Original Research Article

A comparative study on efficacy of two different doses of clonidine added to hyperbaric bupivacaine in spinal anaesthesia in sub umbilical surgeries

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Abstract

Background: intrathecal clonidine an adjuvant to local anesthetics increase both sensory and motor blockade of local anesthesia and a potent analgesic without any clinically significant side effects. **Aim and objectives**: 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**. Methodology:** 60 patients were included in this prospective randomized controlled study. Patients were divided into 3 groups, includes 20 in each group. Patients in group B received 2.75ml of 0.5% hyperbaric bupivacaine plus 0.5ml saline. Patients in group C1 received 2.75ml of 0.5% hyperbaric bupivacaine with 40 µg of clonidine. Patients in group C2 received 2.75ml of 0.5% hyperbaric bupivacaine with 60µg of clonidine. **Results:** Time to onset of sensory block was prolonged in clonidine groups C1(177.25secs) and C2(156.25 secs) than control group (103 secs). The mean time to onset of motor block was prolonged in group C1(199 secs) and group C2 (193 secs) than control group (177 secs). The mean duration of motor block in group B (control) which was significantly lower (188 secs) than both clonidine groups C1 (263 mins) and C2 (284 mins). The mean duration of analgesia prolonged in both clonidine groups C1 (305 mins) and C2 (314 mins) compared with control group B (219 mins). The mean time taken for two segmental regression was longer in clonidine groups C1 (187.05 mins) and C2(211 mins) than control group B (128 min).
key words: clonidine and intrathecally for sub umbilical surgeries

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INTRODUCTION

Spinal anaesthesia is commonly used for abdominal, perineal, gynaecological and lower limb operations. It offers excellent anaesthesia and fewer side effects than general anaesthesia. It is easy to perform and provides faster onset and effective sensory and motor block[1,2]. Local anesthetics are the commonest agents used for spinal anesthesia, but their relatively short duration of action may lead to early analgesic intervention in the postoperative period. Bupivacaine produces long lasting spinal anaesthesia without Transient neurological symptoms. Recently a number of adjuvants to local anesthetics have been used intrathecally to prolong the intraoperative as well as postoperative analgesia[1,2]. Clonidine, a selective partial α_2-adrenergic agonist, is being extensively evaluated as an adjuvant to intrathecal local anesthetics and has proven to be a potent analgesic without any clinically significant side effect. intrathecal clonidine dose 0.5–2 mcg/kg increase both sensory and motor blockade of local anesthetics[3,4,5]. This study was designed to evaluate the addition of two doses of clonidine (40 µg and 60µg) added to hyperbaric

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bupivacaine (0.5%) 2.75ml in spinal anaesthesia for sub umbilical surgeries.

Aim and objectives: 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 surgery. To evaluate Time to onset of sensory and motor block, Duration of sensory and motor block, Duration of effective postoperative analgesia and Side effects.

MATERIALS AND METHODS

Place of study: Mamata general hospital.

Study type: CROSS SECTIONAL STUDY

Period of study: 24 months; SEPTEMBER 2018-SEPTEMBER 2020

Study population: ASA grade I and II patients, aged between 18 and 60 years, scheduled for sub umbilical surgeries in Mamata general hospital.

Sample size: 60 patients, divided into three groups, Group B, Group C1, Group C2.

Inclusion criteria: Patients in age group of 18 to 60 years. ASA –PS I and II. Infra umbilical surgeries.

Exclusion criteria: ASA –PS III and IV, Patient refusal, Renal / hepatic dysfunction, Allergy to drugs, Contraindication to sub arachnoid block.

Methodology: After obtaining the ethics committee approval, 60 patients were included in this prospective randomized controlled study. patients were divided into 3 groups.

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

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	20	20	20	0.001
Mean	103	177.25	156.25	
S.D	10.809	43.542	32.23577	

There is a significant difference between groups with regard to onset of sensory block, with group C2 having a rapid onset compared to 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	20	20	20	0.001
Mean	177.25	199	193.150	
S.D	18.6007	15.61	11.663	

There is significant difference between groups in the onset of motor block. Group C2 has a faster onset compared to C1.

Table 3: DISTRIBUTION OF MEAN TWO SEGMENTAL REGRESSION (mins) BY GROUPS

ARAMETERS	GROUP B	GROUP C1	GROUP C2	p-VALUE
No. Of cases	20	20	20	0.001
Mean	128	187.05	211	
S.D	16.091	8.846	21.250	

There is significant difference between groups in two segment regressions with C2 having a much longer time compared to 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	20	20	20	0.001
Mean	188.75	263.25	284.5	
S.D	13.848	12.904	16.693	

There is significant difference between groups in duration of motor block with group C2 having longer duration compared to C2.

Table 5: DISTRIBUTION OF MEAN DURATION OF ANALGESIA BY GROUPS

PARAMETERS	GROUP B	GROUP C1	GROUP C2	p-VALUE
No. Of cases	20	20	20	0.001
Mean	219.25	305.75	314	
S.D	9.215	17.341	28.635	

There is significant difference between groups in total duration of analgesia with C2 having a much longer duration compared to C1.

DISCUSSION

Onset of Sensory Block

The mean time to onset of sensory block was 103 secs in group B (Control) whereas it was 177.25secs in group C1 and 156.25 secs in group C2. Time to onset of sensory block was prolonged when clonidine was used as adjuvant, both groups C1 and C2 which was statistically significant. Klimscha *et al.*[6] studied intrathecally administered 0.5% bupivacaine 5mg and 150µg clonidine vs plain bupivacaine and showed there is no statistically significant difference between the groups. However, they used clonidine in continuous spinal and epidural anaesthesia. This might be the reason for difference between our and their study. Kanazi GE *et al.*[15] did a study with 30µg clonidine, however they did not report on onset of sensory block. However, in a study conducted by Saxena H *et al.*[16] the results were not in agreement with our study. They observed the onset of sensory blockade to be 6.57±0.49 mins in control group and 2.58±0.33 mins, 2.54±0.34 mins and 2.09±0.89 mins in clonidine group (15 µg, 30 µg and 37.5 µg respectively) and in our study there was a significant delay in the onset time.

Onset of Motor Block

The mean time to onset of motor block was 177 secs in group B(Control). It was 199 secs in group C1 and 193 secs in group C2. The time to onset of motor block was prolonged in both clonidine groups (C1 and C2). However, the results of our study did not correlate with other studies done with clonidine. Acalvoschi *et al.*[17] found that addition of clonidine 2 µg/kg with 1mg/kg meperidine intrathecally had no significant difference compared to meperidine with epinephrine 200µg in the onset of motor blockade. Kanazi GE *et al.*[15] did a study with 30µg clonidine and reported significantly shorter onset time of motor block.

Mean Duration of Motor Block

The mean duration of motor block was 188 min in group B (control) which was significantly lower than both the groups using clonidine, group C1 was 263 mins and group C2 was 284 mins. Sarma *et al.*[11] had similar observations in his study with longer duration of motor block in group with clonidine. Our study also correlated with the study by Dobrydnjov *et al.*[21] where adding clonidine to bupivacaine prolonged the duration of motor block when compared to bupivacaine alone. Our study also concurs with the study conducted by Kaabachi O *et al.*[23] who observed the mean duration of motor blockade to be longer when using clonidine of 1µg/kg compared to plain bupivacaine. Bhar D[10] observed that mean duration of motor block was significantly increased in clonidine group when compared to bupivacaine alone. Sethi BS *et al.*[4] also reported prolonged motor block (205 mins) when clonidine was used as adjuvant to bupivacaine when compared to bupivacaine alone (161 mins). In our study, within both the groups with clonidine, longer duration of motor block was observed with higher dose (60µg) when compared to lower dose (40µg). Our results are in agreement with results from several other studies. Thakur *et al.*[5] observed that mean duration of motor block was the greatest in group III followed by group II and group I (clonidine 30mcg, 15mcg and control group respectively). Similarly, Saxena H *et al.*[16] and Strebel S *et al.*[18] observed longer duration of motor block with higher doses when compared to lower doses of clonidine.

Mean Duration of Analgesia

The mean duration of analgesia was 305 mins in group C1 and 314 mins in group C2. The difference is statistically significant when compared with control group B where the duration was 219 mins. This correlated with study by Strebel *et al.* [24] where he studied small dose intrathecal clonidine and isobaric bupivacaine for orthopaedic surgeries. There was significant prolongation of analgesia compared to control group. Dobrydnjov *et al.*[21] also showed in his study that clonidine added to bupivacaine for inguinal herniorrhaphy had prolonged duration of analgesia compared to control group. Bafna *et al.* [7] also showed in his study that duration of analgesia was significantly longer in clonidine group compared to control group. Bhushan *et al.*[8] observed in his study that addition of 60 µg clonidine to intrathecal bupivacaine provides longer duration of postoperative analgesia than 15 µg or 30µg (598.7±140.47 vs. 436.65 ± 149.84 and 387.1 ± 97.05 minutes respectively). Singh RB *et al.*[12] showed in his study that duration of postoperative analgesia was significantly higher in clonidine group than control group with the duration being 551.06 ± 133.64 min and 254.80 ± 84.19 min respectively. Sapate M *et al.*[13] showed in his study that intrathecal clonidine potentiates bupivacaine, reduces the analgesic requirement in the early post-operative period in unilateral spinal anesthesia for lower limb below knee surgery. Bajwa *et al.*[9] *et al.* showed in his study that duration of analgesia was significantly higher in clonidine group (497.20 ± 139.78 min) than in fentanyl group (416.87 ± 105.67). Sarma *et al.*[11] reported that duration of analgesia was significantly prolonged in clonidine group and dexmedetomidine group with a mean duration of 309.6 ± 50.99 min and 336.8 ± 55.38 min as compared to 204.8 ± 16.81 min in control group. Shidhaye R *et al.*[14] showed in his study that intrathecal addition of 60µg clonidine to bupivacaine provides longer duration of postoperative analgesia than 25µg of fentanyl. Similarly, various other studies conducted by Saxena H *et al.*[16] Barga *et al.*[22], Chethanananda *et al.* [25] and Sharan *et al.* [26], Kumar SK[27] observed a statistically significant increase in mean duration of analgesia when clonidine was added to bupivacaine as adjuvant intrathecally.

A. Time for Two Segmental Regression

The mean time taken for two segmental regression was longer in clonidine groups, 211 mins in group C2 and 187.05 mins in group C1 when compared to control group B which was 128 min. Within the clonidine groups, group C2 with higher dose had significantly prolonged time for two segmental regression compared to lower dose group C1. Our results correlated with the study by Fogarty *et al.*[19] where addition of 75µg of clonidine with 2.75ml of 0.5% hyperbaric bupivacaine prolonged the time to two segment regression below L4 by 216+/- 97.1 mins compared with control of 138+/-59.9 mins. Fakuda *et al.*[20] found in their study that the time to two segment regression of sensory block was significantly prolonged when clonidine 150µg was added to 0.5% tetracaine compared with 0.5% tetracaine alone. In a study conducted by Kanazi *et al.*[15] authors observed the time taken for regression of sensory block by two segments to be 80±28 mins in control group, 101±37 mins in clonidine group and 122±37 mins in dexmedetomidine group and concluded that there was a significant prolongation of two segment regression compared to the control group. Thakur *et al.*[5] observed that the mean time to two-segment regression, was greatest in group III followed by group II and group I (clonidine 30µg,15 µg andcontrol group respectively). Our study is also consistent with studies done by Dobrydnjov *et al.*[21], Saxena H *et al.*[16] and Sethi BS *et al.*[4] where the authors observed a statistically significant increase in the mean duration for two segment regression in clonidine group compared to plain bupivacaine.

CONCLUSION

Addition of clonidine as an adjuvant to bupivacaine in subarachnoid block prolongs duration of both sensory and motor block. My study concludes that 60µg of clonidine hydrochloride added to hyperbaric bupivacaine in subarachnoid block has proved to be a better adjuvant in prolonging the sensory and motor blockade intra operatively and duration of effective post operative analgesia compared to 40µg, without significant adverse effects.

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