

Comparative Assessment of Efficacy of Levobupivacaine and Levobupivacaine with Fentanyl in Patients Undergoing Infra-Umbilical Surgeries under Spinal Anesthesia

Disha Parhi¹, Sarfraj Ahmad², Akash Gupta³, Malti Agrawal⁴, Gulwatan Singh Kang⁵, Shambhu Singh⁶

ABSTRACT

Introduction: Spinal anaesthetics should provide short acting and adequate anaesthesia without compromising early ambulation and discharge from day care surgery unit. This study was conducted to compare the efficacy of levobupivacaine and levobupivacaine with fentanyl in patients undergoing infra-umbilical surgeries under Spinal Anesthesia.

Material and methods: In a prospective study, 180 patients were included in the study to compare the efficacy of levobupivacaine and levobupivacaine with fentanyl in patients undergoing infra-umbilical surgeries under Spinal Anesthesia. The patients were randomly divided into two groups ie. Group A & Group B. Group A ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) & 0.5 ml normal saline and group B ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) plus 0.5 ml fentanyl (25 µg) intrathecally. The data analysis was done. P-value less than 0.05 was considered statistically significant.

Results: In the present study patients were randomly divided into two groups of 90 each in which Group A ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) plus 0.5 ml normal saline and group B ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) & 0.5 ml fentanyl (25 µg) intrathecally. In group A 75.55% were males and 24.44% were females whereas in group B 84.44% were males and 15.55% were females. After the administration of the study drug intrathecally, the mean time taken for the start of sensory block to T10 dermatome and the time to maximum sensory block in group A was more as compared to group B. However the median maximum sensory level reached in group A was T8 dermatome and in group B the median maximum sensory level was T6 dermatome. Median maximum motor block attained in both the groups was Bromage 2. But the mean time taken for attaining Bromage 2 motor block was more in group A as compared to group B. Regression of sensory block to T10 dermatome was significantly prolonged in group B when compared to group A. The total time period of sensory block (Falling off of sensory block to S1 dermatome) and total time period of motor block was also significantly more in group B as compared to group A.

Conclusion: The present study concluded that addition of fentanyl to levobupivacaine leads to early onset and prolonged duration of sensory and motor block.

Keywords: levobupivacaine, fentanyl, infra-umbilical surgeries, Spinal Anesthesia.

consistency, cost effectiveness, effective analgesia, muscle relaxation and prolonged postoperative analgesia.¹ Spinal anaesthesia with bupivacaine is the most common technique used in patients undergoing lower limb and lower abdominal surgeries.² However, the most common side-effects seen with this technique are bradycardia and systemic hypotension. Particularly in elderly patients with limited cardiac reserve marked hypotension may be harmful.³ Levobupivacaine is an amide local anaesthetic agent and is isolated S-enantiomer of racemic bupivacaine. It is the most new long acting local anaesthetic agent that has been introduced for clinical use.⁴ Due to decreased cardiovascular and central nervous system toxicity, levobupivacaine is a good alternative.⁵ Intrathecal administrations of 15 mg of Levobupivacaine provide an adequate sensory and motor block lasting for approximately 6.5 hours. Smaller doses (i.e. 5-10mg) have been used in day-case surgeries.⁶ Levobupivacaine has been widely used in ambulatory surgeries after the development of low dose spinal anaesthesia technique.^{7,8} To improve characteristics of the block, administered low dose local anaesthetics intrathecally, addition of adjuvant is must. Intrathecal opioids augment sensory block without prolonging motor and sympathetic block.^{9,10} Among them, Fentanyl has fast onset of action, binds sturdily to plasma proteins and potentiates the afferent sensory blockade thus help in reduction in the dose of local anesthetics.^{11,12} The present study was conducted to compare the efficacy of levobupivacaine and levobupivacaine with fentanyl in patients undergoing infra-umbilical surgeries under Spinal Anesthesia.

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INTRODUCTION

Spinal anaesthesia is the most frequently used procedure for infraumbilical surgeries because of its unmatched

MATERIAL AND METHODS

In a prospective study, 180 patients were included in the study to compare the efficacy of levobupivacaine and levobupivacaine with fentanyl in patients undergoing infraumbilical surgeries under Spinal Anesthesia. The ethical approval was taken from the Ethical Committee of the institute before the start of the study and written informed consent was taken from the patient after explaining the study. Patients of ASA grades I and II of either sex, in the age between 20-70 years scheduled for elective infraumbilical surgeries under spinal anesthesia were included in the study. Patients with reluctance for the procedure, coagulation or neurological disorders, septicemia, deformity or previous surgery of spine, obesity, pregnancy and allergy to the study drug were excluded from the study. The patients were randomly divided into two groups i.e. Group A & Group B. Group A ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) & 0.5 ml normal saline and group B ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) plus 0.5 ml fentanyl (25 μ g) intrathecally. A detailed preanaesthetic check-up was done on a day before surgery. A complete physical examination along with proper systemic examination and assessment of airway and local examination of lumbar spine was done. Patients were asked to limit the solids and fluids by mouth at least 6 h before surgery. On the day of surgery, after giving injection of glycopyrrolate 0.2 mg intramuscularly 45 min before surgery patients were shifted to operation theatre. Continuous monitoring was done. Intravenous (IV) line was secured with 18 gauge intracath. Injection midazolam 0.04 mg/kg body weight was given IV. Patients were preloaded with 10 ml/kg body weight of Ringer lactate solution over 15–20 min. Spinal anaesthesia was given in L3 and L4 space with 25 gauge or 26 gauge Quincke spinal needle via midline approach in lateral decubitus position. The study drug was injected intrathecally. In group A, 2 ml of 0.5% isobaric levobupivacaine plus 0.5 ml of normal saline and in group B

2 ml of 0.5% isobaric levobupivacaine plus 0.5 ml fentanyl (25 μ g) was given. Patients were turned to supine position and oxygen was started at the rate of 6 L/min. Sensory block was assessed by loss of sensation to pin prick in the midline every 2 min for first 10 min and then at an gap of 5 min till no change in level occurred. Onset of sensory block, highest level of sensory block achieved, time to maximum sensory block, regression of sensory block to T10 and total duration of sensory block was also noted. Motor block was evaluated by using the modified Bromage scale¹³. Maximum motor block achieved, time to maximum motor block and total duration of motor block (motor recovery to Bromage [0] was noted. All parameters were noted by taking the time of giving the study drug intrathecally as time 0. Surgery was allowed to start when sensory block to T10 dermatome was attained. The patient characteristics was analysed using the Chi-square tests and the inter group comparison of the parametric data was done using the unpaired *t*-test. The data analysis was done using SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). P-value less than 0.05 was considered statistically significant.

RESULTS

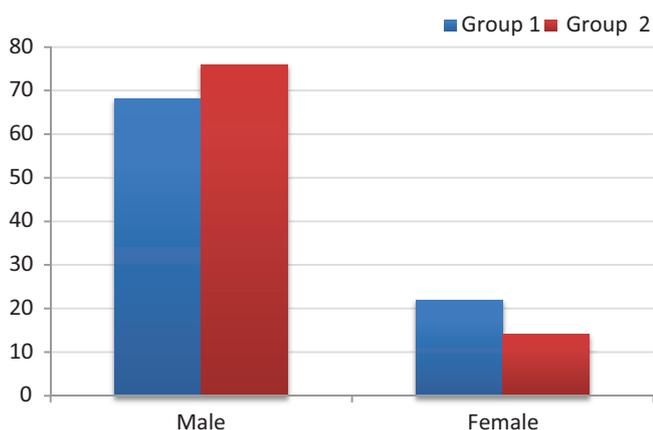
In the present study patients were randomly divided into two groups of 90 each in which Group A ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) plus 0.5 ml normal saline and group B ($n = 90$) received 2 ml of 0.5% isobaric levobupivacaine (10 mg) & 0.5 ml fentanyl (25 μ g) intrathecally. In group A 75.55% were males and 24.44% were females whereas in group B 84.44% were males and 15.55% were females. The mean time taken for initiation of sensory block to T10 dermatome and the time to maximum sensory block in group A was more as compared to group B. However the median maximum sensory level reached in group A was T8 dermatome and the median maximum sensory level reached in group B was T6 dermatome. Median maximum motor block attained in both the groups was Bromage 2. But the mean time taken for achieving Bromage 2 motor block was more in group A as compared to group B. Regression of sensory block to T10 dermatome was significantly prolonged in group B when compared to group A. The total time period of sensory block (regression of sensory block to S1 dermatome) and total time period of motor block was also significantly prolonged in group B as compared to group A.

Variable	Group A (N=90) (%)	Group B (N=90) (%)
Gender		
Male	68(75.55%)	76(84.44%)
Female	22(24.44%)	14(15.55%)
Mean age (yrs)	39.45±11.34	43.23±14.23

Table-1: Demographic data

Parameters in mins	Group A (N=90)	Group B (N=90)	p-value
Initiation of sensory block to T10 dermatome in mins	7.8±2.21	4.9±1.94	<0.05
median maximum sensory level	T8 dermatome	T6 dermatome	
Time to maximum sensory level in minutes	14.65±2.65	9.43±1.65	
Time for regression to T10 dermatome in minutes	94.56±5.34	107.45±4.32	
Total duration of sensory block	196.43±10.87	278.54±27.78	
Maximum motor block	2	2	
Time for maximum motor block	11.43±1.54	7.98±1.23	
Total duration of motor block	154.67±8.45	187.45±9.54	
duration of analgesia	169.56±11.05	263.34±6.87	

Table-2: Characteristics of sensory and motor block in group A and group B



Graph-1: Gender wise distribution

DISCUSSION

Spinal anesthesia is an important tool for anesthesiologist. Characteristics of the spinal block, including latency and duration of anesthesia, and differential blockade, are influenced by choice of local anesthetic, baricity, and adjuvants. Manipulating these variables, as well as patient position and other technique variables, may help the anesthesiologist tailor the desired anesthesia to the specific surgical procedure and patient.¹⁴

The mean time taken for initiation of sensory block to T10 dermatome and the time to maximum sensory block in group A was more as compared to group B. However the median maximum sensory level achieved in group A was T8 dermatome and the median maximum sensory level achieved in group B was T6 dermatome. In both the groups median maximum motor block achieved was Bromage 2. But the mean time taken for attaining Bromage 2 motor block was more in group A as compared to group B. Regression of sensory block to T10 dermatome was significantly prolonged in group B when compared to group A. The total time period of sensory block (deterioration of sensory block to S1 dermatome) and total time period of motor block was also significantly increased in group B as compared to group A.

Ozyilkan et al. compared 2.2 ml of levobupivacaine plain with 10 µg fentanyl or 2.5 µg sufentanil as adjuvant in spinal anesthesia for caesarean section. The initiation of sensory and motor block was attained more rapidly in fentanyl and sufentanil group ($P < 0.001$). The time period of sensory and motor block and time for first analgesic requirement was longer in adjuvant groups as compared to plain group ($P < 0.001$).¹⁵

Attri et al. compared levobupivacaine i.e Group L) and levobupivacaine with fentanyl i.e Group LF in infraumbilical surgeries under spinal anaesthesia. The onset of sensory block was rapid in Group LF (4.8 ± 1.5 min) compared to Group L (7.6 ± 1.5 min).¹⁶

Misirlioglu et al who compared Levobupivacaine (7mg) + Fentanyl 25µg (group L) and Bupivacaine (7mg) + Fentanyl 25µg (group B) for caesarean section. They have discussed the sensory block at start and end of surgery between the study groups. Both groups are comparable for peak level achieved at start and end of surgery.¹⁷

Patil GA et al compared Levobupivacaine (12mg) + Fentanyl 25µg (group L) and Bupivacaine (12mg) + Fentanyl 25µg (group B) for infraumbilical surgeries. The maximum spread of sensory block was T9 in Group Levobupivacaine and T8 in group which received Bupivacaine. There was no statistical difference between the two groups in respect to peak sensory levels ($p > 0.05$).¹⁸

Cuvas et al., compared 15µg fentanyl plus 2.3ml levobupivacaine with 2.5 ml of plain levobupivacaine. The time to initiation of sensory and motor block, deterioration of sensory block to S1 was similar in both groups. Time period of motor block was shorter in fentanyl group and the dose of levobupivacaine used was less in this group. By adding fentanyl to levobupivacaine resulted in higher sensory level (T6) as compared to plain levobupivacaine (T9).¹⁹

CONCLUSION

The present study concluded that addition of fentanyl to levobupivacaine leads to early onset and prolonged duration of sensory and motor block.

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