

To Compare Isobaric 0.5% Levobupivacaine With Isobaric 0.5% Ropivacaine In Brachial Plexus Block For Elective Upper Limb Surgery

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Abstract

Background: The purpose of the investigation is to Compare Isobaric 0.5% Levobupivacaine With Isobaric 0.5% Ropivacaine In Brachial Plexus Block For Elective Upper Limb Surgery. **Subjects and Methods:** Intravenous access was obtained in the limb opposite to that undergoing surgery with an intravenous cannula-18G. Standard monitors, ECG, pulse oximeter, non invasive blood pressure, respiratory monitoring were connected and monitored continuously in all the patients and recorded at interval of 0, 5, 10, 15, 20, 30, 60 minutes in the first hour and every 30 minutes thereafter till the end of surgery. All emergency equipments including intubation aids and drugs such as midazolam, thiopentone or propofol and 20% of lipid emulsion were kept ready to deal with any adverse events during the course of procedure/ surgery. Sixty patients aged between 18yrs and 60yrs physical status ASA grade 1 and ASA grade 2 undergoing elective upper limb surgeries were included in the study. **Results:** Demographic details Age, sex and weight were comparable in both the groups (no significant statistical difference was observed). These eliminated possible bias in term of gender, age, and weight distribution which can alter the study drugs pharmacokinetics and dynamics. The average pulse rate, mean arterial pressure, oxygen saturation and respiratory rate readings at frequent intervals did not differ significantly between two intervention groups ($p > 0.05$ for all) No clinically significant bradycardia or hypotension was noted. **Conclusion:** Levobupivacaine should be considered for peripheral nerve block when postoperative analgesia is a concern but not when an early return of motor function is desired in postoperative period for upper limb elective surgeries. Demographic details Age, sex and weight were comparable in both the groups (no significant statistical difference was observed). These eliminated possible bias in terms of gender, age, and weight distribution which can alter the study drug pharmacokinetics and dynamics. The average pulse rate, mean arterial pressure, oxygen saturation and respiratory rate readings at frequent intervals did not differ significantly between two intervention groups ($p > 0.05$ for all) No clinically significant bradycardia or hypotension was noted.

Keywords: Isobaric, Ropivacaine, Levobupivacaine, Upper Limb & Surgery.

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Introduction

The International Association for the study of pain defines “pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage”.^[1,2]

Peripheral nerve blocks not only provide intraoperative anesthesia but also extend analgesia in the postoperative period without any systemic side effects.^[3]

The approach of Supraclavicular is the most effective block for all portions of upper extremity & is carried out at the level of trunks of brachial plexus.^[4] Plexus is blocked where it is most compact i.e. at the center of brachial plexus, resulting in a homogenous spread of anesthetic throughout the plexus with a fast onset & complete block.^[5,6] Hence supraclavicular block is often called the “spinal anesthesia of the upper extremity”.

The high cardiotoxicity of bupivacaine has led to the development of Ropivacaine. Ropivacaine consists of a single enantiomer, the s isomer. But it is slightly less potent than bupivacaine. An anesthetic profile is almost similar to bupivacaine. CNS and cardiotoxicity are far less than bupivacaine and more importantly, a reversal of toxic effects are far more frequent with ropivacaine than bupivacaine.

Subjects and Methods

The study entitled was conducted at Gajra Raja Medical College, Gwalior from Jul 2018 to June 2019. Sixty patients aged between 18yrs and 60yrs physical status ASA grade 1 and ASA grade 2 undergoing elective upper limb surgeries were included in the study after ethical clearance from the college ethical committee.

PROCEDURE:

Intravenous access was obtained in the limb opposite to that undergoing surgery with an intravenous cannula-18G. Standard monitors, ECG, pulse oximeter, non invasive blood pressure, respiratory monitoring were connected and monitored continuously in all the patients and recorded at interval of 0, 5, 10, 15, 20, 30, 60 minutes in the first hour and every 30 minutes thereafter till the end of surgery. All emergency equipments including intubation aids and drugs such as midazolam, thiopentone or propofol and 20% of lipid emulsion were kept ready to deal with any adverse events during the course of procedure/ surgery.

All the patients received brachial plexus block through the supraclavicular approach by an experienced anaesthesiologist different from the one assessing the patient intra- and post-operatively. Both were blinded to the treatment groups.

Study Population

A minimum of 60 patients admitted to Gajra Raja Medical College, Gwalior, satisfying the inclusion and exclusion criteria and undergoing elective upper limb surgery were included in the study.

Sixty patients aged between 18yrs and 60yr physical status ASA grade 1 and ASA grade 2 undergoing elective upper limb surgeries were included in the study. Each patient was visited pre-operatively and the procedure explained and written informed consent was obtained. Complete blood count, blood grouping, blood sugar, bleeding time, clotting time, blood urea, serum creatinine, serum electrolytes(sodium, potassium, chloride), chest x-ray, ECG were done.

Inclusion Criteria

1. Patients aged between 18yrs and 60yrs
2. American Society of Anaesthesiologists (ASA) physical status I – II.
3. Patient's height more than 150 cm.
4. Patients weighing more than 50kg
5. Scheduled for elective upper limb surgeries

Exclusion Criteria

1. Patient refusal for a procedure
2. Emergency upper limb surgeries
3. Traumatic nerve injury
4. History of respiratory disorders
5. History of neuromuscular diseases
6. History of cardiovascular diseases
7. Neurological deficits involving brachial plexus
8. Any bleeding disorder or patient on anticoagulants
9. Hepatic or Renal failure
10. Pregnant women
11. Known allergy to local anesthetic agents
12. Local infection at the injection site
13. Patients on any sedatives or antipsychotics

Results

Table 1: Comparison of the mean age between the two groups

Age (years)	Group L	Group R	't'-Value	P-value
Mean±SD	39.97±9.71	37.93±9.22	0.831, df=58	0.409, NS

Unpaired t-test applied. P-value < 0.05 was taken as statistically significant

Table 2: Gender wise distribution

Gender	Group L		Group R	
	No.	%	No.	%
Male	17	56.66%	20	66.66%
Female	13	43.33%	10	33.33%
Total	30	100%	30	100%

Pearson Chi-Square = .635, df = 1, p-value = .426, Not Significant

Table 3: Comparison of mean weight between the two groups

Weight (kg)	Group L	Group R	't'-Value	P-value
Mean±SD	66.40±9.361	69.40±10.74	-1.153, df=58	0.254, NS

Unpaired t-test applied. P-value < 0.05 was taken as statistically significant

Demographic details Age, sex and weight were comparable in both the groups (no significant statistical difference was observed). These eliminated possible bias in term of gender, age, and weight distribution which can alter the study drugs pharmacokinetics and dynamics.

Table 4: Comparison of Pulse Rate (PR) Monitoring between the two groups

Time Interval	Group L	Group R	't'-Value	P-value
Preoperative	77.50±4.369	77.30±3.395	.198	.844
0 minute	76.10±5.909	78.30±3.229	-1.789	.079
5 minute	77.266±4.841	77.766±2.800	-.490	.626
10 minute	74.633±4.131	74.133±2.932	.541	.591
15 minute	75.533±2.285	75.166±3.206	.510	.612
20 minute	75.933±2.288	75.066±2.420	1.425	.159
30 minute	79.87±4.584	79.20±1.750	.744	.460
60 minute	79.43±4.883	79.70±3.064	-.253	.801
90 minute	79.80±4.122	79.43±2.300	.425	.672
120 minute	79.400±3.450	78.933±1.928	.647	.520
1 Hour	79.10±3.772	79.17±2.451	-.081	.936
2 Hour	80.33±3.556	79.27±3.269	1.210	.231
3 Hour	81.07±4.409	80.40±1.610	.778	.440
4 Hour	80.40±2.920	78.50±2.910	2.525	.014
5 Hour	80.133±2.750	79.400±1.476	1.287	.203
6 Hour	80.233±2.661	79.300±2.036	1.525	.133

Unpaired t-test applied. P-value < 0.05 was taken as statistically significant

Preoperative haemodynamics were comparable in both the groups.

Table 5: Comparison of Mean Arterial Pressure (MAP) between the two groups

Time Interval	Group L	Group R	't'-Value	P-Value
Preoperative	90.63±2.822	89.37±3.200	1.626	.109
0 minute	89.10±3.252	88.40±3.900	.755	.453
5 minute	86.63±3.419	87.37±3.168	-.862	.392
10 minute	86.933±2.148	85.43±1.406	3.199	.002
15 minute	85.80±2.592	84.13±2.763	2.409	.019
20 minute	86.100±3.066	85.26±2.132	1.222	.227
30 minute	85.166±2.560	84.76±2.358	.629	.532
60 minute	84.466±2.979	83.06±1.981	2.143	.036
90 minute	87.13±4.337	82.67±2.202	5.030	.000
120 minute	84.80±2.734	85.07±1.874	-.441	.661
1 Hour	84.67±2.796	83.30±2.292	2.071	.043
2 Hour	85.27±2.420	84.83±2.588	.670	.506
3 Hour	86.00±3.006	84.33±1.988	2.533	.014
4 Hour	85.53±3.203	87.23±2.402	-2.326	.024
5 Hour	87.500±3.025	87.13±2.542	.508	.613
6 Hour	87.733±2.545	88.60±2.313	-1.380	.173

Unpaired t-test applied. P-value < 0.05 was taken as statistically significant

Discussion

Pain has both sensory & emotional components that interrelate to produce an overall 'pain experience'. Unrelieved pain after surgery can interfere with sleep & physical functioning & can negatively affect a patient's well-being on multiple levels.^[6]

Adequate analgesia is one of the main concerns of both the surgeons and the patients after every surgery. Effective intraoperative and postoperative pain control is an essential component of the care of the surgical patient. Inadequate pain control, apart from being inhuman, may increase morbidity or mortality.^[7]

Afferent neural blockade with local anesthetics is the most active analgesic technique. Next in order of efficiency are high-dose opioids, epidural opioids & clonidine, patient-controlled opioid therapy, & NSAIDs.^[8]

Supraclavicular brachial plexus block is ideal for its rapid onset, reliable anesthesia & as a secure technique for any surgery in the upper extremity not involve the shoulder. This is because the block is performed at nerve trunks where almost the entire innervations of the upper extremity are confined to a very small surface area.^[9]

The average pulse rate, mean arterial pressure, oxygen saturation and respiratory rate readings at frequent intervals did not differ significantly between two intervention groups [Table 4 & 5] ($p > 0.05$)

Conclusion

Levobupivacaine should be considered for peripheral nerve block when postoperative analgesia is a concern but not when an early return of motor function is desired in

postoperative period for upper limb elective surgeries. Demographic details Age, sex and weight were comparable in both the groups (no significant statistical difference was observed). These eliminated possible bias in terms of gender, age, and weight distribution which can alter the study drug pharmacokinetics and dynamics. The average pulse rate, mean arterial pressure, oxygen saturation and respiratory rate readings at frequent intervals did not differ significantly between two intervention groups ($p > 0.05$ for all) No clinically significant bradycardia or hypotension was noted.

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