

A Comparative Evaluation of Intrathecal Isobaric Levobupivacaine 0.5% with Adjuvants Fentanyl and Clonidine in Patients Undergoing Lower Abdominal and Lower Limb Surgeries

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Abstract

Aim: To study Comparative Evaluation of Intrathecal Isobaric Levobupivacaine 0.5% with Adjuvants Fentanyl and Clonidine and the anaesthetic potency and hemodynamics, onset, duration, level and time of sensory and motor block and post-operative complications.

Method: After institutional ethical committee approval the study was conducted on 75 patients, whom spinal anaesthesia was given and divided in 3 groups according to drug patients received. Group 1- 0.5% levobupivacaine (3ml) + 0.5ml normal saline, Group 2- 0.5% levobupivacaine (3ml) + inj fentanyl 25 microgram in 0.5 ml, Group3- 0.5% levobupivacaine (3ml.) + inj clonidine 30 microgram in 0.5ml Normal saline.

Result and Conclusion: Onset of sensory and motor block, Level of sensory block, Duration of motor block, Duration of analgesia was significantly faster with clonidine when compared to other groups.

Keywords: Intrathecal Isobaric Levobupivacaine, Clonidine, Normal Saline, Sensory Block

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Background

Spinal anaesthesia has limited duration of action. To increase this duration local anaesthetics are combined with opioids and alpha-2 agonist etc., as they demonstrate significant synergy. The anaesthetic and analgesic requirements get reduced by the use of these adjuvants and duration of analgesia is increased. α - 2 adrenergic agonists have both analgesic and sedative properties when used as an adjuvant in epidural and spinal anaesthesia

[1,2]. N.K. Girgin, A Gurbet. G Turker (2008) compared intrathecal low dose levobupivacaine 5mg plus fentanyl 25mcg (LF group) and 7.5mg levobupivacaine (L group) in 40 inguinal herniorrhaphy patients 20 in each group. They concluded that 25 μ g fentanyl added to low dose 5mg Levobupivacaine prolonged the duration of sensory block without increasing the incidence of opioid related side effects [3-5].

H Saxena, S.K.Singh *et al* (2010) conducted a study to evaluate the lowest dose of intrathecal clonidine as adjuvant to hyperbaric bupivacaine. They used different doses of clonidine 15mcg, 30mcg and 37.5 mcg with 13.5mg hyperbaric bupivacaine in each group [7-9].

Aims and Objectives

1. To study the anaesthetic potency and hemodynamics of intrathecal Levobupivacaine (0.5%).
2. To investigate the influence of fentanyl and clonidine on the onset of sensory and motor block.
3. To observe the duration of sensory and motor block.
4. To study the highest level of sensory block.
5. To observe the operative and post-operative complications.
6. Time of first rescue analgesia post operatively.

Method

Observations

- This study was conducted on 75 patients of ASA grade 1 and grade 2 between the age group of 18-60 years.
- All the patients were Coloaded with 500 ml of Ringer lactate solution.
- Spinal anaesthesia was carried out under strict aseptic precautions in sitting position, using 25 G Quincke's spinal needle, between L3-L4 interspace.
- 75 patients were divided into 3 groups:
 - Group 1- patients received 0.5% isobaric levobupivacaine 3 ml. (15mg) + 0.5 ml Normal saline.
 - Group 2- patients received 0.5% levobupivacaine (3ml) + inj fentanyl 25 microgram in 0.5 ml.
 - Group 3. patients received 0.5% levobupivacaine (3ml.) + inj clonidine 30 microgram in 0.5ml Normal saline [10-12].

Table 1: Showing Distribution of cases according to time to onset of sensory block (min)

Time (min)	Group 1		Group 2		Group 3	
	No of patients	%	No of patients	%	No of patients	%
≤3	0	0	8	32	22	88
3-8	5	20	17	68	3	12
>8	20	80	0	0	0	0
Total	25	100	25	100	25	100
Mean	9.28		4.08		2.52	
SD	1.31		1.15		0.70	
CD	0.724					

This table shows distribution of cases according to time to onset of sensory block level in all 3 groups. In group 3 patients had fastest onset of sensory block, which is 2.52 ± 0.70 minutes. In group 2 patients had onset time 4.08 ± 1.15 minutes and in group 1 patient had onset time 9.28 ± 1.31 minutes which is maximum in all three groups. The difference among all three groups was statistically significant.

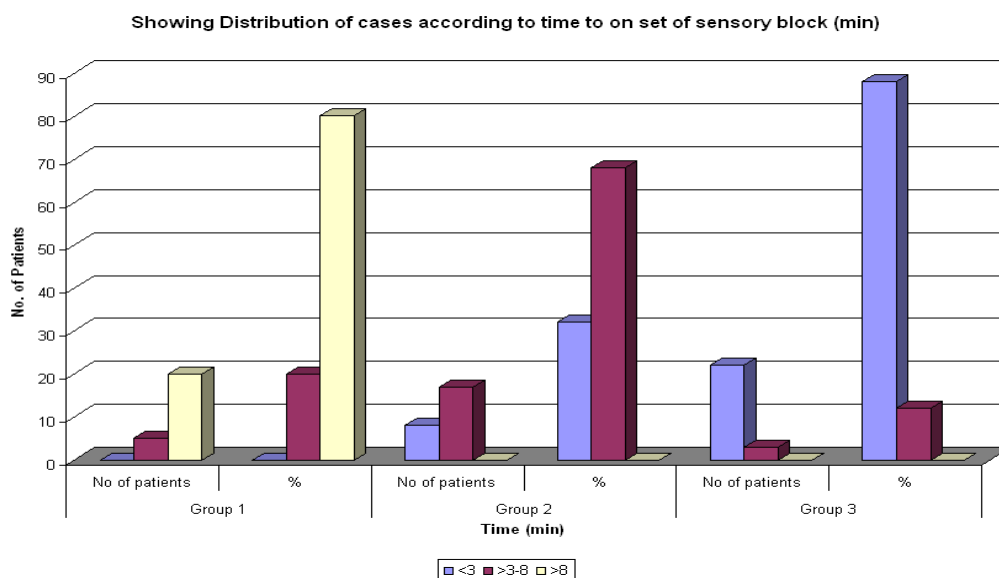


Figure 1

Table 2: Showing distribution of cases according to time to onset of motor block (min)

Time (min)	Group 1		Group 2		Group 3	
	No. of patients	%	No. of patients	%	No. of patients	%
≤6	0	0	16	64	25	100
6-10	12	48	9	36	0	0
>10	13	52	0	0	0	0
Total	25	100	25	100	25	100
Mean	10.52		5.64		4.88	
SD	0.96		1.41		1.01	
CD	0.648					

This table shows onset time of motor block in all three groups. Fastest onset of block was observed with group 3 mean time 4.88 ± 1.41 Followed by group 2 mean times 5.64 ± 1.41 and slowest in group 1 mean time 10.52 ± 0.96. The difference between onset times was significant in all three groups.

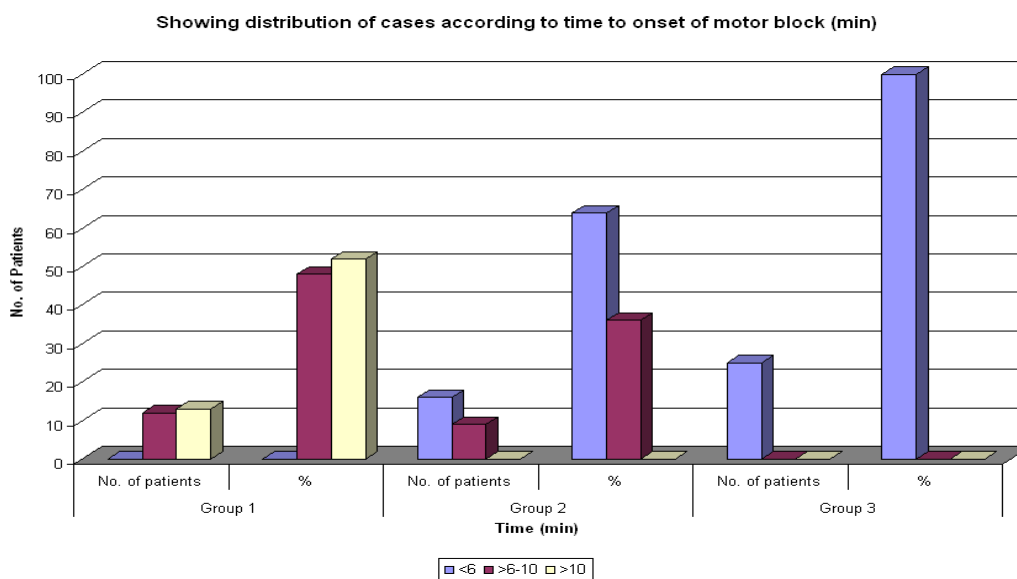


Figure 2

Table 3: Showing distribution of cases according to highest level of sensory Block

LEVEL	Group 1		Group 2		Group 3	
	No. of patients	%	No. of patients	%	No. of patients	%
T4	0	0	0	0	17	68
T6	0	0	17	68	6	24
T8	5	20	5	20	2	8
T10	16	64	3	12	0	0
T12	4	16	0	0	0	0
Total	25	100	25	100	25	100

Distribution of cases according to highest level of sensory block. In all the 3 groups maximum height had in group 3 patients. In 68% T4 level and T6 level in 24% and in group 2 maximum at T6 in 68% patients and in group 1 maximum height T10 Level in 64% Patients.

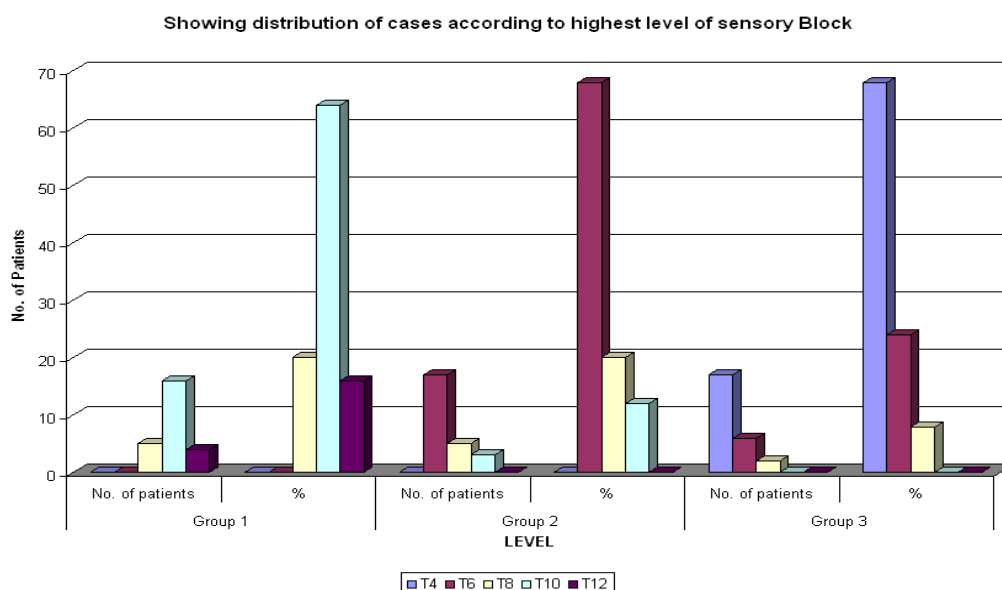


Figure 3

Table 4: Showing distribution of cases according to Duration of motor block

Time (min)	Group 1		Group 2		Group 3	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
≤ 150	10	40	0	0	0	0
151-250	15	60	23	92	5	20
251-350	0	0	2	8	20	80
>350	0	0	0	0	0	0
Total	25	100	25	1000	25	100
Mean	158.80		216.00		276.80	
SD	10.92		21.98		23.58	
CD	11.104					

This table is showing the distribution of cases according to Duration of motor block in all the 3 groups. Maximum duration of motor block was observed with group 3 mean time 276.80 ± 23.58 minutes followed by group 2 mean time 216 ± 21.98 minutes and in group 1 mean time 158.80 ± 10.92 minutes.

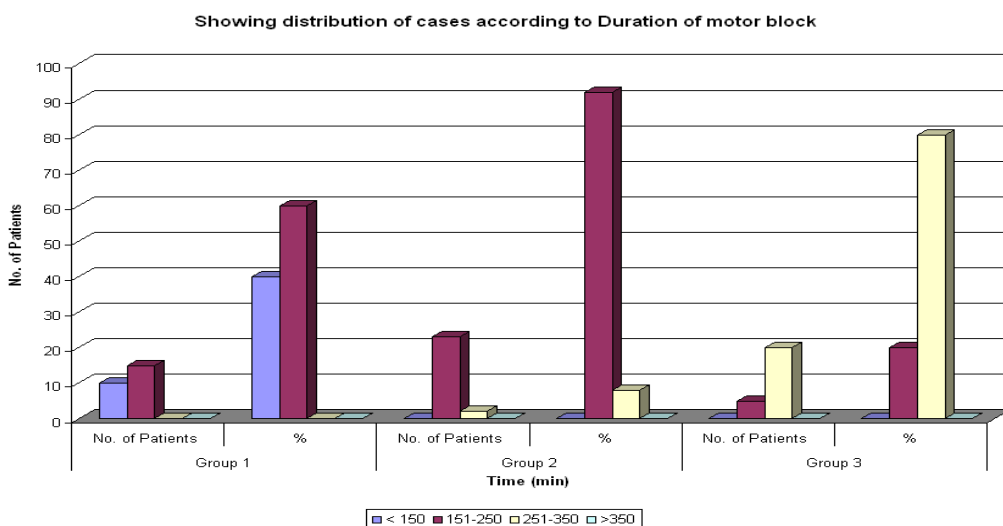


Figure 4

Table 5: Showing distribution of cases according to Duration of Analgesia

Time (min)	Group 1		Group 2		Group 3	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
≤ 200	25	100	6	24	0	0
201-300	0	0	19	76	5	20
301-400	0	0	0	0	20	80
>400	0	0	0	0	0	0
Total	25	100	25	100	25	100
Mean	166.80		227.20		314.40	
SD	11.45		22.27		24.85	
CD	11.507					

This table is showing distribution of cases according to duration of analgesia in all the three groups. Maximum duration of analgesia was observed with group 3 mean time 314.40 ± 24.85 followed by group 2 (227.20 ± 22.27 minutes) and in group 1 (166.80 ± 11.45). The inter group comparisons showed that the differences were significant among all the 3 groups.

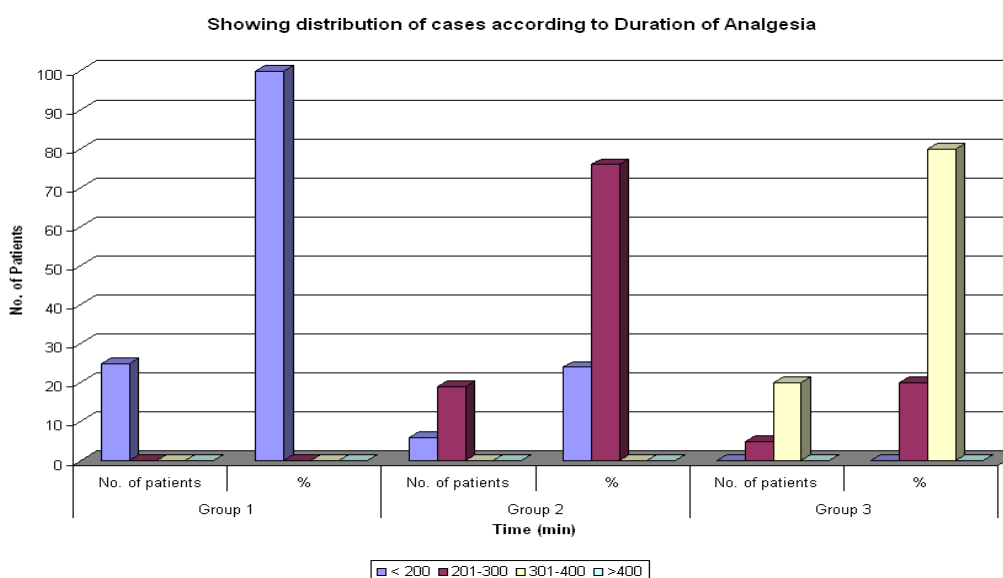


Figure 5

Results

- Surgeries in all three groups were performed without difficulty and there was good analgesia and muscle relaxation.
- The onset of sensory and motor block was significantly faster with clonidine when compared to other groups
- In max. no. of cases of group 3 Highest Level of sensory block was observed up to T4 level in 68% pt. and T6 in 24% group 3 patients, in group 2 at T6 in maximum patients and in group 1 T10 level.
- The duration of motor block was significantly prolonged in group 3 (mean time 276.80 ± 23.58 min.) followed by group 2 (mean time 216 ± 21.98 min.) when compared to control group 1 (mean time 158.8 ± 10.92 min.).
- Duration of analgesia was observed maximum in group 3 (mean time 314.40 ± 24.85) followed by group 2 (mean time 227.20 ± 22.27 min.) and group 1 (mean time 166.80 ± 11.45 min.)
- Incidence of hypotension and bradycardia was more with clonidine than fentanyl but inter-group comparison showed that it was not significant.
- The onset of sensory as well as motor block was significantly faster with clonidine when compared to other groups.
- Highest Level of sensory block was observed up to T4 level in 68% patients and T6 in 24% patients of group 3, T6 level in group 2 and T10 in group 1.
- The duration of sensory and motor block was significantly prolonged in both group 2 and group 3 when compared to control group but it was longer in clonidine (345.60 ± 29.30 min, 276.80 ± 23.58 min.) group than fentanyl (251.40 ± 22.98 min, 216.00 ± 21.98 min) and control (175.60 ± 3.86 min; 158.80 ± 10.92 min) respectively.
- There was significant prolongation of duration of analgesia in both study groups but it was more with clonidine (314.40 ± 24.85 min.) than fentanyl (227.20 ± 22.27 min) compared to control group (166.80 ± 11.45 min.).
- There were more incidences of hypotension and bradycardia with clonidine (6, 2) than fentanyl (2 bradycardia and pruritus) and control (0) groups but intergroup comparison showed that it was not significant.

Conclusion

The effects of subarachnoid block with levobupivacaine (0.5%, 3 ml) alone, levobupivacaine (0.5%, 3 ml) plus fentanyl (25µg), and levobupivacaine (0.5%, 3 ml) plus clonidine (30µg) were studied and following conclusions were drawn:

- Surgeries in all the three groups were performed without difficulty. There was good analgesia and muscle relaxation.
- All three groups remained hemodynamically stable but there was slightly more fall in pulse rate and MAP with clonidine group which was found to be statistically insignificant.

The results of this study concluded that onset of sensory and motor block, Level of sensory block, Duration of motor block, Duration of analgesia was significantly faster and longer with clonidine when compared to other groups. Clonidine and fentanyl are better adjuvants in our study but more studies required to confirm the results.

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