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Original Research Article

Comparison of Effect of Addition of Two Doses of Clonidine (40 microgram and 60 microgram) to 0.5% Hyperbaric Bupivacaine 2.75 ml, Intrathecally for Sub Umbilical Surgery

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Abstract

Background: A powerful analgesic without any clinically relevant side effects, intrathecal clonidine is an adjuvant to local anaesthetics that increases both sensory and motor blocking of local anaesthesia. The main of the study to compare the effect of addition of two doses of clonidine (40µg and 60µg) to 0.5% hyperbaric bupivacaine 2.75 ml, intrathecally for sub umbilical surgeries.

Methods: This prospective randomised controlled study involved 30 individuals. There were 30 patients split into 3 groups, with 10 in each group. A total of 2.75ml of 0.5% hyperbaric bupivacaine and 0.5ml saline were administered to group B participants. 2.75ml of 0.5% hyperbaric bupivacaine and 40µg of clonidine were administered to group C1 patients. Participants in group C2 received 60µg of clonidine and 2.75ml of 0.5% hyperbaric bupivacaine.

Results: As comparison to the control group, clonidine groups C1 (177.25 secs) and C2 (156.25 secs) took longer for sensory block to begin (103 secs). Groups C1 (199 secs) and C2 (193 secs) had a longer mean time to motor block onset than the control group (177 secs). The mean motor block duration in group B (control) was much shorter (188 seconds) than in groups C1 (263 mins) and C2 of clonidine (284 mins).

Conclusion: In comparison to control group B, both clonidine groups C1 (305 min) and C2 (314 min) had longer average analgesia times (219 mins). In comparison to control group B, clonidine groups C1 (187.05 mins) and C2 (211 mins) had longer mean two segmental regression times (128 min).

Keywords: Clonidine and Intrathecally For Sub Umbilical Surgeries.

Introduction

For operations on the abdomen, perineum, gynaecology, and lower limbs, spinal anaesthesia is frequently used. Compared to general anaesthesia, it provides superior anaesthesia with fewer adverse effects. It is simple to carry out and offers a quicker start and efficient sensory and motor block [1,2]. The most frequent spinal anaesthetic agents

are local anaesthetics, however due to their brief duration of action, early analgesic intervention may be necessary in the postoperative period. Long-lasting spinal anaesthesia without momentary neurological effects is produced by bupivacaine. A number of adjuvants to local anaesthetics have recently been employed intrathecally to extend the analgesia during and after surgery [1,2].

As an adjunct to intrathecal local anaesthetics, selective partial α2-adrenergic agonist clonidine has shown to be a powerful analgesic with no discernible clinically relevant side effects. The sensory and motor blockade of local anaesthetics is increased by intrathecal clonidine doses of 0.5-2 mcg/kg [3-5].

This study goal was to assess the effects of adding two doses of clonidine (40µg and 60µg) to 2.75ml of hyperbaric bupivacaine (0.5%) when doing sub umbilical operations. The main aims of this study to compare the effects of adding two doses of clonidine (40 and 60µ mg) to 2.75 ml of 0.5% hyperbaric bupivacaine intrathecally for sub umbilical surgery and assess the onset time of the sensory and motor block, the duration of the sensory and motor block, the time it lasted for the postoperative pain to become effective and any side effects [6-10].

Materials and Methods

From June 2022 to December 2022, a cross-sectional study was conducted at the Darbhanga Medical College and Hospital, Laheriasarai, Bihar. Patients with ASA grades I and II who are between the ages of 18 and 60 are scheduled for sub umbilical operations at the DMCH in Laheriasarai, Bihar. The sample size of 30 patients was split into three groups: Group B, Group C1, and Group C2. Patients between the ages of 18 and 60. PS I and II for ASA. This study includes infra umbilical procedures, but ASA-PS III and IV, patient refusal, renal/hepatic impairment, medication allergies, and sub arachnoid block contraindications are eliminated.

30 patients were involved in this prospective randomised controlled study after receiving ethics committee approval. The patients were split into three groups.

1. Participants in group B got 2.75ml of 0.5% hyperbaric bupivacaine plus 0.5ml saline.
2. Participants in group C1 received 40µg of clonidine and 2.75 ml of 0.5% hyperbaric bupivacaine.
3. Participants in group C2 received 60µg of clonidine and 2.75ml of 0.5% hyperbaric bupivacaine.

Results

Table 1: Distribution of Mean Onset of Sensory Block (Secs) by Groups

Parameters	Group B	Group C1	Group C2	p-value
No. of cases	10	10	10	0.001
Mean	103	177.25	156.25	
S.D.	10.809	43.542	32.23577	

The start of sensory block differs significantly between the groups, with group C2 experiencing a quicker onset than C1.

Table 2: Distribution of Mean Onset of Motor Block (Secs) by Groups

Parameters	Group B	Group C1	Group C2	p-value
No. of cases	10	10	10	0.001
Mean	177.25	199	193.150	
S.D.	18.6007	15.61	11.663	

The onset of motor block differs significantly amongst the groups. Group C2 onset is quicker than Group C1.

Table 3: Distribution of Mean two segmental (Mins.) by Groups

Parameters	Group B	Group C1	Group C2	p-value
No. of cases	10	10	10	0.001
Mean	128	187.05	211	
S.D.	16.091	8.846	21.250	

In two segment regressions, there is a considerable difference between the groups, with C2 having a much longer time than C1.

Table 4: Distribution of Mean duration of Motor Block (Mins.) by Groups

Parameters	Group B	Group C1	Group C2	p-value
No. of cases	10	10	10	0.001
Mean	188.75	263.25	284.5	
S.D.	13.848	12.904	16.693	

The length of the motor block varies significantly between the groups, with group C2 having a longer duration than C2.

Table 5: Distribution of Mean duration of Analgesia by Groups

Parameters	Group B	Group C1	Group C2	p-value
No. of cases	10	10	10	0.001
Mean	219.25	305.75	314	
S.D.	9.215	17.341	28.635	

The entire duration of analgesia varies significantly between the groups, with C2 having a significantly longer duration than C1.

Discussion

In group B (Control), the mean time to the onset of sensory block was 103 seconds, but in groups C1 and C2, it was 177.25 seconds and 156.25 seconds, respectively. When clonidine was given as an adjuvant, both groups C1 and C2 experienced a delayed onset of sensory block, which was statistically significant. In their study of 0.5% bupivacaine 5mg delivered intrathecally in combination with 150µg of clonidine vs. only bupivacaine, Klimscha *et al* [6] found no statistically significant difference between the groups. Clonidine was utilised in continuous spinal and epidural anaesthesia, nevertheless [11-14]. This could be the basis for the discrepancy between our study and theirs. When using 30µg of clonidine in their investigation, Kanazi GE *et al* [15]. did not document when the sensory block began to occur. The findings of a study by Saxena H *et al* [16]. however, did not match those of our investigation. They found that the control group's sensory blockade started at 6.57±0.49 minutes, while the clonidine groups (15 µg,

30 µg, and 37.5 µg, respectively) started at 2.58±0.33 minutes, 2.54±0.34 minutes, and 2.09±0.89 minutes, respectively. Our study found a substantial delay in the onset time.

In group B, the average time to the beginning of motor block was 177 seconds (Control). Group C1 had 199 seconds, while C2 had 193 seconds. Both clonidine groups had a delayed onset of motor block (C1 and C2). The findings of our investigation, however, did not agree with those of other clonidine-related studies. According to Acalvoschi *et al* [17] the start of motor blockage was not significantly delayed by the intrathecal injection of clonidine (2 µg/kg) compared to meperidine (1 mg/kg). In a research using 30µg of clonidine, Kanazi GE *et al* [15] found that the motor block's onset time was dramatically shortened [18-20].

The mean duration of the motor block in group B (the control) was 188 minutes, which was significantly less than the mean durations in group C1 and group C2 that used clonidine. Similar findings were made by Sarma *et al* [11] in his investigation, however the motor block in the clonidine group lasted longer.

Our research also supported the findings of Dobrydnjov *et al* [21] who found that bupivacaine alone was not as effective at blocking motor activity as bupivacaine with clonidine [22]. Our research supports that of Kaabachi O *et al* [23] who found that adding clonidine at a dose of 1µg/kg resulted in a longer mean duration of motor blockage than using bupivacaine alone. Bhar D [10]. discovered that the average length of the motor block in the clonidine group was significantly greater than that in the bupivacaine alone group. Sethi BS *et al* [4] showed a longer motor block (205 mins) when clonidine was introduced as an adjuvant to bupivacaine than when bupivacaine alone (161 mins). In our investigation, clonidine was administered to both groups, and higher doses (60 µg) were found to cause motor blocks to last longer than lesser doses (40 µg).

Our findings concur with those of numerous other studies. According to Thakur *et al* observations from group III (clonidine 30mcg, 15mcg, and control group, respectively), group II and group I had the shortest mean duration of motor block (clonidine 30mcg, 15mcg and control group respectively). Similar findings were made by Saxena H *et al* [16] and Strebel S *et al* [18]. who found that higher doses of clonidine resulted in a motor block that lasted longer than lower doses.

In groups C1 and C2, the average time of analgesia was 305 minutes and 314 minutes, respectively. Comparing the difference to control group B, where the length was 219 minutes, the difference is statistically significant. This was consistent with a research by Strebel *et al* [24]. that looked at isobaric bupivacaine and modest dose intrathecal clonidine for orthopaedic procedures. In comparison to the control group, the analgesia was significantly prolonged.

Dobrydnjov *et al* [21] also demonstrated in their study that the duration of analgesia was prolonged for inguinal herniorrhaphy when clonidine was given to bupivacaine in comparison to the control group. In their study, Bafna *et al* [7] also shown that the clonidine group's analgesia lasted noticeably longer than the control group's did. In their study, Bhushan *et al* [8] found that intrathecal bupivacaine at a dose of 60 µg is associated with a longer duration of postoperative analgesia than intrathecal doses of 15 or 30 µg (598.7±140.47 vs. 436.65±149.84 and 387.1±97.05 minutes, respectively). In their study, Singh RB *et al* [12] demonstrated that the duration of postoperative analgesia was substantially longer in the clonidine group than in the control group (551.06±133.64 min

vs. 254.80±84.19 min, respectively). Using unilateral spinal anaesthesia for lower limb below knee surgery, Sapate M *et al* [13]. shown in their study that intrathecal clonidine potentiates bupivacaine and decreases the need for analgesics in the early post-operative period.

The duration of analgesia was substantially longer in the clonidine group (497.20±139.78 min) than in the fentanyl group (416.87±105.67 min) in the study by Bajwa *et al* [9] According to Sarma *et al* [11]. the average duration of analgesia was much longer in the clonidine and dexmedetomidine groups compared to the control group (204.8±16.81 min and 336.8±55.38 min, respectively).

In their work, Shidhaye R *et al* [14] shown that intrathecal administration of 60 µg of clonidine to bupivacaine results in postoperative analgesia lasting longer than 25 µg of fentanyl. Similar results were found in additional studies by Saxena H *et al* [16]. Barga *et al* [22]. Chethanananda *et al* [25]. Sharan *et al* [26] and Kumar SK [27] who found that adding clonidine to bupivacaine as an adjuvant intrathecally increased the mean duration of analgesia by a statistically significant amount.

In comparison to control group B, which required 128 minutes, the mean time required for two segmental regression was longer in the clonidine groups, totaling 211 minutes in group C2 and 187.05 minutes in group C1. When compared to group C1 lower dose of clonidine, group C2 larger dose significantly lengthened the time for two segmental regression. Our findings were consistent with the findings of a study by Fogarty *et al* [19] in which the addition of 75µg of clonidine and 2.75ml of 0.5% hyperbaric bupivacaine increased the time to two segment regression below L4 by 216±97.1 mins as compared to 138±59.9 mins under control.

In their investigation, Fakuda *et al* [20]. discovered that the addition of 150 µg of clonidine to 0.5% tetracaine resulted in a considerably longer duration for two segment regression of sensory block than 0.5% tetracaine alone. In a study by Kanazi *et al* [15] authors found that there was a significant prolongation of two segment regression compared to the control group, with the time required for regression of sensory block by two segments being 80±28 mins in the control group, 101±37 mins in the clonidine group, and 122±37 mins in the dexmedetomidine group.

According to Thakur *et al* [5] observation, group III (which received doses of 30 µg, 15 µg, and control respectively of clonidine) had the longest mean time to two-segment regression, followed by groups II and I. Our research is in line with studies by Dobrydnjov *et al* [21] Saxena H *et al* [16] and Sethi BS *et al* [4] in which the authors found that the mean duration for two segment regression was statistically significantly longer in the clonidine group compared to plain bupivacaine.

Conclusion

The duration of the sensory and motor blocks is extended when clonidine is added as an adjuvant to bupivacaine during a subarachnoid block. The results of my investigation show that, compared to 40µg, 60µg of clonidine hydrochloride added to hyperbaric bupivacaine in subarachnoid block has proven to be a better adjuvant in extending the duration of effective post-operative analgesia and the sensory and motor blockade intraoperatively.

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