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ORIGINAL RESEARCH

Comparative evaluation of efficacy of Intrathecal levobupivacaine and bupivacaine among patients undergoing inguinal hernia surgery under spinal anesthesia

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Abstract

Background: The present study was conducted for evaluating the efficacy of Intrathecal levobupivacaine and bupivacaine among patients undergoing inguinal hernia surgery under spinal anesthesia.

Materials & methods: A total of 50 patients were enrolled and were randomized into two study groups as follows:Group 1- intrathecal isobaric levobupivacaine, and Group 2- intrathecal hyperbaric racemic bupivacaine. Complete demographic and clinical details of all the patients was obtained. Anthropometric examination of all the patients was done. Patients having history of any systemic illness, or any known drug allergy were excluded. Complete baseline hemodynamic and biochemical profile at baseline was evaluated. All the patients underwent type of spinal according to their respective study groups. Quality of anesthesia was assessed. Motor and sensory block characteristics were also evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results: Mean age of the patients of the group 1 and group 2 was 43.8 years and 45.1 years respectively. Majority proportion of patients of both the study groups were males. Among patients of group 1, excellent and satisfactory anesthesia was seen in 84 percent and 16 percent of the patients respectively.Among patients of group 2, excellent and satisfactory anesthesia was seen in 88 percent and 12 percent of the patients respectively. Mean onset of sensory and motor block were similar for both the study groups. However; mean duration of motor block was significantly lower in group 1 (176.3 mins) in comparison to group 2 (191.7 mins).

Conclusion: Levobupivacaine offered high quality of anesthesia among patients having spinal anesthesia with shorter duration of motor block, allowing quicker recovery.

Key words: Levobupivacaine, Bupivacaine

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Introduction

Spinal anesthesia is a type of regional anesthesia in which a local anaesthetic is injected directly into the cerebrospinal fluid that surrounds the spinal cord and nerve roots.[1,2] It blocks pain from an entire region of the body, such as the hips, the belly, the pelvis, and the legs.[2]Spinal anesthesia is part of the modern practice of anesthesia because of its proven success, predictability, increased patient satisfaction, low complication rate, better pain control than intravenous narcotics, earlier recovery of bowel function, less need for systemic Opioids, easier breathing resulting from better pain control, Easier participation in physical therapy.[3,4]

Spinal anesthesia is commonly used in various surgical procedures, including hernia repair, different types of hysterectomy, cesarean section, prostate surgery, and urological bladder surgeries. In vascular surgeries, it is also frequently utilized for procedures involving the arteries in the legs to treat vascular diseases such as atherosclerosis or deep vein thrombosis.[5, 6]Bupivacaine, a pipecoloxylidide derivative, synthesized in 1957 and introduced in clinical practice in 1963, is widely used. Bupivacaine is a racemic mixture of dextro (D)-isomer and levo (L)-isomer. Levobupivacaine is an amide local anesthetic that is the isolated S (-) enantiomer of racemic bupivacaine. Levobupivacaine has less cardiotoxic and central nervous system effects in comparison with both R (+) bupivacaine and bupivacaine.[6- 8]Hence; the present study was conducted for evaluating the efficacy of Intrathecal levobupivacaine and bupivacaine among patients undergoing inguinal hernia surgery under spinal anesthesia.

Materials & methods

The present study was conducted for evaluating the efficacy of Intrathecal levobupivacaine and bupivacaine among patients undergoing inguinal hernia surgery under spinal anesthesia. A total of 50 patients were enrolled and were randomized into two study groups as follows:

Group 1- intrathecal isobaric levobupivacaine.

Group 2- intrathecal hyperbaric racemic bupivacaine.

Complete demographic and clinical details of all the patients was obtained. Anthropometric examination of all the patients was done. Patients having history of any systemic illness, or any known drug allergy were excluded. Complete baseline hemodynamic and biochemical profile at baseline was evaluated. All the patients underwent type of spinal according to their respective study groups. Quality of anesthesia was assessed. Motor and sensory block characteristics were also evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results

Mean age of the patients of the group 1 and group 2 was 43.8 years and 45.1 years respectively. Majority proportion of patients of both the study groups were males. Among patients of group 1, excellent and satisfactory anesthesia was seen in 84 percent and 16 percent of the patients respectively.Among patients of group 2, excellent and satisfactory anesthesia was seen in 88 percent and 12 percent of the patients respectively. Mean onset of sensory and motor block were similar for both the study groups. However; mean duration of motor block was significantly lower in group 1 (176.3 mins) in comparison to group 2 (191.7 mins).

Table 1: Quality of anesthesia

Quality of anesthesia	Group 1	Group 2	p-value
Excellent	21	22	0.183
Satisfactory	4	3	
In-adequate	0	0	

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Failure	0	0	
Total	25	25	

Table 2: Sensory and motor characteristics

Characteristics	Group 1	Group 2	p-value
Mean onset of sensory block	4.6 mins	4.4 mins	0.270
Mean onset of motor block	4.5 mins	4.2 mins	0.317
Duration of motor block	176.3 mins	191.7 mins	0.001*

*: Significant

Discussion

Spinal anesthesia is easy to perform, it is inexpensive, has less effect on the cardiovascular system than general anesthesia, has a minimal impact on the respiratory system The use of spinal anesthesia avoids the possibility of difficult airway establishment. All these benefits of spinal anesthesia leads to the possibility of day surgery for patients who have had certain risks and contraindications for general anesthesia, such as the elderly, the overweight, or those with comorbidities.[7- 9]Hence; the present study was conducted for evaluating the efficacy of Intrathecal levobupivacaine and bupivacaine among patients undergoing inguinal hernia surgery under spinal anesthesia.

Singh A et al compared isobaric levobupivacaine with hyperbaric racemic bupivacaine with respect to intraoperative quality of anesthesia and the postoperative recovery profile in patients undergoing inguinal hernia surgery.A total of 100 American Society of Anesthesiologists 1 and 2 patients, aged 18–60 years, undergoing elective daycare unilateral inguinal hernia surgery, were randomized into two groups. Group L received spinal anesthesia with 3 ml of 0.5% plain levobupivacaine. Group B received 3 ml of 0.5% hyperbaric racemic bupivacaine. Quality of anesthesia, sensory and motor block characteristics, duration of effective analgesia, time to mobilization, and incidence of side effects were compared.The quality of anesthesia was comparable between the two groups. No difference was observed in the block onset time or maximum block height. The duration of anesthesia was significantly shorter in group L compared with that in group B, as was duration of motor blockand time to walk unaided. The incidence of hypotension was less in group L (12%) compared to group B (32%).Levobupivacaine is an effective alternative to bupivacaine for patients undergoing unilateral inguinal hernia surgery.[10]

Piacherski V et al compared the efficacy of spinal anesthesia (SA) performed with 0.5% isobaric bupivacaine, 0.5% levobupivacaine, and 0.5% hyperbaric bupivacaine. 111 patients were randomly allocated into 3 equal groups for spinal anesthesia in lower limb surgeries. In group 1 (1B) spinal anesthesia was performed with 3 ml of 0.5% isobaric bupivacaine ($n = 37$); in group 2 (2L)—3 ml of 0.5% levobupivacaine ($n = 37$), in group 3 (3H)—3 ml of 0.5% hyperbaric bupivacaine ($n = 37$). The criterion for assessing the effectiveness of anesthesia was the need to switch to another type of anesthesia (criterion-no anesthesia), or the need for additional use of narcotic analgesics or local anesthesia during surgery (criterion-reporting of painful feelings during the operation). In 1B anesthesia efficiency by the criterion of additional intraoperative analgesia was 100% (37 patients; 95% CI [0.88–1.0]); 2L—86.4%; (31 patients; 95% CI [0.68–0.92]); 3H—72.9% (27 patients; 95% CI [0.56–0.84]). There were significant differences between groups 1B and 2L: $p < 0.05$ ($p = 0.0104$). There were no significant differences between groups 2L and 3H ($p = 0.2587$). All patients in group 1B developed complete sensory block (++) within 4 (3; 5) min. In group 2L complete sensory block developed in 34 patients (89.4%) within 9 (5; 14) min, in group 3H sensory block developed in all patients within 3 (2.5; 4). The duration of analgesia period between 1B and 2L did not statistically differ ($p = 0.73$). In 3H the duration of analgesia was 170 (150;

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200) min. The study found 83.7% efficacy of levobupivacaine and 72.9% efficacy of hyperbaric bupivacaine in comparison with isobaric bupivacaine (100%) when administered intrathecally in equal volumes and amounts (by the criterion of additional intraoperative analgesia).[11]

Conclusion

Levobupivacaine offered high quality of anesthesia among patients having spinal anesthesia with shorter duration of motor block, allowing quicker recovery.

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