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Research article

COMPARISON OF TRAMADOL HYDROCHLORIDE AND DEXMEDETOMIDINE FOR THE MANAGEMENT OF INTRA-OPERATIVE SHIVERING IN SUBJECTS UNDERGOING SPINAL ANAESTHESIA

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ABSTRACT

In the management of post-spinal shivering, pharmacological approaches involving a range of medications. in our research, we compared two readily available and effective medications, dexmedetomidine and tramadol hydrochloride, intravenously administered for treating shivering in subjects who received spinal anaethesia for different surgical interventions in the search for a more secure and efficacious medication. under spinal anaethesia, a comparison of tramadol hydrochloride and dexmedetomidine for the prevention of intra-operative shivering. a prospective, randomized study of 40 american society of anesthesiologists stage i and ii subjects of either sex, aged 21 to 65 years, who were scheduled for various surgical interventions under spinal anaethesia was performed. dexmedetomidine 1g/kg or tramadol hydrochloride 1mg/kg were given as a slow IV infusion over 5 minutes to the subjects, who were divided into two categories of 40 subjects each. shivering severity, onset, time to manage shivering, recurrence, and adverse results were all monitored at regular intervals. dexmedetomidine took 205.10 $\pm$ 18.6 seconds to stop shivering, while tramadol hydrochloride took 413.24 $\pm$ 16.45 seconds. only the tramadol hydrochloride category experienced nausea and vomiting. the sedation profiles of the two medications were similar. shivering caused by post-spinal anaethesia can be effectively managed with dexmedetomidine (1 g/kg) and tramadol hydrochloride (1 mg/kg). as compared to tramadol hydrochloride, dexmedetomidine takes less time to control shivering. it has an advantage over tramadol hydrochloride in that it has less side results such as nausea and vomiting.

KEYWORDS: Dexmedetomidine, Intra-operative shivering, Tramadol Hydrochloride

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INTRODUCTION

For various procedures, spinal anaesthesia is a common and secure anaesthesia technique. Shivering is the most common side effect of spinal anaesthesia, affecting 19-33 % of subjects. Shivering is uncomfortable for the patient, anesthesiologist, and surgeon, in addition to being physiologically uncomfortable. 1,2 Shivering has a physiological function of providing heat, but its occurrence in the context of anaesthesia is inconsistent and poorly understood. Subjects undergoing regional anaesthesia and those recovering from general anaesthesia both experience shivering. 3 It has a number of negative physiological results, including a rise in oxygen intake & CO2 production. The vasoconstriction and shivering thresholds are considered to be reduced by spinal anaesthesia. 4 Owing to spinal mediated vasodilation, heat is redistributed from the heart to the periphery, and shivering is followed by core hypothermia and vasoconstriction above the stage of block 2. Intra-operative hypothermia may be minimized by reducing cutaneous heat loss to the cold operating room area, evaporation from surgical incisions, and conductive cooling caused by cold intravenous fluid administration. 5,6 For minimizing heat loss both physical as well as have all been tried as pharmacological approaches. These medications are both readily available and inexpensive. Tramadol Hydrochloride and dexmedetomidine are compared for the prevention of intra-operative shivering during spinal anaesthesia.

MATERIAL AND METHODS

After receiving written informed permission from the subjects and approval from the Institutional Ethics Committee, a prospective, randomized comparative study was performed. The research involved consenting subjects of either gender aged 21 to 65 years who were scheduled for elective surgeries under spinal anaesthesia. Based on the literature reference, 40 subjects were chosen in each category with a confidence interval > 95% and power > 95% to detect a mean difference of 3 minutes in the period for shivering control. On the night before surgery, all of the subjects in the study were given a dose of diazepam 10 mg in tablet form. Subjects were moved to the operating room, where standard monitors were used to log baseline parameters. They were given 10 ml/kg of Ringer Lactate solution as a preload. A mercury thermometer was inserted in the axilla near the axillary artery to record the baseline Temp. The Temp. in the operating room was held between 22 and 25 degrees Celsius. Under strict aseptic precautions, all subjects in our study received spinal anesthesia. Following the free flow of CSF, 0.5 % bupivacaine (hyperbaric) was injected in amounts ranging from 3 to 4 ml, depending on the surgery's needs. They were given 2 liters of

oxygen per minute through a Hudson transparent face mask and were well-protected with surgical drapes. The participants in the study were those who shivered after receiving spinal anaesthesia. Shivering in the Stages 2 and 3 of the Crossly & Mahajan scale was deemed to necessitate care. Those who experienced shivering in the above-mentioned Stages were assigned to one of two study categories at random. Dexmeditomedine was given in a single IV bolus dose of 1 mcg/kg over 5 minutes to Category (A). Subjects in the Tramadol Hydrochloride Category (B) received 1 mg/kg Tramadol Hydrochloride IV over a 5-minute period. The study drug was then given to the appropriate Category through IV. The time from when the medication was given to when the shivering stopped was measured in seconds. All of the subjects were tracked at 1 minute, 3 minute, 5 minute intervals, then 10, 20, and 30 minute intervals before the operation was completed. They were monitored.

RESULTS

In total, 80 subjects met the inclusion criteria in our sample. They were split into two categories at random: Category (A) and Category (B). Dexmedetomidine is in Category A, and Tramadol Hydrochloride is in Category B.

Table 1: Subjects from both categories' demographic profiles

	N= 80	
	Category (A) (%)	Category (B) (%)
Age	38.12 ±1 2.12	37.2 ± 11.6
Gender(Male/ Female)	24/16	12/28
Weight (Kg)	61.8 ± 9.12	61.50 ± 8.14
Stage 2/ Stage 3 Shivering	14/26	22/18

Table 1 shows In terms of age, gender, weight, and shivering severity, both categories are comparable.

Table 2: Temp. Monitoring, onset time, and shivering control

	Category (A) (%)	Category (B) (%)
Temp. prior to spinal anesthesia (°C)	37.14 ± 0.68	37.14 ± 0.68
Temp. while Shivering (°C)	36.34 ± 0.64	36.70 ± 0.74
Time of onset of shivering (min)	39.47 ± 9.30	41.10 ± 7.04
Time from drug administration to control of shivering (Sec)	205.10 ± 18.6	413.24 ± 16.45

Table 2 shows Temp. During shivering and time of onset of shivering are similar in both classes. With a p value of 0.01 here is an important difference between the two categories in terms of shivering control.

Table 3: Adverse Results

Adverse results	Category (A) %	Category (B) %
Nausea	0	20 %
Vomiting	0	25 %
Recurrence of shivering	0	10 %
Low heart Rate	0	0
Low BP	0	0

Table 3 shows adverse results are observed only in Category (B) & absence in Category (A). Haemodynamically both categories are comparable.

Table 4: Stages of Sedation

Stages of Sedation as per Filos	Category (A) (%)	Category (B) (%)
Stage 1	0	80 %
Stage 2	90 %	20 %
Stage 3	10 %	0

Table 4 shows Category (A) shows Stage 2 and Stage 3 sedation, while Category (B) shows Stage 1 and Stage 2 sedation.

DISCUSSION

Spinal anaesthesia is a secure and widely used anaesthesia procedure for a variety of procedures all over the world. In subjects undergoing spinal anaesthesia, a number of factors lead to a drop in core body Temp. Tramadol Hydrochloride's opioid and non-opioid modes of action are believed to function in tandem on the central nervous system's descending inhibitory pathways (CNS). [7,8,9] Tramadol Hydrochloride's anti-shivering effect is due to its serotoninergic or noradrenergic activity. Dexmedetomidine lowers the shivering and vasoconstriction thresholds and is linked to a lower frequency of shivering. [10] Dexmedetomidine lowers the thresholds of vasoconstriction and shivering in a similar way. In terms of age, gender, and weight, the two Categories had similar demographic characteristics. In our research, we used a mercury thermometer to measure Temp. near the axillary artery. [11,12,13] This was based on the findings of a study by Daniel L et al, who found that axillary Temp. s were a strong predictor of core body Temp. when the thermometer was positioned near the axillary artery. The mean Temp. at which subjects in our sample shivered after spinal anaesthesia was 36.34 $\pm$ 0.64 for Category (A) and 36.70 $\pm$ 0.74 for Category (B). There was no discernible difference. The average Temp. at the time of shivering was 36.2°C in a study by Aditi Dhimar et al. Subjects in the Tramadol Hydrochloride Category shivered for 413.24 $\pm$ 16.45 seconds after drug administration, while subjects in the Dexmeditomedine Category shivered for 205.10 $\pm$ 18.6 seconds. The differences in findings were statistically important between the two Categories. All children stopped shivering within 5 minutes of receiving Dexmedetomidine, according to a report by Blaine E et al. The time it took for the impact to appear was 3.5 +/- 0.9 minutes, which was similar to our findings. Shivering regulation was 2.52 $\pm$ 0.44 in the Dexmedetomidine Category and 5.92 $\pm$ 0.81 in the Tramadol Hydrochloride Category, according to Mittal G et al. In our sample, the frequency of nausea and vomiting with Tramadol Hydrochloride was 20% and 25 %, respectively. The findings are consistent with those of other Reddy V S et al. reports. The frequency of nausea and vomiting was 28 % and 20 %, respectively, in a report by Mittal G et al, which also happened in our study. [14,15] Dexmedetomidine sedation ratings were Stage 2 in 36 (90%) subjects and Stage 3 in four (10 %) subjects. Our findings support the findings of Karaman et al, who found that by using a loading dose of 1 g/kg followed by a maintenance dose of 0.5 g/kg, intra-operative Dexmedetomidine infusion induced

minimal sedation. The sedation scores in the Tramadol Hydrochloride category were Stage 2 in 32 (80%) subjects and Stage 1 in 8 (20%) subjects. In both categories, the number of subjects who were sedated did not vary significantly. In the absence of nausea and vomiting, the sedation provided by Dexmedetomidine is beneficial. The hemodynamic parameters were similar in both classes, which supports Mittal G et al findings. Clonidine, the other agonist, is linked to a high rate of hypotension and bradycardia. [16] Dexmedetomidine has an advantage in this regard because it produces less hemodynamic variation. In our analysis, only the Tramadol Hydrochloride Category had a recurrence rate of 10%. In their analysis, Maheshwari et al registered a similar recurrence rate with Tramadol Hydrochloride (8 %). [17,18]

CONCLUSION

Shivering caused by post-spinal anaesthesia can be effectively treated with Dexmedetomidine and Tramadol Hydrochloride. As compared to Tramadol Hydrochloride, Dexmedetomidine takes less time to suppress shivering. It has an advantage over Tramadol Hydrochloride in that it has less side results such as nausea and vomiting. Shivering is caused by a complex network of neurotransmitter pathways including opioids, -2 adrenergic, serotonergic, and anti-cholinergic receptors. In order to avoid or treat this disorder, drugs that operate on these mechanisms are used. Dexmedetomidine's anti-shivering activity has not been thoroughly studied. Dexmedetomidine, like clonidine, is linked to a reduced incidence of shivering. The vasoconstriction and shivering thresholds were decreased after an intravenous infusion of dexmedetomidine.

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