Original Article

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Gabapentin and Tramadol for Prevention of Post Spinal Shivering

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Abstract

Background: The study aims to compare gabapentin and tramadol for prevention of post spinal shivering. **Subjects and Methods:** A total of seventy- eight adult patients aged 20–60 years were randomly divided into three groups of 26 patients each. Group I was administered two capsules of tramadol 50 mg each, Group II was administered two capsules of gabapentin 300 mg each and Group III was administered two sugar filled capsules. **Results:** The mean age was 43.5 years in group I, 44.6 years in group II and 45.3 years in group III, weight was 75.1 Kgs, 75.6 Kgs and 76.2 Kgs, height was 1.25 m, 1.26 m and 1.32 meters, BMI was 26.2 Kg/m^2, 26.5 Kg/m^2 and 1.32 Kg/m^2, duration of surgery was 81.3 minutes, 83.6 minutes and 84.7 minutes, duration of spinal anaesthesia was 186.4 minutes, 190.2 minutes and 191.5 minutes and onset of shivering was 34.2 minutes, 38.5 minutes and 32.4 minutes in group I, II and III respectively. A non- significant difference was observed (P> 0.05). Grade 0 was seen in 83%, 80% and 56% in group I, II and III respectively. Grade 1 was seen in 3%, 3%, grade 2 in 2%, 5%, grade 3 in 12%, 8% and 32% and grade 4 in 0%, 4% and 12% in group I, II and III respectively. Common adverse events reported were dizziness in 5%, 24%, Nausea/vomiting in 6%, 0% and 3% and hypotension in 13%, 6% and 14% in group I, II and III respectively. A significant difference was observed (P< 0.05). **Conclusion:** Oral gabapentin 600 mg and tramadol 100 mg were found to be equally effective for prevention of post spinal shivering.

Keywords: Post spinal shivering, Gabapentin, Tramadol.

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Introduction

Post spinal shivering has been defined as spontaneous, involuntary and oscillatory fasciculations or tremor like hyperactivity of skeletal muscles.[1] It varies from a mild form of having skin eruptions to a severe form with generalized continuous skeletal muscle contractions.[2] It is known to have both intra operative and post-operative complications.[3] Intraoperatively it is known to increase the oxygen demand by 200-500 % along with an increase in the carbon dioxide production. Thus it may further compromise myocardial function in the pregnant females. Moreover, it is distressing for the patient and interferes with perioperative vital monitoring.[4] Post operatively it may contribute to increased wound pain, delayed wound healing and hence a delayed in discharge from the hospital.[5]

Various non pharmacological and pharmacological therapies like preoperative warming, forced air warming, use of intravenous opioids, ketanserin, propofol, granisetron, doxaparem, physostigmine, clonidine and nefopam has been commonly used but intrathecal use of drugs reduce it's dosage as well as side effects associated with it.[6]

Gabapentin premedication is being used due to its analgesic, anxiolytic and opioid sparing effects.[7] Tramadol has been the most commonly studied and employed agent for prevention and treatment of post-spinal shivering. Tramadol, a μ opioid receptor agonist also inhibits neuronal uptake of noradrenaline and promotes hydroxytryptamine secretion.[8] Considering this, we attempted present study to compare gabapentin and tramadol for prevention of post spinal shivering.

Subjects and Methods

A total of seventy- eight adult patients aged 20–60 years and belonging to American society of Anesthesiologists (ASA) grade I-III, scheduled for elective orthopaedic surgery under spinal anaesthesia were enrolled. The selection of the patients proceeded written consent of the patients. Ethical approval form institutional ethical clearance and review committee was obtained before starting the study.

A thorough clinical examination was carries out. Patients were randomly divided into three groups of 26 patients each. Group I was administered two capsules of tramadol 50 mg each, Group II was administered two capsules of gabapentin 300 mg each and Group III was administered two sugar filled capsules. Parameters such as Heart rate (HR), respiratory rate, non-invasive blood pressure (NIBP), oxygen saturation (SPO2), body temperatures were recorded. Grade of shivering and Incidence of adverse effects were also recorded and compared in all groups. Results thus found

were compared in all groups using appropriate statistical test, where level of 0.05 was set as significant.

Results

Table 1: Demographic characteristics

Parameters	Group I	Group II	Group III	P value
Age (years)	43.5	44.6	45.3	>0.05
Weight (Kgs)	75.1	75.6	76.2	>0.05
Height (m)	1.25	1.26	1.32	>0.05
BMI (Kg/m2)	26.2	26.5	25.4	>0.05
Duration of surgery (min)	81.3	83.6	84.7	>0.05
Duration of spinal anaesthesia (min)	186.4	190.2	191.5	>0.05
Onset of shivering (min)	34.2	38.5	32.4	>0.05
Cessation of shivering after rescue drug (Inj Dexmedetomidine 1 mcg/kg IV slowly) (min)	3.8	4.2	6.5	>0.05

The mean age was 43.5 years in group I, 44.6 years in group II and 45.3 years in group III, weight was 75.1 Kgs, 75.6 Kgs and 76.2 Kgs, height was 1.25 m, 1.26 m and 1.32 meters, BMI was 26.2 Kg/m^2, 26.5 Kg/m^2 and 1.32 Kg/m^2, duration of surgery was 81.3 minutes, 83.6 minutes and 84.7 minutes, duration of spinal anaesthesia was 186.4 minutes, 190.2 minutes and 191.5 minutes, onset of shivering was 34.2 minutes, 38.5 minutes and 32.4 minutes and cessation of shivering after rescue (Inj Dexmedetomidine 1 mcg/kg IV slowly) was 3.8 minutes, 4.2 minute and 6.5 minutes in group I, II and III respectively. A non- significant difference was observed (P> 0.05) [Table 1].

Table 2: Grades of shivering

Grades	Group I	Group II	Group III	P value
Grade 0	83%	80%	56%	<0.05
Grade 1	3%	3%	0%	>0.05
Grade 2	2%	5%	0%	>0.05
Grade 3	12%	8%	32%	<0.05
Grade 4	0%	4%	12%	<0.05

Grade 0 was seen in 83%, 80% and 56% in group I, II and III respectively. Grade 1 was seen in 3%, 3%, grade 2 in 2%, 5%, grade 3 in 12%, 8% and 32% and grade 4 in 0%, 4% and 12% in group I, II and III respectively. A significant difference was observed (P<0.05) [Table 2, Figure 1].

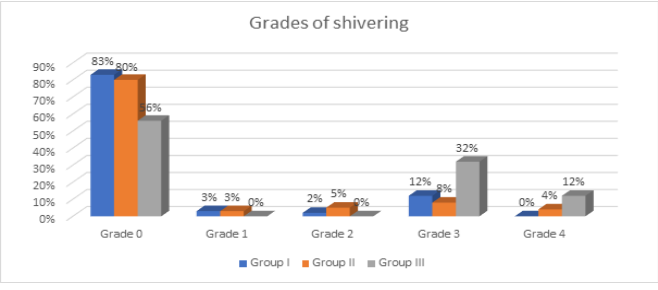
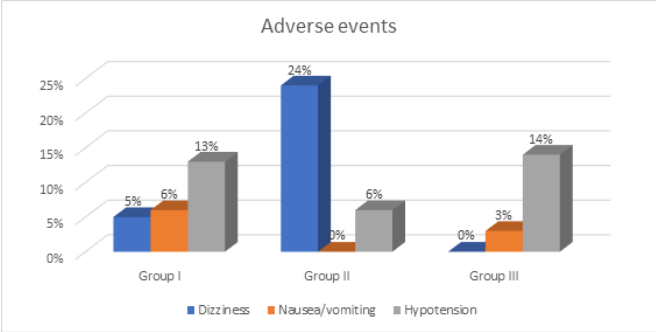


Table 3: Incidence of adverse events

Adverse events	Group I	Group II	Group III	P value
Dizziness	5%	24%	0%	<0.05
Nausea/vomiting	6%	0%	3%	<0.05
Hypotension	13%	6%	14%	<0.05

Common adverse events reported were dizziness in 5%, 24%, Nausea/vomiting in 6%, 0% and 3% and hypotension in 13%, 6% and 14% in group I, II and III respectively. A significant difference was observed (P< 0.05) [Table 3, Figure 2].



Discussion

The cause of shivering post spinal anaesthesia is a common complication and is attributed to peripheral vasodilatation, which results in a core to peripheral distribution of the body heat. This causes a decrease in core body temperature.[9] This decrease is sensed by the hypothalamic thermoreceptors which tries to increase the heat production primarily by shivering.[10] Other intra operative causes of shivering may include disinhibited spinal reflex, respiratory alkalosis, decreased sympathetic activity or pain.[11,12]

Tramadol not only has a weak opioid activity it also inhibits the reuptake of serotonin and nor epinephrine at the spinal cord level. This inhibition increases the release of 5-hydroxytryptamine which influences the thermoregulatory center.[13] Tramadol hydrochloride is a μ opioid receptor agonist which has shown to prevent shivering when given intravenously.[14] Moreover, it's analgesic property when given intrathecally has been widely studied and it is proven to be safe to mother as well as the fetus when given intrathecally.[15] The present study compared gabapentin and tramadol for prevention of post spinal shivering.

Our results showed that the mean age was 43.5 years in group I, 44.6 years in group II and 45.3 years in group III, weight was 75.1 Kgs, 75.6 Kgs and 76.2 Kgs, height was 1.25 m, 1.26 m and 1.32 meters, BMI was 26.2 Kg/m^2, 26.5 Kg/m^2 and 1.32 Kg/m^2, duration of surgery was 81.3 minutes, 83.6 minutes and 84.7 minutes. Nain et al,[16] in their study a total of 150 adult patients of either sex belonging to American Society of Anesthesiologists physical status I–III scheduled for elective orthopaedic surgeries received tramadol 100 mg (group A), gabapentin 600 mg (group B) or placebo (group C) orally 30 min before administration of spinal anaesthesia. The primary outcome was to study the incidence and severity of shivering, whereas the secondary outcome was to evaluate the incidence of adverse effects. Incidence of shivering was comparable among groups A and B (P = 0.8) whereas it was significantly less than in group C (P = 0.00). Severity of shivering (grade 1 and 2) was comparable in all the groups (P = 0.6 and 0.36), whereas shivering grade 3 and grade 4 was significantly lesser in groups A and B as compared to group C (P = 0.01 and 0.01). The incidence of nausea and vomiting was more

in group A (26%) as compared to group B (20%) (P = 0.48) but was significantly lesser than group C (48%) (P = 0.01). Incidence of sedation (sedation score ≥2) was significantly more in group B (22%) as compared to group A (4%) and group C (0%)

Our results found that duration of spinal anaesthesia was 186.4 minutes, 190.2 minutes and 191.5 minutes, onset of shivering was 34.2 minutes, 38.5 minutes and 32.4 minutes and cessation of shivering after rescue was 3.8 minutes, 4.2 minute and 6.5 minutes in group I, II and III respectively. Bansal et al,[17] conducted a study in which sixty patients of American Society of Anaesthesiologist Class I and II were randomly divided into two groups and were given either normal saline (Group C) as control group or Tramadol (group T) as study group intrathecally as adjuvant along with Bupivacaine (hyperbaric) for spinal anaesthesia. The patients were monitored for intensity and incidence of shivering. Statistically significant difference was found in the incidence as well as intensity of shivering among the two groups. The tramadol requirement was significantly reduced in the study group and there was no significant difference between the adverse effects seen in both the groups. They found that when tramadol was given intrathecally along with hyperbaric bupivacaine it was found to be effective in countering the side effect of shivering in parturient after spinal anaesthesia. Also, there was no significant difference in side effects like nausea, vomiting and pruritis due to use of tramadol in both the groups.

Conclusion

Oral gabapentin 600 mg and tramadol 100 mg were found to be equally effective for prevention of post spinal shivering.

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