ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 05 | May - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARISION OF DIFFERENT DOSES OF CLONIDINE ADDED TO INTRATHECAL BUPIVACAINE IN ORTHOPEDICS SURGERY

Anaesthesiology

Dr Harsh Bhardwaj 3rd year post graduate Department of Anaesthesiology Government Medical College Kota

Dr Chetan Shukla* Senior Professor & Former HOD Department of Anaesthesiology Government Medical College Kota*Corresponding Author

Dr Kiran Gocher 3rd year post graduate Department of Anaesthesiology Government Medical College Kota

Dr Anjali Naraniya

ABSTRACT

Background: Intrathecal Clonidine is a very safe nonopioid adjuvant to local anaesthetics to prolong the duration of analgesia without any major side effects. **Objective:** The purpose of the present study is to evaluate the " COMPARISION OF DIFFERENT DOSES OF CLONIDINE ADDED TO INTRATHECAL BUPIVACAINE IN ORTHOPEDICS SURGERY" **Material &Method:** A Total of 60 aduit patients scheduled to undergo lower limb sugeries were ramdonly allocated into either of two group of 30 pateints. Group A: Bupivacaine heavy (0.5%) 2.5ml +30mcg Clonidine, total volume 2.8 ml Group B: Bupivacaine heavy (0.5%) 2.5ml +45mcg Clonidine, total volume 2.8 ml Onset & duration of sensory blockage,Degree of motor blockage, Degree of sedation, Intraoparative heamodynamics. Side effect or any other complication were noted. **Result:** The mean time of onset of sensory & motor block was less in higher dose added to bupivacaine . The Duration of sensory blockage was significantly prolonged in Group B 367.26±36.60 min as compared to Group A 200.13±15.70 min . The Duration of motor blockage was significantly prolonged in Group B 227.86± 22.49min as compared to Group A 176±12.91 min. **Conclusions:** The addition of intrathecal clonidine 30mcg to small dose of bupivacaine increased the spread , duration of analgesia, & produced effective spinal anesthesia with stable heamodynamis.

KEYWORDS

bupivacaine , intrathecal clonidine

INTRODUCTION:

Spinal anaesthesia has many advantages over general anaesthesia which makes it the anaesthesia of choice in the present surgical practice. Adequate muscle relaxation is obtained following spinal anaesthesia and blood loss is reduced which makes it superior to general anaesthesia.Hyperbaric Bupivacaine 0.5% is extensively used in India for spinal anaesthesia. Numerous adjuvants can be added to hyperbaric Bupivacaine to prolong the duration of spinal anaesthesia, decrease the local anesthetic's dose requirement and increase the duration of post-operative analgesia. . Opioids analgesic drugs produce intense, prolonged analgesic action without gross autonomic changes, loss of motor power or impairment of sensation other than pain when injected into subarachnoid or epidural space. . Opioid analgesics can produce serious side effects like, late and unpredictable respiratory depression , post operative nausea and vomiting, pruritus, urinary retention and activation of herpes labialis.

Clonidin e hydrochloride is an imidazoline derivative with α-2 adrenergic agonist (220:1 α-2 to α-1) activity. Direct effects on the spinal cord mediated by α-2 post-synaptic receptors within the dorsal horn. The antinociceptive properties of clonidine were first described in 1974 by Paalzow.

Analgesic effect of intrathecal clonidine are due to interruption of nocicepive stimulus in the periphery, in spinal cord, & in supraspinal sites. It blocks conduction of C and a∂ by increasing potassium conductance.

We conducted the study using low doses of clonidine as an adjuvant to bupivacaine in orthopedic surgeries. In this study we were compared analgesic efficacy of clonidine in doses 30 and 45mcg added to bupivacaine itntrathecaly.

MATERIALAND METHODS

The study was presented after approval by ethical committee and informed consent from all the participants was obtained. It was designed in the form of a prospective, randomized and double blinded study. Sixty patients planed to undergo orthopedic surgeries in the Deptt. of Anaesthesiology, Govt. Medical College and associated MBS hospital, Kota (Rajasthan) were subjected to this study. They were randomly divided into two groups of thirty each.

INCLUSION CRITERIA:

- Patients in ASA I and I I grades
- Age group of 20 – 50 years
- Undergoing elective orthopedics' surgeries
- MPG grade I and I I grades

EXCLUSION CRITERIA:

- Patients refusal for spinal anaesthesia
- Local infection at injection site
- Neurogenic pain
- Neurological deficit
- Coagulopathy
- Patient known to be sensitive or allergic to clonidine or Bupivacaine
- Patient with history of cardiac or respiratory diseases.
- Patient on chronic clonidine treatment for hypertension

All patients planned in the study were undergone through pre-anaesthetic assessment including detailed case history, clinical examination and all necessary investigations.

All patients were kept to nil by mouth after 22:00 hrs. Inside the operation theatre, base line pulse rate and blood pressure (Systolic & Diastolic) were obtained. A wide bore intravenous line (no.18 or 20) was established and the patients were connected to IV Fluids and monitors such as ECG, SpO2, noninvasive blood pressure recording devices. Preloading was done with 20 $ml.kg^{-1}$ of Ringers lactate solution about 15 minute before the intended time of intrathecal drugs administration. Patients were positioned in the sitting position and after adequate aseptic precautions lumbar puncture was performed at L3/L4 or L2/L3 intervertebral space using midline approach with in 25/27 gauge Quincke spinal needle. After ensuring a free flow of CSF, drug was injected. Then, patient allowed turning supine and a pillow kept below head. According to the administered concentration of drug, patients were grouped as following :

Group A: Bupivacaine heavy (0.5%) 2.5ml +30mcg Clonidine + normal saline to make volume 2.8ml .

Group B: Bupivacaine heavy (0.5%) 2.5ml +45mcg Clonidine, total volume 2.8 ml

We used insulin syringe to add clonidine & normal saline to make total volume 2.8ml.

Onset & duration of sensory blockage,Degree of motor blockage, Degree of sedation, Intraoparative heamodynamics. Side effect or any other complication were noted.

The onset of sensory block was defined as the time between injection of intrathecal anaesthesia & absence of pain at the T8/T9 dermatomes, assessed by pin prick.

The duration of sensory block was defined as the time of regression of two segments in the maximum block height, assessed by pin prick. Motor block onset aasessed by bromage score. Time for compelete motot block was assumed when bromage score 4.

Bromage Score Criteria:

1.	Free movement of legs and feet
2.	Just able to flex knees with free movement of feet
3.	Unable to flex knees, but with free movement of feet
4.	Unable to move legs or feet

Compelete motor block recovery was assumed when bromage score become zero (0).The duration of spinal anaesthesia / mean time to analgesic request was defined as the period of spinal injection to first time when patient complained of pain in postoperative period.
Sedation was assessed with a four-point verbal rating scale.

SEDATION SCORE:

Score	Response
0	no sedation
1	light sedation
2	Somnolence
3	deep sedation

The parameters such as pulse rate, SpO2 , non-invasive blood pressure and ECG were monitored by using multipara monitor (including pulse oxymetry and automated NIBP devices) and were recorded at 05 minutes interval upto 30 min.

Then every 10 min upto 1hr, then half hourly upto 3 hour. Blood losses, urine output, IV fluid input were also noted. Patients were observed for any discomfort, nausea, vomiting, shivering, pain, bradycardia/ tachycardia and any other side effect. The need for additional medications was recorded.

IV fluid was administered in the form of Ringer's lactate, in calculated doses depending on the weight of the patient and further adjusted as per blood loss during surgery. A fall of blood pressure to more than 30% of mean arterial blood pressure (MAP) was treated with rapid infusion of 500 ml of RL and 6 mg of injection mephentermine intravenously if no response found to fluid administration. Bradycardia (heart rate less than 60/minute) was treated with intravenous atropine sulphate 0.6mg. After completion of surgery all heamodynamic parameter(HR,SBP,DBP, RR, & SPO2) sensory & motor block was recorded . Then patient were shifted to recovery room.

Intra and postoperative complications were noted and managed accordingly. The mean and standard deviations for the observed data were calculated and was compared within clonidine groups, using Students t-test. A "p" value <0.05 was taken as significant.

OBSERVATIONS AND RESULTS

A total of sixty patients were studied in two groups, with 30 patients in each group. The groups are as follows:-

Group A: Bupivacaine heavy (0.5%) 2.5 ml + 30µg Clonidine
Group B: Bupivacaine heavy (0.5%) 2.5ml + 45µg Clonidine

All the groups were studied in respect of age, height, ASA status and types of surgeries. (Table-1 and 2)

Table-1: DEMOGRAPHIC DATA

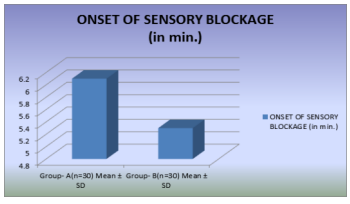
PARAMETER	Group-A(n=30)	Group-B (n=30)
Age (Years) Mean± SD	38.5±9.84	39.36±9.34
Height (cm) Mean ±SD	164.3±8.86	165.9±7.78

Table-1 shows the mean age and height distribution of patients in the two groups. Minimum age in each group was 21 years and maximum age was 50 years.The mean age in Group-A is 38.5±9.84 years, Group-B is years . Minimum height in Group-A was 152 cm but in Group-B was 154cm but maximum height is 179 in Group-A, 181 cm in Group-B . The mean height in Group-A is 164.3±8.86 cm, Group-B is 165.9±7.78 cm . There is no significant difference in the age and height of patients among the two groups.

Table- 2: ONSET OF SENSORY BLOCKAGE

PARAMETER	Group-A(n=30) Mean ± SD	Group-B(n=30) Mean ± SD	P value Group A:B
ONSET OF SENSORY BLOCKAGE (in min.)	6.1±1.06	5.3±0.87	0.0024

Figure-1: ONSET OF SENSORY BLOCKAGE

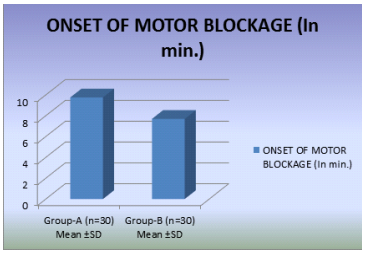


The mean time of sensory block was significantly lower ($p<0.05$) in Group B compared to Group-A, Group-B 5.3±0.8 min..The differences in groups are statistically significant ($p<0.05$).

Table- 3: ONSET OF MOTOR BLOCKAGE

PARAMETER	Group-A (n=30) Mean ±SD	Group-B (n=30) Mean ±SD	P value Group A:B
ONSET OF MOTOR BLOCKAGE (In min.)	9.76±1.87	7.7±1.11	0.0001

Figure-2: ONSET OF MOTOR BLOCKAGE



The mean time of onset of motor block was found lower in Group-B 7.7±1.11 min.. Group -B had a significantly quicker onset ($p<0.05$), as compared to Group-A. There was no spastically significant differences in the extent of block achieved in any group, but it was achieved significantly faster in a dose dependent manner in Group-B as shown by the mean time to achieve it.

Table-4: DURATION OF SENSORY ANALGESIA

PARAMETER	Group- A (n=30) Mean ± SD	Group- B (n=30)Mean ± SD	P value Group A:B
DURATION OF SENSORY ANALGESIA (in min.)	200.13±15.70	367.26±36.60	0.0001

The mean duration of sensory analgesia was 200.13±15.70 min Group-A, 367.26±36.60 min. in Group-B . The dose dependent prolongation of sensory analgesia in Group-B compared to Group-A was significant ($p<0.05$).

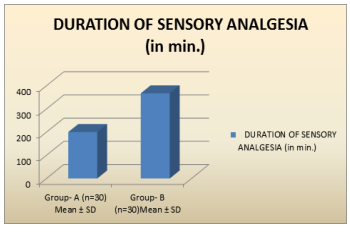


Figure-3: DURATION OF SENSORY ANALGESIA

Table-5: DURATION OF MOTOR BLOCKAGE

PARAMETER	Group- A (n=30) Mean ± SD	Group- B (n=30)Mean ± SD	P value Group A:B
DURATION OF MOTOR BLOCKAGE (in min.)	176.7±12.91	227.86±22.49	0.0001

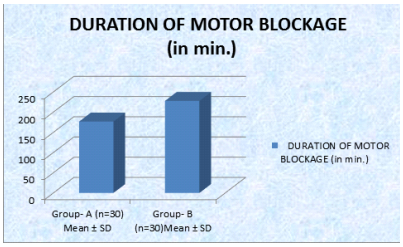


Figure-4 DURATION OF MOTOR BLOCKAGE

The mean duration of motor blockage was 176.7±12.91 min. in group-A,227.86±22.49 min. in Group-B . The prolongation of motor blockage in Group-B compared to Group -A was significant (p<0.05).

HAEMODYNAMIC PARAMETERS

Figure-5: PULSE RATE (BEATS PER MINUTES)

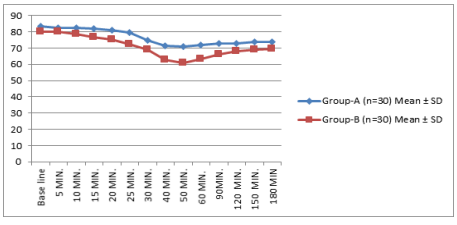
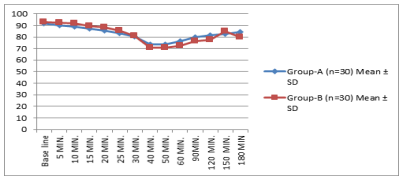


Figure-6: MEAN ARTERIAL PRESSURE (mmHg)



This graph shows the changes in mean arterial pressure (mmHg) in both groups at different time interval following intrathecal injection of drugs. Blood pressure fall was more in Group-B when compared to Group- A. .(P Value <.0.05) Bradycardia without hypotension (pulse rate <60 beats per minutes) was observed only in Group-B (6.66%) intraoperatively. Bradycardia with hypotension (MAP<30% from baseline) found in both group, in Group-A 3.33% patients but in Group-B 6.67% patients. Both these conditions are treated with injection Atropine 0.6% intravenously.

Nausea and vomiting was observed in few patients in both group 10% in Group-A and Group-B both. This problem was managed with injection Ondensetron 4 mg intravenously.

None of the patients had respiratory depression, itching or any neurological deficit in all the groups.

DISCUSSION

Sensory blockade

Onset of sensory blockade : In our study the mean time for onset of sensory block is 6.1±1.06 min in clonidine Group-A (30µg) and 5.3±0.87 min in clonidine Group-B (45 µg). There is a statistically highly significant decrease in the onset of sensory blockade in clonidine Group-B. (p value 0.0024)

In a study conducted by Saxena H et al[1], authors observed onset of analgesia to be 6.57±0.49mins in control group (13.5mg hyperbaric Bupivacaine) and 2.58±0.33 mins, 2.54±0.34mins and 2.09±0.89 mins in clonidine group (15 µg, 30 µg and 37.5 µg respectively) and in this study there was a significant reduction in the onset time which concurs with our study

Duration of sensory blockade : In our study the mean time for onset of sensory block is 200.13±15.70 min in clonidine Group-A (30µg) and 367.26±36.60 min in clonidine Group-B (45 µg). There is a statistically highly significant increase in the duration of sensory blockade in clonidine Group-B. (p value 0.0024).

In a study conducted by Saxena H et al[1], the duration of analgesia was 164.5±23.9mins, 264.75±44.3mins and 285.60±36.59mins in clonidine groups (15µg, 30µg and 37.5µg respectively) which is less than our study in clonidine group and this may be due to lesser mass of clonidine used.

MOTOR BLOCKADE

Time taken for maximum motor blockade and grade of motor blockade: The mean time taken for maximum motor blockade in our study, 9.76±1.87 min in Group-A, 7.7±1.11 min in Group-B. This is statistically highly significant but, the grade of motor blockade in the two groups did not differ. All the groups had a motor blockade of Bromage grade 3 or 4. This is consistent with the stud ies done by Strebel S et al[2], Sethi BS et al[3] and Saxena H et al[1] who observed the complete motor blockade of the lower extremity in all patients.

Duration of motor blockadeIn our study, the mean duration of motor blockage is 176.7±12.91 min. in Group-A and 227.86±22.49 min. in Group-B, which is statistically highly significant. Our study almost concurs with the study conducted by Kaabachi O et al[4] who observed the mean duration of motor blockade to be 252±79mins when using clonidine of 1µg/kg and it is more when compared to the study conducted by Sethi BS et al[3] who observed it to be 205 mins when using clonidine 1 µg/kg.

The hemodynamic stability of our patients was better maintained in 30 µg Clonidine group than the 45 µg comparing the number of patients who needed a vasopressor. This was similar to the findings of Dobrydnjov et al[5] where only one patient each in 15 µg and 30 µg groups needed vasopressor or Atropine.

We found statistically significant hypotension in clonidine group-B at any point of time compared to the control which was in accordance with the findings of authors, like Neimi et al[6], Sethi et al[3], Grandhe et al[7] who used higher doses of clonidine. Sethi et al[3] observed that decrease in mean heart rate and mean arterial blood pressure from 45 minutes to 6 hours was greater in clonidine group that in the control group, Dobrydnjov et al[5] observed that mean arterial pressure was significantly lower during first 45 –120 minutes after intrathecal clonidine injection.

CONCLUSION

we conclude that intrathecal administration of preservative free clonidine 30 mcg and 45 mcg along with 0.5% Bupivacaine significantly prolongs the duration of sensory and motor blockade. Patients with 45 mcg clonidine remains calm, comfortable, minimally sedated throughout procedure with easily arousable with minimum hemodynamic instability like hypotension and bradycardia which can be easily managed .

The mean time to achieve highest sensory block was faster in group B , Total duration of sensory analgesia and mean duration of motor block was longer in group B , which support dose dependent relationship.

REFERENCES

1. H. Saxena, S.K. Singh, S. Ghildiyal: Low Dose Intrathecal Clonidine With Bupivicain Improves Onset And Duration Of Block With Haemodynamic Stability. The Internet Journal of Anesthesiology. 2010 Volume 23.
2. Strebel S, Gurzeler JA, Schneider MC, Aeschbach A, Kindler CH; Small-Dose Intrathecal Clonidine and Isobaric Bupivacaine for Orthopedic Surgery: A Dose-Response Study. Anaesthesia & Analgesia; October 2004 vol. 99 no. 4: 1231-1238.
3. B.S.Sethi, Mary Samuel, Deepak Sreevastava; efficacy of analgesic effects of low dose intrathecal clonidine as adjuvant to Bupivacaine. Indian Journal of Anaesthesia 2007; 51 (5): 415-19.
4. Olfa Kaabachi, Amine Zarghouni, Rami Ouezini, Ahmed Ben Abdelaziz, Olfa Chattaoui, and Hannu Kokki; Clonidine 1 µg/kg Is a Safe and Effective Adjuvant to Plain Bupivacaine in Spinal Anaesthesia in Adolescents. Anaesthesia & Analgesia; August 2007 vol. 105 no. 2 516-519.
5. Dobrydnjov I, Axelsson K, Samarutel J, Holmstrom B. Postoperative pain relief following intrathecal Bupivacaine combined with intrathecal or oral clonidine. Acta Anaesthesiol Scand 2002 Aug; 46(7):806-14.
6. Niemi L. Effects of intrathecal clonidine on duration of Bupivacaine spinal anaesthesia, HEMODYNAMICS, and postoperative analgesia in patients undergoing knee arthroscopy : Acta Anaesthesiol Scand. 1994 Oct;38(7):724-8.
7. Grandhe RP, Wig J, Yaddanapudi LN; Journal Anaesth Clin Pharmacol 2008; 24(2) : 155-158.