Original Research Paper

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COMPARISON OF HYPERBARIC LEVOBUPIVACAINE AND HYPERBARIC ROPIVACAINE FOR SPINAL ANAESTHESIA IN ELECTIVE INFRAUMBILICAL SURGERIES: A PROSPECTIVE RANDOMISED DOUBLE BLIND STUDY

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ABSTRACT

Background: *Spinal anaesthesia is widely used in infraumbilical surgeries for its rapid onset, cost-effectiveness, and reliable blockade. However, the search continues for an ideal local anaesthetic that provides adequate sensory and motor blockade with minimal hemodynamic and systemic side effects. Hyperbaric forms of* ***levobupivacaine*** *and* ***ropivacaine*** *have emerged as safer alternatives to bupivacaine, but a direct clinical comparison remains crucial.* ***Aim:*** *To compare the effectiveness of* ***hyperbaric levobupivacaine*** *and* ***hyperbaric ropivacaine*** *in spinal anaesthesia for elective infraumbilical surgeries.* ***Methods:*** *A prospective, randomized, double-blind study was conducted on* ***60 patients*** *(ASA I/II, aged 18–60 years) undergoing elective infraumbilical surgeries at Malla Reddy Medical College for Women, Hyderabad, between August 2022 and January 2024. Patients were randomized into two groups:*

- ***Group 1:*** *3 ml of 0.5% hyperbaric levobupivacaine*
- ***Group 2:*** *3 ml of 0.75% hyperbaric ropivacaine*

Sensory and motor block characteristics, hemodynamic parameters, and complications were recorded and analyzed using SPSS version 26. A p-value <0.05 was considered statistically significant.

Results:

- ***Onset of sensory block:*** *Faster in Group 2 (140.1 ± 11.3 s) vs Group 1 (215.9 ± 9.1 s), p < 0.0001*
- ***Onset of motor block:*** *Faster in Group 2 (189.4 ± 4.2 s) vs Group 1 (230.5 ± 5.5 s), p = 0.001*
- ***Two-segment regression time:*** *Shorter in Group 2 (165.1 ± 28.4 min) vs Group 1 (198.9 ± 28.9 min), p < 0.0001*
- ***Duration of motor block:*** *Longer in Group 1 (262.7 ± 26.6 min) vs Group 2 (207.1 ± 24.5 min), p < 0.0001*
- *Group 1 (levobupivacaine) demonstrated* ***greater hemodynamic stability*** *with less reduction in SBP, DBP, and pulse rate compared to Group 2.*
- *No major* ***adverse effects*** *were observed in either group.*

Conclusion: *Both hyperbaric levobupivacaine and ropivacaine are effective for spinal anaesthesia in infraumbilical surgeries.* ***Ropivacaine*** *offers a* ***faster onset and quicker recovery****, making it more suitable for day-care procedures. However,* ***levobupivacaine*** *provides* ***prolonged motor blockade with better hemodynamic stability****, suggesting its advantage in longer surgeries requiring sustained anesthesia.*

KEYWORDS : Spinal Anaesthesia, Levobupivacaine, Ropivacaine, Hyperbaric Solutions, Motor Blockade, Hemodynamic Stability.

INTRODUCTION

Spinal anaesthetic has gained popularity due to its cost-effectiveness, quick onset, dense blocking, low failure rate, and ease of application. It also lowers autonomic, somatic, and endocrine reactions and is effective in treating surgical pain. The ideal local anaesthetic drug has been a lengthy and arduous pursuit. Finding a drug that has the ideal combination of sensory and motor block lengths with minimal adverse effects on the nervous system, heart, or other systems has long been a challenge for researchers. [1]

Over the past millennium, bupivacaine has been the principal local anaesthetic agent of choice for most anaesthetists performing intrathecal, regional, and epidural blocks. But the acute, potentially fatal cardiotoxicity of bupivacaine was discovered in the early 1970s, which led to the search for a similar but less cardiotoxic local anaesthetic agent. This search resulted in the development of ropivacaine, a relatively new amide that was only approved for use in 1996 and introduced in India in 2009. Bupivacaine is marketed as a racemic combination of levobupivacaine and dextro bupivacaine, its two enantiomers. [2,3]

Oskar Kreis invented the spinal block using cocaine in July 1900, and since then, the range of spinal medications has expanded. This marked the beginning of neuraxial anaesthesia in obstetrics. The ability of long-acting local anaesthetics to reversibly stop nerve impulses is one of its most significant characteristics. This results in a prolonged sensory and motor blockade that is suitable for anaesthesia during various surgical procedures. When labouring and postoperative patients experience sensory blocking, the acute pain relief they receive at lower doses can occasionally be compromised by concomitant motor blockade, which is highly undesired and has no purpose.

The long-acting, high-potency local anaesthetic levobupivacaine takes a while to start working. Its dissociation rate is faster and its propensity to block inactivated potassium and sodium channels is less than that of its racemic form. [4]

For intrathecal administration, hyperbaric bupivacaine is the most often utilised medication. Widespread use is attributed to its affordability, ease of availability, and lack of negative consequences such momentary neurological problems. However, ropivacaine and levobupivacaine were developed as replacements to bupivacaine due to its associated with adverse effects such as dense motor blockage for lengthy duration and difficulties in micturition. [5]

Most human, in vivo, and in vitro pharmacodynamic nerve block investigations demonstrate that levobupivacaine is just as potent as bupivacaine with a lower risk of CNS and cardiovascular injury. [6] *Because levobupivacaine has a higher cardiac and neurotoxicity threshold than racemic bupivacaine and may be able to replace bupivacaine, this is why anaesthetists prefer to use it. The 'S' isomer of propyl bupivacaine, or ropivacaine, has a longer half-life, less lipid solubility, less potency, and less toxicity to the central nervous system and cardiovascular system. More than motor function-controlling nerve fibres (A fibres), ropivacaine blocks pain-transmitting nerve fibres (A and C fibres).* [7,8,9]

Consequently, it was shown that ropivacaine produced less severe motor blockade than bupivacaine. Its shorter duration, quicker recovery of motor function, and lower toxicity profile have therefore been emphasised as potential advantages for ambulatory surgery in day-care surgical centres as well as intermediate-length surgery.

Ropivacaine is a more recent amino-amide local anaesthetic (LA) drug that shares structural similarities with bupivacaine but is 30–40% less potent. It has been thoroughly investigated for spinal anaesthesia (SA). [10,11,12,13] *The initial research assessed isobaric ropivacaine's safety and effectiveness in neuraxial blockade.* [14,15] *When compared to intrathecal lignocaine, intrathecal ropivacaine was found to be less likely to cause transient neurological symptoms (TNS) and to have a shorter duration*

of action than bupivacaine. [16,17]

Because hyperbaric LA agents provide consistent block properties and dependable SA, their intrathecal usage has grown in popularity. Because it is challenging to keep hyperbaric solutions pharmacologically stable for clinical application.

For many years, hyperbaric bupivacaine (0.5%), an amide-type local anaesthetic, was the gold standard for intrathecal use in spinal anaesthesia. However, when used in large concentrations or accidentally administered intravascularly, it has also been linked to severe hypotension, delayed recovery of motor block, and cardiotoxicity. For continuous infusions and high- volume regional blocks, the introduction of ropivacaine and levobupivacaine—which have a better margin of safety for local anaesthetic systemic toxicity is favoured. [18,19,20]

When compared to bupivacaine at a comparable dosage, ropivacaine exhibits a somewhat different pharmacokinetic profile, with two thirds of the sensory anaesthesia and only half of the motor blockage. This reduced the appeal of ropivacaine for procedures involving the relaxing of muscles. Levobupivacaine, a pure S-enantiomeric form, fills this gap by having a pharmacokinetic profile that is nearly identical to that of bupivacaine but less harmful to the heart and nervous system. [21]

AIM AND OBJECTIVES

Aim

To determine the effectiveness of hyperbaric Levobupivacaine versus hyperbaric Ropivacaine for Spinal Anaesthesia in elective infraumbilical surgeries

Objectives

Primary objectives

To compare the duration of motor blockade taking equipotent doses of intrathecal hyperbaric levobupivacaine with hyperbaric ropivacaine

Secondary Objectives

1. *To compare the onset of motor blockade*
2. *To compare the onset of sensory blockade*
3. *To compare hemodynamic stability within both the drugs*

MATERIAL AND METHODS

Study Area/place:-

Department of Anesthesiology at Malla Reddy Narayana Hospital attached to Mallareddy Medical College for Women, Hyderabad.

Study Design:-

Prospective randomized single center double blind study

Study Period:-

August 2022 to January 2024

Study Population:-

Subjects with ASA grade I and II who have undergone elective surgeries under spinal anaesthesia at Mallareddy Medical College for Women, Hyderabad

Inclusion Criteria

1. *Both the sexes*
2. *Patients between the age 18 and 60 years*
3. *ASA grade I or II*
4. *Patients scheduled for elective infraumbilical surgery*
5. *Hemodynamically stable patients with all routine investigations within normal limit*

Exclusion Criteria

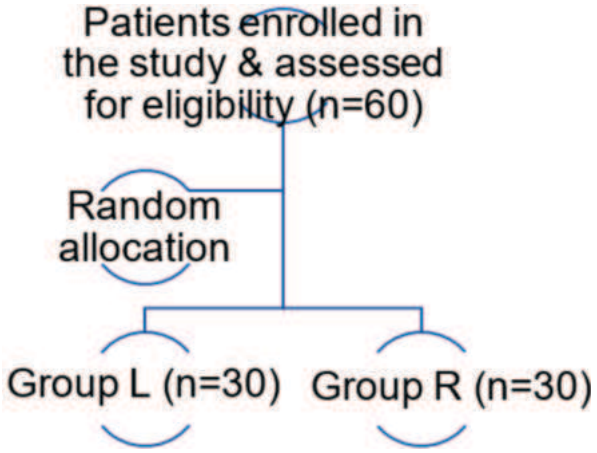
1. *Patients below 18 and over 60 years age*
2. *ASA III and IV*
3. *Pregnant*
4. *Allergy to any of the drugs used in the study*
5. *Patients having any absolute contraindication to spinal anesthesia such as raised intracranial pressure, severe hypovolemia, bleeding diathesis, local infection.*

Sample Size Estimation

Sample size estimation is performed considering the mean duration of motor blockade from the previous research by Patel et al. [22] *According to their findings, the mean duration of sensory block was 223.62 + 23.03 in Group A and 180.65 + 11.58 in Group B.*

When duration of motor blockade is considered and if we desire an equal sample size in both groups, the minimal sample size to detect a difference with a power of 80% at 95% confidence level is 58 with a sample size of 29 in each group.

Based on above formula the sample size required per group was 29 and rounded off to 30 each group.



Study Methods

Patients who underwent infraumbilical surgery at Mallareddy Medical College for Women, Hyderabad during study period were screened for eligibility to be included in the study based on the study inclusion and exclusion criteria. Eligible patients were informed and explained about the study. An informed consent (Annexure- I) was taken from the patients who participated in the study.

Patients were allocated into two groups of 30 participants each using excel random between.

2 Sets of 30 Unique Numbers Per Set
Range: From 1 to 60

Set #1

25, 20, 23, 47, 15, 12, 59, 9, 14, 1, 17, 19, 28, 11, 18, 49, 13, 31, 42, 32, 51, 41, 50, 36, 21, 27, 37, 22, 6, 8

Set #2

30, 51, 9, 44, 21, 28, 2, 11, 36, 15, 6, 14, 37, 55, 52, 24, 7, 29, 18, 12, 23, 33, 34, 60, 42, 10, 47, 8, 39, 5

Set 1: Levobupivacaine (0.5%) hyperbaric 3ml injection(group 1)
Set 2: Ropivacaine (0.75%) hyperbaric 3ml injection?(group 2)

The data was collected by another anesthesiologist who was uninformed of the drug that was given.

On the day of the surgery, all patients were prepared for the procedure. A 18-gauge cannula was secured and an intravenous (IV) infusion of Ringer's lactate solution was administered. . Standard monitors were attached to all patients, including a pulse oximeter and non-invasive BP, electrocardiography and end tidal carbon dioxide monitoring equipment. Various baseline haemodynamic parameters including HR, SBP, diastolic BP (DBP) and mean arterial pressure (MAP) were measured using a B40 GE Monitor. The rate pressure product (RPP) was calculated as the product of HR and SBP.

Spinal anesthesia was performed in patient with sitting position and 25 gauge Quinkes needle. In this study the patient and the data collector were double blinded.

The Following sensory block parameters were assessed with pin prick:

1. *Onset of Sensory Block -Time from injection to onset of loss of pin prick sensation at T12 dermatome*
2. *Time taken for sensory blockade to reach peak level - Time from administration of drug till the loss of pin prick sensation at maximum sensory peak level*
3. *Two segment regression time -Time from administration of drug till the recovery of pin prick sensation as sharp pain at two levels below peak level (T 6 as peak level is taken in this study)taken as duration of sensory blockade.*

The following parameters will be assessed
1. *Onset of motor block - Time of administration of drug till the attainment of modified Bromage scale 3*
2. *Duration of motor block - Time from administration of drug till recovery of motor block level to Bromage scale of 0*

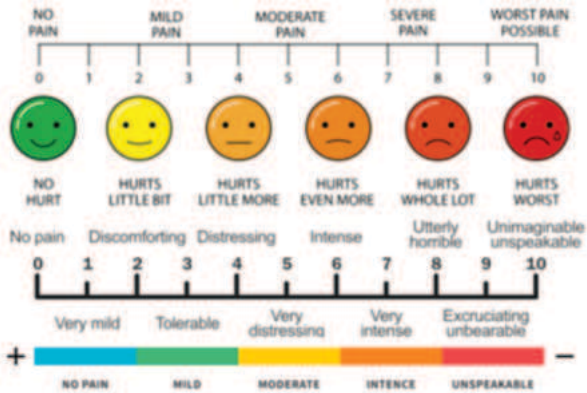
Table 2 :- Modified Bromage Scale

Modified Bromage Scale	
0	Patient is able to move hip, knee and ankle
1	Patient is unable to move hip but able to move knee and ankle
2	Patient is unable to move to hip and knee but able to move ankle
3	Patient is unable to move hip, knee and ankle .

Vitals like pulse rate, systolic blood pressure , diastolic blood pressure, saturation of oxygen are recorded from 0 min , every 10 mins and continued in the postoperative period.

The time for request for first rescue analgesia was noted from the time of administration of spinal anaesthesia to complain of pain (VAS score >/= 3 at rest.

Table 3 :- VAS score



Changes in vital indicators, nausea, vomiting, shivering, and urine retention were monitored postoperatively. The satisfaction of the patient was determined by their willingness to accept the same technique of anaesthesia for their next surgical treatment, whereas the satisfaction of the surgeon was determined by the infra umbilical area relaxation.

Statistical Analysis Plan

- *The data was collected, coded, entered into Microsoft excel worksheet and exported to SPSS.*
- *Data was analysed using a statistical package for social sciences (SPSS) version 26.*
- *The comparison of baseline data was performed using an analysis of variance test.*
- *Mean and SD values was calculated for quantitative variables (time of onset of sensory block, motor block, systolic BP, Diastolic.*
- *Proportions or frequencies were calculated for qualitative variables (age, sex, weight, ASA class, incidence of adverse effects).*
- *Quantitative data like pulse rate, systolic and diastolic blood pressure, was analysed by student "t" test.*
- *A P value of <0.05 is considered statistically significant for all statistical tests performed.*

RESULTS

A prospective randomized single center double blind study was conducted in the department of Anesthesiology of Malla Reddy Medical College for Women, Hyderabad with the aim determine the effectiveness of hyperbaric Levobupivacaine versus hyperbaric Ropivacaine for Spinal Anaesthesia in elective infraumbilical surgeries. The study was done between August 2022 to January 2024. A total of 60 subjects were included and distributed into two groups (1 and 2) of 30 each. The results obtained were as follows :
Results
GROUP 1: Hyperbaric Levobupivacaine 0.5%
GROUP 2: Hyperbaric Ropivacaine 0.75%

Table 4: Distribution According To Age

Age	group 1	group 2
<20 years	1	2
21- 30 years	14	21
31- 40 years	3	4
41- 50 years	5	2
51- 60 years	6	-
>60 years	1	1
Total	30	30
Mean age	36.9± 14.2	28.8± 8.6 years

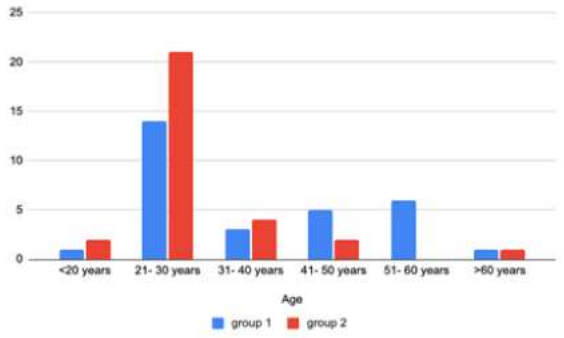


Figure 6: *Column Chart Showing Age*

Table 4 figure 6 shows the age distribution among both the groups were majority (58.3%) of the subjects were between 21- 30 years, 11.7% each were between 31 to 40 years and 41- 50 years respectively, 10% were between 51 and 60 years, 5% were below 20 years and 3.3% were above 60 years. The p value is ***0.09*** *. The difference is considered to be statistically insignificant .*

Table 5 : Table Of Gender Distribution

Gender	group 1	group 2	p value
Males	13	7	
Females	17	23	
Total	30	30	0.09
Sex ratio [M: F]	0.1: 1	0.2: 1	

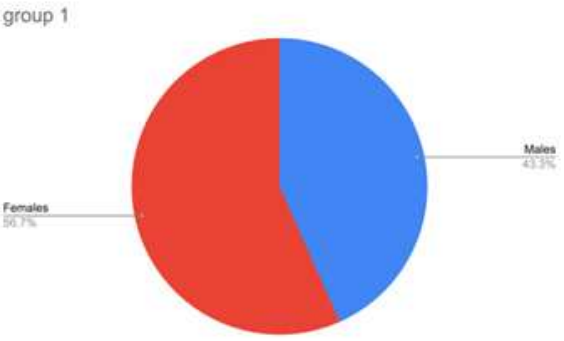


Figure 7a: *Pie Chart Showing Gender In The Levobupivacaine Group*

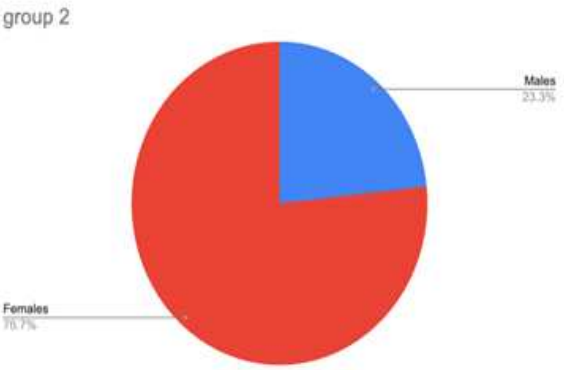


Figure 7b: *Pie Chart Showing Gender In The Ropivacaine Group*

Table 5 and figure 7 shows the gender distribution where overall the study consisted of 31.7% males and 68.3% females with the sex ratio being 0.1: 1 [M: F].The p value is ***0.09*** *. The difference is statistically insignificant.*

Table 6: Anthropometry Measurement

Anthropometry	group 1	group 2	P VALUE
Height (cms)	162.5± 11.7	157.9± 9.8	0.10
Weight (Kgs)	55.9± 13.3	54.4± 10.8	0.63

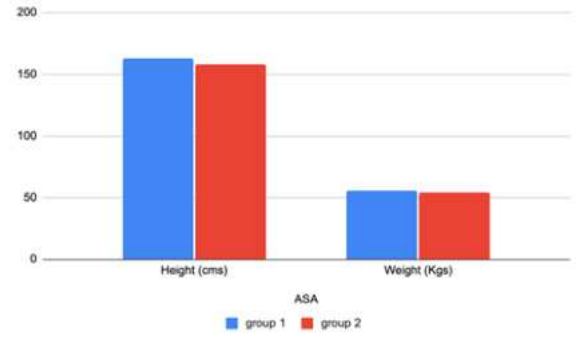


Figure 8: *Bar Chart Showing Anthropometry*

The overall mean height among the subjects was 160.2± 10.75 (cms) and the mean weight was 55.1± 12.05 (Kgs) as seen in table 6. The p value for height is ***0.10*** *, p value for weight is* ***0.63****. The difference between two groups is statistically insignificant .*

Table 7: Distribution According To American Society Of Anaesthesiologists (ASA)

ASA	group 1	group 2	P value
I	27	29	
II	3	1	
Total	30	30	0.9

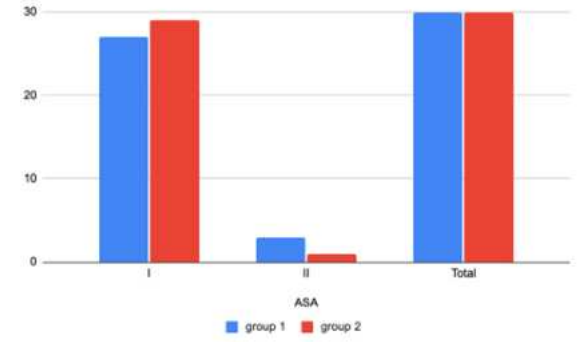


Figure 9: *Column Chart Showing ASA*

In the study 93.3% (56) belonged to ASA I and the remaining 6.7% (4) belonged to ASA II as shown in table 7.The p value is ***0.9*** *, the difference is statistically insignificant .*

Table 8 : Vitals At Baseline

Vitals	group 1	group 2	p value
Pulse rate (/min)	81.2± 12.1	83.6± 11.6	0.43
Systolic BP (mm of Hg)	120.1± 15.6	114± 8.5	0.06
Diastolic BP (mm of Hg)	77.1± 9.2	75.1± 8.5	0.38
Haemoglobin (%)	13.2± 1.4	13.1± 1.7	0.80

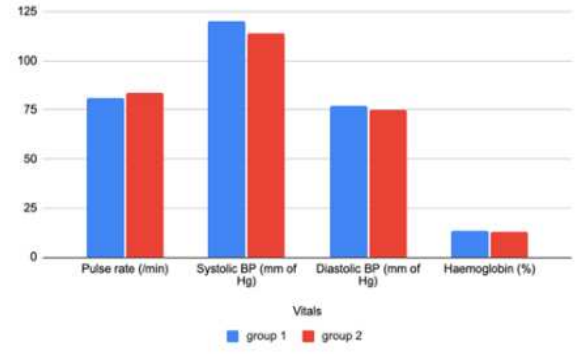


Figure 10: *Column Chart Showing Vitals At Baseline*

At baseline the vitals were within normal limits for all the subjects in both the groups as seen in table 8. The p value of the data at the baseline is recorded and is greater than 0.05 . The difference is statistically insignificant.

Table 9: Onset Of Sensory

Blockades	group 1	group 2	p-value
Time of onset of sensory blockade (Seconds)	215.9± 9.1	140.1± 11.3	0.0001

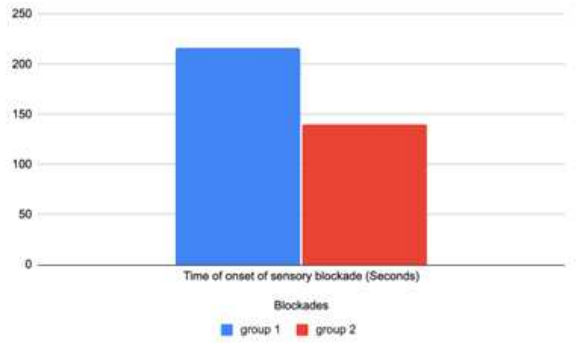


Figure 11:- *Bar Chart Showing Time Of Onset Of Sensory.(in Seconds)*

Table 9 and figure 11 shows, On comparison between both the groups a significant difference (p< 0.05) was noted between them suggesting ropivacaine having faster onset of sensory blockade than levobupivacaine.

Table 10 - Time Of Onset Of Motor Blockade (in seconds)

Blockades	group 1	group 2	p-value
Time of onset of motor blockade (Seconds)	230.5 ± 5.5	189.4 ± 4.2	0.001

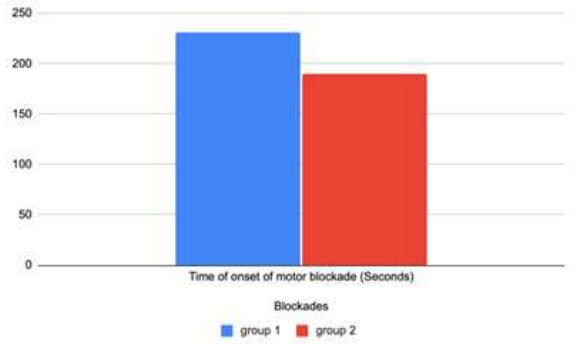


Figure 12 - *Time Of Onset Of Motor Blockade (in seconds)*

Table 10 and figure 12 shows, On comparison between both the groups a significant difference (p< 0.05) was noted between them suggesting ropivacaine having faster onset of motor blockade than levobupivacaine.

Table 11 - Highest Level Of Sensory Blockade (in seconds)

Blockades	group 1	group 2	p-value
Highest level of sensory blockade (Seconds)	294.9± 52.2	275.5± 68.4	0.0002

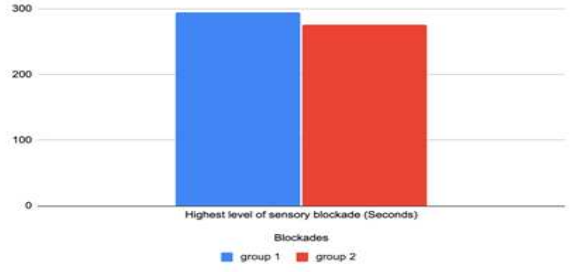


Figure 13 - *Chart showing Highest level of sensory blockade (in seconds)*

Table 11 and figure 13 shows, On comparison between both the groups a significant difference (p< 0.05) was noted between them suggesting ropivacaine having faster highest level of sensory blockade than levobupivacaine .

Table 12 :- Time For Two Segment Regression

Blockades	group 1	group 2	p-value
Time for two segment regression (Minutes)	198.9± 28.9	165.1± 28.4	0.0001

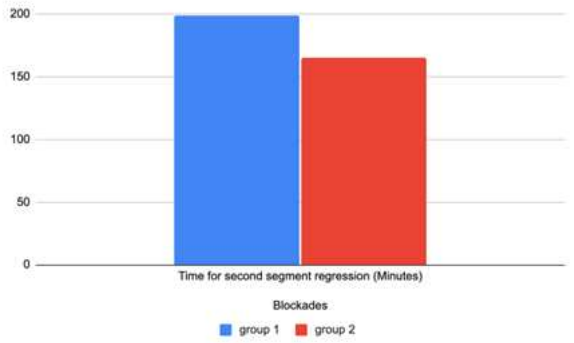


Figure 14:- *Bar Chart Showing Time For Two Segment Regression In Minutes.*

Table 12 and figure 14 shows . On comparison , p value <0.05 noted ,the difference between the two groups is statistically significant suggesting ropivacaine had faster two segment regression .

Table 13 :- Duration Of Motor Blockade

Blockades	group 1	group 2	p-value
Duration of motor blockade (Minutes)	262.7± 26.6	207.1± 24.5	0.0001

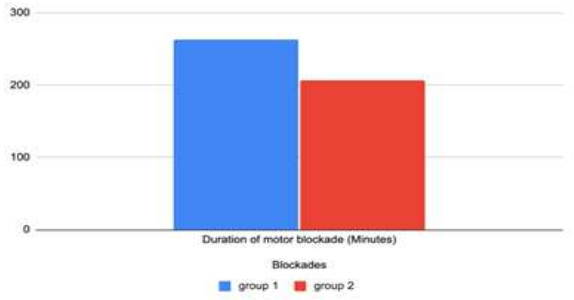


Figure 15:- *Bar Chart Showing Duration Of Motor Blockade In Minutes.*

Table 13 and figure 15 shows , On comparison between both the groups a significant difference (p< 0.05) was noted between them suggesting ropivacaine had sooner recovery from motor blockade.

Table 14: Pulse Rate Distribution

Pulse rate (/min)	group 1	group 2	p value
Pre- procedure	81.2± 12.1	83.6± 11.6	0.43
0 mins	85.1± 14.6	83.8± 10.8	0.69
10 mins	80.7± 12.6	71.2± 10.2	0.004
20 mins	79.7± 12.6	69.3± 10.8	0.001
30 mins	80± 12.08	75.8± 10.03	0.14
40 mins	79.4± 11.8	76.5± 5.9	0.23
50 mins	78± 11.9	76± 5.2	0.40
60 mins	74.6± 12.2	76± 4.2	0.55

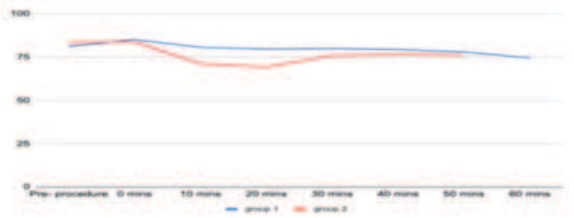


Figure 16: *Line Diagram Showing Pulse Rate*

In the study the pulse rate was recorded, in group 1(levobupivacaine) PR remained almost the same from the 0th minute. In the group 2 (ropivacaine) group there was decrease in the PR from the 10 th and 20th minute as shown in table 14 and figure 15. A statistically significant difference (p< 0.05) was noted.

Table 15: Systolic Blood Pressure Distribution

Systolic BP (mm of Hg)	group 1	group 2	p-value
Pre- procedure	121.1± 15.6	114.5± 8.5	0.65
0 mins	121.3± 12.4	114.2± 11.08	0.72
10 mins	123± 12.05	107.9± 10.3	0.0001
20 mins	122.6± 11.3	105.8± 9.7	0.0001
30 mins	121.5± 11.8	108.1± 9.8	0.0001
40 mins	123.07± 11.8	120.8± 6.8	0.36
50 mins	124.9± 15.3	121.3± 6.5	0.24
60 mins	126.2± 15.2	120.5± 14.8	0.14

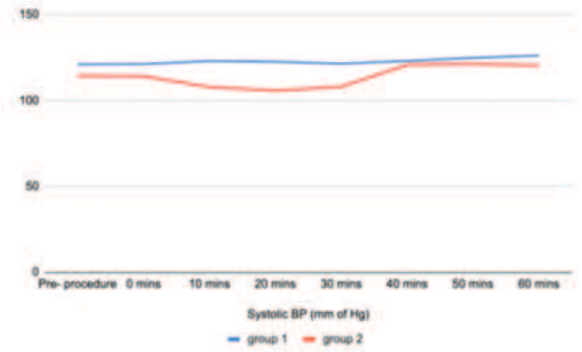


Figure 17: *Line Diagram Showing SBP*

In the study(see table 15 and figure 17) A statistically significant difference (p< 0.05) was noted at times except at 10 ,20 and 30 minutes suggesting Group 1 is more stable and decrease in SBP seen in group 2.

Table 16: Diastolic Blood Pressure Distribution

Diastolic BP (mm of Hg)	group 1	group 2	p-value
Pre- procedure	80.6± 6.6	79.5± 7.5	0.50
0 mins	76.1± 8.6	72.5± 7.9	0.13
10 mins	75.2± 10.1	66.8± 7.7	0.001
20 mins	73.6± 10.09	65.9± 7.3	0.001
30 mins	73.8± 9.9	66± 9.8	0.001
40 mins	73.9± 9.6	67.2± 9.5	0.08
50 mins	73.3± 10.04	59.6± 4.9	0.07
60 mins	72.8± 8.4	61± 1.4	0.30

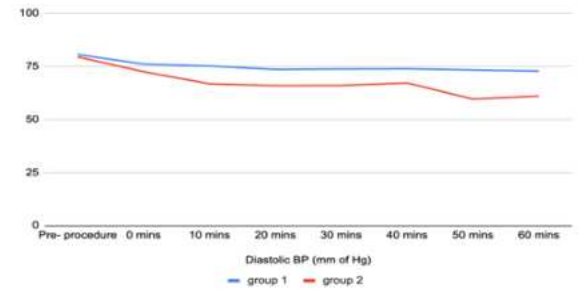


Figure 18: *Line Diagram Showing DBP*

As shown in table 16 and figure 18. A statistical difference was noted at 10, 20 and 30 minutes suggesting decrease in DBP in group 2 whereas group 1 remained more stable .

Table 17: Distribution According To Post- Operative Complications

Complications	group 1	group 2	P-value
None	24	22	0.1
Nausea	2	4	
Shivering	4	4	
Total	30	30	

In the study in table 17 and figure 19. On comparison between both the

groups for complications NO significant association (p value >0.05) was obtained suggesting adverse effects in both the groups are comparable.

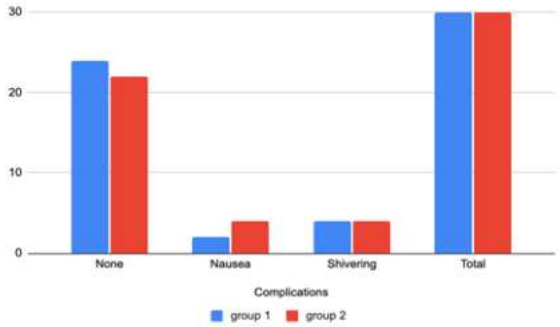


Figure 19: *Column Chart Showing Complications*

DISCUSSION

A total of 60 patients fulfilling inclusion criteria were included with the mean age of the levobupivacaine group was 36.9± 14.2 years and that of the ropivacaine group was 28.8± 8.6 years who were undergoing elective infraumbilical surgeries .Patients with morbid obesity , ASA 3 , ASA 4 , emergency surgery , allergy to any drugs in the study , coagulation disorders were excluded from the study.

Group 1 received 0.5% hyperbaric Levobupivacaine and Group 2 received 0.75% hyperbaric Ropivacaine .

The anthropometric data (age , gender , height , weight , ASA status)in this study between the two study groups were compared and were statistically insignificant .

In the present study, in the levobupivacaine group the mean time of onset of sensory blockade was 215.9 ± 9.1seconds (4minutes), In the ropivacaine group the mean time of onset of sensory blockade was 140.1±11.3 seconds (2.5 minutes).On comparison between both the groups a significant difference (p< 0.05) was noted .

The present study findings were similar to the study of Bora B et al.[23] , Luck et al.[24] , Gianluca C et al.[25] , Kalpana R et al. [26] , Athar M et al[27] where the onset of sensory blockade between levobupivacaine and ropivacaine groups were statistically significant suggesting Ropivacaine had faster onset of sensory blockade than levobupivacaine .

In this study , in levobupivacaine group the mean time of onset of motor blockade 230.5± 5.5 seconds (4.5 minutes) , in ropivacaine group the mean time of onset of motor blockade was 189.4 ± 4.2 seconds (3.15 minutes) .On comparison between both the groups a significant difference (p< 0.05) was noted .The present study findings were similar to the study of Bora B et al.[23] , Luck et al.[24] , Gianluca C et al.[25] , Kalpana R et al. [26] , Athar M et al[27] where the onset of motor blockade between levobupivacaine and ropivacaine groups were statistically significant suggesting that Ropivacaine had faster onset of motor blockade than levobupivacaine.

In the present study , in levobupivacaine group the highest level of sensory blockade was 245.5± 68.4 seconds(5 minutes) where as the highest level of sensory blockade was 294.9± 52.2seconds(5 minutes) in ropivacaine group.On comparison between both the groups a significant difference (p< 0.05) was noted.The present study findings were similar to the study of Bora B et al.[23] , Luck et al.[24] , Gianluca C et al.[25] , Kalpana R et al. [26] , Athar M et al[27] , Bhagya D et al.[28] where ropivacine had faster highest level of sensory blockade than levobupivacaine .

In the present study The time for two segment regression in levobupivacaine group was 198.9± 28.9 minutes(3.3 hrs) where as in ropivacaine group was was 165.1± 28.4 minutes On comparison between both the groups a significant difference (p< 0.05) was noted . In the present study , the duration of motor blockade was 262.7± 26.6 minutes(4.3 hrs) in the levobupivacaine group whereas the duration of motor blockade was 207.1± 24.5 minutes in ropivacaine group . The present study findings were similar to the study of Bora B et al.[23] , Luck et al.[24] , Gianluca C et al.[25] , Fettes P et al. [37] , Orhan G et al. [38] , Kalpana R et al.[26] ,Athar M et al[27] ,Bhagya D et al.[28] ,Kulkarni KR et al[29] , suggesting levobupivacaine group showed longer duration of motor blockade where as ropivacine had sooner recovery from motor blockade.

In the present study, pulse rate compared among both the groups . A statistically significant difference (p< 0.05) was noted in the decrease in pulse rate in the ropivacaine group from 10th minutes to 20 minutes suggesting levobupivacaine is hemodynamically more stable.The present study findings were similar to a study by Athar M et al[27] in which there was no significant difference in decrease in pulse rate episodes among both the groups (7% in levobupivacaine vs 7% in ropivacaine).[27]

In this study the SBP when compared between both the groups systolic blood pressure was stable in the levobupivacaine group. A statistically significant difference (p< 0.05) was noted at 10 and 20 minutes suggesting levobupivacaine is more hemodynamically stable.

In the present study the DBP in both the groups . When compared between both the groups DBP was more stable in the levobupivacaine group. A statistical difference was noted at 10, 20 and 30 minutes suggesting levobupivacaine is more hemodynamically stable.

The present study findings were similar to a study by Athar M et al[27] in which there was no significant difference in decrease in blood pressure episodes among both the groups (25% in levobupivacaine vs 33% in ropivacaine).

In the present study On comparison between both the groups for complications no significant association (p>0.05) was obtained . The present study findings were similar to study by Athar M et al [27], Gurpreet S et al. [30]in which levobupivacaine and ropivacaine groups had no significant adverse effects . There was no statistically significant difference in the incidence of adverse events in both the groups. So both the drugs are considered to be safe in spinal anesthesia.

SUMMARY AND CONCLUSION

A prospective randomized single center double blind study was conducted in the department of Anesthesiology of Malla Reddy Medical College for Women, Hyderabad with the aim determine the effectiveness of hyperbaric Levobupivacaine versus hyperbaric Ropivacaine for Spinal Anaesthesia in elective infraumbilical surgeries. The study was done between August 2022 to January 2024. A total of 60 subjects were included based on inclusion criteria and were distributed into two groups (1 and 2)of 30 each.

Following conclusions were made in the present study

- *Onset of sensory blockade was faster in ropivacaine compared to levobupivacaine (p <0.05).*
- *Onset of motor blockade was significantly faster in ropoivacaine compared to levobupivacaine (p <0.05).*
- *Two segment regression was significantly sooner in ropivacaine compared to levobupivacine (p <0.05).*
- *Duration of motor blockade was significantly prolonged in levobupivacaine compared to ropivacaine (p<0.05).*
- *Haemodynamic changes showed significant transient decreases in PR ,SBP , DBP in group 2 at few points intraoperatively which were brought back to normal without any use of vasopressors .*
- *No significant major complications or adverse events were noted in both groups.*

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