

# Comparison of intrathecal isobaric ropivacaine plus dexmedetomidine and isobaric ropivacaine plus clonidine for elective lower abdominal and lower limb surgeries

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## Abstract

**Aim:** To compare intrathecal isobaric ropivacaine plus dexmedetomidine and isobaric ropivacaine plus clonidine for elective lower abdominal and lower limb surgeries.

**Methodology:** Eighty patients undergoing lower abdominal and lower limb surgeries under intrathecal anesthesia of either gender were randomly divided into 2 groups of 40 each. Group I patients (male- 22, female-18) received isobaric ropivacaine 0.75% 15 mg + 30 mcg clonidine and Group II patients (male- 24, female-16) received isobaric ropivacaine 0.75% 15 mg + 10 mcg dexmedetomidine. Parameters such as sensory blockade, motor blockage, analgesia and VAS was recorded.

**Results:** The mean duration of surgery in group I was 106.4 minutes and in group II was 112.8 minutes. The mean time to onset of sensory analgesia was 6.8 minutes in group I and 4.0 minutes in group II. The mean time taken to achieve complete motor blockade was 14.2 minutes in group I and 13.4 minutes in group II. The time taken for regression of sensory block to T-12 level was 154.2 minutes in group I and 196.5 minutes in group II. The mean time to first postoperative analgesic requirement was 262.8 minutes in group I and 342.6 minutes in group II. The difference was significant ( $P < 0.05$ ). The mean VAS in group I was 4.8 and in group II was 3.6. The difference in both groups was significant ( $P < 0.05$ ).

**Conclusion:** Dexmedetomidine with ropivacaine showed earlier sensory blockade, prolonged duration of sensory and motor blockade for lower limb surgeries.

**Key words:** Dexmedetomidine, ropivacaine, Surgery.

## Introduction

Various adjuvants are being used with local anesthetics for prolongation of intra operative and postoperative analgesia in epidural block for lower abdominal and limb surgeries.<sup>[1]</sup> Ropivacaine an amide local anesthetic.<sup>[2]</sup> It may be a suitable alternative as long-acting local anesthetic because it is considered to be less cardiotoxic and has a significantly higher threshold for central nervous

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system (CNS) toxicity on a milligram basis than bupivacaine. The efficacy of ropivacaine is similar to that of bupivacaine and levobupivacaine for peripheral nerve blocks and, although it may be slightly less potent than bupivacaine when administered epidurally or intrathecally, equi-effective doses have been established.<sup>[3]</sup> Thus, 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>[4]</sup>

Intrathecal clonidine has been used as an adjuvant to local anaesthetics in various surgical procedures without any clinically significant side effects.<sup>[5]</sup> It is known to increase both sensory and motor blockade of local anaesthetics.<sup>[6]</sup> Clonidine, a selective partial  $\alpha_2$ -adrenergic agonist, is being extensively evaluated as an adjuvant to intrathecal local anaesthetics and has proven to be a potent analgesic free of opioid-related side effects.<sup>[7]</sup> Considering this, we compared intrathecal isobaric ropivacaine plus clonidine and isobaric ropivacaine plus dexmedetomidine for elective lower abdominal and lower limb surgeries.

## Materials and Methods

A sum total of eighty patients undergoing lower abdominal and lower limb surgeries under intrathecal anesthesia of either gender willing to participate in this study were recruited. Ethical approval was obtained from institutional ethical review committee. All patients gave their written consent for the participation of the study.

After recording detail demographic profile such as name, age, gender, a case sheet was prepared. Patients were randomly divided into 2 groups of 40 each. Group I patients (male- 22, female-18) received isobaric ropivacaine 0.75% 15 mg + 30 mcg clonidine and Group II patients (male- 24, female-16) received isobaric ropivacaine 0.75% 15 mg + 10 mcg dexmedetomidine. Parameters such as sensory

blockade, motor blockage, analgesia and VAS was recorded. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

### Results

The mean duration of surgery in group I was 106.4 minutes and in group II was 112.8 minutes. The mean time to onset of sensory analgesia was 6.8 minutes in group I and 4.0 minutes in group II. The mean time taken to achieve complete motor blockade was 14.2 minutes in group I and 13.4 minutes in group II. The time taken for regression of sensory block to T-12 level was 154.2 minutes in group I and 196.5 minutes in group II. The mean time to first postoperative analgesic requirement was 262.8 minutes in group I and 342.6 minutes in group II. The difference was significant ( $P < 0.05$ ) (Table 1).

**Table 1: Comparison of parameters in both groups**

Parameters	Group I	Group II	P value
Duration of surgery (mins)	106.4	112.8	0.91
Onset of sensory analgesia (mins)	6.8	4.0	0.02
Time taken to achieve complete motor blockade	14.2	13.4	0.05
Time taken for regression of sensory block to T-12 level	154.2	196.5	0.04
Time to first postoperative analgesic requirement	262.8	342.6	0.01

The mean VAS in group I was 4.8 and in group II was 3.6. The difference in both groups was significant ( $P < 0.05$ ) (Table 2).

**Table 2: Comparison of VAS in both groups**

Groups	Mean	P value
Group I	4.8	0.05
Group II	3.6	

### Discussion

Epidural anesthesia is one of the most common regional anesthetic techniques used for lower abdominal and lower limb surgeries.<sup>[8]</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>[9]</sup> Dexmedetomidine, highly selective,  $\alpha_2$  adrenergic agonist is new neuroaxial adjuvant gaining popularity.<sup>[10]</sup> Various adjuvants are being used with local anesthetics for prolongation of intra operative

and postoperative analgesia in epidural block for lower limb and lower abdominal surgeries. Local anaesthetics are the commonest agents used for spinal anaesthesia.<sup>[11]</sup> Ropivacaine is a new local anaesthetic which combines the anaesthetic potency and long duration of action of bupivacaine with a toxicity profile intermediate between bupivacaine and lidocaine and has advantage of faster recovery.<sup>[12]</sup> We compared intrathecal isobaric ropivacaine plus clonidine and isobaric ropivacaine plus dexmedetomidine for elective lower abdominal and lower limb surgeries.

Our results showed that the mean duration of surgery in group I was 106.4 minutes and in group II was 112.8 minutes. The mean time to onset of sensory analgesia was 6.8 minutes in group I and 4.0 minutes in group II. The mean time taken to achieve complete motor blockade was 14.2 minutes in group I and 13.4 minutes in group II. The time taken for regression of sensory block to T-12 level was 154.2 minutes in group I and 196.5 minutes in group II. The mean time to first postoperative analgesic requirement was 262.8 minutes in group I and 342.6 minutes in group II. Martin et al<sup>[13]</sup> assessed efficacy of clonidine with ropivacaine intrathecally in three different doses of 15, 45, and 75  $\mu\text{g}$  for ambulatory knee arthroscopy, found that a small 15  $\mu\text{g}$  dose of clonidine significantly improves the quality of anaesthesia without delaying sensory and motor recovery. They also noted that a 45 $\mu\text{g}$  dose of clonidine prolongs the sensory blockade without any influence on motor blockade, but a dose of 75  $\mu\text{g}$  is associated with delayed sensory and motor recovery as well as detectable side effects such as hypotension and sedation.

Our results showed that the mean VAS in group I was 4.8 and in group II was 3.6.

El-Attar et al<sup>[14]</sup> compared intrathecal dexmedetomidine and fentanyl as additives to bupivacaine and concluded that dexmedetomidine has faster sensory onset compared with fentanyl and local anesthetic when injected intrathecally.

### Conclusion

Authors found that dexmedetomidine with ropivacaine showed earlier sensory blockade, prolonged duration of sensory and motor blockade for lower limb surgeries.

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**How to cite this article:** Rao UW, Reddy L, Joshi SD. Comparison of intrathecal isobaric ropivacaine plus dexmedetomidine and isobaric ropivacaine plus clonidine for elective lower abdominal and lower limb surgeries. *Acad. Anesthesiol. Int.* 2016;1(1):33-35.

**Source of Support:** Nil, **Conflict of Interest:** None declared.