"A prospective clinical study of 0.5% levobupivacaine with 0.5% bupivacaine in spinal anaesthesia"

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Abstract

Background: Spinal anaesthesia is a popular technique for lower abdominal surgeries for more than a century. Choice of local anaesthetics depends mainly onset, duration, intensity of sensory and motor block and side effects. With time newer local anaesthetics were invented and used to get better analgesia and less side effects.

Aim: To study and compare the effects of 0.5% Levobupivacaine with 0.5% Bupivacaine in spinal anaesthesia.

Design: Randomised Controlled study.

Material & Method: The study includes 100 patients randomly divided into 2 groups of 50 each. Group L patients received 3ml of 0.5% Levobupivacaine (15mg) 5mg/ml.Group B patients received 3ml of 0.5% Bupivacaine (15mg) 5mg/ml.

Statistical Analysis: by using SPSS version 20 (Statistical Package for Social Studies), Chi square test, F table, Mean and standard deviation were used.

Results & Conclusion: Duration of sensory block and time for first requirement of post-operative analgesia was longer in patients who received 0.5% Levobupivacaine intrathecally when compared to 0.5% Bupivacaine intrathecally. Though there was no statistical significance in terms of onset of sensory and motor block, duration of motor block was less in Levobupivacaine group. Stable haemodynamics and less side effects were observed with Levobupicaine. Hence, Levobupivacaine is a better alternative to Bupivacaine for spinal anaesthesia.

Access this article online	
Quick Response Code:	**Website:** www.innovativepublication.com
	DOI: 10.5958/2394-4994.2016.00070.6

Introduction

Spinal anaesthesia is one of the most popular techniques for both elective and emergency surgical procedures, particularly caesarean sections, lower abdominal surgeries, orthopaedic and urological procedures, was introduced into clinical practice by Karl August Bier[1] in1898.

Spinal anaesthesia,which is defined as 'the regional anaesthesia achieved by blocking nerves in the subarachnoid space' is a common technique worldwide. The advantages of spinal anaesthesia are, an awake patient, simple to perform, offers rapid onset of action, has minimal drug cost and relatively less side effects.

The choice of local anaesthetics is determined by the duration of surgery and by the intensity of sensory and motor blockade required. Lignocaine was the first amide local anaesthetic and it replaced esters following its clinical introduction in the early1950's.Lignocaine does not have allergic sensitization, seen with esters and was extensively used. Its use is limited nowadays due to transient neurological symptoms. This prompted a search for alternatives.

The increase in day care surgery has generated a need for a local anaesthetic with a faster onset and shorter duration of action, allowing early ambulation. Moreover, the major concern about the cardiotoxicity of Bupivacaine has led to the development of Levobupivacaine, a new long acting amide[3]with a reasonably stable hemodynamic profile.

Levobupivacaine is the S-enantiomer of racemic bupivacaine and has less of negative inotropism and decreased affinity for cardiac sodium channels than Bupivacaine. Thus it has an improved safety profile over Bupivacaine.

The objective of the present study is to investigate the clinical efficacy of Levobupivacaine compared with racemic Bupivacaine in spinal anesthesia for lower abdominal, pelvic and lower limb surgeries.

Aims and Objectives

Aim: To study and compare the effects of 0.5% Levobupivacaine with 0.5% Bupivacaine in spinal anaesthesia.

Objectives: To measure and compare these variables at regular time intervals

- Time of Onset of Sensory Block
- Time of Onset of Motor Block
- Duration of sensory and motor block.
- Systolic blood pressure
- Diastolic blood pressure
- Mean arterial pressure
- Heart rate

Patients and Methods

After approval by the Institutional Ethical Committee, the study was conducted on 100 ASA physical status I and II patients, undergoing elective lower limb and lower abdominal surgeries under spinal anesthesia. The age of the patients rangedbetween 19-68 yrs and weighing 35- 65kgs.

Preoperatively we have examined all the patients and the investigations were checked. The procedure was explained to the patients and consent was taken.

Inclusion Criteria:

- Age range 19-68 years of both sex
- Weight 35-65kgs
- ASA grade I & II

Exclusion criteria:

- Patient refusal
- Local infection
- Coagulopathy and bleeding disorders
- ASA grade > 3
- Allergy to either of the drugs

Method: The patients were randomly allocated into two groups of 50 each.

Group L patients received 3ml of 0.5% Levobupivacaine (15mg) 5mg/ml.

Group B patients received 3ml of 0.5% Bupivacaine (15mg) 5mg/ml.

Before shifting the patient anaesthetic machine was checked and equipment were kept ready. Emergency drugs were drawn and labelled. Then patients were shifted to the operating room and monitoring such as ECG, Pulse Oximetrey and NIBP were attached. Preoperative baseline mean arterial pressure, pulse rate and $SP0_2$ were recorded. Patients were secured with 18G intravenous cannula and preloaded with10 ml/kg of ringer lactate.

All the patients were placed in sitting position, under full aseptic precautions the skinover the back was prepared with antiseptic solution(5% povidone-iodine)and draped with sterile towel. Lumbar puncture was performed with a 23G Quincke Babcock spinal needle at L_2-L_3 or L_3-L_4 intervertebral space through midline approach. The drug was injected intrathecally and the time of injection noted.

The following parameters were observed

Sensory block: The **Onset of Sensory Block** was defined as the time between the injection of anesthetic solution and the absence of sensation to pinprick upto T10dermatome. The **Duration of Sensory Block** was defined as the time from the onset of sensory block to the time when the patient required first dose of rescue analgesia(for post-operativepain)

Motor Block: Modified Bromage Scale was used to assess motor block.

Modified Bromage Scale:

0- No block, able to raise extended legs against gravity
1- Unable to raise extended legs, but just able to flex knees.
2- Unable to flex knees, but able to flex ankle.
3- Total block-inability to flex ankle

Assessment of motor block was started immediately after placing the patient in supine position and continued every minute till Bromage score of 3 wasreached.

The **Onset of Motor Block** was defined as the time to achieve Bromage score of 2or 3 from the time of injection whichever is achieved. The **Duration of Motor Block** was taken as the time from subarachnoid injection to return of Bromage score to zero.

Vital signs and side effects

Systolic Blood Pressure, Diastolic Blood Pressure, Mean arterial pressure, heart rate, SPO_2 was monitored continuously were recorded at 3, 5, 10 minutes and thereafter at every 5 mins interval until 30 minutes then every 15 minutes upto 90 minutes. Hypotension was defined as a decrease in MAP more than 20% from baseline or systolic blood pressureless than 90mmHg. Hypotension was managed by incremental doses of 6mg intravenous Ephedrine. Bradycardia was defined as heart rate less than 60/min and managed by incrementaldoses of 0.6 mg intravenous Atropine. Respiratory depression was said to be presentif the respiratory rate was less than 8/ min and SPO_2 less than 90%. Vomiting was managed with Ondansetron 4mg/IV which was rarely required.

Observation and Results

This study includes 100 patients posted for elective abdominal and lower limb surgeries, divided into two groups of 50 each. Group L-50 patients received 0.5% Levobupivacaine 3ml and group B – 50 patients received 3ml of 0.5% Bupivacaine.

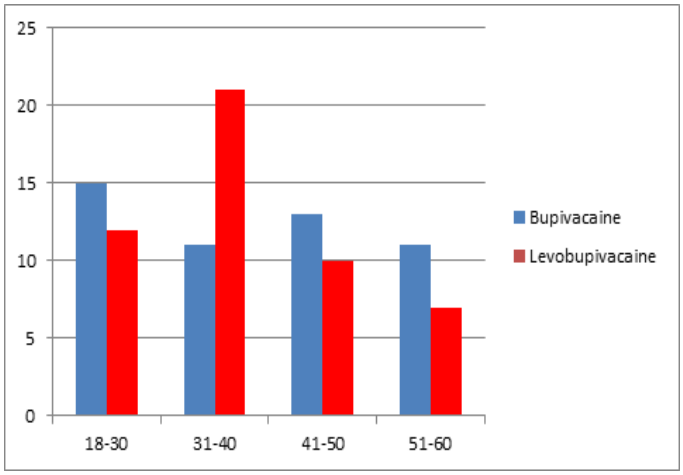
Statistical analysis

- Done by using SPSS version 20 (Statistical Package for Social Studies).
- Chi square test
- Mean and standard deviation were used.
- F table (degree of freedom)

Age distribution in two groups

Parameters	Group L		Group B		
	N	%	N	%	
Age					
18-30	15	30	12	24	Chi sq. = 4.739
31-40	11	22	21	42	df. = 3
41-50	13	26	10	20	p = 0.192
51-60	11	22	7	14	(NS)

- Group L: Levobupivacaine, Group B: Bupivacaine, df = degree of freedom, p value > 0.05 (0.192) not significant.
- The table shows age distribution of the patients in both the groups, the minimum age was 20 yrs and maximum was 60 yrs.
- There is no significant difference in the age of the patients between group L and B.
- Both groups were similar with respect to age distribution as p value is > 0.05.

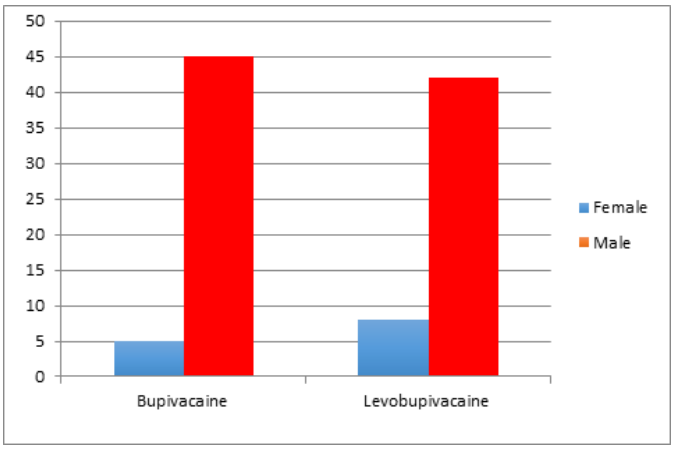


- This graph shows four different age groups (18-30), (31-40), (41-50), (51-60) in Levobupivacine and Bupivacaine groups.
- Age in years is depicted on X axis and number of patients along Y axis.
- The age was not statistically not significant as p value is > 0.05, as far as our present study is concerned.

Sex distribution in two groups

Female	5	10	08	16	Chi sq. = 0.795 d.f = 1 p = 0.372
Male	45	90	42	84	

- Although the male and female patients are not exactly equal, the difference in the two groups is statistically not significant.(p value > 0.05)
- Demographically there is no significance found with respect to age and sex, a in both the factors p value > 0.05
- d. f = degree of freedom



Graphical representation of sex distribution in both groups, females are represented in blue and males in red colour bars.

Comparison of Height and weight between both the groups

Parameter	Group L	Group B	p value
Height (cms)	163±9	160±7	0.16
Weight (kg)	60.9±8.6	64.3±9.2	0.28

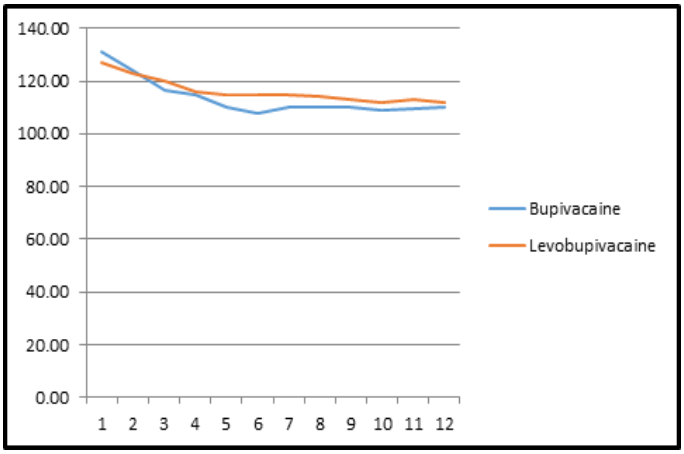
Demographically there is no significance found with respect to age, sex, height and weight as in these factors p value is > 0.05.

Haemodynamic parameters

Systolic blood pressure changes in both groups

Parameter	Bupivacaine		Levobupivacaine		P value
	Mean	SD	Mean	SD	
SBP Baseline	132.16	12.13	130.52	13.29	0.52
SBP 3 min	123.51	11.74	123.06	19.76	0.89
SBP 5 min	118.75	11.56	121.60	12.18	0.23
SBP 10 min	114.96	10.94	119.78	10.98	0.03
SBP 15 min	110.47	11.35	117.41	11.29	0.01
SBP 20 min	109.84	10.57	117.20	11.50	0.01
SBP 25 min	109.44	8.73	116.34	11.68	0.01
SBP 30 min	108.84	8.25	114.22	18.47	0.06
SBP 45 min	109.06	8.31	115.54	10.38	0.02
SBP 60 min	110.16	7.56	114.78	10.19	0.01
SBP 75 min	110.46	7.01	115.36	9.11	0.01
SBP 90 min	110.78	7.18	115.10	9.30	0.01

- This table shows Systolic Blood Pressure measurements in mm Hg at baseline, 3min, 5min then every 5min till 30min. Later SBP was recorded every 15 min till 90 min.
- The baseline SBP in B group was (132.16±12.13) mm Hg and (130.52±13.29) mm Hg, both of them are statistically comparable as p value is > 0.05
- After first 10 mins, the values of SBP became statistically significant (p value < 0.05)
- When compared the fall in SBP was more in Bupivacaine group compared to Levobupivacaine group.



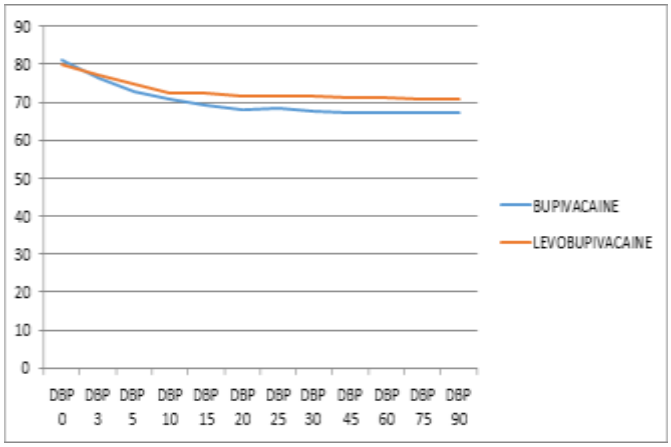
Intraoperative changes in SBP in L and B groups
Graphical representation of SBP changes with Time interval in minutes on X axis and SBP in mmHg along Y axis.

- The changes in Systolic Blood Pressure are not significant at 3 mins and 5 mins.
- The fall in SBP is statistically significant in Bupivacaine group whereas the observations are more stable in Levobupivacaine group.
- In the line graph depicted above, SBP observations in B group is plotted in blue colour, with steeper fall compared to L group.

Diastolic blood pressure changes in both groups

Parameter	Bupivacaine		Levobupivacaine		p value
	Mean	SD	Mean	SD	
DBP Baseline	81.02	9.47	79.84	7.70	0.50
DBP 3 min	76.39	8.23	77.16	9.38	0.66
DBP 5 min	72.67	9.42	74.96	9.80	0.43
DBP 10 min	70.68	7.53	72.38	9.41	0.32
DBP 15 min	69.46	7.47	72.49	9.25	0.07
DBP 20 min	68.14	6.38	71.84	9.81	0.03
DBP 25 min	68.51	6.27	71.72	8.83	0.04
DBP 30 min	67.53	6.12	71.84	8.82	0.01
DBP 45 min	67.42	5.72	71.26	8.33	0.01
DBP 60 min	67.32	5.20	71.22	7.52	0.02
DBP 75 min	67.36	5.31	70.76	7.90	0.01
DBP 90 min	67.18	5.54	70.84	9.44	0.02

- This table shows Diastolic Blood Pressure changes at baseline, 3min, 5min and every 5 min till 30 min.
- Later, after 30 mins DBP was recorded every 15 min till 90 min.
- Baseline mean value of diastolic blood pressure was 81.02 mm Hg with a SD of 9.47 in B group and 79.84 mm Hg and SD of 7.70 in L group.
- After initial 15 mins, the p value became statistically significant ($p < 0.05$) when the observations were comparable between both the groups.



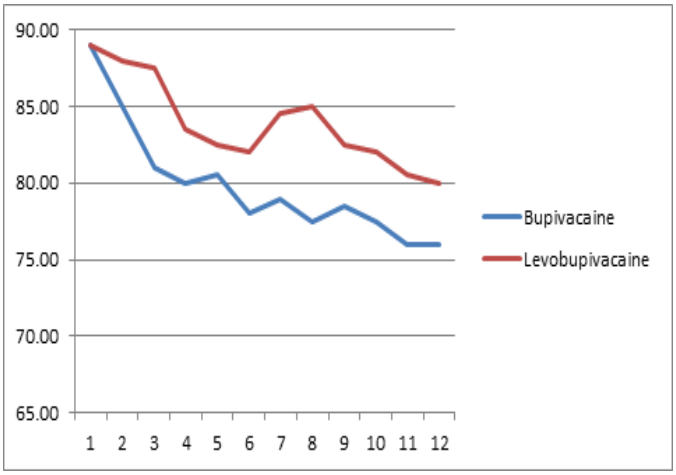
Graphical representation of changes in DBP in both the groups, with time interval on X axis and Diastolic blood pressure changes along the Y axis

- Intraoperative changes in diastolic blood pressure are more in Bupivacaine group, the p value was found to be statistically significant (<0.05)
- In the line graph plotted above, B group is represented in blue and L group is red colour.
- The blue line graph can be seen with steeper fall in DBP compared to red line graph.
- Levobupivacaine group shows more stable diastolic blood pressure observations.

Mean arterial pressure changes in both groups

Parameter	Bupivacaine		Levobupivacaine		p value
	Mean	SD	Mean	SD	
MAP baseline	88.20	12.91	91.20	12.26	0.24
MAP 3min	84.72	12.40	89.24	12.31	0.01
MAP 5 min	81.28	11.55	87.80	13.32	0.01
MAP 10 min	80.04	10.82	85.66	11.61	0.01
MAP 15 min	79.18	8.67	84.30	11.03	0.01
MAP 20 min	77.36	8.04	83.16	15.88	0.02
MAP 25 min	76.92	8.00	83.12	15.35	0.01
MAP 30 min	76.30	6.93	85.12	10.31	<0.01
MAP 45 min	77.22	6.74	83.68	9.44	0.01
MAP 60 min	76.46	7.31	82.36	9.72	0.01
MAP 75 min	75.50	6.18	80.98	9.78	0.03
MAP 90 min	75.32	6.23	79.96	9.53	0.02

- This table shows MAP values in mm Hg at baseline, 3mins, 5mins then every 5mins till first 30 min.
- Later, after 30 min MAP was recorded every 15 mins till 90 mins.
- The baseline mean value for B group was 88.20±12.2 mm Hg and 91.20±12.26 mm Hg for L group respectively.



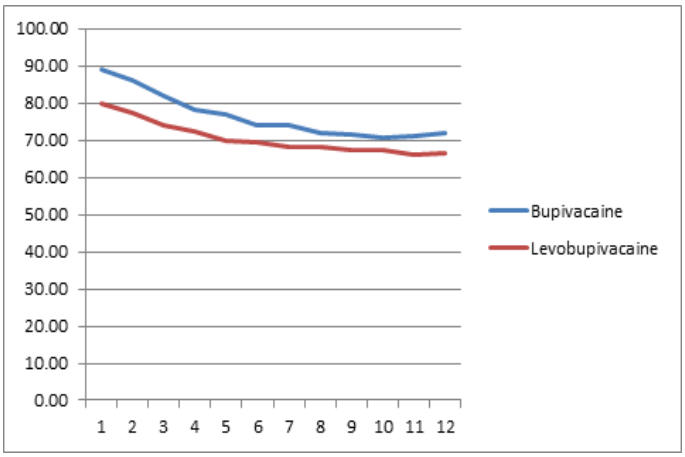
Graphical representation of changes in MAP in both the groups with time interval on X axis and Mean Arterial Pressure changes along Y axis.

- After first three minutes, p value (<0.05) for Mean Arterial Pressure was observed to be statistically significant.
- More stable observations are seen in Levobupivacaine group compared to Bupivacaine group.
- Till now SBP, DBP and MAP values were compared in both the groups which were measured in similar time intervals.
- These changes were found to be statistically comparable in Levobupivacaine group.
- Hence, Levobupivacaine group shows more hemodynamic stability.

Heart rate changes in both groups

Parameter	Bupivacaine		Levobupivacaine		p value
	Mean	SD	Mean	SD	
HR Baseline	89.6	12.66	88.32	12.70	0.61
HR 3 min	88.00	13.44	84.65	10.93	0.18
HR 5 min	84.32	13.27	80.10	10.54	0.08
HR 10 min	79.42	10.76	76.02	9.76	0.10
HR 15 min	72.00	9.66	71.20	10.89	0.01
HR 20 min	75.10	9.35	70.08	11.09	0.02
HR 25 min	70.32	9.72	69.27	8.24	0.03
HR 30 min	74.02	8.28	68.14	9.06	0.06
HR 45 min	66.40	8.82	67.76	8.38	0.05
HR 60 min	70.48	8.07	67.74	7.31	0.03
HR 75 min	63.06	7.47	67.64	6.61	0.04
HR 90 min	62.72	7.06	68.84	8.29	0.01

- This table shows changes in heart rate measured at baseline, 3min, 5 min and then after every 5 min till first 30 min.
- Later, after 30 min Heart Rate in beats / min were recorded every 15 min till 90 min.
- Baseline mean Heart rate in Bupivacaine group was 89.6±12.66 beats / min and 88.32±12.7 beats / min in Levobupivacaine group.
- It was treated with Inj. Atropine 0.6 mg / IV or Inj .Glycopyrrolate 0.2 mg / IV.
- There were more episodes of bradycardia after initial ten minutes of spinal anaesthesia in Bupivacaine group.



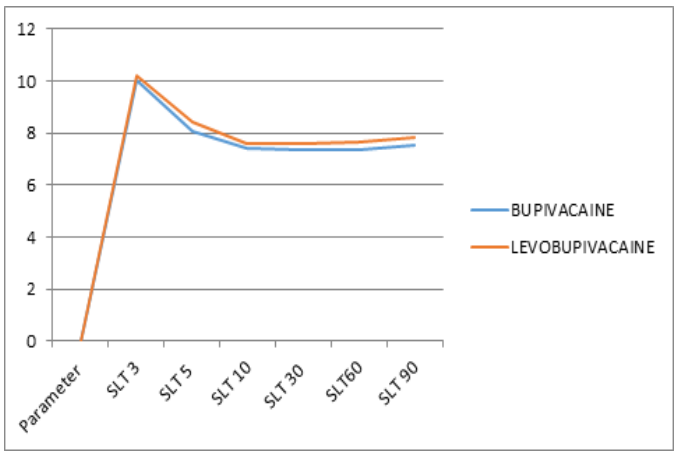
Graphical representation of Heart Rate changes in between both the groups was compared with time interval on X axis and heart rate in beats / min along Y axis.

- The p value (<0.05) is statistically significant for intraoperative heart rate changes in Bupivacaine group
- More cases of bradycardia was recorded in Bupivacaine group compared to Levobupivacaine group.

Level of sensory block

Parameter	Bupivacaine		Levobupivacaine		p value
	Mean	SD	Mean	SD	
SLT 3 min	10.04	1.03	10.22	1.09	0.40
SLT 5 min	8.08	1.14	8.40	1.07	0.15
SLT 10 min	7.40	1.36	7.60	0.90	0.39
SLT 30 min	7.36	1.31	7.60	0.90	0.29
SLT 60 min	7.36	1.31	7.64	0.96	0.23
SLT 90 min	7.52	1.03	7.84	0.89	0.10

- The Level of sensory blockade was observed at different time intervals of 3, 5, 10, 30, 60 and 90 minutes.
- When compared between the two groups there was no statistical significance (p value > 0.05).
- However, the peak value of sensory block in a few cases of Levobupivacaine group was found to be T_4 compared to T_6 in Bupivacaine group.



Graphical representation of sensory level blockade in both the groups with time interval on X axis and sensory level along Y axis.

Time of onset of sensory and motor blockade

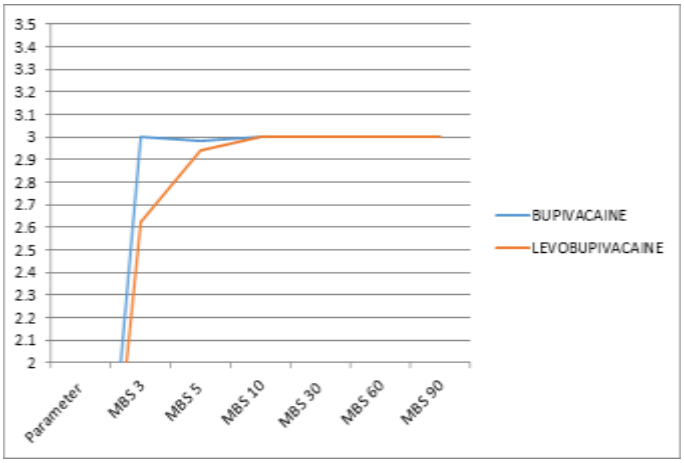
Parameter	Bupivacaine		Levobupivacaine		t Test	
	Mean	SD	Mean	SD	t statistics	p value
OSL	4.38	1.93	4.24	1.34	0.43	0.67
OMB	6.28	2.28	6.24	1.64	0.10	0.92

- This table shows onset of sensory level and onset of motor block in Levobupivacaine and Bupivacaine groups.
- **OSL** – Onset of sensory level; **OMB** – Onset of motor block.
- The time taken for onset of sensory level and for onset of motor blockade was compared in both groups and it was found statistically not significant, p value > 0.05.

Comparision of modified bromage scale in both groups

Parameter	Bupivacaine		Levobupivacaine		p value
	Mean	SD	Mean	SD	
MBS 3min	3.00	0.78	2.62	0.53	0.01
MBS 5 min	2.98	0.14	2.94	0.24	0.13
MBS 10min	3.00	0.00	3.00	0.00	
MBS 30min	3.00	0.00	3.00	0.00	
MBS 60min	3.00	0.00	3.00	0.00	
MBS 90min	3.00	0.00	3.00	0.00	

There is faster progression of motor block in Bupivacaine group compared to Levobupivacaine group. But, this difference does not last for more than initial ten minutes after which grade 3 motor block is achieved in both the groups. This can be seen by a steeper graphical curve in B group when compared with a smoother curve of L group.



Graphical representation of modified bromage scale in both the groups at different time intervals on X axis and grade of motor block plotted against Y axis.

Time taken for complete recovery of sensory and motor block in both groups

Parameter	Bupivacaine		Levobupivacaine		t Test	
	Mean	SD	Mean	SD	t statistics	p value
CSR	160.20	46.03	173.8	32.26	-0.53	0.014
CMR	132.60	49.17	120.5	30.84	1.30	0.019

- **CSR** – Complete Sensory Recovery, **CMR** – Complete Motor Recovery
- The mean time taken for complete sensory recovery in Bupivacaine group is 160.2 mins and in Levobupivacaine group is 173.8 mins.
- For complete sensory recovery p value is < 0.05, statistically significant longer duration in Levobupivacaine group.
- The mean time taken for complete motor recovery in Bupivacaine group is 173 mins and in Levobupivacaine group is 166 mins.
- For complete motor recovery p value is < 0.05, statistically significant which means earlier recovery in Levobupivacaine group which helps in early ambulation of the patients.

Frequency of side effects in both groups

Parameter	Bupivacaine	Levobupivacaine
Hypotension	8	2
Bradycardia	5	3
Nausea/Vomiting	3	1
Shivering	1	0

- In Bupivacaine group 5 patients had bradycardia and 3 patients in Levobupivacaine group.
- 8 patients had hypotension in B group whereas 2 patients in L group.
- Total number of patients suffering from side effects is more in Bupivacaine group, compared to Levobupivacaine group.

Discussion

This study was done on 100 patients, divided into two groups of 50 each. The L and B groups, i.e. Levobupivacaine and Bupivacaine groups, every patient received 3 ml of 0.5% of drug (15mg) intrathecally for lower abdominal and lower limb surgeries. They were observed for changes in systolic blood pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP), Heart rate, time for onset of sensory and motor block and duration of sensory and motor block were noted after calculated time intervals.

Bupivacaine remains the most widely used and cost effective, long acting local anaesthetic used in spinal anaesthesia. But, it comes with its own disadvantages like hypotension, bradycardia, cardiotoxicity and neurotoxicity.

Levobupivacaine has a potentially greater margin of safety than the racemic Bupivacaine. The unbound fraction of Levobupivacine was significantly lower than that of unbound Bupivacaine because of its increased protein binding affinity. The early clinical presentation of toxicity in Levobupivacaine mostly consisted of central nervous system symptoms like drowsiness, disorientation, slurred speech which may complicate with tonic clonic seizures in some cases. These symptoms are generally self-limiting or respond to anti convulsive treatment. The susceptibility for seizure activity after intoxication with Levobupivacaine is 1.5 to 2.5 times less than that after racemic Bupivacaine.

Onset of sensory block: Our study shows no difference between Levobupivacaine and Bupivacaine for the time of onset for sensory block. **Guler et al[2]** conducted a study: Levobupivacaine versus Racemic Bupivacaine for Spinal Anaesthesia showed similar results.

This is consistent with the findings in studies conducted **by Casati et al[3], Mantouvalou et al[4], Sathikarnmanee et al[5]** in which the time of onset of sensory block showed no difference.

Time for onset of sensory block		
Study	**L Group**	**B Group**
Guler et al	4.60±1.41min	4.46±1.07 min
Present study	4.24±1.34min	4.38±1.93 min

Onset of Motor block: In our study no statistical difference in the time of onset of motor block. Present study differs with **Guler et al, Vanna et al[6]** in which the time of onset of motor block was faster in Bupivacine group than Levobupivacaine group.

Time for onset of motor block		
Study	**L Group**	**B Group**
Guler et al	4.10±0.88 min	2.36±0.61 min
Vanna et al	3.90±1.71 min	3.0±1.32 min
Present study	6.24±1.64 min	6.28±2.28 min

In a study by **F Fattorini and Z Ricci et. al[7]** there was no significant difference in the onset of motor block between Bupivacaine and Levobupivacaine group which coincides with the findings of our study. This is also supported by a study conducted by **Erbay et al[8]**, showing no statistical significant difference in the onset of motor block in Levobupivacaine and Bupivacaine group.

Mean duration of sensory block: The mean duration of sensory block was longer with Levobupivacaine compared with Bupivacaine group in our study, which may be attributed to the greater intrinsic vasoconstrictor property of Levobupivacaine. Though the intergroup difference is not very significant between both the groups.

In the present study the duration of sensory block in Levobupivacaine (172 mins) lasting longer than Bupivacaine (164 mins) group of patients. These findings were consistent with study by **Mantouvalou et al.**

A study conducted **by Mehtaet al[9]**– found that the mean duration of sensory block in Bupivacaine and Levobupivacaine was 175.76 mins and 189.4 mins respectively, Levobupivacaine having a longer duration of sensory block which is comparable with our study.

Duration of sensory block		
Study	**B Group**	**L Group**
Present study	164 min	172 min
Mehta et al	175.76 min	189.40 min
Mantouvalou et al	127 min	157 min

Monica del-Rio-Vellosillo et al[10] concluded, isobaric bupivacaine produces spinal blockade with a faster time to the onset of sensory and motor blockades than levobupivacaine, as well as a higher mean maximum sensory blockade level.

Mean duration motor block: In our study the mean duration of motor block was found to be higher in Bupivacaine group compared to Levobupivacaine group patients. The regression of motor block was significantly more rapid in Levobupivacaine group which is advantageous for early ambulation after day – case surgeries.

Guleret al concluded that motor block lasted longer in Bupivacaine group compared Levobupivacaine group. **Erbay et al**, **Gautier et al**[11] studies showed similar results.

Duration of motor block comparison with other studies

Duration of Motor Block		
Study	**B Group**	**L Group**
Present study	139 min	125 min
Gautier et al	142 min	121 min
Erbay et al	113 min	105 min
Guler et al	135 min	100 min

Sathikarnmanee et al Compared spinal isobaric Levobupivacaine and racemic Bupivacaine for lower abdominal and lower limb surgery and concluded that there was no difference in the duration of motor block between Bupivacaine and Levobupivacaine.

Delfino J et al[12], found in their study for lower limb surgeries, that the duration of motor block was significantly longer in Levobupivacaine group.

Level of sensory block: In our study there was no statistical difference in the level of sensory block.

Studies **by Glaser et al**[13] and **Fattorini et al**, showed that the level of sensory block in both groups has no significant difference, which is similar to our study. But Casati et al showed a higher level of sensory block in Bupivacaine group contrary to our study.

Haemodynamic Parameters: The fall in SBP was more in Bupivacaine group compared to Levobupivacaine group. Intraoperative changes in diastolic blood pressure are more in Bupivacaine group. Statistically significant for intraoperative heart rate changes in Bupivacaine group.

More cases of bradycardia was recorded in Bupivacaine group compared to Levobupivacaine group.

Levobupivacaine group showed more stable hemodynamics compared to Bupivacaine group in our study. Episodes of hypotension and bradycardia were less compared to Bupivacine group and they were easily reversible with Ephidrine and Atropine. Lesser incidence of hemodynamic compromise could be due to the inherent vasoconstrictor properties of Levobupivacaine, after its absorption into systemic circulation.

Coppejans H.C. et al[14] compared Bupivacaine, Levobupivacaine and Ropivacaine Hemodynamic values were comparable between the three groups although a trend towards better systolic blood pressures and a lower incidence of severe hypotension were noticed in favour of Levobupivacaine.

Christian Glaser et al., compared Levobupivacaine with Bupivacaine intrathecally for hip surgeries, showed slight reductions in heart rate and mean arterial pressure, but there was no intergroup difference in hemodynamics in both the groups.

Demet Gulec et al[15], compared intrathecal Bupivacaine and Levobupivacaine in elderly patients undergoing TURP surgery. They concluded that Levobupivacaine did not cause any significant changes in hemodynamic parameters.

Side effects: The most common adverse drug reactions reported are hypotension followed by nausea, vomiting, headache and dizziness. Allergic type reactions are rare and range in severity from urticaria to anaphylactoid - like reaction.

Safety margin of Levobupiacaine is 1.3, which means toxic effects are not seen until the concentration rises by 30%. The concentration necessary to produce cardiac and neurotoxicity is higher for Levobupivacaine than for racemic Bupivacaine.

The better safety profile of Levobupivacaine confers an advantage over its racemic parent, Bupivacaine. Clinical evidence supporting our results, equal efficacy with better safety profile proves the superior qualities of levobupivacaine.

Rosa Herrera etal[16] found lower incidence of side effects with Levobupivacaine in elderly patients undergoing hip surgery.

Summary

This study was conducted to compare the anaesthetic efficacy of intrathecal Levobupivacaine and Bupivacaine in 0.5% concentration in lower abdominal and lower limb surgeries. After getting ethics committee approval, 100 ASA grade I and II patients of both sexes in the age group of 19-60 years undergoing elective surgery under spinal anaesthesia were divided into two groups of 50 each.

The first group L received 3ml of 0.5% Levobupivacaine (5mg/mI), the second group B received 3ml of 0.5% Bupivacaine intrathecally. The onset of sensory andmotor blocks, duration of sensory and motor blocks, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure and Pulse rate was recorded every 2 mins for the first 10 mins then after at every 5 mins interval in two groups. The results were analyzed statistically usingSPSS Version 20 package.

On comparision of data we found that the time for onset of sensory and motor block showed no statistical significance in both L and B groups. But the duration of sensory block and time for first requirement of post-operative analgesia was longer in patients who received

Levobupivacaine. Patients who were given Bupivacaine had shorter duration of sensory block and earlier requirement of rescue analgesia post operatively.

The duration of motor block was shorter in Levobupivacaine group of patients i.e. they had earlier recovery of motor block and early ambulation compared to group of patients who received Bupivacaine intrathecally. Time for complete reversal of motor block after was lesser in Levobupivacaine group.

The height of block (peak of sensory level) is more in Levobupivacaine group (T4), as it is isobaric preparation compared to Bupivacaine group (T6).

Hemodynamic parameters like Systolic Blood Pressure(SBP), Diastolic Blood Pressure(DBP), Mean Arterial Pressure(MAP) and Heart Rate(HR) showed lesser variation in L group when compared with the B group.

Incidence of Side effects like hypotension, bradycardia were more in Bupivacaine group. Oxygen saturation was almost stable in both the groups. None of the patients in the study showed any allergic reactions to both the drugs. Greater number of patients in Bupivacaine group asked for earlier rescue analgesia compared to patients in Levobupivacaine group.

Conclusion

From the present study we conclude that, the time for onset of sensory and motor block showed no statistical significance in both L and B groups.

But the duration of sensory block and time for first requirement of post-operative analgesia was longer in patients who received Levobupivacaine compared to Bupivacaine.

The duration of motor block was shorter, resulting in early ambulation in Levobupivacaine group. Haemodynamic parameters SBP, DBP, MAP and HR were stable in the Levobupivacaine group when compared with the Bupivacaine group.

Fewer episodes of hypotension and bradycardia and other side effects were observed in Levobupavaine group.

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