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EFFICACY OF 0.5% HYPERBARIC BUPIVACAINE AND 0.5% HYPERBARIC BUPIVACAINE WITH CLONIDINE (30 MG) FOR NEURAXIAL BLOCKADE IN THE LOWER LIMB ORTHOPEDIC SURGERIES – A COMPARATIVE STUDY

Anaesthesiology

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ABSTRACT

Background: In the present study practice of spinal anaesthesia, bupivacaine is the most commonly used drug for spinal anaesthesia. To improve the quality of analgesia mainly adjuvants have been used. Intrathecal clonidine, which is a centrally acting alpha 2 adrenergic agonist, has analgesic effect in the substantia gelatinosa of the spinal cord which is due to activation of the postsynaptic alpha 2 receptors.

Objective: To evaluate the efficacy of spinal anaesthesia with clonidine added to hyperbaric bupivacaine in lower limb orthopaedic surgeries

Methodology:60 Adult ASA I and ASA II point of both sexes and ages ranging from 20 – 50 years were included in the study who underwent orthopedic surgeries.

They were divided into two groups:

Group A – 3.5 mL (17.5 mg) of 0.5% Hyperbaric Bupivacaine + 0.2 mL of Clonidine (30 µg) intrathecally – 30 cases.

Group B – 3.5 mL (17.5 mg) of 0.5% Hyperbaric Bupivacaine + 0.2 mL of 0.9% NS intrathecally – 30 cases.

Results:

a) Intrathecal clonidine along with 0.5% bupivacaine provided prolonged post – operative analgesia without significant increase in side effects compared to 0.5% bupivacaine alone.
b) The quality of surgical anesthesia and post – operative analgesia were excellent.

Conclusion: It can be concluded by the present comparative and statistically significant results, that the combination of Bupivacaine 0.5% and Clonidine (low dose) 30 µg is better compared to Bupivacaine 0.5% alone, in providing post – operative analgesia as the combination group offers a convenient, simple, inexpensive, effective and safe means of good post – operative analgesia.

KEYWORDS

bupivacaine , clonidine , spinal anaesthesia

Introduction:

An ideal local anesthetic solution was proposed to have rapid onset and prolonged duration of action. In an attempt to combine the two properties there had been various studies to the effects of mixture of anesthetic solutions. Clonidine is used with increasing frequency in surgical anesthesia. To control the metabolic and endocrine responses to stress. Opioid local anesthetics have anti – nociceptive effect in the spinal cord via different mechanisms and this formed the rationale of their combined use.

Aim & Objective:

Study is aimed at evaluating the relative efficacy of subarachnoid Bupivacaine 0.5% & a combination of Bupivacaine 0.5% and Clonidine low dose to relieve intra-operative and post – operative pain in lower limb orthopedic operations in the age group of 20 – 50 years orthopedic operations in the age group of 20 – 50 years.

Methods:

60 Adult ASA I and ASA II point of both sexes and ages ranging from 20 – 50 years were included in the study who underwent orthopedic surgeries.

They were divided into two groups:

- Group A – 3.5 mL (17.5 mg) of 0.5% Hyperbaric Bupivacaine + 0.2 mL of Clonidine (30 µg) intrathecally – 30 cases.
- Group B – 3.5 mL (17.5 mg) of 0.5% Hyperbaric Bupivacaine + 0.2 mL of 0.9% NS intrathecally – 30 cases.

Preoperative preparations consisted of overnight fasting, Injection Ranitidine 50 mg, Injection Ondan 4 mg. No sedatives or analgesic medication was administered to any patient before surgery. Preoperative Blood Pressure, Pulse Rate and SpO_2 were recorded.

Materials:

1. 23 G Spinal Needle (Quincke)
2. 2 CC Disposable Syringe
3. 0.5% Hyperbaric Bupivacaine ampoule
4. 1 mL Clonidine (150 µg/mL) ampoule
5. Antiseptic Solutions & Spinal Towel

Procedure:

Before giving spinal anesthesia, thorough scrubbing of hands was preformed and a sterile apron and gloves were worn. The point was placed on the left lateral position and skin over the back was cleaned with Betadine, spirit and draped with a sterile towel. In a sterile 2 cc disposable syringe, 2 mL of 2% Lignocaine was taken and a local infiltration was given at L2 – L3 or L3 – L4 intervertebral space and waited for one minute in order to prevent pain during spinal needle insertion. A 23G Quincke spinal needle was introduced into L2 – L3 or L3 – L4 intervertebral space in midline until it reached the subarachnoid space [dripping of CSF observed]. After confirming its position in the SAB space, the study drug or the control drug was injected into SAB slowly with the bevel cephalad. The needle was withdrawn and the point turned supine oxygen at the rate 3 – 4 l/min was administered via face mask.

The points Blood Pressure, Heart Rate, Respiratory Rate, and SpO2 were monitored and recorded. The level of sensory and motor blockade were monitored and recorded. Intravenous fluids (RL) was infused and injected with Ephedrine (5 – 10 mg) and Injection Atropine (0.6 mg) IV were used when necessary to maintain the system blood pressure at (or) above 90 mmHg. The degree of sedation was recorded as per Ramsey scale.

Blood pressure was monitored at 2 min intervals and Mean Arterial Blood Pressure. Pulse Rate and O_2 Saturation were monitored with pulse oximeter. Respiratory Rate was recorded.

Post – Operative Observations -After surgery cardiovascular (Pulse Rate & Blood Pressure) and respiratory (Respiratory Rate and Oxygen Saturation) parameters were recorded and clinical evaluation of sensory and motor blockade were noted. During post – operative period continuous monitoring of vital parameters at regular intervals was done until complete return of sensory and motor functions.

The points were visited at regular intervals in order to arrest the post – operative pain relief and complications.

In the post – operative period, follow up was carried on for the first 3 days to record the complications of spinal anesthesia.

The following parameters were recorded in both groups and the results were subjected to appropriate statistical analysis.

1. Pulse Rate, Blood Pressure, Mean Arterial Blood Pressure,

Respiratory Rate, SpO_2
2. Sensory Blockade – Onset, Duration of Sensory Blockade, and Degree of Pain Relief
3. Motor Blockade
4. Complication – Intra & Post – Operatively

Observations and Results:

The present comparative study was undertaken to assess the efficacy of intrathecal 0.5% Bupivacaine and a combination of 0.5% Bupivacaine with Clonidine (30 µg) for intra – operative and post – operative pains relief and to study incidence of side effects.

Table 1:Onset of Analgesia

	Group A	Group B
Minutes	Orthopedic Surgeon (n = 30)	Orthopedic Surgeon (n = 30)
0-1	18 (60%)	
1-2	12 (40%)	
2-3		
3-4		21 (70%)
4-5		9 (30%)
Mean	0.971	3.86666
SD	0.105	0.526

The difference in the onset of analgesia is statistically significant orthopedic surgeries of both group A & group B.

Table 2: Duration of Analgesia (Mean ± S.D.)

	Group A	Group B
Duration in Minutes		
100-150		1 (3.4%)
151-200		29 (96.6%)
201-250	1 (3.4%)	
251-300	29 (96.6%)	
301-350		
351-400		
Mean	275.4	157
SD	15.3	3.48

In group A, the duration of analgesia in Orthopedic surgeries was 4.3 hours and in group B it was 2.3 hours. Duration of analgesia was significantly ($P<0.001$) prolonged in group A post – operatively when compared to group B.

It is evident that duration of analgesia was significantly prolonged in (Bupivacaine 0.5% + Clonidine 30 µg) group A when compared to that of group B.

Table 3: Efficacy of Analgesia in study group (Group A)(Visual Analogue Scale – Pain Score)

Post – Operative Period (Hours)		**Orthopedic Surgeries (n = 15)**			
		Grade			
	O	**I**	**II**	**III**	**IV**
0	15				
2	15				
3	15				
3.30	2	11	2		
4	0	7	5	3	
6	0	0	1	1	13
8					
12					
16					
20					
24					

So, in conclusion when compared between Group A (study group) and Group B (control group) there is a statistically significant change in group A (study group) where duration of analgesia prolonged to a greater extent than Group B (control group).

Discussion:

In the present study, 60 patients with ASA group I and II of age group 20 – 50 years were selected and posted for surgery under spinal anesthesia for orthopedic surgeries were divided into two groups. Group A – received 3.5 mL (17.5 mg) of 0.5% hyperbaric (study group) Bupivacaine and 0.2 mL of Clonidine (30 µg) Group B – received 3.5 mL (17.5 mg) of 0.5% hyperbaric (control group) N = 30 Bupivacaine and 0.2 mL of 0.9% normal saline.

The parameters measured in the two groups included hemodynamic measurements (pulse rate, systolic blood pressure, diastolic blood pressure and mean arterial blood pressure) respiratory rate, oxygen saturation, characteristics of sensory and motor block intra – operative and post – operative analgesia.

The demographic data compared the two groups were age, height, weight, and sex. The differences in the mean values of these parameters were not statistically significant ($P > 0.05$) among the two groups.

In the present study, there is a slight fall in pulse rate from the baseline values in the 2 groups. The fall in pulse rate from the baseline in group A was more when compared with group B i.e., statistically significant ($P < 0.05$).

The fall in systolic blood pressure, diastolic blood pressure and arterial blood pressure were more in group A than in group B. There was no significant fall in blood pressure of more than 20% from the baseline value in the two groups ($P > 0.05$). Therefore, intrathecal Clonidine 30 µg is hemodynamically stable in combination with bupivacaine.

In the present study, there was no significant decrease in oxygen saturation and respiratory rate in any patient in any of the two groups. B.S.SETHI et al. In their study found that intrathecal use of clonidine in place of opioids avoids problems of respiratory depression, pruritus, urinary retention and abuse liability.

Sensory and motor block were assessed in the present study and the following observations were made.

In the present study the onset of analgesia for study group varied 0.97 ± 0.105 minutes, on the other hand the onset of analgesia in control group varied from 3.80 ± 0.52 minutes which were statistically significant ($P < 0.05$).

In the present study, the total duration of sensory loss was assessed as, the period from onset of sensory loss to the time of first analgesic request.

In the present study patients were evaluated for efficacy or potency of post – operative analgesia using (VAS) visual analogue scoring for the degree of pain. The intensity of pain relief in the study group was significantly prolonged than that of control group.

The main advantages of selective blocked by spinal clonidine is, absence of respiratory depression and postural hypertension allowing the patient to ambulate earlier. The intrathecal route also has advantage of greater technical ease and single injection produces pain relief of sufficient duration.

Results:

From this study it was concluded that:

a) Intrathecal clonidine along with 0.5% bupivacaine provided prolonged post – operative analgesia without significant increase in side effects compared to 0.5% bupivacaine alone.
b) The quality of surgical anesthesia and post – operative analgesia were excellent.
c) Therefore, Clonidine (low dose 30 µg) along with bupivacaine 0.5% is a suitable drug for post – operative analgesia when given intrathecally. The low does intrathecal clonidine along with Bupivacaine 0.5% offers a convenient, simple, inexpensive, effective and sage means of good post – operative analgesia.

Conclusion:

Efficacy of analgesia was assessed by VAS score.

1) Patients in the two groups were haemodynamically stable.
2) Duration of analgesia in the study group was significantly prolonged when compared to control group.
3) Side effects observed in the study group were minimal intraoperatively and post-operatively.

It can be concluded by the present comparative and statistically significant results, that the combination of Bupivacaine 0.5% and

Clonidine (low dose) 30 µg is better compared to Bupivacaine 0.5% alone, in providing post – operative analgesia as the combination group offers a convenient, simple, inexpensive, effective and safe means of good post – operative analgesia.

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