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# USING NEFOPAM FOR MANAGEMENT OF POSTOPERATIVE SHIVERING.

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**Abstract:**

This paper aims to using nefopam for the management of postoperative shivering, and in this study, 60 patients were collected and distributed into two groups (the first group was nefopam for 40 patients) (and the second group was meperidine for 20 patients)

Sixty patients were included, and the average age was (30-60 years), and 10.88±1.11 mg of nefopam was given to 40 patients; as for the comparison group, 11.1±0.98 of meperidine was given.

The response rate in this study was for the nefopam group for 38 patients with (95%) In the comparison group; it was somewhat lower for 17 patients with (85%); the duration of shivering after surgery was reduced in the group of patients for nefopam 4.11 ± 1.2, while for the control group, the duration of shivering after surgery was reduced by 3.11 ± 0.56

The use of nefopam allows the cessation of shivering after surgery in 95% of patients. A single bolus dose of nefopam is sufficient for the rapid cessation of muscle tremors. No recurrent episodes of muscle twitching, nausea, vomiting, sweating, or tachycardia were observed.

The main cause of intraoperative or postoperative tremor is intraoperative hypothermia, which is caused by a violation of thermoregulation against the background of the action of anaesthesia. The development of hypothermia in the period of surgery is primarily associated with a defect in the physiological mechanisms of thermoregulation, which are affected by general and local anaesthesia.

**Keywords:** Nefopam, Anaesthesia, Vomiting, ASA, BMI, Surgery.

## INTRODUCTION

That Nefopam has a role in multimodal analgesia is attributed to a minimal effect on opioid consumption during the postoperative period. It also reduces the incidence of nausea, drowsiness, and chills, improving patient comfort during the initial phase of recovery [1]. Adverse effects described from previous studies include nausea, dizziness, tachycardia, drowsiness, insomnia, dry mouth, and decreased appetite, which are reduced by slowing the rate of infusion or by decreasing the dose ingested and are lower with oral administration. [2]

Compared with NSAIDs and opioids, Nefopam has minimal effects on platelet aggregation and does not depress the central nervous system. Rare cases of fatal overdose have been documented with the oral combination of the drug, which is characterized by seizures and arrhythmias. [3,4,5]

Kranke et al. performed a meta-analysis of randomized postoperative trials of pharmacological anti-reflux agents. Data from 20 studies in which 944 adults received the active intervention and 413 adults who were controls were analyzed. Anti-tremor activity

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depends on the method and duration of use of nefopam. [6,7]

The efficacy of meperidine (25 mg), clonidine (150 mcg), and nefopam was studied in three studies. All drugs were more effective, and a positive relationship was obtained in these studies. [8,9]

According to Piper et al., in patients after urological surgery, preoperative clonidine was effective in preventing tremors, but dolasetron was not; Administration of nefopam at a dose of 0.2 mg/kg outweighed the effect of clonidine at a dose of 1.5 mcg/kg for the prevention of post-anesthetic shivering [10,11]and was not associated with sedative or hemodynamic side effects. According to Rohm et al., the nefopam significantly ( p-value < 0.01) reduces the frequency of postoperative nausea and vomiting; [12] Physostigmine is a safe alternative to nefopam, significantly reducing the incidence and severity of postanesthetic shivering without affecting postanesthesia recovery. [13]Thus, most studies support the efficacy of clonidine and nefopamom in preventing postanesthesia shivering.

Clinical studies have shown that 20 mg of nefopam is equivalent to 12 mg of morphine, and 15 mg of nefopam is equivalent in analgesic effect to 50 mg of meperidine [14,15].

The mechanism of action of the drug is based on the inhibition of the reuptake of dopamine, norepinephrine, and serotonin, which leads to an increase in the inhibitory effects of serotonin. In addition, nefopam was found to affect glutamine transport by modulating calcium and sodium ion channels, which inhibits the activity of NMDA receptors [16].

## MATERIAL AND METHOD

This study aimed to evaluate the effectiveness of nefopam to stop muscle tremors in the postoperative period

Where demographic information and data were collected from different hospitals in Iraq.

In this study, 60 patients were collected and distributed into two groups (the first group was nefopam for 40 patients) (and the second group was meperidine for 20 patients) and the patients were distributed according to age, and the age group from 30-39 was the most prevalent in this study for 8-20 patients Consecutively, with no statistically significant differences, weight gain was noted, and this led to a higher BMI in patients aged 50-60 years

Shivering is a fairly common complication in the postoperative period, with a frequency of up to 20%.

The main cause of intraoperative or postoperative muscle tremor is intraoperative hypothermia, which is caused by a violation of thermoregulation against the background of anesthesia. The development of hypothermia in the period of surgery is primarily associated with a defect in the physiological mechanisms of thermoregulation, which are affected by general and local anesthesia. Understanding the characteristics of the effect of anesthesia on the existing mechanisms of thermoregulation is the key to solving the problem of perioperative temperature fluctuations since the direct effect of anesthesia and causing most of the temperature disturbances we encounter in surgical patients—purpose: materials and methods. The study was conducted in a center at different hospitals in Iraq for 60 patients with ages ranging from 30 to 60 years.

## RESULTS

**Table 1- Charateristics results of patient study**

| Variable | Group nefopam, N=40 | meperidine N-20 | P-value |
|---|---|---|---|
| **Age** | | | |
| **30-39** | **20** | **8** | **0.55** |
| **40-49** | **12** | **7** | |
| **50-60** | **8** | **5** | |
| **BMI** | | | |
| **25-28** | **12** | **4** | **0.04** |
| **29-32** | **17** | **11** | **0.03** |

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| | | | |
|---|---|---|---|
| **33-36** | **11** | **5** | **0.001** |
| **ASA** | | | |
| **I** | **30** | **12** | **0.05** |
| **II** | **10** | **8** | **0.43** |
| **Sex** | | | |
| **Male** | **7** | **4** | **0.03** |
| **Female** | **33** | **16** | **0.02** |
| **Duration of operation Mean ± sd** | **90±35,2** | **78.8±40.3** | **0.004** |
| **Dose bupivacaine** | **10.88±1.11** | **11.1±0.98** | **0.56** |

**Fig 1- Demographic findings related to heart rate BPM**

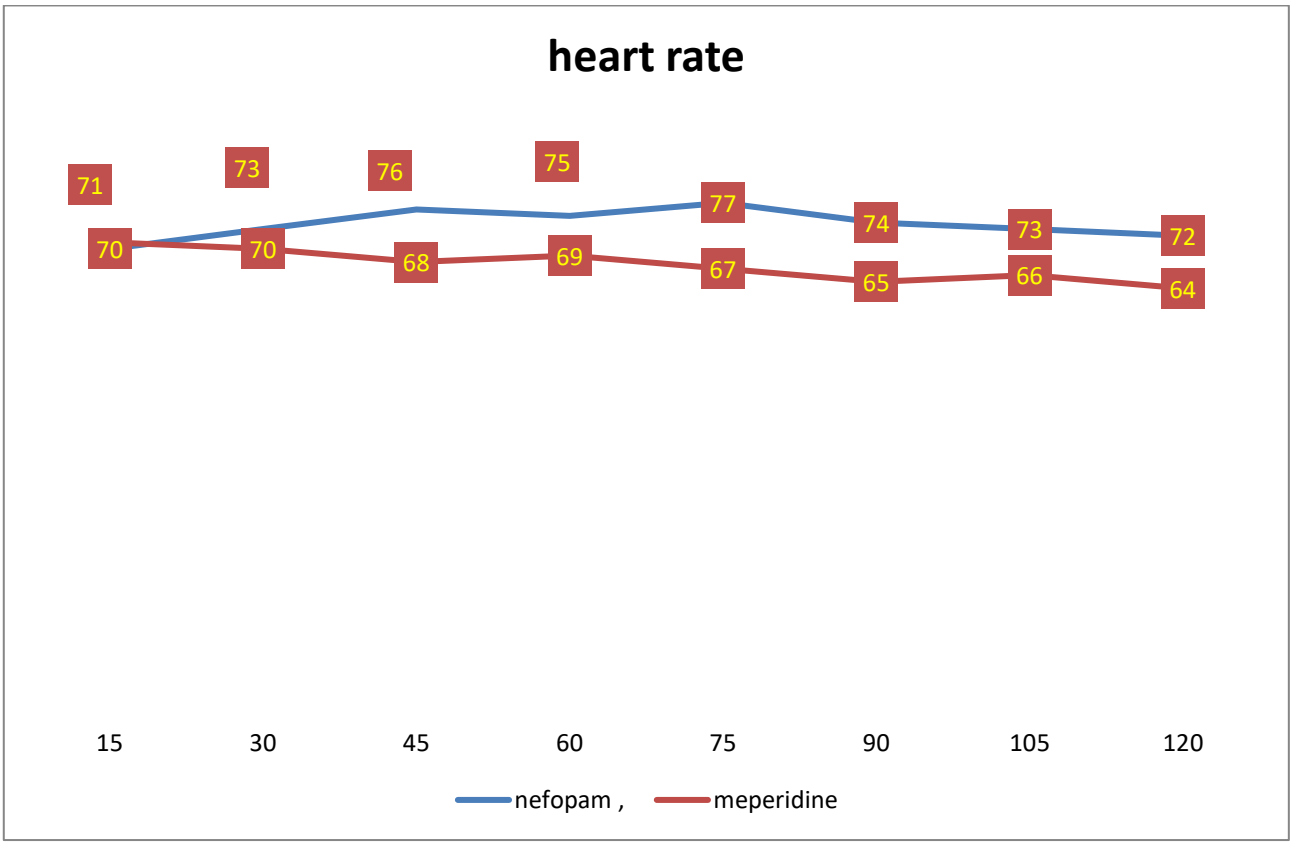


**Fig 2- Outcomes of mean artificial pressure for 60 patients**

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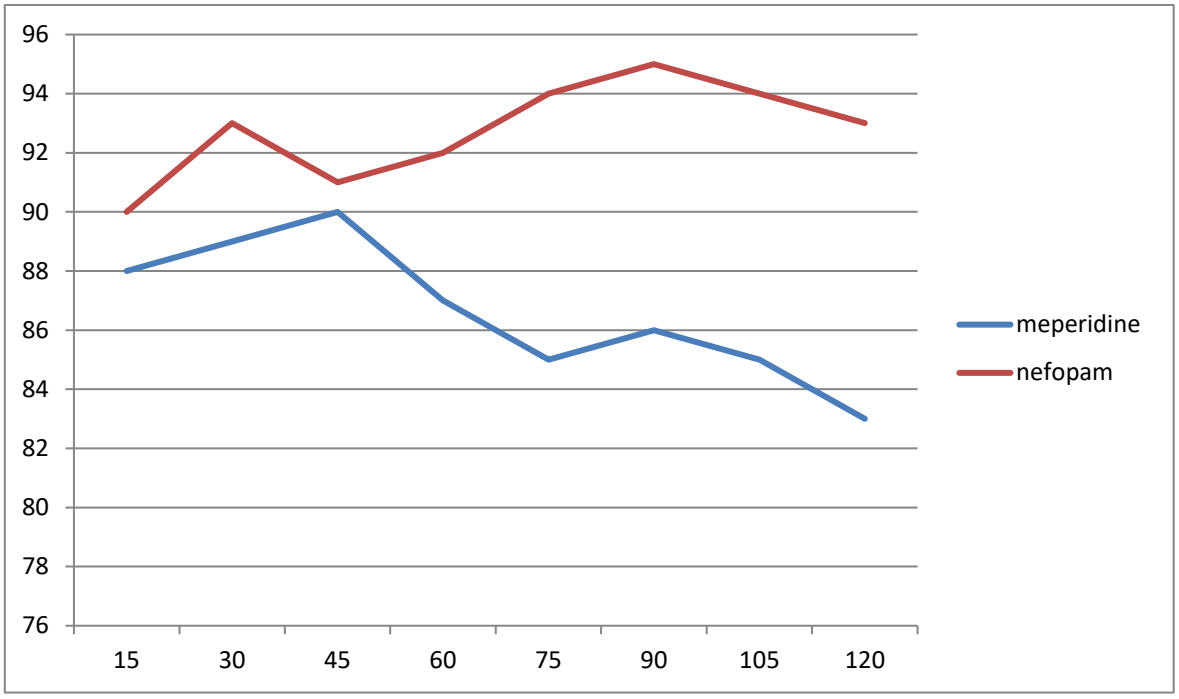


**Fig 3- Results of Volume of blood loss (ml)**

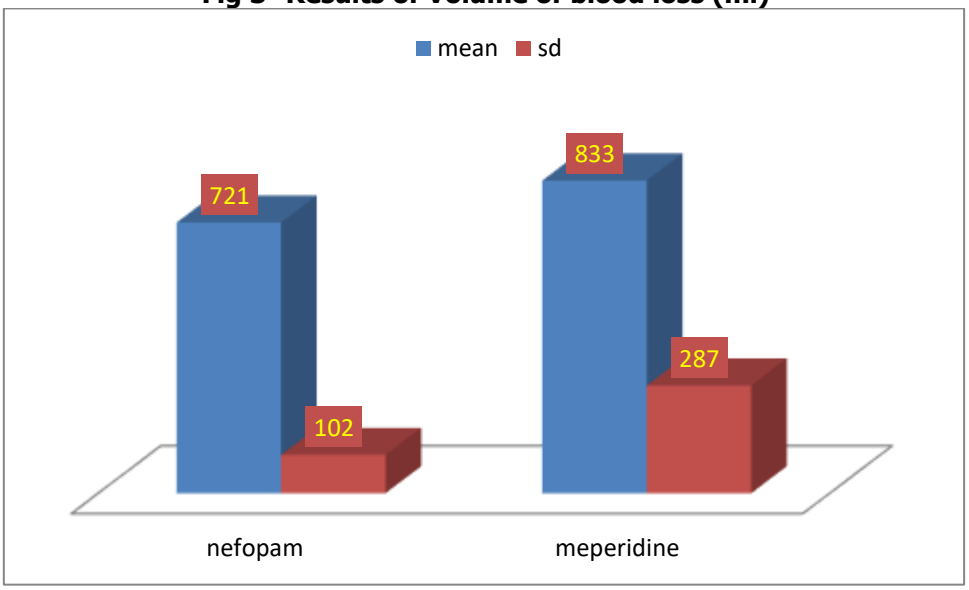


**Table 2- Results of patients' study according to Hb% (Preoperative, Intraoperative, Postoperative)**

| Variable | Nefopam | Meperidine | P-value |
|---|---|---|---|
| Preoperative | 11.89±1.1 | 12.1±0.98 | 0.5 |
| Intraoperative | 10.2±0.87 | 10.3±0.67 | 0.034 |
| Postoperative | 9.9±1.1 | 9.5±0.66 | 0.1 |

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**Table 2. Final results of the study on shivering.**

| Parameter | Group nefopam, N=40 | meperidine N-20 | P-value |
|---|---|---|---|
| Time for cessation of shivering min | 4.11±1.2 | 3.11±0.56 | 0.001 |
| Response rate | 38(95%) | 17(85) | 0.56 |
| Incomplete response | 2 (5%) | 3(15%) | 0.23 |

**Table 3. Harmful complications for both groups**

| Parameter | Bradycardia | Bradycardia | P-value |
|---|---|---|---|
| Nausea | 2 | 3 | 0.023 |
| Vomiting | 1 | 1 | 0.01 |
| Pain on injection | 0 | 1 | 0.033 |
| Sedation | 3 | 2 | 0.098 |
| Pruritus | 1 | 2 | 0.34 |

## DISCUSSION

In this study, 60 patients were collected and distributed into two groups (the first group was nefopam for 40 patients) (and the second group was meperidine for 20 patients) and the patients were distributed according to age, and the age group from 30-39 was the most prevalent in this study for 8-20 patients Consecutively, with no statistically significant differences, weight gain was noted, and this led to a higher BMI in patients aged 50-60 years.

According to the category of physical condition, taking into account the underlying and concomitant diseases of the cardiorespiratory system, most patients belong to the category 2-1 ASA. Body weight ranged from 57 to 98 kg with a mean of 74.2 ± 13.4 kilograms.

Patients were distributed according to gender, and females were the most prevalent in this study. In the nefopam group of patients, 33 patients were female, and seven were male. In the meperidine group, the most frequent female patients were also for 16 patients and four males.

The analgesic properties of nefopam are based on the suppression of the reuptake of serotonin, norepinephrine, and dopamine and the enhancement of the inhibitory effects of serotonin and norepinephrine. Nefopam also affects glutamine transport by modulating calcium and sodium ion channels, which inhibits the activity of NMDA receptors [4-6].

Recent studies have shown that the use of nefopam can prevent the development of postoperative shivering associated with hypothermia after general anesthesia and, in this capacity, significantly outperforms various groups of drugs used for this purpose [1-5].

In addition, many researchers believe that nefopam in single doses is safe for pain relief in elderly patients and patients in various critical conditions [7-9].

The drug is effective and safe for postoperative pain relief in cardiac surgery patients, orthopaedic patients, obstetrics, and gynaecology [10-18].

Analysis of the results of postoperative analgesia in the intensive care unit showed that 25% of patients treated with nefopam did not require additional opioid analgesic administration, which indicates a high analgesic capacity of the drug and generally coincides with global experience data

The mean arterial pressure in the first group was maintained higher than in the second group at 15, 30, and 60 minutes after anaesthesia (P = 0.001, 0.014, and 0.026 at 15, 30, and 60 minutes, respectively,

The authors found that the administration of 20 mg of nefopam reduced complications by approximately 4%. According to J. Willer (1985), a decrease in complications was observed after intravenous administration of morphine at a dose of 0.2 mg/kg. [17]

In a controlled, double-blind study, the administration of nefopam 20 mg every 6 hours to patients undergoing open surgery on the upper abdominal cavity organs was associated with a 30% opioid maintenance effect.

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Early perioperative administration of nefopam has been shown to significantly improve the quality of postoperative analgesia

## CONCLUSION

Although there have been no major advances in the pharmacology of new analgesics over the past 15 years, significant improvements in postoperative pain management have been observed, thanks to new principles of multimodal analgesia, early treatment with nefopam painkillers, and postoperative rehabilitation. These three principles are interrelated, and their simultaneous application leads to a reduction in acute complications and significantly reduces postoperative fatigue, and promotes faster functional recovery.

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