

Efficacy of Pethidine and Dexamethasone Combination in Managing Postoperative Shivering (Cesarean) Section

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Abstract

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Background: Postoperative shivering is a common complication after the spinal anesthesia particularly in the cesarean section patients. Effective management strategies, including the use of Pethidine and Dexamethasone, have been explored to reduce shivering.

Objective: To evaluate the efficacy of the combination of pethidine and dexamethasone in controlling postoperative shivering in patients undergoing cesarean section under spinal anesthesia.

Methodology: A randomized controlled trial was conducted with 100 patients undergoing cesarean section, assigned to either Pethidine or Pethidine + Dexamethasone groups. Shivering severity, duration, recurrence, and complications were assessed postoperatively.

Results: The combination therapy of Pethidine + Dexamethasone significantly reduced shivering severity (mean = 0.56), duration (mean = 1.74 minutes), and recurrence (14.0%) compared to Pethidine alone (severity mean = 1.91, duration mean = 5.25 minutes, recurrence 43.9%). The combination group also had fewer complications (18.6%).

Conclusion: Pethidine combined with Dexamethasone is more effective and safer than Pethidine alone in managing postoperative shivering in cesarean section patients under spinal anesthesia.

Introduction

Postoperative shivering is describes as unusual skeletal muscle movement occurring immediately after anesthesia as a result of the violation of the normal thermoregulation processes. It often occurs following the spinal anesthesia due to the redistribution of body heat between the core and the peripheral tissues owing to sympathetic blockage. Shivering is the one that is regarded as a frequent complication in the course of perioperative period and can be experienced by a substantial percentage of the spinal anesthesia patients. The agents that have been actively examined include pethidine and dexamethasone which have shown the possibility of having anti-shivering effect. These drugs can help to improve patient comfort and perioperative stability with preventative administration [1].

The incidence of postoperative shivering in patients who have undergone cesarean section under spinal anesthesia has been shown through clinical evidence that dexamethasone is a significant tool in reducing postoperative shivering. Randomized controlled observations have identified a reduced occurrence of shivering in patients under prophylaxis dexamethasone therapy as opposed to regular management. The decrease in shivering is explained by the anti-inflammatory and membrane-stabilizing influence of corticosteroids. Dexamethasone has also been shown to have an effect on thermoregulation by inhibiting the release of inflammatory mediators during surgical stress. The drug has also been known to decrease postoperative nausea and vomiting. The results confirm the applicability of dexamethasone as a viable pharmacological intervention in inhibition of shivering after spinal anesthesia in patients undergoing cesarean section [2].

Comparative clinical trials assessing the prophylactic drugs used to prevent shivering after a spinal anesthesia have revealed that pharmacologic treatment of shivering is a major way of minimizing the result. Comparative studies on acetaminophen, dexamethasone, and pethidine proved that dexamethasone and pethidine are effective in preventing postoperative shivering. Pethidine has always exhibited high anti-shivering effects that are attributed to activities on central opioid receptors and thermoregulatory mechanisms. The incidence and severity of shivering was significantly reduced in patients who were given pethidine than in patients who were not administered the drug. Pharmacologic prophylaxis is thus important in reducing the postoperative complications in relation to thermoregulation. These results highlight the fact that pethidine and dexamethasone are useful in regulating shivering in the aftermath of the spinal anesthesia [3].

Shivering in the face of neuraxial anesthetic use during cesarean section has been extensively reported as a frequent perioperative complication. The physiological alterations related to pregnancy and spinal anesthesia are some of the causes of the disruption of normal thermoregulation. Spinal anesthesia results in sympathetic blockade that results in peripheral vasodilation and redistribution of body heat. When the cool operating room environment is exposed to, the risk of hypothermia and shivering is even greater. Due to these possible effects, prevention and treatment of shivering are regarded as significant to the obstetric anesthesia treatment. It is thus

common to recommend pharmacological interventions to ease the occurrence and extent of perioperative shivering [4].

Shivering that occurs after the spinal anesthesia is a frequent complication that augments the oxygen expenditure, metabolic rate, and patient agony. The drugs that are commonly used to control shivering are pethidine and dexamethasone as they have a thermoregulatory effect as well as anti-inflammatory effect. Although both drugs are useful on their own, there is a lack of information on their concomitant use. The combination could have a better control of shivering since the combination happens to interact in various physiological processes. Thus, the purpose of the research is to determine the effectiveness of pethidine with dexamethasone and compare them with pethidine alone in the treatment of postoperative shivering.

LITERATURE REVIEW

Gholami H et al., (2018) performed randomized clinical trial compared the comparative effect of dexamethasone and pethidine in prevention of shivering after spinal anesthesia in patients who underwent cesarean section. The aim of the study was to find out which pharmacologic agent can be used to achieve a better control of temperature regulatory disturbances in the perioperative phase. There were two groups of participants who were to receive either dexamethasone or pethidine before spinal anesthesia. The results have shown that both drugs have an important inhibitory effect on postoperative shivering. Shivering was reduced, which was related to reduced metabolic demands and oxygen use. The research indicated that a combination of these agents had a potential therapeutic betterment [23].

Zheng G et al., (2023) performed meta-analysis evaluates efficiency and safety of the ondansetron to prevent the post-anesthesia shivering during the cesarean section under the spinal anesthesia. The study used several randomized controlled trials in the evaluation of the prophylaxis of ondansetron as a prophylaxis anti-shivering agent. Results showed that ondansetron had significant influences on reducing postoperative shivering than placebo or usual care. The general evidence favored the use of pharmacologic prophylaxis to reduce shivering in obstetric anesthesia. The authors have made a conclusion that ondansetron is an effective and safe choice in terms of preventing shivering in cesarean section under spinal anesthesia [24].

Ravishankar N et al., (2025) performed randomized clinical trial assessed the impact of the single-dose systemic dexamethasone given before surgery on the postoperative outcomes of term parturients induced into spinal anesthesia during cesarean section. Dilution of the stress related to surgical operations can have an indirect effect on stabilization of thermoregulatory processes. Better perioperative results were noted in patients who were treated with dexamethasone. The results confirmed the value of corticosteroid therapy when used as an adjunctive drug in obstetric anesthesia. The authors came to the conclusion that dexamethasone has important advantages on enhancing the postoperative outcomes in women undergoing cesarean section [25].

Ioannopoulos D et al., (2025) performed meta-analysis and systematic review assessed the effectiveness and safety of intravenous dexamethasone in decreasing postoperative pain in women having a cesarean section. In this study, the available clinical evidence was analyzed in order to find out the therapeutic value of dexamethasone in obstetric anesthesia practice. The results have shown that dexamethasone greatly enhanced pain relieving and patient comfort after surgery. It also demonstrated that the drug decreased inflammatory reactions after surgical operations. Better analgesia also led to an

improved recovery of the mother and less discomfort during surgery. Better perioperative stability improves patient safety in general when operating a cesarean section. The researchers made the conclusion that dexamethasone is an effective second-line drug to use in the treatment of postoperative patients in the case of cesarean section [26].

METHODOLOGY

This cross-sectional study was conducted at MNH Hospital Manga Mandi and Noor Hospital Lahore, involving 100 patients undergoing elective surgery under spinal anesthesia, selected through non-probability convenience sampling. Patients aged 18–65 years who met the inclusion criteria were divided into two groups of 50 each. One group received pethidine alone, while the other received pethidine combined with dexamethasone. Postoperative shivering, its severity, onset, duration, and associated adverse effects were recorded using a structured proforma. Data were analyzed using SPSS version 26, applying independent sample t-tests and chi-square tests, with a p-value ≤ 0.05 considered statistically significant, while informed consent and patient confidentiality were ensured.

RESULTS

Table 1: Descriptive statistics of study variables

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	20	37	29.44	4.736
BMI	100	19.8	32.2	25.737	2.9440
Duration of Shivering (min)	100	.0	9.8	3.744	2.7916
Shivering Severity (0-3)	100	0	3	1.33	1.006
Valid N (listwise)	100				

Interpretation:

This shows the demographic and clinical characteristics of the study sample. The mean age of the participants was 29.44 years (SD = 4.74), and the mean Body Mass Index (BMI) was 25.74 (SD = 2.94). The average duration of postoperative shivering was 3.74 minutes (SD = 2.79), and the average severity of shivering was 1.33 (SD = 1.01), indicating mild to moderate shivering in the majority of participants.

Figure 1: Shivering severity by drug group

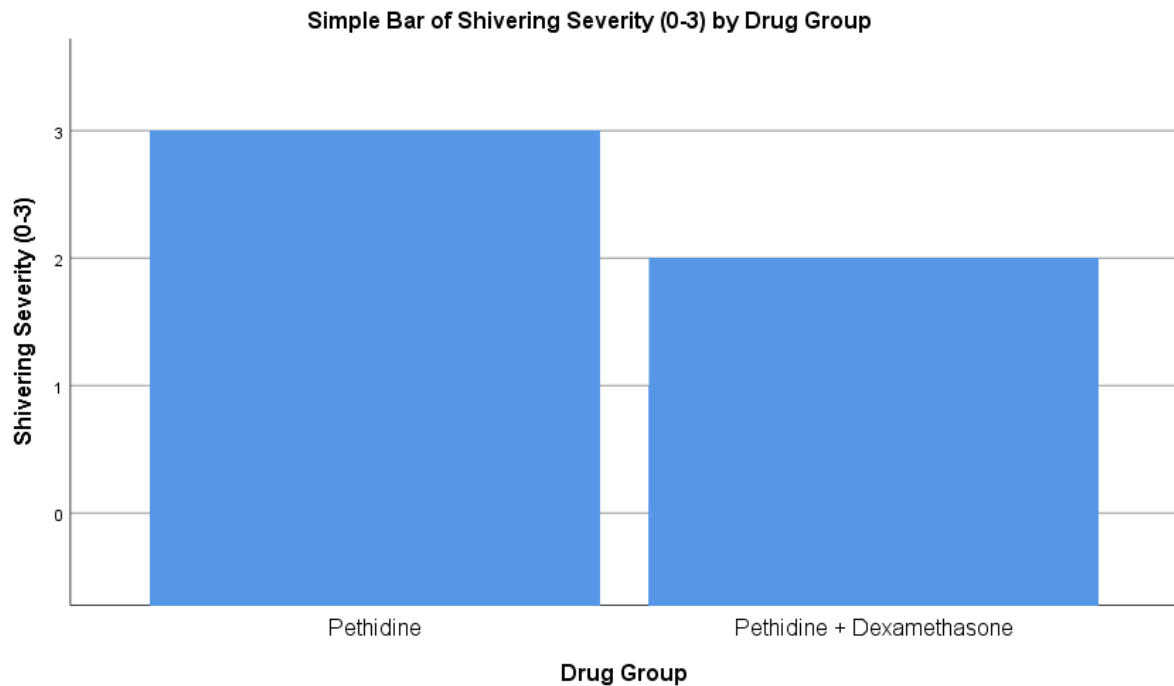


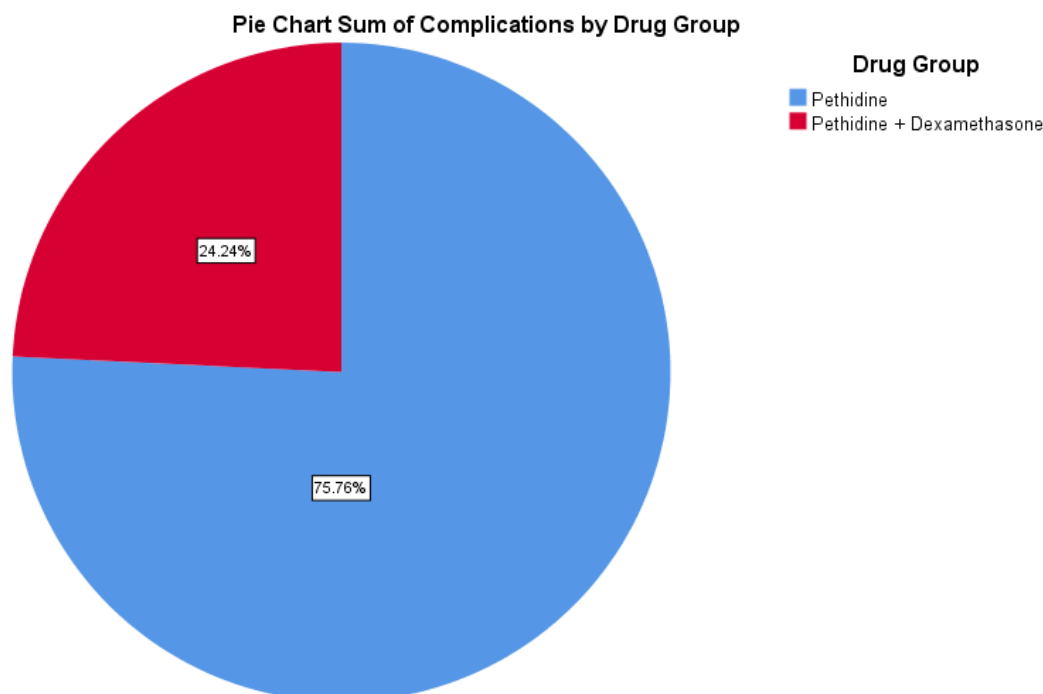
Table 2: Chi-square test for drug group and recurrence of shivering

Drug Group * Recurrence Crosstabulation					
			Recurrence		Total
			no	yes	
Drug Group	Pethidine	Count	32	25	57
		% within Drug Group	56.1%	43.9%	100.0 %
	Pethidine + Dexamethasone	Count	37	6	43
		% within Drug Group	86.0%	14.0%	100.0 %
Total		Count	69	31	100
		% within Drug Group	69.0%	31.0%	100.0 %

Interpretation:

This shows that the recurrence rate of shivering was significantly lower in the Pethidine + Dexamethasone group (14.0%) compared to the Pethidine group (43.9%), with a statistically significant difference ($\chi^2 = 10.248$, $p = 0.001$), indicating that the combination therapy significantly reduced the recurrence of shivering.

Figure 2: Drug group and complications



DISCUSSION

This research aimed to compare the effectiveness of dexamethasone and pethidine in postoperative shivering prevention in patients who are subjected to transurethral resection of the prostate with the help of the spinal anesthesia. The results showed that dexamethasone was very effective in suppressing the severity and incidence of postoperative shivering, in comparison with the use of pethidine. In the same way, our study found that in our case, Pethidine + Dexamethasone caused a significant reduction in severity and duration of shivering than Pethidine alone. The findings of this study support the overall idea that the addition of dexamethasone can enhance the efficacy of Pethidine. This further establishes the clinical relevance of using combination therapies in perioperative care. Finally, our research contributes to the increasing literature on the benefits of using combination therapies to minimize postoperative shivering and enhance patient outcome [1].

Kalawa and Wongseeda carried out a randomized controlled trial to compare the effectiveness of dexamethasone in the reduction of postoperative shivering in patients undergoing cesarean section with spinal anesthesia. Their research established that the administration of dexamethasone much lowered the occurrence of shivering, which is in line with our research. Pethidine + Dexamethasone used in our study exhibited a drastic reduction in shivering severity and duration of shivering relative to Pethidine. The statistical differences that we were able to notice in the study especially in recurrence (14.0% in the combination and 43.9% in the Pethidine group), are quite pertinent in the context of their results, which proved the effectiveness of the combination approach. Our results add more weight to the general literature on the advantages of combination therapies in the management of postoperative shivering in cesarean section patients [2].

Nouh et al. performed a comparative study to compare intravenous acetaminophen, dexamethasone and pethidine in the prevention of shivering after lower limb orthopedic surgeries. In their research, dexamethasone combined with pethidine had a significant effect in reducing shivering. This is in agreement with our results where we found out that the use of Pethidine + Dexamethasone was more effective in suppressing both the severity and duration of postoperative shivering than Pethidine itself. The large decrease in recurrence of shivering in our experiment reflects their results, wherein dexamethasone was important in inhibiting recurrence of shivering. In general, our findings are consistent with the notion of the comparative study, which states that dexamethasone is a drug that should be included in the standard operating procedures to prevent shivering in different surgical scenarios [3].

CONCLUSION

This research was performed to determine the effectiveness of Pethidine and Dexamethasone used together or independently in the management of postoperative shivering in cesarean section patients. The results showed that the combination therapy was significantly better than Pethidine alone in its efficacy and safety. The combination group experienced a significant decrease in severity and duration of shivering in comparison to Pethidine group. These findings strongly affirm that combination therapy is a better choice of shivering control method in post-cesarean section patients. It was statistically found that the severity ($p < 0.001$) and the duration of postoperative shivering ($p < 0.001$) of the combination group were significantly reduced. Also, there was a statistically significant difference in recurrence of shivering in the combination therapy (14.0% vs. Pethidine group (43.9%)) with a statistically significant correlation ($p = 0.001$). The results suggest that Dexamethasone when used together with Pethidine treatment can be beneficial in improving the entire performance of the treatment in the prevention and suppression of postoperative shivering.

The combination therapy had much lower complication rate (18.6%) than the Pethidine group (43.9) and the difference was statistically significant ($p = 0.008$). Notably, no significant differences in ASA status were found in the two groups, which affirms that the groups were similar at the baseline. These findings imply that not only is a combination of Pethidine and Dexamethasone more effective, but also safer and should be considered a good alternative to controlling postoperative shivering after a cesarean section.

RECOMMENDATIONS

- Future studies should involve a larger, multi-center cohort for improved generalizability.
- A longer follow-up period should be incorporated to assess the long-term effects of the treatment.
- Future research should compare a broader range of anti-shivering agents, including tramadol and magnesium sulfate.
- The study should explore varying doses of Dexamethasone and Pethidine to identify the most effective dosage.
- Cost-effectiveness analysis should be conducted to evaluate the clinical and financial implications of using combination therapy.

LIMITATIONS

- The study had a sample size of 100 patients, which may limit generalizability to larger populations.
- It was conducted at a single center, which might not reflect outcomes in diverse hospital settings.
- The study focused only on immediate postoperative outcomes, without assessing long-term effects.
- Other anti-shivering agents, like tramadol or magnesium sulfate, were not compared, limiting the scope.

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