ORIGINAL RESEARCH

A comparative evaluation of intrathecal isobaric ropivacaine plus dexmedetomidine with isobaric ropivacaine plus clonidine in patients undergoing lower limb surgeries

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Received: 20 October, 2021 Accepted: 25 November, 2021

ABSTRACT

Background: One of the most used regional anesthetic methods for lower limb and lower abdomen procedures is epidural anesthesia. The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine plus clonidine for lower limb surgeries. **Materials & Methods:** 110 patients undergoing lower limb surgeries under intrathecal anesthesiawere divided into groups of 55 each. Group I patients received isobaric ropivacaine 0.75% 15 mg + 30 mcg clonidine and group II patients received isobaric ropivacaine 0.75% 15 mg + 10 mcg dexmedetomidine. Parameters such as sensory blockade, motor blockage, VAS and analgesia was recorded. **Results:** The group I had 25 males and 30 females and group II had 28 males and 27 females. The mean duration of surgery was 108.1 minutes in group I and 114.5 minutes in group II. The mean time to onset of sensory analgesia was 8.4 minutes in group I and 5.2 minutes in group II. The time taken for regression of sensory block to t12 was 155.2 minutes in group I and 202.7 minutes in group II. The mean time to first postoperative analgesic requirement was 270.4 minutes in group I and 360.4 minutes in group II. The mean time taken to achieve complete motor blockade was 14.1 minutes in group I and 13.6 minutes in group II. The difference was significant ($P< 0.05$). The mean VAS in group I was 4.5 and in group II was 3.1. The difference was significant ($P< 0.05$). **Conclusion:** For patients undergoing intrathecal anesthesia, dexmedetomidine combined with ropivacaine demonstrated earlier sensory blockage and longer durations of both sensory and motor blockade for lower limb procedures.

Key words: Dexmedetomidine, pain, ropivacaine

INTRODUCTION

One of the most used regional anesthetic methods for lower limb and lower abdomen procedures is epidural anesthesia.[1] Effective surgical anesthetic, the ability to accommodate longer surgical needs, prolonged post-operative analgesia, and a lower risk of hemodynamic alterations are some of the benefits of epidural anesthesia.[2] The Food and Drug Administration (FDA) approved the amide local anesthetic ropivacaine. Because it is thought to be less cardiotoxic and has a much higher threshold for central nervous system (CNS) toxicity on a milligram basis than bupivacaine, it might be a good substitute as a long-acting local anesthetic.[3] Although ropivacaine may be a little less successful than bupivacaine when given intrathecally or epidurally, equi-effective doses have been found, and its effectiveness for peripheral nerve blocks is comparable to that of bupivacaine and levobupivacaine.[4]Therefore, ropivacaine seems to be a viable choice for regional anesthesia and the treatment of postoperative and labor pain due to its effectiveness, decreased tendency for motor block, and decreased risk of CNS toxicity and cardiotoxicity.[5] An effective analgesic without opioid-related side effects, clonidine is a selective partial α2-adrenergic agonist that is being thoroughly studied as an adjuvant to intrathecal local anesthetics.5. It is

known to enhance local anesthetics' sensory and motor blockage.[6]The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine plus clonidine for lower limb surgeries.

MATERIALS & METHODS

The present study was conducted on 110 patients undergoing lower limb surgeries under intrathecal anesthesia of both genders. All patients gave their written consent for the participation of the study. Data such as name, age, gender was recorded. Patients were divided into groups of 55 each. Group I patients received isobaric ropivacaine 0.75% 15 mg + 30 mcg clonidine and group II patients received isobaric ropivacaine 0.75% 15 mg + 10 mcg dexmedetomidine. Sensory blockade, motor blockage, VAS, and analgesia were among the parameters that were noted. Results of the study was statistically analysed. P value less than 0.05 was considered significant (P< 0.05).

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	isobaric ropivacaine 0.75% 15 mg + 30 mcg clonidine	isobaric ropivacaine 0.75% 15 mg + 10 mcg dexmedetomidine
M:F	25:30	28:27

Table I shows that group I had 25 males and 30 females and group II had 28 males and 27 females.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
Duration of surgery (mins)	108.1	114.5	0.54
Onset of sensory analgesia (mins)	8.4	5.2	0.01
Time taken for regression of sensory block to t12	155.2	202.7	0.03
Time to first postoperative analgesic requirement	270.4	360.4	0.01
Time taken to achieve complete motor blockade	14.1	13.6	0.05

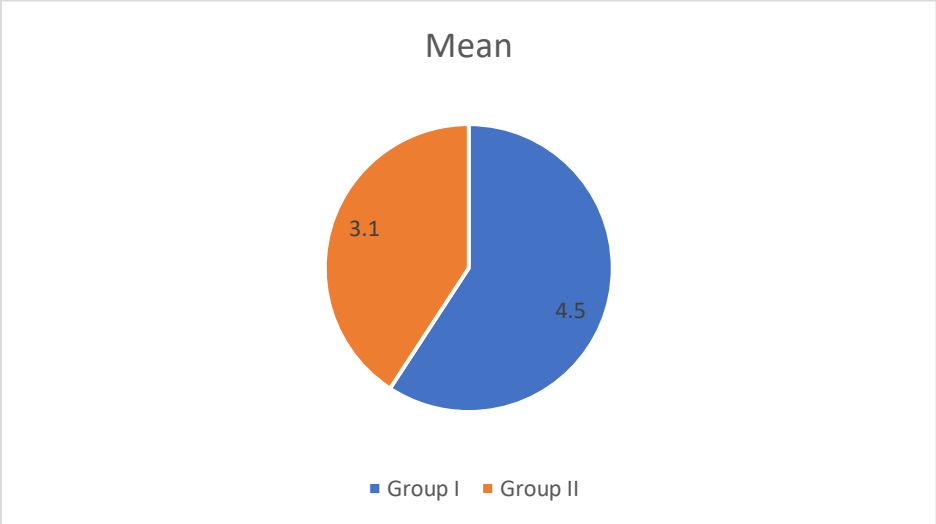
Table II shows that mean duration of surgery was 108.1 minutes in group I and 114.5 minutes in group II. The mean time to onset of sensory analgesia was 8.4 minutes in group I and 5.2 minutes in group II. The time taken for regression of sensory block to t12 was 155.2 minutes in group I and 202.7 minutes in group II. The mean time to first postoperative analgesic requirement was 270.4 minutes in group I and 360.4 minutes in group II. The mean time taken to achieve complete motor blockade was 14.1 minutes in group I and 13.6 minutes in group II. The difference was significant (P< 0.05).

Table III Comparison of pain (VAS)

Groups	Mean	P value
Group I	4.5	0.05
Group II	3.1	

Table III, graph I shows that mean VAS in group I was 4.5 and in group II was 3.1. The difference was significant(P< 0.05).

Graph I Comparison of pain (VAS)



DISCUSSION

In epidural blocks for lower abdominal and limb procedures, a variety of adjuvants are utilized in conjunction with local anesthetics to prolong intraoperative and postoperative analgesia. Dexmedetomidine is a novel neuroaxial adjuvant that is becoming more and more popular. It is a highly selective α2 adrenergic agonist.[7] In epidural blocks for lower limb and lower abdomen procedures, a variety of adjuvants are used in conjunction with local anesthetics to prolong intraoperative and postoperative analgesia. The most often used substances for spinal anesthesia are local anesthetics.[8] With a toxicity profile halfway between that of bupivacaine and lidocaine, ropivacaine is a novel local anesthetic that combines the anesthetic strength and prolonged duration of action of bupivacaine with the benefit of quicker recovery. Without any clinically significant side effects, intrathecal clonidine has been utilized as an adjuvant to local anesthetics in a variety of surgical operations.[9]The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine plus clonidine for elective lower abdominal and lower limb surgeries.

We found thatgroup I had 25 males and 30 females and group II had 28 males and 27 females.Mahendru et al[10] in their study the patients were randomly allocated into four groups (30 patients each). Group BS received 12.5 mg hyperbaric bupivacaine with normal saline, group BF received 12.5 mg bupivacaine with 25 g fentanyl, group BC received 12.5 mg of bupivacaine supplemented 30 g clonidine, and group BD received 12.5 mg bupivacaine plus 5 g dexmedetomidine. The onset time to reach peak sensory and motor level, the regression time of sensory and motor block, hemodynamic changes, and side effects were recorded.Patients in Group BD had significantly longer sensory and motor block times than patients in Groups BC, BF, and BS with Groups BC and BF having comparable duration of sensory and motor block. The mean time of two segment sensory block regression was 147 ± 21 min in Group BD, 117 ± 22 in Group BC, 119 ± 23 in Group BF, and 102 ± 17 in Group BS ($P > 0.0001$). The regression time of motor block to reach modified Bromage zero (0) was 275 ± 25, 199 ± 26, 196 ± 27, 161 ± 20 in Group BD, BC, BF, and BS, respectively ($P > 0.0001$). The onset times to reach T8 dermatome and modified Bromage 3 motor block were not significantly different between the groups. Dexmedetomidine group showed significantly less and delayed requirement of rescue analgesic.

We found that mean duration of surgery was 108.1 minutes in group I and 114.5 minutes in group II. The mean time to onset of sensory analgesia was 8.4 minutes in group I and 5.2 minutes in group II. The time taken for regression of sensory block to t12 was 155.2 minutes in group I and 202.7 minutes in group II. The mean time to first postoperative analgesic requirement was 270.4 minutes in group I and 360.4 minutes in group II. The mean time taken to achieve complete motor blockade was 14.1 minutes in group I and 13.6 minutes in group II. When administered intrathecally as an adjuvant to 2.5 ml of 0.75% isobaric ropivacaine, Ravipati et al[11] evaluated the effectiveness of fentanyl and dexmedetomidine. In order to compare block characteristics, hemodynamic changes, and adverse effects, sixty chosen patients were randomly assigned to receive either 20 mcg of fentanyl (Group RF) or 2.5 ml of 0.75% isobaric ropivacaine with dexmedetomidine 5 mcg (Group RD) intrathecally for lower limb procedures. The effectiveness of both medications when administered intrathecally was investigated. In groups RD and RF, the mean time required for sensory blockage at T10 was 156.4667 ± 33.78 and 185.2000 ± 35.17 seconds, respectively. Clinically and statistically significantly, the mean total length of sensory block in Group RD was 194.400 minutes, whereas in Group RF it was 139.9000 minutes. In all groups, the time it took for a motor block to start was nearly identical. Clinically and statistically significantly, the mean total motor block time in Group RD was 136.7333 minutes, whereas in Group RF it was 94.8667 minutes.

We found that mean VAS in group I was 4.5 and in group II was 3.1. Martin et al[12] who used Clonidine with ropivacaine intrathecally in three different doses of 15, 45, and 75 µg for ambulatory knee arthroscopy, observed that a small 15 µg dose of Clonidine significantly improves the quality of anaesthesia without delaying sensory and motor recovery. They also noted that a 45µg dose of Clonidine prolongs the sensory blockade without any influence on motor blockade, but a dose of 75 µg is associated with delayed sensory and motor recovery as well as detectable side effects such as hypotension and sedation.Kanazi et al[13] found that 3g dexmedetomidine or 30 g clonidine added to 13 mg spinal bupivacaine produced same duration of sensory and motor block with minimal side effects in urological surgical patients.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that for patients undergoing intrathecal anesthesia, dexmedetomidine combined with ropivacaine demonstrated earlier sensory blockage and longer durations of both sensory and motor blockade for lower limb procedures.

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