

Comparison between Intrathecal Dexmedetomidine and Bupivacaine Vs Bupivacaine Alone for Prevention of Shivering in Cesarean Section

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ABSTRACT

Background: Shivering is one of the very common side effects of spinal anesthesia. It can be extremely discomforting for parturient undergoing caesarean section.

Aim: To compare intrathecal dexmedetomidine and bupivacaine with bupivacaine alone to see whether intrathecal dexmedetomidine can be helpful in preventing shivering in cases undergoing C-section

Methodology: This was a prospective randomized controlled trial carried out at Department of Anaesthesiology, Sheikh Zayed Hospital, Rahim Yar Khan. In this study all pregnant females undergoing C section between the age of 18 to 40 years irrespective of their gravida and parity were included. The cases were divided into two equal groups B and D. Group B were offered injection Bupivacaine only and those in group D were offered Bupivacaine along with Dexmedetomidine. Final outcome was seen at 4 hours for shivering after giving spinal anesthesia.

Results: In this study there were 120 cases, 60 in each group. The mean age in group B and D was 31.12 ± 4.57 vs 30.67 ± 5.03 years with p value 0.81 and mean BMI was 23.19 ± 4.11 vs 23.81 ± 4.23 kg/m² with P value 0.95 respectively. There were 80% cases in group B and 66.67% in group D belonging to rural population with p value 0.88. Shivering was observed in 24 (40%) cases in group B and 6(10%) in group D with p value 0.01.

Conclusion: Combination of intrathecal Bupivacaine and Dexmedetomidine is significantly better than intra thecal Bupivacaine alone in prevention of shivering in patients undergoing C section.

Keywords: Bupivacaine, Dexmedetomidine, Shivering, Intrathecal

INTRODUCTION

The modes of delivery and associated parameters have changed immensely in the recent past. There is a marked rise in the number of C-section^{1,2}. Anesthesia during C-section is a very important entity and regional anesthesia is highly preferred as compared to general anesthesia (GA) in recent times to reduce the associated complications and ease of administration. Dedicated anesthesia teams for obstetric anesthesia and better working relationship between anesthesiologists and obstetricians have also led to judicious use of GA for caesarean section.³ Early mobilization and fewer maternal and fetal complications are also the leading factors^{4,5}.

Shivering is a protective mechanism by virtue of which heat production occurs by vigorous involuntary muscle activity to compensate for the decreased core temperature in a normal healthy living body. Shivering is commonly encountered both after regional and general anesthesia. Spinal anesthesia (SA) is the preferred method during most C-sections. However, the adverse effects of neuraxial anesthesia, such as maternal hypotension, shivering, vomiting or nausea, and light headedness cannot be underestimated. Crowley LJ and Buggy DJ found shivering in about 55% of patients undergoing neuraxial anesthesia⁶.

Various drugs, techniques and measures have been used in the past to prevent shivering but the search for an ideal drug or drug combination is ongoing. Mostafa et al has shown that the intrathecal use of adjuvant drugs for C-section have not only led to better efficacy of anesthesia, they also reduced the unwanted effects like shivering⁷. Dexmedetomidine (DEX) is a highly selective agonist of alpha 2-adrenergic receptors. It's intravenous and intrathecal use has increased tremendously in anesthesia and intensive care units. It is postulated that DEX exhibits anti shivering effects through its centrally mediated actions⁸. YQ Wang et al meta-analysed in their study that intrathecal DEX is effective in

reducing shivering in caesarean section.⁹ K Nasser et al also found intrathecal DEX to be effective in lowering the incidence and severity of shivering in patients undergoing Cesarean Sections when used as an adjuvant to 0.5% bupivacaine without major adverse effects¹⁰.

Bupivacaine is a commonly used drug in resource depleted areas and under developed countries. In our part of the world, there is very few data regarding DEX to be used as an adjuvant to Bupivacaine to prevent or reduce the incidence of shivering especially in the settings of C section. This is why we planned to study the intrathecal effect of DEX with regard to prevention of shivering when used as an adjuvant to intrathecal 0.5% bupivacaine in patients undergoing C-section.

The objective of the study was to compare intrathecal dexmedetomidine and bupivacaine vs bupivacaine alone for prevention of shivering in patients undergoing C-section.

MATERIAL AND METHODS

After approval from institutional review board, this prospective double-blinded randomized controlled trial that was carried out at Department of Anaesthesiology, Sheikh Zayed Hospital, Rahim Yar Khan. Written and informed consent was taken from all the patients under study. 120 cases of American Society of anaesthesiologists (ASA) physical status 1 and 2 were enrolled (60 in each group)]. The sample size was calculated by keeping the confidence level up to 90%, power equal to 90% and the prevalence of shivering in intrathecal Bupivacaine alone as 52% and Bupivacaine plus DEX as 24% in previous study¹⁰. In this study all pregnant females between the age of 18 to 40 years irrespective of their gravida and parity undergoing elective C-section under spinal anesthesia (SA) were included. Patients with hypothermia or hyperthermia, body mass index (BMI) more than 25, hyperthyroidism or hypothyroidism, with contraindications for SA, heart diseases, psychiatric diseases, on α -receptor antagonists, hypertension or using antihypertensive drugs, deranged renal or hepatic profiles, any history of allergy to drugs

Received on 17-01-2022

Accepted on 27-06-2022

under study, massive haemorrhages needing blood transfusions, failed or partial spinal block were excluded from the study.

These cases were randomly divided into two equal groups by computer generated method. In pre-operative area, one 18 G and one 20 G venous cannulas were placed in the dorsum of the hand or any suitable area in the forearms of all patients. They were preloaded by Ringer's lactate solution (10mL/kg) and maintained by 6-8mL/kg/h at room temperature. ASA 1 monitoring was chosen for all patients. Patients in group B were offered 12.5mg of injection Bupivacaine (0.5%) and 0.5ml of normal saline while those in group D were offered Bupivacaine in same dose along with 5 micrograms of Dexmedetomidine in 0.5ml of normal saline. The C-sections were done according to standard protocols. The cases were followed for vital signs like blood Pressure and heart rate. Shivering was assessed with a five-point scale validated by Crossley and Mahajan, where 0 is graded as no shivering, 1 as piloerection or peripheral vasoconstriction but no visible shivering, 2 as muscular activity in only one muscle group, 3 as muscular activity in more than one muscle group, and 4 as whole body shivering¹¹. Shivering incidence and intensity was registered every 15min during surgery and in the recovery room with a total duration of 4 hours. Score of 2 or more at any stage was labelled as shivering.

Statistical analysis: The data was analyzed by using SPSS version 21.0. Quantitative data was presented as mean and SD and frequencies and percentages were calculated for categorical data. Both the groups were compared by using Chi square test and p value of ≤ 0.05 was taken as significant.

RESULTS

Table I. Demographic comparison (n= 60 in each group)

	Group B	Group D	P value
Age (years)	31.12±4.57	30.67±5.03	0.81
BMI (kg/m ²)	23.19±4.11	23.81±4.23	0.95
Duration of surgery (mints)	53.11±10.11	55.67±11.71	0.91

Table II. Categorical demographics (n= 60 in each group)

	Group B	Group D	P value
House wife	44 (73.33%)	46 (76.67%)	1.0
Working woman	16 (26.67%)	14 (23.33%)	
Rural	48 (80%)	40 (66.67%)	0.88
Urban	12 (20%)	20 (33.33%)	
Educated	24 (40%)	20(33.33%)	0.91
Uneducated	36 (60%)	40 (66.67%)	

Table III: Comparison of shivering in both groups (n= 60 in each group)

Shivering	Group B	Group D	P value
Yes	24 (40%)	6 (10%)	0.01
No	36 (60%)	54 (90%)	

DISCUSSION

Perioperative complications like pain and shivering are concerning and need early anticipation and better management in cases undergoing C section under spinal anesthesia as they add to overall anxiety and surgical stress. A number of techniques and doses of different drugs have been used in the past with varying degree of success where Bupivacaine was the most commonly used drug and Dexmedetomidine is a recent addition with promising results.

In the present study shivering was observed in 24(40%) out of 60 cases in group B managed with Bupivacaine only and (10%) out of 60 cases in group D managed with Bupivacaine and Dexmedetomidine. In a study done by Usta B et al shivering was observed in intrathecal Bupivacaine as 56.7% as compared to 40% in present study and Bupivacaine plus dexmedetomidine as 10% which was similar to our study¹².

Ping Y et al also concluded after their meta- analysis that DEX is a potential anaesthetic adjunct which facilitate anaesthesia and analgesia when given in Brachial Plexus Block¹³. According to another study done by He et al compared three groups in which one was offered normal saline, the other one 2.5 micrograms of Dexmedetomidine and the third was offered 5

micrograms of Dexmedetomidine and it was seen that shivering was seen in 36.7%, 33.3% and 6.7% of the cases respectively. The last group with shivering of 6.7% used the same dose as was used in present study.¹⁴

In another randomized controlled trial done by Liu X et al revealed that combination of Dexmedetomidine and Bupivacaine was significantly better than Bupivacaine alone and placebo alone with odds ratio, 0.26; 95% confidence interval, 0.14–0.49 and a significant p value of < 0.05 ¹⁵.

In another study done by Zhang et al compared 10 vs 5 micrograms of Dexmedetomidine for prevention of shivering and it was seen that there was no significant difference in both the groups with $p>0.05$ ¹⁶. This again favours that even 5 micrograms of Dexmedetomidine can help preventing shivering.

This was also supported by the studies of Bajwa SJ et al and Usta B et al where they found that shivering was markedly decreased by adding intra thecal Dexmedetomidine and there were no significant side effects observed with this drugs.¹⁷

CONCLUSION

Combination of intra thecal Bupivacaine and Dexmedetomidine is significantly better than Bupivacaine alone in preventing shivering in cases undergoing C section.

Conflict of interest: Nil

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