



Anaesthesiology

A COMPARISON OF INTRATHECAL DEXMEDETOMIDINE AS ADJUVANT TO HYPERBARIC BUPIVACAINE WITH BUPIVACAINE ALONE FOR LOWER LIMB SURGERY: A DOUBLE BLIND CONTROLLED STUDY

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ABSTRACT It is proven in previous human studies that 5 µg dexmedetomidine can be used to produce more analgesic effect when used as an adjuvant with hyperbaric bupivacaine in spinal anesthesia. Also it is known to produce less side effects. Besides production of lesser duration of motor blockade. In aim of prolonging the duration of block in order to manage postoperative pain intrathecal adjuvants has gained more point of interest in recent years. Prolonging the duration of block increases the success rates, increases patient satisfaction in turn, decreases utilization of other resources, faster recovery can be gained, when compared with general anesthetics. Various drug related characteristics have also been assessed which included time to onset of sensory block, in terms of minutes, which was recorded to be 8.3±2.8 in group A and 8.6±1.5 in group B. time to onset of motor block was recorded to be 9.8±3.6 in group A and 9.0±3.0 in group B. time taken to reach maximum sensory level was recorded as 9.5±3.0 for group A and 9.6±2.9 for group B. duration of sensory motor block was observed to be 117.0±21.8 in group A and 119.5±22.7 in group B. duration of motor block was reported to be 198.7±26.4 in group A and 196.0±26.8 in group B. duration of spinal anesthesia was observed to be 242.3±54.2 in group A and 235.5±38.3 in group B as given in table 3.

KEYWORDS : Anesthesia, Bupivacaine, Intrathecal, Anesthesia, Adjuvant Therapy, Dexmedetomidine.

INTRODUCTION:

For various applications like perioperative and critical care settings dexmedetomidine which is a selective α_2 adrenergic agonist has been considered as a panacea drug of choice[1]. It is also have been used as a valuable adjuvant to various other anaesthetics in now-a-days, which included local/regional anesthetics and general anesthetics[2,3]. It is proven in previous human studies that 5 µg dexmedetomidine can be used to produce more analgesic effect when used as an adjuvant with hyperbaric bupivacaine in spinal anesthesia[4]. Also it is known to produce less side effects. Besides production of lesser duration of motor blockade[5]. In aim of prolonging the duration of block in order to manage postoperative pain intrathecal adjuvants has gained more point of interest in recent years[6]. Prolonging the duration of block increases the success rates, increases patient satisfaction in turn, decreases utilization of other resources, faster recovery can be gained, when compared with general anesthetics[7-9]. Dexmedetomidine which is now been used as an adjuvant to ropivacaine is found to be associated with effective blockade of sensory and motor block, which is a α_2 -adrenoceptor agonist[10]. For both somatic and visceral pain, α_2 -receptor agonists are found to have an antinociceptive action[11-12].

Thus, the present study was aimed to assess the efficacy of dexmedetomidine and bupivacaine in patients with lower limb surgery.

AIMS & OBJECTIVES:

- To assess the safety and efficacy of dexmedetomidine as an adjuvant to hyperbaric bupivacaine.
- To assess the safety and efficacy of hyperbaric bupivacaine when used alone with normal saline.
- To compare and report the safety and efficacy of hyperbaric bupivacaine alone and dexmedetomidine as adjuvants for hyperbaric bupivacaine in adults undergoing lower limb surgeries.

MATERIALS & METHODS:

80 adults of both the sex have been included into the study by giving written and informed consent to the Hospital Ethics Committee and getting approval from them. All the patients were from the surgical department of the study hospital who had been scheduled for a lower limb surgery. The study was designed to be a randomized, prospective, double blind study. Patients with other contraindications like sensitive to regional anesthesia, coexisting diseases which are significant, hypertension, renal impairment, rheumatoid arthritis, asthma, liver diseases and other chronic diseases have been excluded from the study. Pregnant women, partial heart blocks in medical history, malnourished patients have also been excluded from the study. All the patients have been examined for their pain assessment by using visual analogue scale (VAS). Patients were advised to fast for 6 hours prior to administration of alprazolam at a dose of 0.5 mg in the night and 0.25 mg in the morning of the day of surgery.

Study was carried out the departments of male and female surgical wards and also in the general medicine department and orthopedics departments of the study hospital. Study was carried out for a period of 6 months in RVS Multi-Specialty Hospital, RVS Nagar, Tirupathi Road, Chittoor District, Andhra Pradesh, India.

RESULTS & DISCUSSION:

A total of 80 patients have been included into the study. Among which both male and female have been included. Patients have been divided into two groups based on the drug used for induction of anesthesia. Group A patients have been administered with bupivacaine alone with normal saline and group B patients have been administered with dexmedetomidine mixed as an adjuvant to hyperbaric bupivacaine. As represented in table 1, 11 patients in group A have been undergone for dynamic hip screw fixation, 9 patients of group B have been undergone for dynamic hip screw fixation surgery. Tibia ORIF was performed in 12 patients of group A and 11 patients of group B. shaft of femur ORIF was performed in 8 patients of group A and 8 patients of group B. Anteriorcruciate ligament reconstruction was performed in 4 patients of group A and 6 patients of group B. split skin grafting was performed in 5 patients of group A and 6 patients of group B.

Table 1: Type of lower limb surgeries performed

Type of lower limb surgeries performed	Group A	Group B
Dynamic hip screw fixation	11	9
Tibia ORIF	12	11
Shaft of femur ORIF	8	8
Anteriorcruciate ligament reconstruction	4	6
Split skin grafting	5	6

The mean age of group A patients was 37.8±15.6 and 37.0±12.0 for group B. male patients included of about 35 members in group A and 36 patients in group B, female patients included for 5 patients in group A, 4 patients for group B. mean height of patients in group A was 170.6±5.6 and 101.6±36.3 in group B. details are given in table 2.

Table 2: patients demographics

Variable	Group A	Group B	p
Age (years)	37.8±15.6	37.0±12.0	0.66
Sex (M:F)	35:5	36:4	0.76
Height (cm)	170.6±5.6	170.6±5.6	0.20
Weight (kg)	67.2±8.7	69.3±10.7	0.18
Duration of surgery (min)	99.8±34.5	101.6±36.3	0.31

Various drug related characteristics have also been assessed which included time to onset of sensory block, in terms of minutes, which was recorded to be 8.3±2.8 in group A and 8.6±1.5 in group B. time to onset of motor block was recorded to be 9.8±3.6 in group A and 9.0±3.0 in group B. time taken to reach maximum sensory level was recorded as 9.5±3.0 for group A and 9.6±2.9 for group B. duration of sensory motor

block was observed to be 117.0 ± 21.8 in group A and 119.5 ± 22.7 in group B. duration of motor block was reported to be 198.7 ± 26.4 in group A and 196.0 ± 26.8 in group B. duration of spinal anesthesia was observed to be 242.3 ± 54.2 in group A and 235.5 ± 38.3 in group B as given in table 3.

Table 3: Characteristics of spinal block

Variable (min)	Group A	Group B	p
Time of onset of sensory block	8.3 ± 2.8	8.6 ± 1.5	0.112
Time of onset of motor block	9.8 ± 3.6	9.0 ± 3.0	0.076
Time to reach maximum sensory level	9.5 ± 3.0	9.6 ± 2.9	3.30
Duration of sensory block	117.0 ± 21.8	119.5 ± 22.7	0.0001
Duration of motor block	198.7 ± 26.4	196.0 ± 26.8	0.0001
Duration of spinal anesthesia	242.3 ± 54.2	235.5 ± 38.3	0.0001

CONCLUSION:

From the study, it can be concluded that, dexmedetomidine acts as a best anesthetics which shows its eight property of adrenergic antagonist. Thus, dexmedetomidine can be considered as a better drug of choice over bupivacaine single drug use for management of pain in adults with lower limb surgery, with its varied levels of efficacy. But, the main drawback includes, it cannot be used for short length surgeries due to its prolonged anesthetic property.

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