



EFFICACY AND POTENCY OF DEXAMETHASONE IN COMPARISON TRAMADOL IN THE PREVENTION OF POST-OPERATIVE AND INTRA OPERATIVE SHIVERING DURING BOTH SPINAL AND GENERAL ANAESTHESIA

Anaesthesiology

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ABSTRACT

A typical side effect of spinal anaesthesia (SA) is intraoperative shivering, which is frequently brought on by a breakdown in thermoregulatory regulation. Shivering can impair patient comfort and safety, raise metabolic needs, and disrupt surgical monitoring. Although a number of pharmacological medications have been investigated for their treatment, nothing is known about how effective they are in comparison. The purpose of this study is to assess and contrast the effectiveness of dexamethasone, and tramadol in treating intraoperative shivering after spinal anaesthesia.

KEYWORDS

Desamethasone, Tramadol, post operative shivering, intraop shivering, spinal anesthesia, general anesthesia.

INTRODUCTION

One of the most often documented side effects of central neuraxial blockade is shivering, which is caused by disturbances in thermoregulatory control [1]. Because spinal anaesthesia prevents tonic vasoconstriction and transfers core heat from the trunk to peripheral tissues, patients are vulnerable to hypothermia and shivering during this procedure. The current data training period ends in October 2023. PSS (PSAS) is a reflexive, recurrent skeletal muscle reaction to core hypothermia that increases the production of metabolic heat. "PSAS increases cardiac output, plasma catecholamines, CO₂ production, and O₂ consumption, which may interfere with blood pressure, oxygen saturation, and ECG monitoring [2]." Anti-shivering medications and nonpharmacological and pharmacological techniques can effectively control shivering during anaesthesia. To treat intra-operative shivering, a range of pharmaceutical drugs are used, including as opioids, 5-hydroxytryptamine receptor (5-HT₃) antagonists, N-methyl D-aspartate (NMDA) receptor antagonists, cholinomimetics, and biogenic amines [1]. Despite the widespread use of spinal anaesthesia, post-spinal shivering (PSS) is a possible side effect that is frequently seen following surgery in developing nations because of a lack of resources to maintain normothermia. It has been seen to range between 8.15% to 11.6% in developing countries [3,4]. A high incidence of PSS is linked to hypothermia, which is defined as "heat redistribution from the core" to the periphery during the intraoperative phase as a result of vasodilation and decreased "thermoregulatory vasoconstriction below the spinal block level." According to research, PSS is influenced by the type of anaesthesia used, the age and gender of the patient, and the type of surgery performed [5]. Serious side effects, including worsening surgical site pain, prolonged wound healing, higher metabolic demand, elevated oxygen consumption, and haemostatic dysfunction, can result from untreated PSS, particularly in patients with reduced cardiac reserves and arterial hypoxia. To lessen the incidence of PSS, non-pharmacological techniques such warm humidified anaesthetic gases or radiant heat are used. These nonpharmacological treatments are expensive and not widely available [6]. The purpose of this study was to evaluate and contrast the ways in which dexamethasone and tramadol can reduce intraoperative shivering following spinal or general anaesthesia.

Methodology

A comparison study was carried out during the study period of 18 months at the Department of Anaesthesiology, Vedanta College, Palghar. Patients with ASA physical status I or II who were between the ages of 18 and 60 were included. In addition to those with baseline body temperatures of 36.5 or 38.0 degrees Celsius, patients having a history of ischaemic heart disease, behavioural or psychological disorders, epilepsy, glaucoma, or allergies to the research medications were not included.

Data Collection:

One hundred patients scheduled for elective procedures under spinal or general anaesthesia were randomly assigned to one of two groups following ethical committee approval and patient informed

agreement. An equal number of patients were assigned to each group, which received intravenous tramadol at a dose of 1 mg/kg and intravenous dexamethasone at a dose of 0.1 mg/kg. The operating room was kept at a consistent temperature of 18 to 20 degrees Celsius following spinal or general anaesthesia. Pinprick testing was used to measure sensory level and regression time, and the modified Bromage scale was used to measure motor block. Bromage scale 3 and T6, respectively, were used to determine the desired motor and sensory blocks. Throughout the treatment, shivering was observed every five minutes for an hour. A scale was used to measure the degree of shivering: 0 meant no shivering, 1 meant piloerection without shivering, 2 meant shivering in one muscle group, 3 meant shivering in several muscle groups, and 4 meant widespread shivering. Hallucinations, nausea, vomiting, nystagmus, and perspiration were among the possible adverse effects of the medications that were delivered. Patients who reported having fictitious sights, sounds, tastes, scents, or sensations were said to be experiencing hallucinations. Ten milligrammes of metoclopramide were administered intravenously to patients who were experiencing nausea and vomiting. The observer, who was not informed of the study medications, watched the patients in the recovery area for thirty minutes while keeping an eye on the designated criteria.

Statistical Analysis

The statistical analysis was conducted using IBM SPSS Version 28. Using a Microsoft Excelbook 2021, tables and graphs were created. P < 0.05 was considered significant.

RESULTS:

Table 1: Demographic profile

Demographic profile	Group T	Group D	P value
Age	43.2±10.7	45.8±10.6	0.92
Gender			
Male	60	62	
Female	40	38	0.8
ASA Grade			
I	45	43	
II	55	57	0.78

Table 2: Comparison of shivering between groups

Shivering	Group T	Group D	P value
Intraop Shivering			
Yes	6	10	0.84
No	94	90	
Postop Shivering			
Yes	2	3	0.98
No	98	97	

Table 3: Adverse effects

Adverse Effects	Group T	Group D	P value
Nausea / Vomiting	15%	10%	0.52
Hallucination	2%	0%	
Sweating	13%	9%	

DISCUSSION

One frequent reaction to hypothermia is shivering, which is an involuntary rhythmic contraction of the skeletal muscles.[6] Anaesthesia, a cool operating room, and surgical variables that result in substantial heat loss can all contribute to hypothermia when thermoregulatory control is disturbed. Since hypothermia is a medical emergency, it must be treated right away.[7]. Regardless of the underlying reason, shivering is a thermogenic reaction to restore normal body temperature in cases of intraoperative hypothermia. A synthetic opioid called tramadol has variable degrees of temperature control. It works by preventing serotonin and norepinephrine from being reabsorbed in the spinal cord, which increases serotonin release.[8] According to Baldo and Rose, tramadol works by interacting with alpha-2 adrenoceptors and kappa opioids to prevent shivering.[9] Tramadol dosages between 0.5 and 3 milligrammes per kilogramme have been shown in earlier research to be effective in lowering postoperative shivering.[10,11] Previous studies on tramadol have revealed shivering incidences ranging from 8.8% to 16%.[12] In line with other research, 2% of participants in our study experienced shivering while using tramadol. Compared to dexamethasone, prophylactic injection of 1 mg/kg tramadol dramatically decreased shivering. In a research by McSwain et al., dexamethasone (0.3–0.6 mg/kg) successfully avoided postoperative shivering in patients undergoing cardiopulmonary bypass under general anaesthesia.[7] Although we used a lower dose (0.1 mg/kg) to preserve efficacy with minimum side effects, our study found that the intraoperative incidence of shivering was 10% with dexamethasone and 6% with Tramadol. This is consistent with our study's findings. The results of our study are in line with another randomised controlled trial by Asaad et al. that looked at ENT surgery patients under general anaesthesia using 0.15 mg/kg dexamethasone to minimise postoperative shivering.[13] Our research showed that tramadol was marginally more effective than dexamethasone at preventing postoperative shivering. However, in line with the findings published by G. Alice Vinathi, it was linked to a marginally increased frequency of adverse symptoms such nausea and vomiting.[14]

CONCLUSION

The effectiveness of tramadol, ketamine, and dexamethasone in reducing intra-operative shivering after spinal anaesthesia (SA) was thoroughly assessed and contrasted in this study. Despite variations in their duration, onset of action, and adverse effect profiles, the results showed that all three medications were successful in treating post-spinal shivering. With a balanced onset and duration of effect, tramadol demonstrated a consistent decrease in the intensity of shivering. Dexamethasone offered long-lasting comfort with few adverse effects, whereas ketamine had a quick onset and possible neuropsychiatric side effects. These findings highlight the importance of a customised strategy for the best intraoperative care and support the use of anti-shivering medications depending on the requirements of each patient.

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