Original Article

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Intrathecal Isobaric Levobupivacaine Versus Isobaric Ropivacaine for Infra-Umbilical Surgeries

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Abstract

Background: The aim is to compare intrathecal isobaric levobupivacaine versus isobaric ropivacaine for infra-umbilical surgeries. **Subjects & Methods:** Sixty- eight patients of either gender of American Society of Anaesthesiologists (ASA) class I, II or III scheduled for infra-umbilical surgery were included. Patients were divided into 2 groups of 34 each. Group A received isobaric levobupivacaine (0.5%, 0.3-0.4 mg/kg), whereas group B received isobaric ropivacaine (0.5%, 0.5 mg/kg) intrathecally. **Results:** Mean age as 34.5 years in group I and 36.2 years in group II, there were 14 males and 20 females in group I and 18 male and 16 females in group II. The mean weight was 56.2 Kgs inn group I and 53.1 Kgs in group II and duration of surgery was 37.4 minutes in group I and 38.0 minutes in group II. Sensory block onset (min) was 2.14 and 2.65, duration of sensory block (min) was 254.6 and 210.2, complete sensory block (min) was 5.28 and 6.12, 2-segment regression time (min) was 87.1 and 80.2, onset of motor block (min) was 2.30 and 3.52, complete motor block (min) was 10.2 and 12.3, duration of motor block (min) was 204.5 and 102.6 and duration of analgesia (min) was 273.4 and 232.8. A significant difference was observed (P< 0.05). **Conclusion:** Intrathecal isobaric levobupivacaine and ropivacaine with fentanyl produces effective surgical anaesthesia and postoperative analgesia.

Keywords: Fentanyl, Postoperative Analgesia, Ropivacaine, Surgical Anaesthesia.

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Introduction

Spinal anaesthesia has a popular technique for all lower abdominal surgeries, provide a fast onset and effective sensory and motor blockade. Spinal Anaesthesia (SA) is regaining popularity in recent times due to advanced equipment and skill enhancement.[1] It is an easy and safe technique in patients with difficult airway and provides excellent analgesia with good muscle relaxation. SA has good control on cardiovascular and stress responses, provides good postoperative pain relief, shortens the hospital stay and is thus cost-effective.[2]

Neuraxial anaesthesia is preferred over general anaesthesia as it provides satisfactory post-operative analgesia with less incidence of nausea and vomiting.[3] Hyperbaric bupivacaine is the most common local anaesthetic drug used for subarachnoid block (SAB).[4] Bupivacaine is available as a racemic mixture of its enantiomers, dextrobupivacaine and levobupivacaine. The last few years, its pure S- enantiomers, ropivacaine and levobupivacaine, have been introduced into clinical practice because of their lower toxic effects for heart and central nervous system the clinical profile of spinal ropivacaine, levobupivacaine has been evaluated in volunteers and clinical studies.[5,6]

Levobupivacaine is an S (-) enantiomer of bupivacaine, having less cardio toxic and neurotoxic effects in comparison with R (+) bupivacaine.[7] Ropivacaine, another local anaesthetic, when used intrathecally for day care procedures provides adequate sensory block and early motor recovery due to greater degree of sensory motor differentiation.[8] Considering this, the present study was undertaken with the aim to compare intrathecal isobaric levobupivacaine versus isobaric ropivacaine for infra-umbilical surgeries.

Subjects and Methods

Sixty- eight patients of either gender of American Society of Anaesthesiologists (ASA) class I, II or III scheduled for infra-

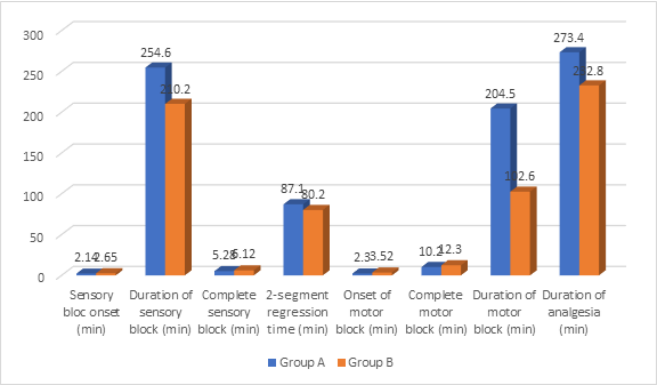
umbilical surgery were included. All patients were included in the study once they agreed for active participation.

All relevant information was recorded in case history file. Patients were divided into 2 groups of 34 each. Group A received isobaric levobupivacaine (0.5%, 0.3-0.4 mg/kg), whereas group B received isobaric ropivacaine (0.5%, 0.5 mg/kg) intrathecally. Fentanyl (0.2 μg/kg) was used as an adjuvant in both the groups. Parameters such as onset, peak and duration of sensory and motor blockade, duration of post-operative analgesia, time for micturition, perioperative haemodynamic parameters and complications were compared. Results of the present study after recording all relevant data were subjected for statistical inferences using chi- square test. The level of significance was significant if p value is below 0.05 and highly significant if it is less than 0.01.

Results

Mean age as 34.5 years in group I and 36.2 years in group II, there were 14 males and 20 females in group I and 18 male and 16 females in group II. The mean weight was 56.2 Kgs in group I and 53.1 Kgs in group II and duration of surgery was 37.4 minutes in group I and 38.0 minutes in group II. A non-significant difference was observed (P> 0.05). [Table 1].

Sensory block onset (min) was 2.14 and 2.65, duration of sensory block (min) was 254.6 and 210.2, complete sensory block (min) was 5.28 and 6.12, 2-segment regression time (min) was 87.1 and 80.2, onset of motor block (min) was 2.30 and 3.52, complete motor block (min) was 10.2 and 12.3, duration of motor block (min) was 204.5 and 102.6 and duration of analgesia (min) was 273.4 and 232.8. A significant difference was observed (P< 0.05). [Table 2, Figure 1].



Discussion

The present study was undertaken with the aim to compare intrathecal isobaric levobupivacaine versus isobaric ropivacaine for infra-umbilical surgeries. We enrolled 68 adult patients which were divided into 2 groups and each group had 34 patients. Group A received isobaric levobupivacaine (0.5%, 0.3-0.4 mg/kg), whereas group B received isobaric ropivacaine (0.5%, 0.5 mg/kg) intrathecally. Group A had 14 males and 20 females and 18 male and 16 females in group II.[9–11]

We observed that Sensory block onset (min) was 2.14 and 2.65, duration of sensory block (min) was 254.6 and 210.2, complete sensory block (min) was 5.28 and 6.12, 2-segment regression time (min) was 87.1 and 80.2, onset of motor block (min) was 2.30 and 3.52, complete motor block (min) was 10.2 and 12.3, duration of motor block (min) was 204.5 and 102.6 and duration of analgesia (min) was 273.4 and 232.8.[12] Bhati et al,[13] compared intrathecal isobaric levobupivacaine versus isobaric ropivacaine drugs intrathecally to study their efficacy and safety in school-age children. Group A received isobaric levobupivacaine (0.5%, 0.3-0.4 mg/kg), whereas group B received isobaric ropivacaine (0.5%, 0.5 mg/kg) intrathecally. Onset and peak of sensory and motor block were earlier in group A. Significantly longer duration of sensory and motor block was achieved in group A (251 $\pm$ 41 min, 201 $\pm$ 40 min) compared to group B (211 $\pm$ 21 min, 102 $\pm$ 16 min) ($P < 0.001$). The time to first rescue analgesic was also significantly prolonged in group A (270 $\pm$ 39 min) compared to group B (233 $\pm$ 18 min) ($P < 0.001$). Time to micturition was much early in group B (157 $\pm$ 27 min) compared to group A (225 $\pm$ 31 min) ($P < 0.001$).

Peter compared the block characteristics and haemodynamic stability of intrathecal isobaric levobupivacaine 0.5% with isobaric ropivacaine 0.5% for infra umbilical surgeries under spinal anaesthesia.[14] 100 patients of ASA I and ASA II coming for elective infra umbilical surgeries under spinal anaesthesia were randomly allocated to two groups with 50 patients in each group. Group L received isobaric levobupivacaine 0.5% and Group R received isobaric ropivacaine 0.5%. Sensory and motor characteristics were assessed by pin prick and modified Bromage scale respectively an observed haemodynamics were recorded. The onset of sensory and motor block was faster in Group L compared to the Group R. The duration of sensory and motor block was found to be significantly long in Group L compared to Group R.

Yadav et al compared the efficacy of intrathecal 0.5% hyperbaric bupivacaine,[15] 0.5% isobaric levobupivacaine and 0.5% isobaric ropivacaine with fentanyl as adjuvant for outpatient knee arthroscopic surgeries. This prospective, randomized, double-blind study was conducted on 60 ASA I/II patients between 18-60 years, scheduled for knee arthroscopy under subarachnoid block. Patients were randomised into three groups; group BF: 10 mg 0.5% hyperbaric bupivacaine (2 ml), group LF: 10 mg 0.5% isobaric levobupivacaine (2 ml), group RF: 10 mg 0.5% isobaric ropivacaine (2 ml). In addition, each patient received fentanyl 25 μg (0.5 ml) as an adjuvant to the local anaesthetic (total intrathecal volume 2.5 ml in all

Table 1: Demographic characteristics

Parameters	Group A	Group B	P value
Mean age (years)	34.5	36.2	>0.05
M:F	14:20	18:16	>0.05
Weight (Kgs)	56.2	53.1	>0.05
Duration of surgery (mins)	37.4	38.0	>0.05

Table 2: Comparison of block characteristics

Parameters	Group A	Group B	P value
Sensory bloc onset (min)	2.14	2.65	<0.05
Duration of sensory block (min)	254.6	210.2	<0.05
Complete sensory block (min)	5.28	6.12	<0.05
2-segment regression time (min)	87.1	80.2	<0.05
Onset of motor block (min)	2.30	3.52	<0.05
Complete motor block (min)	10.2	12.3	>0.05
Duration of motor block (min)	204.5	102.6	<0.05
Duration of analgesia (min)	273.4	232.8	<0.05

three groups). The sensory and motor block characteristics, time to ambulation and discharge were recorded. Mean time to ambulation and discharge was significantly less in group RF (10.10 ± 3.63 hr) compared to 14.80±3.63 hr in group BF and 12.40±2.30 hr in group LF ($p<0.001$). Mean time to complete motor recovery was significantly less in group RF (204.75±34.39 min) compared to 260±40.78 min in group BF and 280.25±28.72 min in group LF ($p<0.001$). Duration of subarachnoid block was comparable in all the three groups ($p=0.522$).

Conclusion

Intrathecal isobaric levobupivacaine and ropivacaine with fentanyl produces effective surgical anaesthesia and postoperative analgesia. However, isobaric levobupivacaine with fentanyl provided more rapid and prolong sensory blockade as compared to ropivacaine with fentanyl.

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