(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Comparative evaluation of hemodynamic effect of Isobaric levobupivacaine with fentanyl and isobaric ropivacaine and fentanyl: An observational study

¹Anisur Rehman, ²Jahangir Nazir Kawoosa

¹Senior Resident, Deptt of Anesthesia and Critical, Sher-i-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India;

²Consultant, Anaesthesiology, JK Health Services, Jammu and Kashmir, India

ABSTRACT:

Background: The present study was conducted for comparing the efficacy of Isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl. **Materials & methods:** A total of 40 subjects scheduled to undergo Caesarean section were enrolled. Complete demographic and clinical details of all the patients was obtained. Baseline hemodynamic variables were monitored continuously. Patients were randomly divided into two groups. For Group A (n = 20); 10 mg 0.5% (2 ml) Isobaric levobupivacaine + 25 μ g (0.5 ml) fentanyl, for Group B (n = 10); 10 mg 0.5% (2 ml) isobaric ropivacaine + 25 μ g (0.5 ml) fentanyl, for Group B (n = 10); 10 mg 0.5% (2 ml) isobaric ropivacaine + 25 μ g (0.5 ml) fentanyl, being a total of 2.5 cc, administered intrathecally within 10 s. Subsequently, patients were turned to the supine position. All the surgical C Section procedures were carried out under strict septic conditions. Continuous intraoperative monitoring of all the patients was done. All the results were recorded and analysed using SPSS software. **Results:** Time to onset of anesthesia was significantly lower among the subjects of group A. However; non-significant results were obtained while comparing the hemodynamic response among the patients of the two study groups. **Conclusion:** No significant dissimilarity among the haemodynamic parameters between isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl.

Key words: Ropivacaine, Levobupivacaine, Fentanyl

Corresponding author: Anisur Rehman, Senior Resident, Deptt of Anesthesia and Critical, Sher-i-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India

This article may be cited as: Rehman A, Kawoosa JN. Comparative evaluation of hemodynamic effect of Isobaric levobupivacaine with fentanyl and isobaric ropivacaine and fentanyl: An observational study. J Adv Med Dent Scie Res 2016;4(4):285-287.

INTRODUCTION

Regional anesthesia techniques have seen numerous modifications over the last two decades with the advent of many new and safer local anesthetics. Bupivacaine, the widely used local anesthetic in regional anesthesia is available in a commercial preparation as a racemic mixture (50:50) of its two enantiomers, levobupivacaine, S (-) isomer and dextrobupivacaine, R (+) isomer. Severe central nervous system (CNS) and cardiovascular adverse reactions reported in the literature after inadvertent intravascular injection or intravenous regional anesthesia have been linked to the R (+) isomer of bupivacaine. The levorotatory isomers were shown to have a safer pharmacological profile with less cardiac and neurotoxic adverse effects.¹⁻³

Ropivacaine, a long acting amide local anesthetic, shares many physiochemical properties with bupivacaine, but with less systemic toxicity and greater margin of safety due to its purity in Senantiomer form. Recent clinical data have shown that ropivacaine is effective and safe for regional anesthetic techniques. The low lipid solubility of ropivacaine leads to greater sensory-motor differentiation by blocking sensory nerve fibers more readily than motor fibers. Early recovery of motor function is associated with decreased incidences of venous thrombo-embolism and shorter hospitalization.⁴⁻⁶Hence; under the light of abovementioned data, the present study was conducted for comparing the efficacy of Isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl.

MATERIALS & METHODS

The present study was conducted for comparing the efficacy of Isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl. A total of 40 subjects scheduled to undergo Caesarean section were enrolled. Complete demographic and clinical details of all the patients was obtained. Baseline hemodynamic variables were monitored continuously. Patients were randomly divided into two groups. For Group A (n = 20); 10 mg 0.5% (2 ml) Isobaric levobupivacaine + 25 µg (0.5 ml) fentanyl, for Group B (n = 10); 10 mg 0.5% (2 ml) isobaricropivacaine + 25 μ g (0.5 ml) fentanyl, being a total of 2.5 cc, administered intrathecally within 10 s. Subsequently, patients were turned to the supine position. All the surgical C Section procedures were carried out under strict septic conditions. Continuous intraoperative monitoring of all the patients was done. All the results were recorded and analysed usingSPSS software.

RESULTS

Mean age of the patients of Group A and group B was 34.74 years and 36.76 years respectively. Both the study groups were comparable in terms of agewise distribution of patients. Mean weight of the patients of group A and group B was 68.24 Kg and 69.60 Kg respectively. Non-significant results were

Table 1: Assessment of motor block

Variable	Group A	Group B	p- value
Time to onset of anaesthesia (minutes)	1.38	2.35	0.001*
Time to achieve peak sensory block (minutes)	7.12	7.96	0.000*

*: Significant

Table 2: Comparison of heart rate at different time intervals

Heart rate	Group A	Group B	p- value
Baseline	81.3	80.2	0.312
1 minute	79.5	78.4	0.825
5 minutes	80.4	79.6	0.318
10 minutes	75.3	74.2	0.112
20 minutes	77.2	76.8	0.248
30 minutes	78.6	77.1	0.257

Table 3: Comparison of systolic blood pressure at different time intervals

Systolic blood pressure	Group A	Group B	p- value
Baseline	138.5	135.1	0.325
1 minute	128.4	127.3	0.117
5 minutes	122.3	123.9	0.895
10 minutes	124.7	125.2	0.659
20 minutes	122.6	123.1	0.336
30 minutes	129.4	128.5	0.225

Table 4: Comparison of Diastolic blood pressure at different time intervals

Diastolic blood pressure	Group A	Group B	p- value
Baseline	86.5	88.3	0.174
1 minute	85.4	86.1	0.126
5 minutes	80.2	82.4	0.395
10 minutes	78.6	80.4	0.287
20 minutes	84.6	84.3	0.221
30 minutes	88.4	86.1	0.510

DISCUSSION

Ropivacaine is an amide local anaesthetic with local anaesthetic properties similar to those of Bupivacaine. Ropivacaine produces an equivalent sensory block but shorter duration of motor block than intrathecal bupivacaine and thus quicker regression of motor block, early mobilisation and early recovery.3 Ropivacaine produces CNS and cardiovascular toxicity at a higher plasma concentration than bupivacaine and thus the incidence is lower than bupivacaine.⁶⁻⁸

Opioid analogues have been used as additives in spinal anaesthesia to improve the onset of action, prolong the duration of block and to improve the quality of perioperative analgesia. Fentanyl (a lipophilic opioid) has a rapid onset and short duration of action following intrathecal administration. The co-administration of opioids reduces the total dose of local anaesthetics required for anaesthesia and significantly prolongs the duration of complete and effective analgesia without prolonging the duration of motor block. It prolongs the duration and reduces analgesic requirement in early postoperative period following spinal block.^{8- 10}Hence; under the light of above-mentioned data, the present study was conducted for comparing the efficacy of Isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl.

obtained while comparing the mean weight of the

patients of the two study groups. Time to onset of

anesthesia was significantly lower among the

subjects of group A. However; non-significant results

were obtained while comparing the hemodynamic

response among the patients of the two study groups.

Mean age of the patients of Group A and group B was 34.74 years and 36.76 years respectively. Both the study groups were comparable in terms of agewise distribution of patients. Mean weight of the patients of group A and group B was 68.24 Kg and 69.60 Kg respectively. Non-significant results were obtained while comparing the mean weight of the patients of the two study groups.Goyal A et al

compared the sensorial, motor block levels, and sideeffects of equal doses of hyperbaric bupivacaine and levobupivacaine with intrathecal fentanyl addition in elective cesarean cases. Subjects were randomly divided equally to either Group BF receiving 10 mg (2 ml) hyperbaric bupivacaine and 25 mcg (0.5 ml) fentanyl, or Group LF receiving 10 mg (2 ml) isobaric levobupivacaine and 25 mcg (0.5 ml) fentanyl.Hemodynamic parameters like mean arterial pressure of Group BF were found to be lower. Group BF exhibited maximum motor block level whereas in Group LF, max sensorial block level and postoperative visual analog scale scores were higher. Umbilical blood gas pCO2 was slightly higher, and pO2 was marginally lower in Group BF. Onset of motor block time, time to max motor block, time to T10 sensorial block, reversal of two dermatome, the first analgesic need were similar in both groups.Intrathecal isobaric levobupivacaine-fentanyl combination is a good alternative to hyperbaric bupivacaine-fentanyl combination in cesarean surgery as it is less effective in motor block, it maintains hemodynamic stability at higher sensorial block levels.¹¹

Time to onset of anesthesia was significantly lower among the subjects of group A. However; nonsignificant results were obtained while comparing the hemodynamic response among the patients of the two study groups. Murali CH et al evaluated the effect of fentanyl on isobaric ropivacaine in subarachnoid anaesthesia for lower abdominal and lower extremity surgeries. Hundred patients, male and female, ASA I or ASA II, aged 18 to 65 years scheduled for elective lower abdominal and lower extremity surgeries were randomized into two groups. Group R (control group) received 0.75% isobaric ropivacaine 22.5 mg (3 ml) and Group RF (study group) received 0.75% isobaric ropivacaine 22.5 mg (3 ml) and 25 mcg of fentanyl (0.5 ml). Both groups were comparable with respect to age, height, weight and duration of surgery. There was no significant difference in hemodynamics, onset of sensory and motor block, peak level of block, recovery from motor block, return of micturition and incidence of side effects with the addition of fentanyl to ropivacaine. There was a significant prolongation of the duration of sensory block (250.8±20.7 VS 362.1±15.1* min) and postoperative analgesia (320.56+15.32 VS462.41±38.42 *min) in Group RF (P < 0.001). It was concluded that the addition of 25 mcg fentanyl to 22.5mg of 0.75% isobaric ropivacaine for spinal anaesthesia significantly increases the duration of sensory block and decreases the rescue of analgesia with better hemodynamic stability, early recovery and mobilization.¹²

CONCLUSION

No significant dissimilarity among the haemodynamic parameters between isobaric levobupivacaine and fentanyl with isobaric ropivacaine and fentanyl.

REFERENCES

- 1. Hughes D, Hill D, Fee JP. Intrathecal ropivacaine or bupivacaine with fentanyl for labour. Br J Anaesth 2001;87:733-7.
- Levin A, Datta S, Camann WR. Intrathecal ropivacaine for labor analgesia: A comparison with bupivacaine. Anesth Analg 1998;87:624-7.
- Polley LS, Columb MO, Naughton NN, Wagner DS, van de Ven CJ. Relative analgesic potencies of ropivacaine and bupivacaine for epidural analgesia in labor: Implications for therapeutic indexes. Anesthesiology 1999;90:944-50.
- Hallworth SP, Fernando R, Columb MO, Stocks GM. The effect of posture and baricity on the spread of intrathecal bupivacaine for elective cesarean delivery. Anesth Analg 2005;100:1159-65.
- Martin R, Frigon C, Chrétien A, Tétrault JP. Onset of spinal block is more rapid with isobaric than hyperbaric bupivacaine. Can J Anaesth 2000;47:43-6.
- Agarwal A, Verma RK, Srivastava S. Ropivacainethe latest local anaesthetic in the indian market. J Anaesthesiol Clin Pharmacol. 2010;26(2):223–231.
- Jain S, Bendwal HP, Deodhar P, Bhambani P, Romday R, Jain P. Comparative study of ropivacaine (0.5%) plain versus levobupivacaine (0.5%) plain in gynecological surgeries. Int J Reprod Contracept Obstet Gynecol. 2017;6:1573.
- Layek A, Maitra S, Gozi N, Bhattacharjee S, Pal S, Sen S, et al. Comparison between intrathecal isobaric ropivacaine-fentanyl and bupivacaine-fentanyl in elective infraumbilical orthopedic surgery: A randomized controlled study. J Anaesthesiol Clin Pharmacol. 2015;31:542
- Akcaboy EY, Akcaboy ZN, Gogus N. Low dose levobupivacaine 0.5% with fentanyl in spinal anaesthesia for transurethral resection of prostate surgery. J Res Med Sci. 2011;16:68–73.
- Hakan Erbay R, Ermumcu O, Hanci V, Atalay H. A comparison of spinal anesthesia with low-dose hyperbaric levobupivacaine and hyperbaric bupivacaine for transurethral surgery: A randomized controlled trial. Minerva Anestesiol. 2010;76:992– 1001.
- 11. Goyal A, Shankaranarayan P, Ganapathi P. A randomized clinical study comparing spinal anesthesia with isobaric levobupivacaine with fentanyl and hyperbaric bupivacaine with fentanyl in elective cesarean sections. Anesth Essays Res. 2015 Jan-Apr;9(1):57-62
- Murali CH, Narsaiah GL. Effects of fentanyl on isobaric ropivacaine in subarachnoid anaesthesia for lower abdominal and lower extremity surgeries. Int J Res Med Sci 2016;4: 2850-5