

Research Article

Comparison of two Different Doses of Intrathecal Tramadol to Prevent Post-Operative Shivering in Patients Undergoing Surgeries under Spinal Anesthesia

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ABSTRACT

Objective: To compare two different doses of Tramadol for prevention of post-operative shivering in patients undergoing surgeries under spinal anesthesia

Study Design: Comparative cross-sectional study

Setting and Duration of Study: Combined Military Hospital Skardu
September 2024 to February 2025

Patients and Methods: All the patients undergoing surgical procedures at operation theater of CMH Skardu under spinal anesthesia were recruited in this study. Patients were divided into two groups for the sake of comparison. Group I had 10mg Tramadol along with routine pre-anaesthetic medication while group II had 20 mg of same medication. Both the groups were observed for 5 hours after the surgery for post-operative shivering or other immediate adverse events in the recovery room.

Results: Out of 220 patients randomized into two groups for the sake of comparison, 128 (58.2%) took 10 mg Tramadol and 92 (41.8%) took 20 mg Tramadol before induction of spinal anesthesia. Mean age of patients put who were recruited in this study was 34.84 ± 10.64 years. When both the groups were compared, post spinal anesthesia shivering and post-operative need for opiate analgesia were found statistically significantly less in group of patients who took 20mg Tramadol than those who took 10mg Tramadol (p -value<0.001).

Conclusion: Shivering after the surgery under spinal anesthesia was not uncommon in our study participants. It was concluded that 20mg dose of Tramadol was more effective in preventing post spinal anesthesia shivering as compared to 10mg dose of Tramadol used for same purpose.

Keywords: Dose, Shivering, Spinal anesthesia, Tramadol.

INTRODUCTION

Local and spinal anesthesia techniques have been evolving with time and replacing general anesthesia for most of the surgeries performed in routine.¹Epidemiological data suggests that large number of surgeries involving region of abdomen and lower limb are carried out under spinal anesthesia.² For

most of the cases surgeries performed under spinal anesthesia are considered more safe as compared to surgeries performed under general anesthesia.³It becomes important for anesthesia doctors to be aware of adverse effects associated with each type of anesthesia.

Spinal anesthesia generally considered to have fewer side effects but still some complications have been associated with this type of anesthesia techniques.⁴ Post-operative shivering in patients who underwent surgery under spinal anesthesia is a finding reported by significant number of patients.⁵ This adverse effect usually not considered serious or life threatening but still could be cumbersome for the patient therefore set protocols exist to prevent or manage post-operative shivering in patients undergoing surgical procedure under spinal anesthesia.⁶ Various agents have been compared and tried to prevent shivering after the surgery performed under spinal anesthesia. A randomized controlled trial was published by Thangavelu et al. which revealed that Ketamine was effective agent when compared to saline for prevention of shivering after the surgical procedure performed under spinal anesthesia.⁷ In 2017 similar trial was performed but it was not placebo controlled. It compared Tramadol with low dose of Ketamine and established efficacy of both the agents in prevention of post-operative shivering while recovering from spinal anesthesia.⁸ Tramadol was also evaluated for same purpose in a study done in India and compared to other two agents (Ketamine and Dexmetomidine). It was found superior to Ketamine but inferior to Dexmetomidine.⁹ Dose and route of Tramadol used is different trials and studies have been different therefore still there is a gap in literature that what dose and route may be best for this medication for prevention of post spinal anaesthesia shivering.

A big chunk of surgeries is performed under spinal anaesthesia in all of our secondary or tertiary care hospitals. Most of the time teams are concerned about intra-operative issues related to anaesthesia but recently a lot of work has been done for preventing early post-operative anaesthesia related complications. A recent local study done at Karachi evaluated the impact of adding low dose Ketamine to Tramadol for prevention of post-operative shivering and found that this addition was quite effective. Limited local data has been available regarding exact dose of Tramadol effective for prevention of post-operative shivering. We therefore designed this study with the rationale to compare two different doses of Tramadol for prevention of post-operative shivering in patients undergoing surgeries under spinal anesthesia.

PATIENTS AND METHODS

This comparative cross-sectional study was conducted at the anesthesia department of combined military hospital Skardu from September 2024 to February 2025. Sample size was calculated by WHO Sample Size Calculator by using two groups. Group I took 10mg Tramadol=20% while group II took 20mg Tramadol=6.67%.¹¹ Non probability Consecutive sampling technique was used to gather the sample and then all the study participants were randomized into two groups via lottery method before induction of anesthesia.

Inclusion Criteria: Patients (male or female) between the age of 18 and 60 years who underwent any surgical procedure at CMH Skardu under spinal anesthesia were recruited.

Exclusion Criteria: Patients managed for trauma or any emergency condition under spinal anesthesia were not recruited. Patients classed as ASA IV were not included in the study. Those who had transfusion during the surgery or had to switch to general anesthesia during the surgery were excluded from the analysis. Those who had evidence of active infection at the time of surgery but still underwent surgery were excluded as well. Patients taking any medication which could interfere with metabolism of anesthetic or pre-anesthetic medications were also not included in our study.

Ethical approval (letter number XXX) was sorted d from CHM Skardu ethical review board committee after their meeting and discussion on study protocol. Patients fulfilling the criteria set for this study and undergoing surgical procedure under spinal anaesthesia were included in our study. Lottery method was used to assign the patients into two comparison groups. Patients in group A 10 mg of Tramadol intrathecal via standard protocol while patients in group B received 20mg Tramadol intrathecal via set protocol.¹² These medications were given to patients just before the induction of spinal anaesthesia along with other routine pre-anaesthetic medications.¹³ Patients after the surgical procedure were evaluated both by surgeon and anaesthetist and shifted to recovery room adjacent to the operation theatre. In recovery room they were observed closely for vital signs and all the immediate complications by trained team. Post-operative shivering was classified into 4 classes, 0 was no shivering, 1 was piloerection

or peripheral vasoconstriction but no visible muscular activity, 2 was muscular activity in one muscle group, 3 was Muscle activity in more than one muscle group but not generalized and 4 was generalized muscle activity in whole body. Significant shivering was considered as class 1 or above or requiring intravenous meperidine for stabilizing the patient.¹⁴ Other post-operative complications like requirement of opiate analgesia, hemodynamic instability and post-operative delirium were diagnosed by consultant anaesthetist in the recovery room as per set criteria.¹⁵

All statistical analysis for this comparative cross-sectional study was performed by Statistics Package for Social Sciences version 24.0 (SPSS-24.0). Frequency and percentages were calculated for gender, patients with hemodynamic instability, patients with post-operative shivering, post-operative delirium and requirement of postoperative opiate analgesia and type of surgery. Mean and

standard deviation for age was calculated for all the patients recruited in this analysis. Pearson Chi-square test was applied to look for statistically significant difference of various clinical parameters among the two study groups. The p-value less than or equal to 0.05 was conferred significant to establish the difference.

RESULTS

A total of 220 patients meeting inclusion/exclusion criteria were recruited for this study from surgery/anesthesia department of CMH Skardu. Mean age of patients put who were recruited in this study was 34.84 ± 10.64 years. Table-I showed the basic demographic and clinical characteristics of participants recruited in this analysis. Out of 220 patients randomized into two groups for the sake of comparison, 128 (58.2%) took 10 mg Tramadol and 92 (41.8%) took 20 mg Tramadol before induction of spinal anesthesia.

Table-I: Characteristics of Patients Undergoing Surgery under Spinal Anesthesia at CMH Skardu

Study Parameters	n(%)
Age (years) Mean $\pm$ SD	34.84 $\pm$ 10.64 years
Gender Male Female	52 (23.6%) 168 (76.4%)
Dose of Tramadol Used 10 mg 20 mg	128 (58.2%) 92 (41.8%)
Post-operative Shivering No Yes	186 (84.5%) 34 (15.5%)
Requirement of Post-surgical Opiate Anesthesia No Yes	199 (90.4%) 21 (9.6%)
Types of Surgery General surgery Gynecological surgery Others	78 (35.4%) 134 (60.9%) 08 (3.6%)

Table-II showed the results of statistical analysis done for establishing comparison. When both the groups were compared, post spinal anesthesia shivering and post-operative need for opiate analgesia were found statistically significantly less in group of patients who took 20mg Tramadol than those who took 10mg Tramadol (p-value<0.001).

Table-II: Comparison of Various Clinical Factors Including Post-Operative Shivering in Two Study Groups

	10 mg Tramadol	20 mg Tramadol	
Clinical Parameters			p-value
Post-operative shivering			

No	124	(96.8%)	62	(67.3%)	<0.001
Yes	04	(3.2%)	30	(32.7%)	
Hemodynamic instability					
No	17	(13.3%)	20	(21.7%)	0.1
Yes	111	(86.7%)	72	(78.3%)	
Requirement of post-surgery opiate analgesia					
No					0.004
Yes	110	(85.9%)	89	(96.7%)	
	18	(14.1%)	03	(3.3%)	
Post-operative delirium					
No	124	(96.8%)	86	(93.5%)	0.237
Yes	04	(3.2%)	06	(6.5%)	

DISCUSSION

Twenty milligrams dose of Tramadol was more effective than 10 mg for prevention of post-operative shivering in our study participants. Post-operative shivering occurs in considerable number of patients after surgery under spinal anesthesia. Worldwide, number of pharmacological agents have been tried to prevent this complication. Type, route and dose of agent used along with pre-anesthetic medications for prevention of shivering are important for the treating team. Still no single medication with a fixed dose and route has got a place in guidelines for this purpose and clinicians are trying various agents. We conducted this study with an aim to compare two different doses of Tramadol for prevention of post-operative shivering in patients undergoing surgeries under spinal anesthesia. Gupta et al. published a study in 2018 and studied patients undergoing surgeries under sub-arachnoid block. They compared two different doses of Tramadol (10 mg and 20 mg) for prevention of postsurgical shivering and revealed that dose of 20mg was better in pain control but did not offer any additional benefit for prevention of post-surgical shivering.¹¹ Our results were different from that of Gupta et al. and Tramadol 20mg was superior to 10mg in preventing post spinal anesthesia shivering.

Efficacy of Tramadol + Thiopentone and Tramadol + Propofol was compared for prevention of post-operative shivering. They used standard dose of Tramadol i-e. 1mg/kg and found out that Tramadol was better when combined with Propofol in preventing post-operative shivering.¹⁶ We did not see benefits of any add on medication but compared two different doses of Tramadol and found 20mg better than 10mg for prevention of post-operative shivering.

Tramadol in doses of 1,2 and 3 mg/kg was compared for prevention of post-anesthetic shivering by Mohta et al. they concluded that 2mg/kg dose was best in prevention of post-anesthetic shivering in their study participants.¹⁷ We compared two different doses and concluded that 20mg dose of Tramadol was more effective in preventing post spinal anesthesia shivering as compared to 10mg dose of Tramadol used for same purpose.

A prospective cohort study was used to compare 0.5 mg/kg of Tramadol with Ketamine for prevention of post-spinal shivering in patients undergoing orthopedic surgery. It was revealed that Ketamine was better than 0.5 mg/kg of Tramadol for prevention of post-spinal shivering.¹⁸ We compared 10 and 20mg of Tramadol for the said purpose and found 20mg better than 10mg.

STUDY LIMITATIONS

Mostly dose of medication is estimated according to body weight. We did not classify our patients according to body mass index and did not use tramadol according to body weight. Two fixed dose regimens were used which may not give exact dose of Tramadol required to prevent shivering. Data of one hospital of northern area may also not give exact results which could be generalized to whole local population.

CONCLUSION

Shivering after the surgery under spinal anesthesia was not uncommon in our study participants. It was concluded that 20mg dose of Tramadol was more effective in preventing post spinal anesthesia shivering as compared to 10mg dose of Tramadol used for same purpose.

CONFLICT OF INTEREST

No

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No

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