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Original Article

Effect of Intrathecal Clonidine on Post-operative Analgesia in Pregnant Patients Undergoing Lower Segment Caesarian Section

D Palaramakrishnan[1], G Angel Vellut[1], Heber Anandan[2]

[1]Assistant Professor, Department of Anesthesiology, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India, [2]Senior Clinical Scientist, Department of Clinical Research, Dr. Agarwal's Healthcare Limited, Tirunelveli, Tamil Nadu, India

Abstract

Introduction: Neuraxial anesthesia is now the preferred technique for lower segment cesarean sections (LSCS). Although epidural, spinal, continuous spinal, and combined spinal-epidural techniques have all been advocated, the most cesarean sections are performed under single-shot spinal anesthesia.

Aim: To evaluate the efficacy of clonidine in prolonging the duration of post-operative analgesia when combined with bupivacaine and the property of clonidine to potentiate the analgesic effect of bupivacaine and to observe the safety of intrathecally administered clonidine.

Materials and Methods: Pregnant patients belonging to the American Society of Anesthesiologists Physical Status I and II from 18 to 28 years, weighing 45-70 kg were included in the study. The patients were randomly allocated into two groups, Group B and Group C. Group B administered with 0.5% hyperbaric bupivacaine 10 mg and Group C administered with 0.5% hyperbaric bupivacaine 10 mg with clonidine 75 μg.

Results: A mean duration of analgesia in Group B is 176.9 ± 69.5 and Group C is 288.6 ± 130.3. Time to 2 segment regression in Group B is 126.8 ± 56.5 and Group C is 214.6 ± 103.5.

Conclusion: An addition of 75 μg of clonidine to hyperbaric bupivacaine is safe and beneficial to pregnant patients posted for LSCS.

Key words: Analgesic, Bupivacaine, Clonidine, Lower segment caesarean sections

INTRODUCTION

Bupivacaine in orthopedic surgeries had proved that the combination of clonidine was effective in preventing the tourniquet pain and effectively prolonging the post-operative analgesia. Spinal anesthesia has increasingly become the technique of choice for lower segment cesarian section.[1] It has the advantages of simplicity of technique,[2,3] rapid onset of action, and reliability in producing uniform sensory and motor blockade as compared to epidural anesthesia.[4-6] Its main disadvantage relates to its limited duration of action and hence the lack of long-lasting post-operative analgesia. Spinal anesthesia and post-operative analgesia can be prolonged using adjuvant to local anesthetic such as adrenaline,[7] midazolam,[8] opioids, neostigmine, and clonidine.[9-14] Clinical studies have suggested that intrathecal clonidine prolongs sensory as well as a motor block of spinal anesthesia. It decreases local anesthetic requirements and provides prolonged post-operative analgesia.[9,14-17] Other beneficial effects are anti-emesis, reduced post spinal shivering, anxiolysis, and sedation.[18] Increased sedation caused by it may also be unwanted at times. The necessity to find out the lower effective dose of clonidine to avoid its known side effects like hypotension and bradycardia and sedation prompted us to design this study.

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Aim

To evaluate the efficacy of clonidine in prolonging the duration of post-operative analgesia when combined with

Corresponding Author: Heber Anandan, No. 10, South By-pass Road, Vannarpettai, Tirunelveli - 627 003, Tamil Nadu, India. Phone: +91-9894067910. E-mail: clinicalresearch@dragarwal.com

bupivacaine and the property of clonidine to potentiate the analgesic effect of Bupivacaine and to observe the safety of intrathecally administered clonidine.

MATERIALS AND METHODS

Open-labeled, randomized controlled study was conducted in Department of Anesthesiology, Tirunelveli Medical College in Pregnant patients belonging to American Society of Anesthesiologists Physical Status I and II. Patients from 18 to 28 years, weighing 45-70 kg were included in the study. Patients with systemic illness, patients with partial block or failed block, height <145 cm, procedures ending with hysterectomy or requiring blood transfusion, anemia, bleeding disorders, contraindication to clonidine, patients with psychiatric problems, and patients having spinal deformities were excluded from the study. After getting, informed consent, the patients were randomly allocated into two groups. Group "B" was administered with bupivacaine and Group "C" was administered with clonidine group. 0.5% hyperbaric bupivacaine 10 mg was injected in Group B and 0.5% hyperbaric bupivacaine 10 mg with clonidine 75 μg was injected in Group C.

RESULTS

The study was conducted on 70 patients randomly allotted into 2 groups as given below and the visual analog pain scale assessed.

After 2 h postoperatively, both Groups B and C patients exhibited a pain score of 0-1 and were comfortable, manifesting no signs of pain (Table 1). After 3 h, 8 patients in Group B manifested mild to moderate levels of pain requiring systemic analgesic supplementation. In Group C, only 5 patients manifested pain which required analgesic supplementation (Table 2). After 4 h, 31 patients in Group B manifested pain requiring systemic analgesic supplementation. In Group C, only 8 patients manifested pain which required analgesic supplementation (Table 3). After 6 h, 34 patients in Group B manifested pain, with almost 97% requiring systemic analgesic supplementation (Table 4).

In Group C, only 23 patients manifested pain, with an average only 66% required analgesic supplementation. 12 of the patients did not show any sign of pain, which is 34% of the study group had a good analgesic effect even after 6 h duration.

The mean "duration of analgesia" and mean "time to 2 segment regression" between the two groups were statistically significant ($P < 0.0001$) (Table 5). The hemodynamic variables such as mean arterial pressure (MAP), pulse rate did not significantly differ at all the time periods of monitoring (5, 10, 15, 20, 30, 60, 90, 120). The SPO_2 of Group B was lesser than Group C at 5th min only. In all other time periods, the SPO_2 of the Group C was lesser than Group B which is statistically significant, though it is not clinically significant.

Table 1: VAP score (2nd h)

Pain score	Number of patients (%)	
	Group B	Group C
0-1	35 (100)	35 (100)
2-4	0 (0)	0 (0)
5-6	0 (0)	0 (0)
>7	0 (0)	0 (0)

VAP: Visual analog pain scale

Table 2: VAP score (3rd h)

Pain score	Number of patients (%)	
	Group B	Group C
0-1	7 (20)	21 (60)
2-4	20 (57)	9 (26)
5-6	6 (17)	5 (14)
>7	2 (6)	0 (0)

VAP: Visual analog pain scale

Table 3: VAP score (4th h)

Pain score	Number of patients (%)	
	Group B	Group C
0-1	3 (8)	20 (57)
2-4	1 (3)	7 (20)
5-6	6 (17)	6 (17)
>7	25 (72)	2 (6)

VAP: Visual analog pain scale

Table 4: VAP score (6th h)

Pain score	Number of patients (%)	
	Group B	Group C
0-1	0 (0)	6 (17)
2-4	1 (3)	6 (17)
5-6	4 (12)	10 (30)
>7	30 (850	13 (36)

VAP: Visual analog pain scale

DISCUSSION

Clonidine added to bupivacaine for spinal anesthesia in caesarean section improves the immediate post-operative analgesia effect. The effective dose range of intrathecal clonidine for post-op analgesia is not known till date. Actually, all effects of clonidine including

Table 5: Comparison of duration of analgesia

Category	*n*	Mean±SD		Mean difference	t	Diff	Significance
		Group B	Group C				
Duration of analgesia	35	176.9±69.5	288.6±130.3	111.7	4.475	68	*P*<0.0001
Time to 2 segment regression	35	126.8±56.5	214.6±103.5	87.8	3.955	68	*P*<0.0001

SD: Standard deviation

analgesia are dose dependent. This study suggests that compared to bupivacaine alone, the addition of 75 μg clonidine to bupivacaine produced a strong analgesia with a mean duration of 288 minutes. Furthermore, our patients were not administered any additional opioids or tranquilizers perioperatively that may have potentiated the analgesic action of clonidine. Van Essen *et al.*[19] studied the effect of addition of intrathecal clonidine to hyperbaric bupivacaine on post-operative pain and morphine requirements after caesarean section. He demonstrated that addition of 75 μg clonidine to hyperbaric bupivacaine prolongs spinal analgesia and the motor block after caesarean section and improves early analgesia. In this study using clonidine 75 μg alone the analgesia lasted for a mean of 288 min. The dose is lesser than that used by Coombs *et al.*, but the duration of analgesia is closer to that study even without opioid. Mendez *et al.*[13] used epidural clonidine in doses of 400 and 800 μg for cesarean section, and they found that 800 μg group had 5 h of median duration of analgesia and this is closer to this study. This study shows that the intrathecal route required lesser dose than epidural route but with the same duration of analgesia and is safer with no side effects. Filos *et al.*[20] 150, 300, 450 μg intrathecal clonidine for its hemodynamic effects. They found the 300 and 450 μg group had hemodynamic stability, but the 150 μg group presented with immediate fall in MAP but with no delayed fall in this group. There was no incidence of significant bradycardia in all the three groups. This study with 75 μg clonidine also showed no significant hemodynamic changes. Moreover, it had no measurable deleterious side-effects in mother. Although MAP was lower in the Group C, this apparently was not considered clinically important, as the fall in MAP was manageable with intravenous fluids and the occurrence of bradycardia was not significantly different between the two groups. Furthermore, the average MAP did not decrease >20% from baseline.

CONCLUSION

This study has demonstrated that addition of 75 μg clonidine to hyperbaric bupivacaine prolongs post-operative analgesia and the two segment regression after caesarean section, without clinically significant hemodynamic derangements or any adverse effects. Hence, intrathecal clonidine along with bupivacaine proves to be a safer alternative to intrathecal opioids and with a dose of 75 μg, the hemodynamic profile is also very acceptable. Thus, intrathecal clonidine 75 μg not only potentiates and prolongs the analgesic effect of bupivacaine but also has a good safety profile for intrathecal use.

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