Original Article

DOI: 10.17354/ijss/2016/20

Effect of Oral and Intravenous Clonidine as an Adjunct during Spinal Anesthesia

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Abstract

Background: There are always study going on which upsurge the onset and duration of subarachnoid block with minimal side effects.

Objective: The aim of this study was to compare the effects of oral and intravenous (IV) clonidine in spinal anesthesia in lower abdominal and lower limb surgeries.

Materials and Methods: Total 60 patients undergoing spinal anesthesia were randomly divided into three groups of 20 patients.

Group B: 0.5% bupivacaine heavy 15 mg/kg.

Group OC: 0.5% bupivacaine heavy 15 mg + oral clonidine 3 mcg/kg.

Group IC: 0.5% bupivacaine heavy 15 mg + IV clonidine 3 mcg/kg.

Result: In our study, both the drugs are α_2 agonists, but IV clonidine was found to shorten the onset and increase the duration of anesthesia compared to oral clonidine.

Conclusion: Both the drugs were found to upsurge the onset and duration of spinal anesthesia, but IV clonidine is a more effective.

Key words: Intravenous clonidine, Oral clonidine, Spinal anesthesia

INTRODUCTION

Pain is as old as mankind and may be even older. There are ample reasons to believe that it is inherent to life and so the looking for the methods of pain relief. Many techniques and drug regimen with partial or greater success have been tried from time to time by the mankind for the relief of pain.[1]

A extension of this analgesia into the post-operative period is an advantage as the need for analgesics is minimized.[2,3]

Access this article online

www.ijss-sn.com

Month of Submission : 11-2015
Month of Peer Review : 12-2015
Month of Acceptance : 01-2016
Month of Publishing : 01-2016

Drugs like epinephrine and fentanyl prolong bupivacaine subarachnoid block (SAB) and analgesia but have their own limitations.[4,5]

The aim of the study was to compare motor block provided by equianalgesic concentrations of oral and intravenous (IV) clonidine in spinal anesthesia.

An imidazole was synthesized in early 1960's. Acts as an antihypertensive by virtue of its ability to decrease sympathetic nervous system output from the central nervous system.

Intrathecal clonidine when used as adjunct potentiates the effect of local anesthetics and allows a decrease in required doses.[6] A non-opioid α_2 agonist is administered sublingually, intramuscularly, IV and various other routes. It prolongs the duration of motor and sensory spinal

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blockade when used along with local anaesthetics.[6] It also acts a sedative and reduces post-operative shivering.

The dose of oral and IV clonidine is same because the bioavailability of the routes remains the same which is 3.5 mcg/kg.

MATERIALS AND METHODS

A prospective, randomized, comparative study was carried out on 60 patients of 18-60 years of age posted for elective lower abdominal and lower limb surgeries in spinal anesthesia. Detailed pre-anesthetic checkup was done on all patients and relevant hematological, biochemical and radiological investigations was done for all patients as per surgical requirements. Patients selected for the study was randomized into 3 groups of 20 patients each.

- Group B: 0.5% bupivacaine heavy 15 mg/kg.
- Group OC: 0.5% bupivacaine heavy 15 mg + oral clonidine 3 mcg/kg.
- Group IC: 0.5% bupivacaine heavy 15 mg + IV clonidine 3 mcg/kg.

Pre-anesthetic checkup of all the patients will be done 1 day prior to the surgery. All the routine hematological and biochemical investigations were done. All the patients will be preloaded with 10 ml/kg of crystalloid solution via an 18 G IV cannula. Standard anesthesia monitors were used. With the patient in the sitting position, SAB was performed at the level of L3-L4 space through midline approach using a 25G Quincke spinal needle. Thereafter, heart rate (HR), mean arterial pressure and O_2 saturation were recorded every 5 min until surgery. The sensory block was assessed using loss of sensation to pinprick. The motor block was assessed using a modified bromage scale. Sedation was assessed using a Ramsay sedation scale and visual analog scale score was recorded during the 1st h of surgery.

RESULTS

Table 1 shows age distribution of the patients of three groups.

Table 2 shows weight wise distribution of patients.

Table 3 Comparing variables sensory onset, sensory duration, motor onset, motor duration, sedation score, time of the 1st post-operative analgesia, total analgesic required post-operative (24 h).

Table 1: Age distribution of the patients of three groups

Age groups (years)	Bupivacaine (%)	Oral clonidine (%)	IV clonidine (%)
<20	1 (5.0)	3 (15.0)	4 (20.0)
20-30	9 (45.0)	12 (60.0)	5 (25.0)
31-40	5 (25.0)	4 (20.0)	4 (20.0)
>40	5 (25.0)	1 (5.0)	7 (35.0)
Total	20 (100.0)	20 (100.0)	20 (100.0)
Mean±SD	29.5±8.7	28.2±9.4	30.4±7.9

SD: Standard deviation, IV: Intravenous

Table 2: Weight wise distribution of patients

Weight in kg	Bupivacaine (%)	Oral clonidine (%)	IV clonidine (%)
40-45	3 (15.0)	2 (10.0)	4 (20.0)
46-50	6 (30.0)	7 (35.0)	9 (45.0)
51-55	7 (35.0)	6 (30.0)	4 (20.0)
>55	4 (20.0)	5 (25.0)	3 (15.0)
Total	20 (100.0)	20 (100.0)	20 (100.0)
Mean±SD	51.2±3.4	50.9±2.3	52.7±4.2

SD: Standard deviation, IV: Intravenous

DISCUSSION

Baseline Comparison of Groups

The study included the patients of age group between 20 and 60 years. In the present study, the age in Group I (control group) was 29.5 ± 8.7 years, in Group II (oral clonidine) 28.2 ± 9.4 years and in Group III (IV clonidine) 30.4 ± 7.9 years. The age was not different and thus was comparable.

The weight of patients in Group I (control group) was 51.2 ± 3.4, in Group II (oral clonidine) 50.9 ± 2.3 and in Group III (IV clonidine) 52.7 ± 4.2 kg. The weight of patients was not different and thus was comparable.

Distribution according to sex was also comparable. In our study, time of sensory onset up to T10 in Group I (control group) was 5.35 ± 0.67 min, in Group II (oral clonidine) 5.3 ± 0.73 min and in Group III (IV clonidine) 3.25 ± 0.72 min. The onset of sensory block was shortest in Group III (IV) as compared to control and oral groups.

In our study, time of motor block onset to Bromage 3 in Group I (control group) was 7.4 ± 0.75 min, in Group II (oral clonidine) 7.25 ± 0.79 min and in Group III (IV clonidine) 6.35 ± 0.75 min. The onset of motor block was earliest in Group III (IV) as compared to control and oral groups.

In our study, time of sensory regression to S1 in Group I (control group) was 163.5 ± 6.71 min, in Group II

Table 3: Comparing variables sensory onset, sensory duration, motor onset, motor duration, sedation score, time of the 1st post-operative analgesia, total analgesic required post-operative (24 h)

Variables	Mean±SD			*P* value		
	Group B	Group OC	Group IC	B versus OC	OC versus IC	B versus IC
Sensory onset (min)	5.35±0.67	5.3±0.73	3.25±0.72	0.97	<0.001	<0.001
Sensory duration (min)	163.5±6.71	165.25±7.16	175.75±7.48	0.98	<0.001	<0.001
Motor onset	7.4±0.75	7.25±0.79	6.35±0.75	0.98	<0.001	<0.001
Motor duration	136.5±5.87	140.34±22.68	148.75±22.7	0.37	0.156	0.039
Sedation score	2.85±0.88	1.9±0.72	1.3±0.47	<0.001	0.029	<0.001
Time of 1st post op analgesia	1.05±0.76	1.4±0.68	2.1±0.55	0.31	0.005	<0.001
Total analgesic required post-operative (24 h)	1.1±0.64	0.7±0.57	0.45±0.6	0.12	0.592	0.004

SD: Standard deviation

(oral clonidine) 165.25 ± 7.16 min and in Group III (IV clonidine) 175.75 ± 7.48 min. The time of sensory regression was longest in Group III (IV) as compared to control and oral group.

In our study, time of motor block onset to Bromage 0 in Group I (control group) was 136.5 ± 5.87 min, in Group II (oral clonidine) 140.34 ± 22.68 min and in Group III (IV clonidine) 148.75 ± 22.7 min. The time of motor regression was longest in Group III (IV) as companied to control and oral group.

Hemodynamic Changes

In our study, there was a statistically significant fall in HR in group oral clonidine group compared to group bupivacaine and IV clonidine ($P < 0.05$).

There was a significant fall in the systolic blood pressure in all three groups with maximum fall in Group IV clonidine, but it was not statistically significant ($P > 0.05$).

There was a significant fall in the diastolic blood pressure in all three groups with maximum fall in Group IV clonidine, but it was not statistically significant ($P > 0.05$).

Oxygen saturation was similar in all three groups.

The sedation score in Group B (bupivacaine) was 1.3 ± 0.47, (oral clonidine) OC was 1.9 ± 0.72, Group IC (IV clonidine) was 2.85 ± 0.88.

In our study, duration of analgesia in Group I (control group) was 1.05 ± 0.76 h, in group II (oral clonidine) was 1.40 ± 0.68 h and in Group III (IV clonidine) was 2.10 ± 0.55 h. The analgesia was the longest in Group IC (IV) as compared to oral and placebo groups.

In our study, total analgesic required in 1st 24 h in Group I (control group) was 1.10 ±0.64 in Group II (oral clonidine) was 0.70 ± 0.57 and in group III (IV clonidine) was 0.45 ± 0.60. Thus, the requirement of analgesic was least in IV clonidine group.

CONCLUSION

Hence, it can be concluded that IV clonidine is a more effective than oral clonidine with less incidence of side effects.

REFERENCES

1. Höhener D, Blumenthal S, Borgeat A. Sedation and regional anaesthesia in the adult patient. Br J Anaesth 2008;100:8-16.
2. Yanagidate F, Hamaya Y, Dohi S. Clonidine premedication reduces maternal requirement for intravenous morphine after cesarean delivery without affecting newborn's outcome. Reg Anesth Pain Med 2001;26:461-7.
3. Ghignone M, Quintin L, Duke PC, Kehler CH, Calvillo O. Effects of clonidine on narcotic requirements and hemodynamic response during induction of fentanyl anesthesia and endotracheal intubation. Anesthesiology 1986;64:36-42.
4. Chambers WA, Littlewood DG, Logan MR, Scott DB. Effect of added epinephrine on spinal anesthesia with lidocaine. Anesth Analg 1981;60:417-20.
5. Sung CS, Lin SH, Chan KH, Chang WK, Chow LH, Lee TY. Effect of oral clonidine premedication on perioperative hemodynamic response and postoperative analgesic requirement for patients undergoing laparoscopic cholecystectomy. Acta Anaesthesiol Sin 2000;38:23-9.
6. Dobrydnjov I, Axelsson K, Thörn SE, Matthiesen P, Klockhoff H, Holmström B, *et al.* Clonidine combined with small-dose bupivacaine during spinal anesthesia for inguinal herniorrhaphy: A randomized double-blinded study. Anesth Analg 2003;96:1496-503.

How to cite this article: Ishita G, Chandra K, Geeta K, Nanda HS. Effect of Oral and Intravenous Clonidine as an Adjunct during Spinal Anesthesia. Int J Sci Stud 2016;3(10):99-101.

Source of Support: Nil, **Conflict of Interest:** None declared.