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Original Research Article

The effect of clonidine with bupivacaine on perioperative hemodynamics and post-operative analgesia in cesarean section cases

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ABSTRACT

Background: Cesarean section is the commonest procedure in Obstetric practice and postoperative pain can be a major factor for wound healing as well as mother and baby bonding. Spinal anesthesia is considered to be safest and easiest modality for cesarean section cases. Bupivacaine is the commonest drug given in spinal anesthesia, but many additive drugs have been introduced to cover post-operative analgesia. Clonidine is an alpha 2 agonist which can be used as an adjunct to heavy bupivacaine to extend analgesic effects.
Methods: A randomized double-blind study was performed in 100 women undergoing elective cesarean section under spinal anaesthesia. After proper informed written consent patient undergoing cesarean section were divided by computerized method into group A (Given 10.0 mg 0.5% hyperbaric Bupivacaine) and Group B (Given 9.0 mg 0.5% hyperbaric bupivacaine and 30 µg clonidine).
Results: Intraoperative hypotension is the most worrisome factor but it is transient and can be managed by ephedrine effectively. Intraoperative nausea and vomiting are slightly higher with clonidine as occurrence of hypotension is more. VAS scoring in post-operative period was better and need of first analgesic dose was much delayed in women been given clonidine with bupivacaine.
Conclusions: Clonidine can be considered as adjunct in spinal anesthesia to extend post-op analgesic cover.

Keywords: Spinal anesthesia, Clonidine, Bupivacaine, Intra-operative hypotension

INTRODUCTION

Cesarean section is the commonest procedure in obstetric practice and posto-perative pain is the major concern for the obstetrician as well as the patient herself. Post operatively 50-70% patients experience moderate to severe pain.[1]Many times it is attributed to the lack of knowledge for mechanism of pain and poor attitude of health personnel's and attendants towards it.[2]

It is well proven fact that good postoperative analgesia cover gives better recovery.[3,4] The neuro-axial block is the commonest modality used for cesarean sections. For postoperative analgesia, various agents from opioid and nonopioid groups are used routinely by intravenous, neuraxial, regional or oral routes. Still the mainstay of post-operative analgesia is opioid based which have significant side effects that limit their use. The most important side effect is respiratory depression that could result in hypoxia and respiratory arrest. Hence, regular monitoring of respiration and oxygen saturation is essential in patients on opioids postoperatively. In addition, nausea, vomiting, pruritus, and reduction in bowel motility leading to ileus and constipation are also common side effects of these medications.[5]

Some patients are opioid tolerant and can have poor pain relief.[6] So, there is an ardent need for postop analgesia as the woman has to take the responsibility of baby also. All

spinal anaesthetics contain a local anesthetic and/or a narcotic.

The drug, hyperbaric bupivacaine is the most commonly used local anesthetic in spinal anesthesia. There is renewed interest in administering non- opioid analgesic adjunct via neuro-axial route to increase post op analgesic cover. Clonidine is alpha 2 agonist that mediates its analgesic effect via the alpha 2 receptors reducing afferent transmission of pain.[7]

METHODS

A randomized double-blind study was performed at government medical college Banda in the department of obstetrics and gynaecology from Jan 2017 to July 2019 in 100 women undergoing elective cesarean section under spinal anesthesia. After proper informed written consent patient undergoing cesarean section were allocated randomly by block randomized computer generated random numbers into group A 50 women (Given 10.0 mg 0.5% hyperbaric bupivacaine) and group B, 50 women (Given 9.0 mg 0.5% hyperbaric bupivacaine and 30 µg clonidine).

Inclusion criteria were women with full term pregnancy and exclusion criteria were any skin allergy/reaction, severe PIH, placenta previa, obstructed labor, severe anemia, previous LSCS, other previous abdominal surgery, any other medical disorder.

All baseline preoperative investigations were done and women were explained about the visual analogue scale. Multipara monitor attached for standard non-invasive monitoring (NIBP, SpO_2, ECG, RR, temperature). Preloading with 20 ml/kg Ringer lactate was done. With all standard aseptic precautions, spinal anesthesia was given in sitting position at L2-L3 level with 25-gauge spinal needle. 2.0 ml of pre-prepared drug was given. Incision was allowed after confirmation of sensory block up to T6 level. Intraoperative vitals were noted down every 5 mins for first 30 mins and thereafter every 10 minutes till surgery ended.

Postoperative VAS scoring was done at every 30 minutes for 2 hours, 4 hourly for next 8 hrs and then 6 hourly. VAS of 0-3 was graded as mild, 4-6 as moderate and 7-10 as severe pain. Rescue analgesia was given when VAS score was $\geq$4 by Injection Tramadol 100 mg and injection paracetamol 1 gm IV infusion. Double blinding was done by keeping patient unaware about drug and anaesthesiologist was also kept blind by providing prefilled syringe.

Observations

Intraoperative hypotension, vasopressor dose requirement, bradycardia, nausea, vomiting, sedation, pruritus was noted down. Neonatal outcome was noted in terms of APGAR score.

Post-operative visual analogue scale (VAS) scoring was done for pain and time to first dose analgesic requirement and total doses of analgesic requirement was noted down.

Statistical analysis

The data was presented by mean±ST deviations for continuous variables. Frequency with relative percentages were given for categorical variables. Independent T test was used to compare the means between two groups. Chi square test was used for testing association between categorical variables. A p value less than 0.05 was considered statistically significant.

RESULTS

Total of 100 women were taken in the study whose characteristics matched in both groups in terms of age, height, weight and socioeconomic status. After spinal anesthesia the sensory effect was checked up to T6 level and time taken was noted down. In group A, sensory block was observed in 5.5± 0.5 min and in Group in B 4.4±0.8 min, p value difference was significant (Table 2). Hypotension (MAP 20% fall from pre-anaesthesia value) was significantly observed in group B as shown by a greater number of women requiring ephedrine to manage intraoperative hypotension. Intra-operative bradycardia, nausea, vomiting, sedation and rigors was not significantly different in both groups as shown in Table 2. Post-operative parameters were observed in turns of total duration of analgesia and motor recovery time, sedation and duration after which rescue analgesic was required in both groups as shown in Table 3. Duration of analgesia just after surgery was significantly more in group B and hence the dose of rescue analgesic required was also significantly less in group B. VAS scoring was observed postoperatively (Table 4). Scoring was significantly better after 4 hours of surgery in group B. APGAR Score was not significantly different in both groups (Table 5).

The characteristics were comparable in both the groups.

Table 1: Characteristics of women.

Variables	Group A (n=50)	Group B (n=50)	P value
Age (years)	29±2	29±3	1.000
Height (cm)	157±3	156±3	0.099
Weight (kg)	63±3	64±3	0.099
Socioeconomic status	Lower to middle	Lower to middle	

Table 2: Intra-operative characteristics.

Variables	Group A	Percentage (%)	Group B	Percentage (%)	P value
Onset of sensory block up to T6 (min)	5.5±0.5		4.4±0.8		<0.0001
Intraoperative visceral pain	02	4	0	00	0.153
Hypotension (MAP 20% fall from pre-anaesthesia value)	19	38	42	84	<0.0001
Ephedrine (mg)	5.04±1.8	-	17.56±4.5	-	<0.0001
Bradycardia (HR<60 bpm)	2	4	07	14	0.081
Sedation	0	0	0	0	-
Nausea	3	6	11	22	0.021
Vomiting	0	0	4	8	0.041
Rigors	2	4	3	6	0.646

Table 3: Post-operative conditions.

Variables	Group A (n=50)	Group B (n=50)	P value
Duration of analgesia post-op (min)	140±25	280±25	<0.0001
Motor recovery time (min)	130±15	120±15	0.001
Sedation	0	0	
Tramadol used in first 24 hrs (mg)	262±21	190±17	<0.0001

Table 4: VAS scoring.

VAS score post-op (min)	Group A (n=50)	Group B (n=50)	P value
30	0	0	
60	0	0	
90	1.2±0.7	0.9±0.5	0.015
120	1.7±0.9	1.4±0.4	0.034
240	4.6±2.1	3.2±1.8	0.0005
480	4.3±2.4	4.2±2.1	0.825

Table 5: Neonatal outcome.

APGAR score (min)	Group A (n=50)	Group B (n=50)	P value
APGAR 1	8.65±0.25	8.35±0.32	<0.0001
APGAR 5	8.50±0.34	9±0.39	<0.0001

DISCUSSION

Regional anesthesia is considered to be safest modality for cesarean sections in comparison to general anesthesia. Post-operative analgesia gives better hemodynamic of patients and early recovery with good mother and baby attachments. In our study, we found that onset of sensory block was earlier in group B and the reason is that due to addition of clonidine the baricity of bupivacaine heavy is reduced and ascends faster than group A.[10] During cesarean section visceral pain is a common complaint by the patient often associated with nausea, vomiting, sweating, uneasiness and changes in blood pressure and heart rate. This usually happens with exteriorization of uterus and closure of peritoneum. The predominant analgesic effects of clonidine are mediated through alpha 2 adrenergic receptors and this effect is enhanced in pregnancy.[11,12] Clonidine also provides analgesia for visceral pain and slows regression of the sensory block as reflected by the prolonged duration of analgesia in patients receiving a single dose of it. This ability of clonidine to enhance the sensory block may explain not only its postoperative analgesic effect, but also the reduced need for intraoperative analgesic supplementation when it was administered as part of the neuraxial anaesthetic technique for caesarean section. In our cases, visceral pain was there in 2 patients in group A and no pain in group B.

Hypotension was more in group B and was managed by Ephedrine and total average dose required was 17.56 mg of it as found by Shidhaye et al in their study.[13,14] The hypotensive episodes were transient and neonatal outcome was comparable in both groups.

In our study in group B, 7 women had bradycardia. In other studies, the dose of clonidine was 50 or 75 µg which decreased the hyper-baricity and could have done higher level block.[15,16]

As there was significantly increased incidence of hypotension in group B, nausea and vomiting was also higher.

Postoperatively, duration of analgesia was significantly higher in group B and dose of first analgesic was required after 4 hours in group A and 8 hours in group B as VAS scoring was significantly lower in group B. The good post-op analgesic cover with pain free period caused more satisfaction in group B with early recovery.[17]

Limitations

The limitation of our study was small sample size.

CONCLUSION

In our study, we conclude that neuraxial clonidine modestly enhances postoperative analgesia in women undergoing Caesarean section. This beneficial effect has to be balanced against the increased incidence of intraoperative hypotension which is usually transient. Based on these findings, clonidine may be a useful analgesic adjunct in women undergoing caesarean section under neuraxial anaesthesia.

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