Mean	SD	Mean	SD		
Before Premed	121.46	6.32	123.2	7.64	0.342	P>0.05 (NS)
Before Induction	117.66	6.45	122.26	6.88	0.0098	P<0.05 (S)
0 Min	116.46	6.40	120.13	6.70	0.034	P<0.05 (S)
5 Min	115.13	6.38	118.4	6.17	0.048	P<0.05 (S)
10 Min	115.8	6.22	116.13	6.10	0.834	P>0.05 (NS)
20 Min	114.53	6.49	113	6.07	0.348	P>0.05 (NS)
30 Min	114.86	5.62	111.2	5.52	0.0013	P<0.05 (S)
40 Min	115.33	5.28	109.46	4.78	0.00003	P<0.001(HS)
50 Min	115.72	5.47	107.73	4.63	0.0000001	P<0.001(HS)
60 Min	115.44	4.98	107.46	4.78	0.0000002	P<0.001(HS)
80 Min	117	5.56	108.27	4.74	0.00001	P<0.001(HS)
100 Min	117.14	4.74	108.58	3.44	0.0019	P<0.05 (S)
120 Min	120	6.00	107	4.40	0.041	P<0.05 (S)



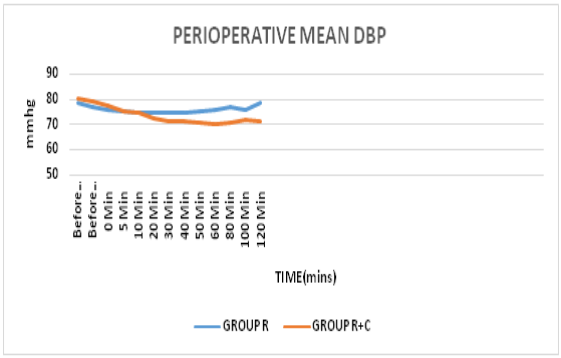
Graph 2:

The table 8 and chart 2 shows the changes in mean systolic blood pressure at different time interval (pre-operative and intra-operative). After applying t-Test the difference was statistically highly significant (p<0.001).

Table 9: Comparison of perioperative DBP status of patients in Group R and Group R+C

Time	Group R		Group R + C		t-Test	Significance
	Mean	SD	Mean	SD		
Before Premed	78.53	4.54	80.4	5.46	0.156	P>0.05 (NS)
Before Induction	76.8	4.08	79.06	4.66	0.049	P<0.05 (S)
0 Min	76.06	3.98	77.53	3.98	0.159	P>0.05 (NS)
5 Min	75.13	3.84	75.26	3.91	0.894	P>0.05 (NS)
10 Min	74.86	3.88	74.6	2.83	0.762	P>0.05 (NS)
20 Min	74.8	4.25	72.66	3.37	0.035	P<0.05 (S)
30 Min	74.66	4.01	71.2	3.22	0.0005	P<0.001(HS)
40 Min	74.8	4.12	71.13	2.86	0.0002	P<0.001(HS)

50 Min	75.10	3.64	70.6	2.47	0.000001	P<0.001(HS)
60 Min	75.68	3.54	70.26	2.27	0.000001	P<0.001(HS)
80 Min	76.75	3.71	70.96	2.75	0.00001	P<0.001(HS)
100 Min	76	3.05	71.64	2.76	0.008	P<0.05 (S)
120 Min	78.66	2.30	71.5	1.77	0.016	P<0.05 (S)

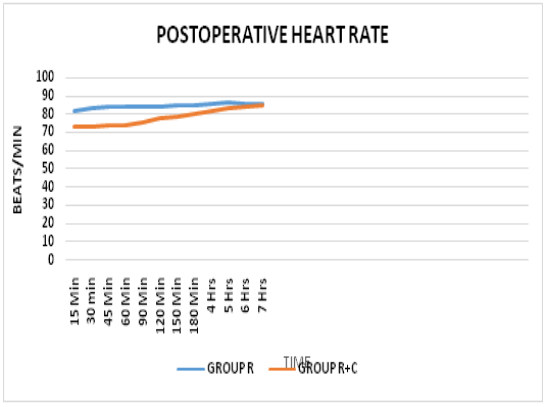


Graph 3:

The table 9 and chart 3 shows the changes in mean diastolic blood pressure at different time interval (Pre-operative and intra-operative). After applying paired t-Test the difference was statistically highly significant (p<0.001).

Table 10: Comparison of post-operative mean heart rate status of patients in Group R and Group R+C

Time	GroupR		GroupR + C		t-Test	Significance
	Mean	SD	Mean	SD		
15 Min	81.6	7.8	73	6.88	0.00001	P<0.001(HS)
30 min	83	7.08	73.13	6.71	0.000001	P<0.001(HS)
45 Min	83.66	7.77	73.46	6.82	0.000001	P<0.001(HS)
60 Min	83.93	8.68	74.13	6.86	0.00001	P<0.001(HS)
90 Min	84	7.77	75.2	6.29	0.00001	P<0.001(HS)
120 Min	84.2	7.70	77.46	6.70	0.0006	P<0.001(HS)
150 Min	84.66	7.77	78.6	7.82	0.0038	P<0.05 (S)
180 Min	85	7.73	80.06	7.17	0.013	P<0.05 (S)
4 Hrs	85.86	7.94	81.33	7.01	0.022	P<0.05 (S)
5 Hrs	86.4	8.00	82.8	7.09	0.070	P>0.05 (S)
6 Hrs	85.66	8.33	83.6	7.65	0.321	P>0.05 (NS)
7 Hrs	85.66	7.96	84.46	7.13	0.541	P>0.05 (NS)

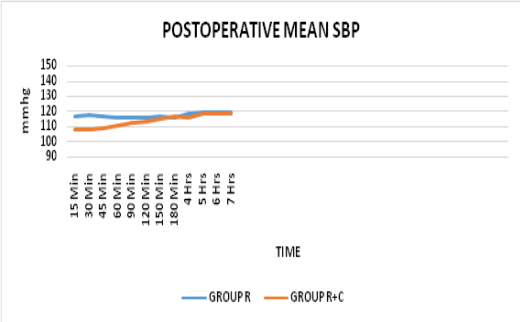


Graph 4:

The table 10 and Chart 4 shows the changes in mean heart rate at different time interval (postoperative). After applying t-Test the difference was statistically highly significant (p<0.001).

Table 11: Comparison of post-operative mean SBP status of patients in Group R and Group R+C

Time	GroupR		GroupR + C		t-Test	Significance
	Mean	SD	Mean	SD		
15 Min	117	5.29	108.4	5.04	0.000001	P<0.001(HS)
30 Min	117.6	5.39	108.06	5.21	0.000001	P<0.001(HS)
45 Min	116.53	5.35	108.53	6.25	0.000001	P<0.001(HS)
60 Min	116.13	6.10	110.33	6.12	0.0005	P<0.001(HS)
90 Min	116.26	6.38	112.13	4.84	0.0065	P<0.05 (S)
120 Min	116.2	5.54	113.2	6.22	0.053	P>0.05 (NS)
150 Min	116.33	4.87	114.93	5.69	0.310	P>0.05 (NS)
180 Min	116	5.84	116.4	5.78	0.790	P>0.05 (NS)
4 Hrs	118.46	5.52	116.06	6.67	0.134	P>0.05 (NS)
5 Hrs	119.46	5.25	118.13	6.34	0.379	P>0.05 (NS)
6 Hrs	119.06	5.47	118.6	6.83	0.771	P>0.05 (NS)
7 Hrs	119.33	4.37	118.86	6.74	0.751	P>0.05 (NS)

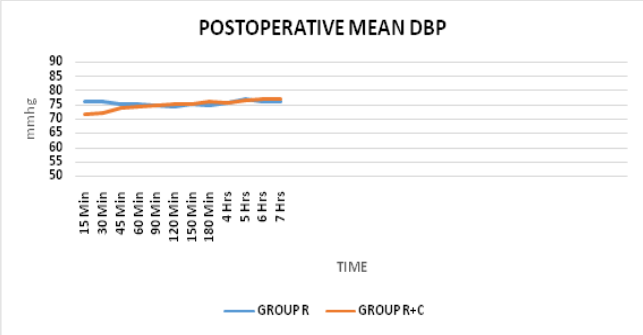


Graph 5:

The table 11 and chart 5 shows the changes in mean systolic blood pressure at different time interval (postoperative). After applying t-Test the difference was statistically insignificant in most of the time (p>0.05).

Table 12: Comparison of post-operative mean DBP status of patients in Group R and Group R+C

Time	GroupR		GroupR + C		t-Test	Significance
	Mean	SD	Mean	SD		
15 Min	76.26	4.12	71.53	2.33	0.000001	P<0.001(HS)
30 Min	76.2	4.25	72.26	2.95	0.00009	P<0.001(HS)
45 Min	75.46	4.13	74	3.28	0.133	P>0.05 (NS)
60 Min	75.2	4.50	74.2	3.41	0.337	P>0.05 (NS)
90 Min	74.93	4.22	74.66	3.20	0.784	P>0.05 (NS)
120 Min	74.53	3.99	75.2	3.50	0.495	P>0.05 (NS)
150 Min	75.13	3.77	75.2	3.77	0.945	P>0.05 (NS)
180 Min	75	3.95	76.2	3.97	0.246	P>0.05 (NS)
4 Hrs	75.8	3.76	75.8	3.57	1	P>0.05 (NS)
5 Hrs	76.86	3.58	76.73	3.98	0.892	P>0.05 (NS)
6 Hrs	76.33	3.56	76.86	4.56	0.616	P>0.05 (NS)
7 Hrs	76.33	3.36	76.93	4.16	0.541	P>0.05 (NS)



Graph 6:

The table 12 and chart 6 shows the changes in mean diastolic blood pressure at different time interval (postoperative). After applying t-Test the difference was statistically insignificant ($p>0.05$).

DISCUSSION

Supraclavicular approach of brachial plexus block is the most commonly used approach and provides the most complete and reliable anaesthesia for upper limb surgery. Supraclavicular blocks are performed at the level of the brachial plexus trunks. Here, almost the entire sensory, motor and sympathetic innervations of the upper extremity are carried in just three nerve structures (trunks), confined to a very small surface area. Consequently, typical features of this block include rapid onset, predictable and dense anaesthesia along with its high success rate. Levobupivacaine and Ropivacaine, two new long-acting local anaesthetics, have been developed as an alternative to Bupivacaine, after the evidence of its severe toxicity. Both of these agents are pure left-isomers and, due to their three-dimensional structure, seem to have less toxic effects on the central nervous system and on the cardiovascular system. Local anaesthetics alone for supraclavicular brachial plexus block provide good operative conditions but have a shorter duration of postoperative analgesia. Hence various drugs such as opioids, Clonidine, Dexamethasone, Midazolam, Magnesium etc. were used as adjuvant with local anaesthetics in brachial plexus block to achieve quick, dense and prolonged block but the results are either inconclusive or associated with side-effects. Recently, Clonidine has been reported as an effective adjuvant for regional anaesthetic agents.

Peripheral action of Clonidine: Clonidine was initially used for its antihypertensive properties. The central actions are mediated throughalpha-2 adrenoceptors, which are situated at locus coeruleusand dorsal horn of spinal cord. But, specific peripheral effects of Clonidine appear to be less obvious becausealpha-2 adrenoceptors are not present on the axon of thenormal peripheral nerve. The direct action of Clonidine on the nerve can be explained on the basis of a study conducted by Dalle *et al.* They proposed that Clonidine, by enhancing activity dependent hyperpolarisation generated by the Na/K pump during repetitive stimulation, increase the threshold for initiating the action potential causing slowing or blockage of conduction. In this prospective, randomized, and double-blinded trial, we had compared the effect of 150µg of Clonidine as an adjuvant to 30 ml 0.75% Ropivacaine in supraclavicular brachial plexus block, on the onset time and duration of sensory and motor block as well as on the post-operative rescue analgesic (injection Diclofenac sodium i.v.) requirement. In our study 60 patients aged between 19 to 50 years with ASA grade 1 or 2 posted for elective upper limb orthopaedic surgeries were included. The study patients were randomly divided into 2 groups with 30 patients in each group.

Group R: 0.75% Ropivacaine (30cc) + 1 ml Normal Saline

Group R+C: 0.75% Ropivacaine (30cc) + Clonidine 150µg (1ml)

The following parameters were observed:

1. Onset of complete sensory block
2. Onset of complete motor block
3. Duration of motor block
4. Duration of sensory block
5. Duration of analgesia
6. Haemodynamic changes
7. Complications

According to our study, it was observed that there was no statistically significant difference between the two groups of patients in terms of age, weight, sex ratio and duration of surgery. In our study time to onset of complete sensory block was assessed by pin prick test, in areas innervated by radial, ulnar and median nerve. Onset time of complete sensory was defined as time taken from the end of injection of study drug to the complete development of anaesthesia in all three sensory nerve of upper limb.The data from our study reveals the time of onset for complete sensory blockade was longer in case of group R+C (Ropivacaine with Clonidine) compared to group R

(Ropivacaine alone). In our study, the mean onset time for complete sensory block in group R was 17.76 ± 1.10min and in group R+ C was 22.76±1.86 min ($p<0.001$). In our study, time to onset of complete motor block was assessed by asking the patient to raise hand above head with movement of arm and forearm. Onset of complete motor was the time from end of injection of study drug to loss of motor power at the shoulders. The data from our study reveals the mean time for onset of complete motor blockade in group R was 23.03±1.42 min, in group R+C was 26.63±2.73 min. ($p<0.001$). In our study, duration of sensory block is the time from onset of sensory block to onset of pain at surgical site with pin prick. The data from our study reveals that duration of sensory blockade in group R was 557.66±51.17 min and in group R+C was 705.3±39.6 min ($p<0.001$). In our study, duration of motor block is the time from the onset of motor to complete recovery of motor block(able to hand raise above head with movement of arm and forearm). The data from our study reveals that duration of motor blockade was longer in case of Group R+C (652.5±39.62) compared to Group R (507.83±53.07)(P value<0.001). In our study, duration of analgesia is the time from onset of sensory blockade (grade 1) to pain at surgical site. The data from our study reveals that mean duration of analgesia in group R was 590.66±52.12min and in group R+C was 735±39.78 min ($p<0.001$). In our study, we have observed following changes in hemodynamic parameters. During perioperative period, in heart rate and blood pressure (SBP, DBP) we have observed statistically significant changes (at majority of observation time period) as well as statistically non-significant changes. None of our patient required any anticholinergic treatment or any vasopressor support during the study period. There was no incidence of headache, nausea, vomiting, hypotension, bradycardia, chest pain, coughing, convulsion and respiratory depression and procedure related complication. There was no CNS and CVS toxicity seen in either group in our study.

CONCLUSION

Based on the present clinical comparative study and a short review of past literature, it was concluded that Clonidine as an adjuvant to Ropivacaine in supraclavicular brachial block for upper limb surgery delays the onset time for sensory and motor block and prolongs the duration of sensory and motor blocks with longer duration of postoperative analgesia, causes decrease in need of rescue analgesia in patients with no side effects.

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