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Comparision Between Pethidine Versus Tramadol in Treatment of Postoperative Shivering Under Spinal Anasthesia

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ABSTRACT

Objective: *Quivering is very hostile and often stressful some patients after passing through a surgery. It may cause arterial hypoxemia, lactic acidosis, supplemented intracranial pressure as well intraocular pressure, may affect the hemodynamics and add to the pain. Numerous pharmacological and non- pharmacological approaches are available in order to control the potential shivering. Drugs like Tramadaol, Clonidine, Doxa pram, were assumed to control person suffering from shivering. Here, an artificial opioid, IV Tramadol at 1mg/kg will be compared with IV Pethidine 0.5mg/kg, standard drug for dealing with shivering and comparing between them.* ***Method:*** *The study involved fifty patients who were found with the case of shivering who were randomly chosen and classified into two groups with each containing twenty-five patients' tramadol content; group (Group 1) with pethidine group (Group 2). Patients were handled with 1mg/kg tramadol (Group 1) and 0.5mg/kg pethidine (Group 2).* ***Results:*** *After arterial administration of the tramadol substance of 1 mg/kg, termination of shivering took place instantly. The shivering lasted for additional time after the administration of pethidine 0.5 mg/kg. Repetition rate in tramadol category was recorded to be less than that of pethidine group. Where nausea as well as vomiting occurred in tramadol group.* ***Novelty:*** *venous tramadol 1 mg/kg is more efficient for the dealing with postoperative shivering than pethidine.*

INTRODUCTION

1. Postoperative shivering

Shivering is involuntary oscillatory muscle activity, fasciculation in the parts of the jaw, face, head, and muscle hyperactivity at the early after the process of anesthesia that generate heat and warms the body, it is fundamental physiological response lasting more than 15 seconds . Shivering is believed to increase oxygen consumption, increase the risk of hypoxemia, induce lactic acidosis, and catecholamine release commonly occur because of spinal anesthesia postoperatively [1]. Although shivering may have beneficial thermoregulatory effects, but may put the patient under stressful physiological response, Shivering is often caused by hypothermia, conversely, it occurs even in patients with normothermic trends at the time of preoperation.

Another possible issue is the constant pain and severe opioid withdrawal with regards to short-acting narcotics). Perioperative hypothermia prevention is the first method to avoid shivering.

Shivering has dangerous impacts in monitoring the pulse rate and blood pressure (BP), as well as ECG, to supplement oxygen intake. They are all associated with general

anesthesia with regards to shivering and the case of shivering where the incidence is around 40%-60% in regional anesthesia and up to 60% in general anesthesia .

General anesthesia could impair the central thermoregulation, but spinal anesthesia affects central and peripheral thermoregulation [2].

Effect of spinal anesthesia on shivering :

Shivering when having spinal anesthesia is one of the multifactorial challenges activated by some factors like the cold ecosystems and vasodilation, which leads to discomfort, potential surgical hitches and high oxygen intake. It will serve to produce heat and comprises the contraction of the skeletal muscles. Shivering regularly can take place as a result of the problems of the anesthesia, more especially the spinal type, where there is an incidence rate of around 50-65% reported cases. The mechanism fundamental shivering during spinal anesthesia is basically vasolidation, which leads to swift heat loss and shift from the body heat which results in hypothermia and later shivering. This aspect can create oxygen intake.

2. Causes of shivering:

The major cause of shivering may include shivering with spinal anesthesia, fever, postanesthetic shivering, movement disorders, stress, anxiety, fear, excitement, low blood sugar. The etiology of trembling is multifactorial, with numerous thermoregulatory problems owing to anesthesia, pain, exposure to a cool environment, decreased sympathetic activity and disinhibited spinal reflexes. Despite being connected to hypothermia, trembling can happen in distinct normothermic patients during the perioperative time. Shivering has both thermoregulatory advantages ands other adverse issues. Whereas it helps to raise the main body temperature. And put the body under high physiological stress, possibly doubling oxygen intake which may lead to cardiac output, heart rate, and arterial pressure. It can affect monitoring during anesthesia and postoperative care, disturbing patient comfort and fulfilment.

3. Treatment

The right treatment plan for your shivering and other symptoms will depend on their underlying cause Treated by:

1. Oxygen
2. Equipment (warming blankets-blankets, air warming)
3. Drugs (is effective and can be used when clinically indicated) [3]

4. Hypothermia

It is a medical emergency that occurs when the body lose heat faster than it can produce heat, causing a dangerously low body temperature. Normal body temperature should be around 37C, hypothermia happens when the body temperature is below 35C which leads to cardiac arrest, death and brain damage.

Indications of hypothermia:

Signs depend on the temperature:

- Slight hypothermia: shivering and linked mental problem.
- Modest: shivering, surge confusion.
- Sever : shivering, hallucination and increase the danger of heart function

Signs of hypothermia include:

1. Trembling.
2. Slurred speech or incoherent Slow, shallow breathing.
3. Weak pulse.
4. Sleepiness as well as very low energy.
5. Misperception or memory loss.
6. Loss of awareness.

Someone with hypothermia often, is no aware of his condition because the symptoms usually begin gradually. Again, irrational thinking connected with hypothermia stops self-consciousness. The confused thinking can also learn to risk-taking behavior [4].

Factors that can increase your inner temperature may include:

Exercise, fever, digestion

Factors that can decrease your inner temperature which include:

Alcohol usage, drug use, metabolic conditions, like under-functioning

If your body requires to cool down, these aspects may include:

1. **Sweating**: Your designated sweat glands will release sweat which will later cool it down as it gets to evaporate. This will assist to lower your internal temperature.
2. **Vasodilatation**: The vessels under your very skin get larger. This will supplement the blood flow to various parts of the skin and later gets cooler from the inner part and eventually release heat radiation to the whole part of the body [5].

If the body needs to warm up, these aspects can comprise the following:

1. **Vasoconstriction**: The vessels under the skin will become narrower and reduce the blood flow so that heat can be retained near the warm inner part of the body.
2. Thermogenesis: Organs, body's muscles, and the brain produce heat in a number of ways. For instance, muscles can yield heat via shivering.

Hormonal thermogenesis**:** thyroid gland releases some sort of hormones to supplement the metabolism. This increases the energy that the creates and the amount of heat it produces" [6].

2.1 Pethidine (Meperidine)

2.1.1 Mechanism of Action

Pethidine is a synthetic opioid analgesic that works primarily by binding to μ-. opioid receptors related to central nervous system, which leads to analgesia and sedation. It has a unique action on the thermoregulatory center in the hypothalamus, which reduces the shivering threshold, making it highly effective in treating postoperative shivering by stimulation of k opioid receptors. Pethidine also has mild anticholinergic properties, which may contribute to its anti- shivering effects.

2.1.2 Common Dosage

For postoperative shivering, the recommended dose is 25-50 mg Intravenously (IV).

2.1.3 Adverse effects :

Central nervous system effects: Sedation, dizziness, miosis, at high doses, respiratory depression

Cardiovascular effects: Hypotension and bradycardia, especially under spinal anesthesia

Gastrointestinal effects: Nausea, vomiting and constipation.

Risk of dependence: Prolonged use may lead to opioid dependency.

Serotonin syndrome: When combined with serotonergic drugs [7].

2.2 Tramadol

2.2.1 Device of Action

Tramadol is serving the role of acting analgesic with two distinct mechanisms.

Weak agonist activity at p-opioid receptors Inhibition of norepinephrine and serotonin reuptake, which also plays a role in temperature regulation and reduces shivering

2.2.2 Common Dosage

For postoperative shivering, the typical dose is 0.5-1 mg/kg IV.

2.2.3 Adverse effects :

Central nervous system effects: Dizziness, drowsiness, and headache.

Cardiovascular effects: Rarely, it may cause tachycardia or hypertension.

Gastrointestinal effects: Nausea, vomiting, and constipation.

Seizures: Higher risk in patients with a history of epilepsy or when used with other serotonergic agents

Serotonin syndrome: Possible when used with serotonergic drugs.

2.2.4 Comparison

Feature Pethidine Tramadol

Mechanism μ-opioid receptor agonist + effect on hypothalamus u-opioid receptor agonist + serotonin/norepinephrine reuptake inhibition

Anti-shivering efficacy Highly effective Moderately effective Side effects More sedative and hypotensive Less sedation and hypotension

Onset of action Rapid (5-10 min) Moderate (10-15 min)

Safety Risk of respiratory depression Safer in terms of respiratory effects [8].

RESEARCH METHOD

We are a group of students from Al-Nukhba University College who conducted graduation research with the aim of comparing Tramadol and Pethidine in preventing postoperative shivering under spinal anesthesia. The preset study was observed at Baghdad Teaching Hospital and Al-Saadoun Private Hospital from {15/11/2024 to 15/1/2025}. The total number of cases was 50 cases. The 50 cases were divided into Tramadol 25 and Pethidine 25.

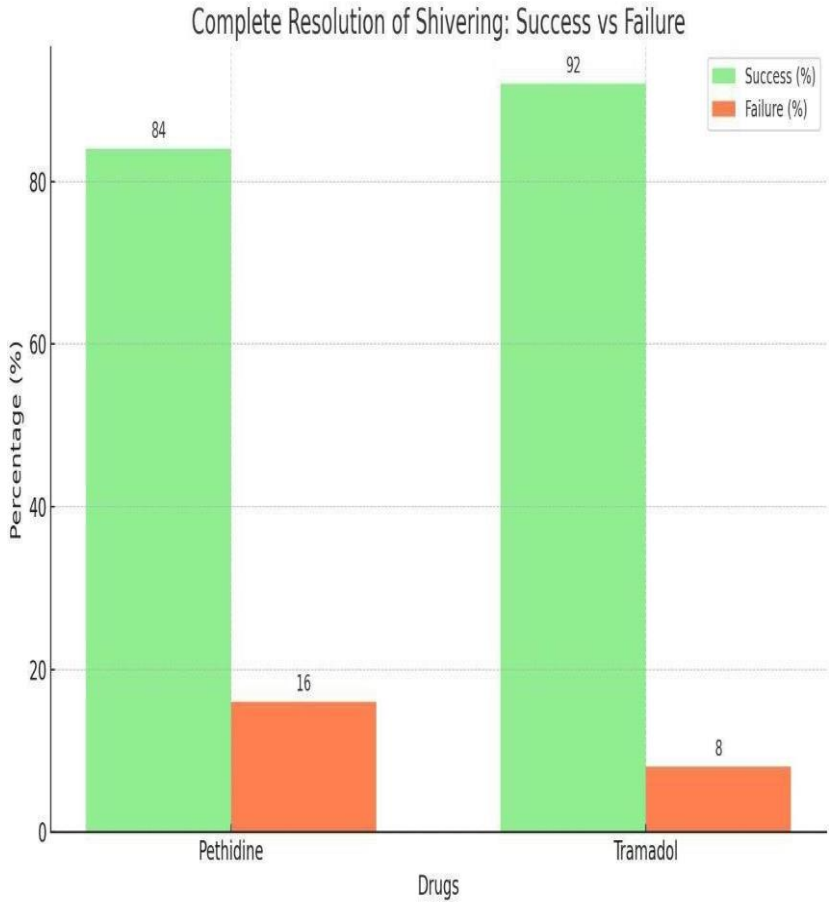
RESULTS AND DISCUSSION

Results

A significant number of 50 patients were involved in the study which were regrouped into two distinct parts: Group P (pethidine, n=25) and Group T (tramadol, n=25). The results are summarized in the table below:

Parameter	Group (p)	Group (T)
	Pethidine	Tramadol
1-no shivering	22 (84)%	23(92)%
2-shivering	3(16)%	2(8)%
3-side effect (Nausea and vomiting)	24%	16%

4-Abscenge side effect	86%	90%
5-onset of action	7-minute	5 -minute



Discussion

The results of this study demonstrated that both pethidine and tramadol are effective in treating postoperative shivering, with a slightly higher efficacy observed in the tramadol group. The percentage of patients who experienced absence of shivering was higher in Group T (92%) compared to Group P (84%). Additionally, the onset of action was faster in the tramadol group, with a mean onset time of 5 minutes compared to 7 minutes in the pethidine group. Tramadol also exhibited a lower incidence of side effects such as nausea (16%) compared to pethidine (24%), contributing to a higher patient satisfaction rate in the tramadol group (90% vs. 86%).

These findings suggest that tramadol may be a more suitable option for the treatment of postoperative shivering due to its faster onset of action, higher efficacy, and less side effect profile [9].

CONCLUSION

Fundamental Finding : The results of this study indicated that the two distinct groups shard similar trends like hemodynamic responses, while tramadol decreased the case of study showed that the two groups were similar in terms of post- anesthesia trembling more pointedly than pethidine, and tramadol is more efficient for the early

control of tremor and its impact on shivering regularity than this study showed that pethidine, and tramadol has lesser side effects such vomiting, nausea, and respiratory depression, and this study was in accordance with previous studies that indicate that tramadol can effectively control post-anesthesia shivering [14]. **Implication :** It is necessary to come up with some measures to reduce shivering by maintaining the patient's temperature by maintain room temperature and use special medical blankets, give warm intravenous fluids, give the best possible anesthesia to reduce the chances of shivering, and maintain the patient's blood sugar level [15]. **Limitation :** The two distinct groups shard similar trends like hemodynamic responses. **Future Research :** Based on some previous studies, tramadol is more efficient for the early control of tremor and its impact on shivering regularity than this study showed that pethidine.

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