

A Study Of Incidence Of Post Spinal Shivering And The Effectiveness Of Prophylactic Ketamine In Reducing Incidence

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Abstract: Post spinal shivering is a common complication from spinal anesthesia and usually causes discomfort for the patients. It was said to have resulted from reduced sympathetic tone and the resulting vasodilatation, redistribution of heat from core to peripheral parts of the body. Apart from the discomfort, post spinal shivering is associated with increased cardiac, systemic energy requirement and oxygen consumption and can lead to hypoxaemia.

Objective: The objective of the study was to compare the effectiveness of low dose intravenous ketamine and placebo in reducing the incidence of post spinal shivering.

Methods: After ethical approval 60 patients ASA 1 -2 ages 15 to 60 being planned for elective caesarian section were recruited for the study after they have consented for the study. Immediately after subarachnoid block consecutive patients were given 0.25mg ketamine diluted to 5mls syringe or normal saline also in 5mls syringe according to the group they were randomized to using table of random numbers. The incidences of post spinal shivering, the haemodynamics, sedation scores and complications were sought for

Results: There was more incidence of shivering with higher degree in the placebo group compared to the ketamine. There was no need for rescue pethidine in the ketamine when compared to the placebo group while there were incidences of vomiting hallucinations in the ketamine group.

Conclusion: Post spinal shivering is a common complication after subarachnoid block and ketamine is effective in reducing the incidence of post spinal shivering.

Keynotes: subarachnoid block, post spinal shivering, ketamine

I. INTRODUCTION

Shivering defined as involuntary repetitive activities of the skeletal muscles. It is a common occurrence in obstetrics anesthesia especially for procedures under subarachnoid blocks with incidence of 24 to 56%. The pathogenesis of shivering after subarachnoid block is said to be due to reduced sympathetic tone, vasodilatation and consequent redistribution of heat from core to peripheral tissues from the trunks and areas below the level of the block.

Prolonged inhibition of autonomic thermoregulation, cold temperatures of the operating theatre and cold infusion fluids

lower the temperature and leads to shivering. Shivering creates problems in monitoring by increasing the incidence of artifacts on monitors, increases postoperative pain, cardiac output, basal metabolic rates and oxygen consumption. Various techniques have been employed in the control of post spinal Shivering which includes the use of warming blanket, warm intravenous fluids, radiant heaters. Several pharmacological agents have also being employed which includes pethidine, tramadol, clonidine, allfentanil, dexmethomidine etc.

This study aimed at determining the effectiveness of small dose intravenous ketamine in reducing the incidence of post spinal Shivering.

II. METHODS

After ethical approval sixty ASA1 -11 patients aged 15-60 being planned for elective caesarian section were recruited for the study after obtaining consent from them. They were randomly divided into two groups by picking from tables of random numbers kept in an opaque envelope in a box. A resident doctor in the department prepared the tested drugs in two syringes each 5mls. Only the resident doctor was aware of the coding of the group and the corresponding syringes.

Patients were examined both generally and systemically, while basic investigations like Packed Cell Volume, Electrolyte urea & creatinine were done and blood was grouped and crosshatched if there is likelihood of transfusion. Patients were premeditated with oral diazepam 10mg nocte and were fasted overnight.

On the morning of surgery patients were brought into theater; the equipments were checked while table was also set for general anesthesia. Baseline vital signs were checked and patients were then cannulated with size 18 canulla then preloaded with normal saline 20 mL/kg. They were monitored with automated noninvasive blood pressure, pulse oximetry, and electrocardiogram. 25G quencke spinal needles were introduced through L3-L4 interspaces in sitting position using aseptic precautions. Each patient was given 2.5mls of hyperbaric bupivacaine and was subsequently put in supine position.

Immediately after lying supine drugs from either syringes were given intravenously according to the number picked and the corresponding syringes. Sensory level was checked with cotton wool spirit swab. Surgery was allowed to commence with block at T10. Vital signs notably the blood pressure, pulse rate and saturation were recorded every 15mins. Incidences of shivering were sought for likewise incidence of complications like vomiting, hallucination were sought for. Blood loss was monitored with patient being transfused volume for volume when needed. Level of sedation were recorded according to Ramsey scale with 1 as agitated, 2 tranquil and calm 3 sleeping but responds to verbal stimulus, 4 sleeping with a brisk response to glabellar tap, 5 sleeping with sluggish response to glabellar tap or loud verbally stimulus and 6 for sleeping with no response to glabellar tap or loud auditory stimulus.

At the end of surgery patients were transferred to recovery room where postoperative analgesic and monitoring continued. Incidences of vomiting were treated with 10mg metoclopramide.

III. RESULTS

The study showed there was more incidence of shivering with higher degree in the placebo group compared to the ketamine Table 1. There was no need for rescue pethidine in the ketamine when compared to the placebo group with p value 0.0001 Table 3. In terms of vital signs; the average systolic, diastolic blood pressures and pulse rate was higher than the baseline values in the ketamine group while the values appears lower than the baseline in the normal saline(placebo group) Table 2.

The incidences of complications were more in the ketamine group. The incidence of vomiting (30 vs. 3.3%); hallucinations 36% vs. 0; ketamine and placebo group respectively Table 4.

Ketamine administration was associated with sedation as the group has lesser average sedation score compared to the saline group Table 4.

Degree of shivering	Group K N (%)	Group P. N (%)
0	24 (80)	05(16.7)
I	4(13.3)	06(20)
II	1(3.3)	04(13.3)
III	1(3.3)	05(16.7)
IV	0(0)	10(33.3))

Table 1: Degree of Shivering seen in each group

Vital signs	Group K	Group P	P value
Systolic BP. Preoperative	120±8.12	124± 8.20	
Intraoperative	142 ± 9.22	112 ± 7.86	0.002
Diastolic BP. Preoperative	68 ± 4.40	72.0 ± 4.60.	0.004
Intraoperative	82.0 ± 5.2	66.0 ± 4.44.	
Pulse rate. Preoperative	72.6 ± 4.62	78.12 ± 5.12	0.005
Intraoperative	92.8 ±6.12	65.40 ±4.40.	

Table 2: Comparison of vital sign changes between the two groups

Groups	Rescue pethidine use	P value
Group K	0(0)	0.0001
Group P	18(60)	

Table 3: Risqué pethidine use

Complications	Group K	Group P	P value
Vomiting	09(30))	1(3.3)	0.002
Hallucinations	11(36.6)	0 (0)	0.0001
Average sedation score	3	4	0.005

Table 4: Incidence of complications

IV. DISCUSSION

The result of this study showed that patients with prophylactic ketamine had fewer incidences and lesser degrees of shivering when compared with the patients that had saline (placebo group). None of the patients in the ketamine group also had rescue pethidine while 18 of the saline group; more than fifty percent of the study population in that group had rescue pethidine to abate their incidences of shivering. This shows that incidences of shivering is high after bupivacaine subarachnoid blocks and also that ketamine prophylaxis intravenously is effective in preventing post spinal shivering

A study done by Rabi et al in which ketamine was compared with placebo in preventing Post spinal shivering in repair of vesicovaginal fistula. Though the type of surgery differs but the outcome is similar while they also concluded that ketamine is effective in preventing post spinal Shivering. Sagir et al & Kose et al in different studies also had similar results like ours in terms of the efficacy ketamine in preventing postoperative shivering.

Other studies also affirmed the efficacy of ketamine in preventing post spinal shivering. Ketamine, a competitive N methyl-D-Aspartate (NMDA) receptor antagonist inhibits post spinal shivering by inhibiting NMDA receptors which modulate thermoregulation at several levels in the brain. ketamine as a NMDA receptor antagonist also controls shivering through non shivering thermogenesis either by action on the thalamus or by the B adrenergic effect of norepinephrine, Patients in the ketamine group had a higher pulse rate, systolic and diastolic blood pressure compared to the control group. This is similar to findings by. Reda SA et al and Alfonsi et al in different studies...

Ketamine however with its efficacy was associated with incidences of vomiting and hallucinations as shown in this study. This was corroborated by a study by Gecaj-Gashi A et al. however Honarmand et al did not find incidences of hallucination nor sedation in their own study despite the fact that same dose of ketamine {0.25mg/kg} was used.

V. CONCLUSION

Prophylactic dose of ketamine prevents postoperative shivering though with associated incidences of hallucinations, vomiting and mild sedation.

VI. RECOMMENDATION

Based on the findings of this study it is recommended that 0.25mg/kg of ketamine is effective in preventing post spinal shivering. It is also recommended that prophylactic antiemetic and anxiolytic could be administered to prevent vomiting and hallucinations as a complications of ketamine use.

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