

## Intrathecal isobaric ropivacaine plus dexmedetomidine and isobaric ropivacaine alone for elective lower abdominal and lower limb surgeries

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### Abstract

**Background:** Lower limb, pelvic, perineum, and lower abdominal surgeries can all be performed under epidural anaesthesia as the only anaesthetic. The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine for elective lower abdominal and lower limb surgeries.

**Materials & Methods:** 80 patients undergoing lower abdominal and lower limb surgeries under intrathecal anesthesia of both genders were divided into groups of 40 each. Group I patients received isobaric ropivacaine 0.75% 15 mg + 1ml normal saline and group II patients received 15 ml of 0.75% isobaric ropivacaine + 0.6mcg/kg dexmedetomidine diluted with 1ml normal saline. Parameters such as sensory blockade, motor blockage, duration of two segment regressions, and duration of analgesia was recorded.

**Results:** Group I had 22 males and 18 females and group II had 20 males and 20 females. The mean onset of sensory blockade was 10.5 minutes in group I and 7.9 minutes in group II. The mean onset of motor blockade was 15.2 minutes in group I and 9.4 minutes in group II. The mean duration of two segment regressions was 97.3 minutes in group I and 162.1 minutes in group II. The mean duration of motor blockade was 140.5 minutes in group I and 217.3 minutes in group II. The mean duration of analgesia was 187.2 minutes in group I and 312.6 minutes in group II. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Dexmedetomidine with ropivacaine demonstrated earlier sensory blockade and prolonged duration of sensory and motor blockade for patients undergoing lower limb procedures while under intrathecal anaesthesia.

**Key words:** Dexmedetomidine, lower limb, ropivacaine

### Introduction

Lower limb, pelvic, perineum, and lower abdominal surgeries can all be performed under epidural anaesthesia as the only anaesthetic. After an epidural catheter has been inserted, it has the capacity to maintain continuous anaesthesia, making longer treatments possible.<sup>1</sup> The optimum local anaesthetic for the epidural area should have a rapid onset, enough motor block for surgical relaxation, and appropriate sensory block for postoperative analgesia with little adverse effects on the cardiovascular system and central nervous system. The benefit of this method is that it allows for graded epidural anaesthesia or drug augmentation even during operation.<sup>2</sup>

Highly selective 2 adrenergic agonist dexmedetomidine is a novel neuroaxial adjuvant that is gaining favour. For the purpose of extending the duration of the intraoperative and postoperative analgesia in an epidural block for lower limb and lower abdominal procedures, various adjuvants are utilised in conjunction with local anaesthetics.<sup>3</sup> The highly selective 2 adrenergic agonist dexmedetomidine is a novel neuroaxial adjuvant that is gaining popularity. The Food and Drug Administration (FDA) has approved ropivacaine, an amide local

anaesthetic.<sup>4</sup> It is thought to be less cardiotoxic than bupivacaine and has a much larger milligrams threshold for central nervous system (CNS) toxicity, making it a potential replacement as a long-acting local anaesthetic.<sup>5</sup> Although it may be slightly less potent than bupivacaine when delivered epidurally or intrathecally, equi-effective doses have been found, and ropivacaine's effectiveness for peripheral nerve blocks is comparable to that of bupivacaine and levobupivacaine.<sup>6</sup> The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine alone for elective lower abdominal and lower limb surgeries.

### Materials & Methods

The present study comprised of 80 patients undergoing lower abdominal and lower limb surgeries under intrathecal anesthesia of both genders. All patients gave their written consent to participate in the study.

Data such as name, age, gender was recorded. Patients were divided into groups of 40 each. Group I patients received isobaric ropivacaine 0.75% 15 mg + 1ml normal saline and group II patients received 15 ml of 0.75% isobaric ropivacaine + 0.6mcg/kg dexmedetomidine diluted with 1ml normal saline. Parameters such as sensory blockade, motor blockage, duration of two segment regressions, and duration of analgesia was recorded. 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	0.75% isobaric ropivacaine+normal saline	0.75% isobaric ropivacaine+dexmedetomidine
M:F	22:18	20:20

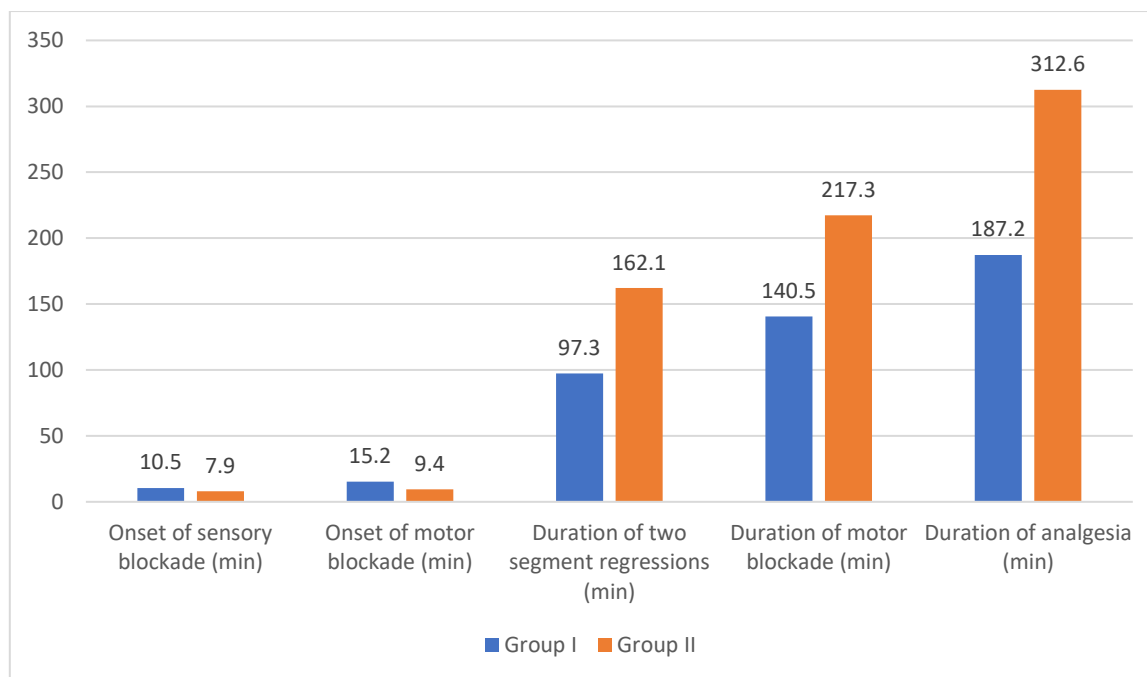
Table I shows that group I had 22 males and 18 females and group II had 20 males and 20 females.

**Table II Comparison of parameters**

Parameters	Group I	Group II	P value
Onset of sensory blockade (min)	10.5	7.9	0.05
Onset of motor blockade (min)	15.2	9.4	0.01
Duration of two segment regressions(min)	97.3	162.1	0.02
Duration of motor blockade (min)	140.5	217.3	0.01
Duration of analgesia(min)	187.2	312.6	0.01

Table II, graph I shows that mean onset of sensory blockade was 10.5 minutes in group I and 7.9 minutes in group II. The mean onset of motor blockade was 15.2 minutes in group I and 9.4 minutes in group II. The mean duration of two segment regressions was 97.3 minutes in group I and 162.1 minutes in group II. The mean duration of motor blockade was 140.5 minutes in group I and 217.3 minutes in group II. The mean duration of analgesia was 187.2 minutes in group I and 312.6 minutes in group II. The difference was significant ( $P < 0.05$ ).

### Graph I Comparison of parameters



## Discussion

Epidural anesthesia is one of the most common regional anesthetic techniques used for lower abdominal and lower limb surgeries.<sup>7</sup> The advantages of epidural anesthesia being, it provides effective surgical anesthesia and can meet the extended duration of surgical needs, provides prolonged post-operative analgesia, reduces the incidence of hemodynamic changes.<sup>8</sup> Ropivacaine, with its efficacy, lower propensity for motor block, and reduced potential for CNS toxicity and cardiotoxicity, appears to be an important option for regional anaesthesia and management of postoperative and labour pain.<sup>9,10</sup> The present study compared 0.75% intrathecal isobaric ropivacaine plus dexmedetomidine and 0.75% isobaric ropivacaine for elective lower abdominal and lower limb surgeries.

We found that group I had 22 males and 18 females and group II had 20 males and 20 females. Chandana et al<sup>11</sup> compared the hemodynamic, sedative and analgesia potentiating effects of epidurally administered dexmedetomidine when combined with ropivacaine on 60 ASA Grade I and II patients with age group 20-60 years who were posted for lower limb and lower abdominal surgeries under epidural anesthesia. All patients were randomly allocated into two groups of 30 each. Group R patients-15ml of 0.75% Ropivacaine with 1ml normal saline. Group RD patients-15ml of 0.75% Ropivacaine with 0.6mcg/kg dexmedetomidine diluted with 1ml normal saline. Addition of 0.6mcg/kg dexmedetomidine to 15ml of 0.75% ropivacaine for epidural anaesthesia of lower limb and lower abdominal surgeries prolonged duration of analgesia, motor blockade, time to two segment regression, with faster onset of sensory and motor blockade.

We found that mean onset of sensory blockade was 10.5 minutes in group I and 7.9 minutes in group II. The mean onset of motor blockade was 15.2 minutes in group I and 9.4 minutes in group II. The mean duration of two segment regressions was 97.3 minutes in group I and 162.1 minutes in group II. The mean duration of motor blockade was 140.5 minutes in group I and 217.3 minutes in group II. The mean duration of analgesia was 187.2 minutes in group I and 312.6 minutes in group II. Ravipati et al<sup>12</sup> examined the effectiveness of fentanyl and dexmedetomidine when administered intrathecally as a supplement to 2.5 ml of 0.75% isobaric ropivacaine. For lower limb procedures, 60 patients were randomly assigned to receive either 20 mcg of fentanyl (Group RF) or 2.5 ml of 0.75% isobaric ropivacaine (Group RD) intrathecally. In group RD, the mean time for sensory blocking at T10 was 156.4667

seconds, while in group RF, it was 185.2000 35.17 seconds. The mean of total duration of motor block in Group RD was 136.7333 min while it was 94.8667 min in Group RF which was clinically and statistically significant. The mean of total duration of sensory block in Group RD was 194.4 min while it was 139.9 min in Group RF which was clinically and statistically significant. Time taken for onset of motor block was almost same in both groups. Sambari et al<sup>13</sup> in their study group A patients received 20 mL of 0.75% Ropivacaine plus 1 mL of sodium chloride 0.9% epidurally and Group B patients received 20 mL of 0.75% Ropivacaine plus 1 mL of Dexmedetomidine 1 [micro]g/kg diluted with Sodium chloride 0.9%, so that the volume will be completed to 1 mL epidurally in strict aseptic conditions in sitting position at L2-L3 interspace and monitored for sensory and motor blockade parameters and complications occurred among both groups were observed. The findings demonstrated that Group-B experienced sensory blocking on average 4.2 [+ or -] 1.21 min earlier than Group-A did (9.333 [+ or -] 2.84 min). In Group-B, it took less time to reach the highest sensory level (12.97 [+ or -] 2.87 min) than it did in Group-A (18.73 [+ or -] 2.03 min), and Group-A's sensory blockade lasted less time on average (368.83 [+ or -] 25.16 minutes compared to 284.1667 [+ or -] 25.86 minutes in Group-B. In comparison to Group A (25.07 [+ or -] 3.95 min), Group B experienced an earlier average onset of motor block (17.07 [+ or -] 4.60 min). In comparison to Group-A (223.5 [+ or -] 24.71 min), Group-B had a greater mean total time of motor blockage (302.16 [+ or -] 31.03 min). The shortcoming of the study was small sample size.

### Conclusion

Authors found that dexmedetomidine with ropivacaine demonstrated earlier sensory blockade and prolonged duration of sensory and motor blockade for patients undergoing lower limb procedures while under intrathecal anaesthesia.

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