



A COMPARATIVE CLINICAL STUDY OF ANAESTHESIA WITH ISOBARIC LEVOBUPIVACAINES IN CASES UNDERGOING LOWER LIMB SURGERIES UNDER SPINAL ANESTHESIA OR PERIPHERAL NERVE BLOCKS .

Anaesthesiology

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ABSTRACT

Levobupivacaine is long acting local anaesthetic drug introduced in practice. The study has been made to compare the anaesthesia produced by this drug used in two different techniques - subarachnoid block or peripheral nerve blocks . Methodology - A prospective, comparative, randomised , double blind clinical study was carried in S.R.N. hospital , Allahabad (Prayagraj) over a period of two years after approval from ethical committee of the institution . Sixty patients belonging to physical ASA 1 or 2 having cardiovascular or respiratory diseases (well controlled with medication) , aged 18-60 years undergoing lower limb surgeries were included . Two groups A and B of thirty each were made . Group A received 3ml isobaric Levobupivacaine 0.5% in subarachnoid block , Group B received combined sciatic-femoral nerve blocks (along with Obturator and Lateral Cutaneous nerve of thigh block when required) given with same drug . Observations for onset, quality, duration of sensory and motor blocks ; pulse, BP, electro cardiography and SpO₂ were made. Rapid onset of sensory and motor blocks was observed in patients given spinal (p < 0.05). Postoperative analgesia was longer in patients given nerve block (p < 0.05) . Quality of anaesthesia in both groups was good. There was fall in blood pressure at 1 and 4 hour in few cases in spinal group (p < 0.05). Both groups showed stable vital parameters . Conclusion - Anaesthesia was good , safe and comparable with both techniques. Post operative analgesia was additional advantage with nerve blocks which added to patient's satisfaction . Future work – The study can be further extended to patients having co morbidities where safety of anaesthesia is a concern.

KEYWORDS

isobaric Levobupivacaine , subarachnoid block , peripheral nerve blocks .

INTRODUCTION:

Spinal anaesthesia is widely used for lower limb orthopaedic surgeries. It provides effective block with rapid onset, attenuation of stress response and shows lesser thromboembolic episode [1]. Arterial hypotension is the most prevalent adverse effect after subarachnoid block which may not be of any clinical significance in healthy patients but carries definite risk in patients with respiratory or cardiovascular co-morbidity [2]. Peripheral nerve blocks with Levobupivacaine provide good anaesthesia of long duration. Anaesthesia with multiple nerve blocks is also useful for lower limb surgeries. It is frequently used in surgeries of poly-trauma cases where coexisting diseases are present. The technique provides good anaesthesia , postoperative analgesia, avoids hemodynamic instability, reduce hospital stay and adds to patients' satisfaction. Levobupivacaine is pure s(-) enantiomer of racemic Bupivacaine , shows lower risk of cardiovascular toxicity than Bupivacaine . Present work was aimed to study use of Levobupivacaine when given in spinal anaesthesia or peripheral nerve block . The benefit of evaluation will be applied to high risk patients in future studies.

MATERIAL AND METHOD

A prospective, randomised, double blinded study was performed at S R N Hospital, Allahabad (Prayagraj) over a period of two years . Approval from ethical committee of institution was obtained . Patients of ASA 1 - 2 status , suffering from co morbid diseases of cardio respiratory system (well controlled with medication) , aged 18-60 year , belonging to either sex , scheduled for elective lower limb surgery under spinal anaesthesia or peripheral nerve blocks were enrolled. Those having allergy , local infection , endocrinal or psychiatric diseases were excluded from the study.

After Randomisation and blinding patients were allocated one of the two groups -

Group-A Patients given 3ml isobaric levobupivacaine in spinal anaesthesia at L3-L4 interspinous space in sitting position with spinal needle no 23 G .

Group-B Patients given Peripheral nerve blocks with 0.5% isobaric Levobupivacaine . Sciatic and Femoral nerve block given in all , Lateral cutaneous nerve of thigh or obturator nerve were blocked as and when required. Sciatic Nerve Block was given by Posterior (Classic or Labat approach) Femoral Nerve Block given in supine

position [3] .

Assessment of sensory and motor block was done at different time intervals. Sensory block assessment was done with pinprick method by using 22 Gauge blunt needle and Motor block was assessed by Modified Bromage scale [4] . Time duration of onset , highest sensory block level and time duration of two segment regression from the highest sensory level was noted .

Onset and Duration of motor block - Time interval from onset of motor block to regression of motor block to Bromage scale 0 was noted .

Post-operative analgesia-The time duration from end of operation to patient's complaint of pain , was noted .

Assessment of pain - This was done using a visual analogue scale of (0-10)
0-No pain to 10-Severe pain .

RESULTS – As shown in Table – 1, Groups A and B were similar with respect to age, height, weight and sex .

Table 1: Demographic profile of patient , values in Mean ± SD (n=60)

	Group A	Group B	P value
Age(year)	36.23±15.27	39.96±11.36	0.28 (Insignificant)
Height(cm)	166.9 ±2.80	167.93±5.38	0.35 (Insignificant)
Weight (kg)	69.83±11.29	69.6±8.47	0.95 (Insignificant)
Gender ratio	25:5	27:3	Z-test (Insignificant)

Table 2 : Heart rate (per minute) at different time intervals (Mean ±SD)

heart rate	Group A	Group B	P value
Pre-op	85.46±7.50	87.33±2.30	0.19
0 Min	86.23±4.45	86.86±1.77	0.47
15 Min	87.46±5.55	87.66±3.48	0.86
30 Min	84.60±11.27	87.13±4.50	0.25
45 Min	88.43±12.78	85.93±6.89	0.34

1 HRs	84.8±11.70	87.86±4.63	0.18
2Hrs	84.4±11.10	87.13±4.50	0.21
3Hrs	91.8±9.88	87.66±4.61	0.04 (Significant)
4 HRs	92.6±5.66	87.46±5.55	0.0001 (Highly Significant)

Upto 2 hours both groups showed similar values. After 2 hours onwards difference was seen.

Graph 1 : Heart rate distribution at different time intervals:

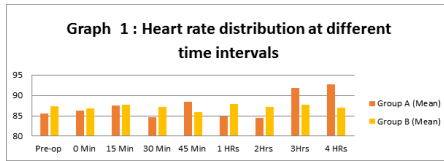


Table 3 : Blood pressure (mmHg) at different time intervals:

Blood pressure	Group A	Group B	P Value	Group A	Group B	P value
	SYSTOLIC B. P.			DIASTOLIC B. P.		
Pre-op	122.4±7.60	119.27±2.99	0.04	74.2±8.79	74.46±4.19	0.88
0 Min	122.6±6.15	120.53±2.16	0.08	73.86±7.62	74.73±3.38	0.56
15 Min	122±5.09	120.8±2.44	0.24	74.73±6.20	73.53±3.00	0.34
30 Min	122.07±4.91	120.6±2.17	0.13	74.13±5.75	73.53±2.60	0.6
45 Min	120.8±4.50	121.4±2.35	0.52	73.46±5.84	76.006±3.65	0.04
1Hrs	119.73±4.25	121.3±2.24	0.07	73.26±6.18	74.86±3.04	0.2
2Hrs	120.4±4.49	121.07±2.33	0.47	72.33±6.62	75.26±4.08	0.04
3Hrs	127.93±4.53	120.8±4.50	<0.0001	79.7±6.63	73.46±5.84	0.0003
4 Hrs	129.77±3.67	122±5.09	<0.0001	81.53±6.57	74.73±6.20	0.0001

Significant differences were observed in systolic and diastolic blood pressures at 3 hours onwards.

Table-4 showing oxygen saturation at different time intervals

Saturation (%)	Group A	Group B	P value
Pre-op	98.83±1.05	98.83±0.37	1
0 min	98.7±1.36	99.00±0.77	0.61
15 min	98.6±1.13	98.86±0.34	0.23
30 min	98.53±0.93	98.86±0.34	0.07
45 min	98.46±0.97	96.53±7.15	0.14
1 Hour	98.9±0.54	98.93±0.25	0.78
2 Hour	98.86±0.43	98.80±0.55	0.63
3 Hour	98.96±0.41	98.73±0.82	0.07
4 Hour	98.96±0.49	98.66±0.99	0.14

Oxygen saturation was same in both groups at all the times.

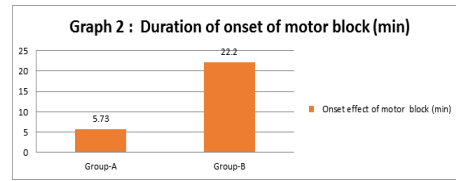
Table 5 – time duration showing onset of effect of sensory block in between two groups in minutes (Mean ± SD)

Group A	Group-B	P value
3.8 ± 1.63	16 ± 3.2	<0.0001

Significant difference in two groups in onset effect of sensory block (p<0.001) group A had earlier onset of sensory effect.

Table 6 - Onset of motor block in between two groups in minutes (Mean ± SD)

Group A	Group-B	P value
5.3±0.65	22.2 ± 22.24	<0.0001

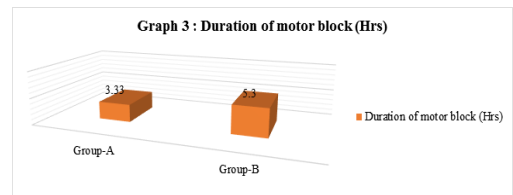


Significant difference observed in two groups in time duration of onset effect of motor block (p < 0.001) group A had rapid onset of sensory effect.

Table 7 - Duration of motor block (Hours) in between two groups (Mean ± SD)

Group A	Group-B	P value
3.33±0.47	5.3 ± 0.65	<0.0001

Graph 3 - Duration of motor block (hours) in between two groups

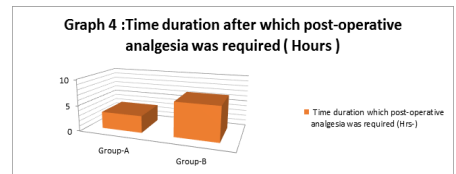


There was highly significant difference in both groups in time duration of motor block (p<0.001). The time duration of motor blocks in group B was more than group A (Table - 7 and Graph – 3).

Table 8 : Time duration (hours) after which post-operative analgesia was required .

Group A	Group-B	P value
3.26±0.44	6.76 ± 0.85	<0.0001

Graph 6 : Time duration of post op analgesia (Hrs):



Significant difference in duration of post-operative analgesia which was longer in groups B in comparison to A

Table –9, Different co morbid disease

Sr. No	Co morbid disease	no of cases	Percent %
1	Hypertension (controlled)	18	30
2	Low left ventricular ejection fraction (> 45 %)	9	15
3	Bronchial asthma (controlled)	11	18
4	Debridement of Wound	8	13.3
5	Chronic obstructive Pulmonary Disease (controlled)	14	23.3
	TOTAL	60	100

DISCUSSION

Udita Naithani et al [1] compared isobaric Levobupivacaine with hyperbaric Bupivacaine in intrathecal spinal anaesthesia and observed good anaesthesia with stable cardiovascular haemodynamics in Levobupivacaine group patients. This was our starting point to initiate this study . Sciatic or Femoral nerve block are not usually associated with change of vital parameters so the technique should be more safe in in surgical patients with associated cardio respiratory co morbidities . We in our study have also observed stable pulse ,blood pressure , electrocardiography and SpO2 in both groups .

Onset of sensory block in patients given spinal is more rapid (3.8 ± 1.63 min) than who received peripheral nerve block (23.36 ± 1.95

min) . The observation is expected since local anaesthetic when injected into intrathecal space easily comes in contact with spinal cord nerve fibres so transmission of impulse is rapidly blocked while in peripheral nerve block local anaesthetics solution has to penetrate epineurium and perineurium of the nerve before blocking of impulse takes place . Bhatt K A and Prajapati [4] observed onset of sensory block in patients who received intrathecal 0.5% 3 ml Levobupivacaine as 3.2 ± 1.5 mins . Gautam Singh et al [5] observed the same as 4.10 ± 1.67 min . These observations are very much similar to ours . Fournier R et al [6] observed onset of sensory effect in peripheral nerve block as 15 min (mean) , range (5-40 min) which is almost similar to our observations . Casati A et [7] also had comparable observations .

Onset effect of motor block:

In our study the onset effect of motor block in patients who received isobaric Levobupivacaine in spinal anesthesia ranged 4 - 6 min (5.3 ± 0.65) and in patient who received peripheral nerve block ranged 20 - 24 min (22.2 ± 2.24) . Kajal A et al [8] observed that onset of motor block in patients who received intrathecal 0.5% 3 ml Levobupivacaine ranged 3.6 ± 1.8 min . Their observations is similar to our study . Vanna O et al [9] studied 70 patients undergoing elective lower transurethral endoscopic surgery who received either 0.5% 2.5 ml isobaric Levobupivacaine or 0.5% 2.5 ml hyperbaric Bupivacaine intrathecally and found that the both the groups were similar in onset of sensory and onset of motor block.

Duration of block :

In our study , the duration of block in patient who received 3 ml isobaric Levobupivacaine in spinal anesthesia was 3.33 ± 0.47 hrs and duration of block in patient who received peripheral nerve block was 5.3 ± 0.65 Hrs . The duration of block was longer in patient who received peripheral nerve block . Kajal A et al observed that duration of motor block in groups of patients who received intrathecal 0.5% 3 ml Levobupivacaine as 170 ± 16.4 min . Our observation is similar to this study . Gautam Singh et al observed that duration of motor block in patient in groups received 0.5% 3 ml intrathecal isobaric Levobupivacaine as 154.2 ± 27.0 mins . The observations are similar to our study . Khushboo Malav et al [10] also had nearly similar observations .

Post-operative analgesia requirement:

We observed that time duration of the 1st analgesic dose requested by the patient in combined sciatic-femoral nerve blocks was 6.67 ± 0.85 hours in comparison to the patients of spinal group where it was 3.26 ± 0.44 hours . Fournier et al. conducted study of 40 patient who received equal volume of 0.5% Levobupivacaine or 0.5% ropivacaine) in both groups for the sciatic nerve block. The postoperative analgesia provided by Levobupivacaine was longer , median -1605 min (range - 575 - 2400 min) . Compared to our study his observations are different . Santorsola et al [11] also report longer duration of post operative analgesia .

Quality of analgesia was assessed by VAS score during intra-operative period. In our study VAS score in both group was good , difference of which was not significant ($p > 0.05$).

None of the groups required rescue analgesia .

Quality of motor blockade was assessed by Bromage Scale, which was found satisfactory in both groups.

CONCLUSION

We conclude that using Levobupivacaine , combined sciatic-femoral nerve block (in combination with obturator /Lateral femoral cutaneous nerve of thigh) for lower limb surgeries is effective and safe technique . It is preferred over intrathecal spinal anesthesia .

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