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Research Article

# Comparison between Opioid and Non-Opioid Analgesia for Postoperative Pain in some Obstetric Iraqi Patients

**Marwa A. Qasim*[1], Alaa H. Al-Taei[2]**

[1]*Ibn Al-Baladi Children & Gynecology Hospital, Al-Russafaa Health Directorate, Ministry of Health , Baghdad, Iraq*
[2]*Ghazi Al-Hariri Specialized Surgical Teaching Hospital, Medical City Complex, Ministry of Health, Baghdad, Iraq*



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## Abstract

**Background:** preventive analgesia using opioids has been the cornerstone in relieving postoperative pain. However, it carries undesirable side effects. The recent approach is to use other modalities instead. A lot of studies and research have been done to evaluate ketorolac and Nefopam efficacy, duration of pain relief and their side effects.

**Objectives:** To evaluate the efficacy and duration of action of ketorolac and Nefopam in relieving postoperative pain in comparison to Pethidine in obstetric patients after caesarean section under general anaesthesia.

**Methods:** The study was carried at the emergency theatres/ Obstetrics department both in Al-Kadhymiiah and Medical City Teaching centres in Baghdad, Iraq, from the 14th of April 2019 to 1st September 2019 and included 120 patients. They were randomly divided in 3 groups. Group P received Pethidine, group K received Ketorolac, and group N received Nefopam. All received one of the 3 drugs involved in the study. Postoperative pain was assessed using Verbal rating scale-4, up to six hours after arrival to Post-Anaesthesia Care Unit. Patients received rescue drugs when they had moderate pain. Ordinal logistic regression model was formulated to predict the odd's ratio for developing severe pain.

**Results:** Ketorolac has shown results parallel to those of Pethidine with lesser adverse effects. Nefopam, on the other hand, was significantly less efficient in relieving postoperative pain in comparison with Pethidine.

**Conclusion:** single dose ketorolac can be used alone in the management of postoperative pain with similar efficacy to Pethidine and less nausea and vomiting. Nefopam was not as effective as Pethidine, and it was not prudent to use it as a sole analgesic drug.

**Keywords:** Analgesia; Caesarean section; General anaesthesia; Ketorolac; Nefopam; Pethidine; Postoperative pain; Verbal rating scale-4.

## Introduction

Pain is defined (according to International Association for the Study of Pain) as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (1).

Acute pain is typically precipitated by a known noxious insult or trauma. The severity of acute pain is a function of objective autonomic and events associated with tissue injury, and it generally resolves following tissue regeneration and/or repair over time (2). Postoperative pain is an acute, anticipated, and temporary two to five days (3). It has a confluence of somatic, sensory, and psychological responses to surgical injury (4). Inadequate post-operative pain control can lead to poor recovery, function, and quality of life and can increase the risk of persistent post-surgical pain and complications(5). A Caesarean Section is a surgical procedure in which a fetus is delivered through an incision in the mother's abdomen and uterus (6). From 169 countries that include 98.4% of the world's births, estimation of 29.7 million (21.1, 95% uncertainty interval 19.9-22.4) births occurred through caesarean section in 2015, almost double the number of births by this method in 2000 (16 million [12.1%, 10.9-13.3] births) (7).

The global and regional increases in Caesarean Section use were driven both by an increasing proportion of births occurring in health facilities (accounting for 66.5% of the global increase) and increases in caesarean section use within the facilities (33.5%), with considerable variation between regions (8).

Women undergoing Caesarean delivery are unique because, in addition to their own recovery, they must also begin bonding with and caring for their newborns (9). The need for early mobilization and avoidance of over-sedation is also important in this population due to an increased risk of thromboembolic complications. The incidence of chronic post-surgical pain after caesarean section ranges from 4 to 9% in prospective studies which have excluded pre-

* *Corresponding author:* drmarwaabdulkhaleq@gmail.com.

existing pain conditions, with 2% of women reporting severe pain. Scar pain predominates and very often presents with neuropathic features (50–60% of the cases at 6 months and still 26% of the cases at 12 months). Deep visceral pain is also mentioned and specifically chronic pelvic pain (incidence of 2.9% at 6 months and 1.3% at 12 months) (10).

This will increase their risk of developing postpartum depression, and negatively impact breastfeeding and new-borns care (9).

Mepridine Hydrochloride (Pethidine) was discovered in 1939 during a search for atropine-like compounds. Pethidine is primarily a μ-receptor agonist (15). Pethidine is moderately lipid soluble and has an onset of action shorter than that of morphine following IM injection. About 70% is protein bound to albumin (17). It is extensively metabolised in the liver and excreted in the urine.

Meperidine Hydrochloride active metabolite, Normepridine. It causes central excitation and convulsions, if it accumulates after prolonged intravenous administration or in renal impairment (15).

Meperidine has atropine-like properties. Patients receiving meperidine may demonstrate decreased salivary secretions and an increased heart rate because of its vagolytic properties. Meperidine may also produce localized histamine release, resulting in the phenomenon of “tracking” at the site of meperidine (18).

Serotonin syndrome occurs when administering meperidine to patients receiving anti-depressant drugs (MAO inhibitors, fluoxetine). It causes constipation, urinary retention and less biliary tract spasm (19).

Ketorolac tromethamine (Toradol), a nonsteroidal anti-inflammatory drug (NSAID), used for moderate-sever pain management. It is available as injectable formulation approved for intramuscular injection (IM) and intravenous (IV) routes of administration in addition to oral and intranasal administration. Ketorolac proposed mechanism of action is predominantly peripheral inhibition of prostaglandin synthesis through cyclooxygenase-1 and -2 and it is thought to have more analgesic than anti-inflammatory effects (11, 12).

Ketorolac is almost entirely bound to plasma protein (>99%), which result in a small apparent volume of distribution with extensive metabolism by conjugation in the liver and excreted via the kidneys (12).

The analgesic effect occurs within 30 minutes (via IM or IV routes), with maximum effect between 1 and 2 hours and duration of 4 to 6 hours (13).

The side effects are as for NSAIDs, such as CNS effects, including drowsiness, dizziness, psychological changes and convulsions. Contraindications include peptic ulcer disease, coagulation abnormalities/anticoagulant drugs (including low dose heparin), asthma, concurrent treatment or allergy to any other NSAID, renal impairment, hypervolemia, stroke (14).

Finally, Nefopam (Acupan) is a non-opioid, non-steroidal, centrally acting analgesic drug that is derivative of the non-sedative benzoxazocine, developed and known in 1960s as fenazocine (20).

Although the mechanisms of analgesic action of NFP are not well understood, they are similar to those of triple neurotransmitter (serotonin, norepinephrine, and dopamine) reuptake inhibitors and anticonvulsants (20,21).

The absorption of Nefopam after oral administration is rapid with peak concentrations being reached in 1½ to 2 hours. The elimination from plasma occurs with a mean half-life of 6 hours. The medicine undergoes extensive metabolism by the liver and both unchanged medicine and metabolites are excreted principally in the urine, with approximately 6% in the faeces (21, 22).

Undesirable side effects include nausea, nervousness, dry mouth, light-headedness, urinary retention, hypotension, syncope, palpitations, gastrointestinal disturbances (including abdominal pain and diarrhoea), dizziness, paraesthesia, convulsions, tremor, confusion, hallucinations, angioedema, and allergic reactions may occur (23).

Pain was assessed using verbal rating scale (VRS), it consists generally of a series of adjectives (or phrases), ordered from least intense (or unpleasant) to most intense. An adequate VRS should span a maximum possible range of the pain experience (e.g. from "no pain" to "extremely intense pain") (24).

The strengths of the VRS includes simplicity, ease of administration and scoring, as well as face validity. Because they are easy to comprehend, compliance rates for the VRS can be superior to the rates obtained with other scales.

The scales usually come with four, five or six descriptors. A representative list of adjectives is listed in Table (1) (25).

This study aimed to evaluate the efficacy and duration of action of ketorolac and Nefopam in relieving postoperative pain

**Table (1): Typical descriptors with the VRS**

| Pain score | Descriptor |
|---|---|
| 0 | No pain |
| 1 | mild discomfort |
| 2 | Moderate pain |
| 3 | Excruciation pain |
| **Pain score** | **Descriptor** |
| 0 | No pain |
| 1 | Mild pain |
| 2 | Moderate pain |
| 3 | Severe pain |
| 4 | Very severe pain |
| 5 | Worst possible pain |

## Patients and Methods

**Study design and setting:** This is a prospective, randomized, double-blind clinical trial. The study was conducted in the emergency operation theatres/Obstetric department both in Al-Kadhymiah and Medical city teaching centers in Baghdad, Iraq, from the 14th of April 2019 to 1st of September 2019.

**Ethical consideration:** Approval were obtained from Arabic board for medical specializations.
Consents were taken from all patients.

**Participants:** The 120 patients were candidates for emergency obstetrical surgeries. They were randomly divided into 3 equal groups. group K received ketorolac tromethamine 30mg in 100ml normal saline, group P received Pethidine hydrochloride 50mg IM and group N received Nefopam 20mg in 100 ml normal saline. The aim is to identify which drug is more efficient in reducing pain score postoperatively according to VRS-4 using equipotent doses.

**The inclusion criteria**

1. Age between18-50 years.
2. Class II ASA (Pregnant ladies with no history of any disease).
3. Obstetric surgery.
4. Patient surgery urgent or emergent.
5. No history of allergy to any drug used in the study.

**Exclusion criteria**

1. Patient refusal.
2. vitally unstable patient.
3. Patient undergoing CS for reasons related to bleeding.
4. patient with gestational thrombocytopenia (platelet < 100).
5. Patient already received analgesia.

**Anaesthetic protocol**

Patients were prepared for general anaesthesia (GA). 18G cannula were done for all patients and IV fluids were given. The patients lay on the operating theatre with 15 degree left lateral tilt. Basic monitoring equipment included NIBP, SPO2, Capnograph, ECG, Temperature.

GA induction was according to the following steps:

1. Pre-oxygenation.
2. Metaclopramide 10mg IV.
3. Dexamethasone 8mg IV.
4. Midazolam 1mg.
5. Ketamine 0.5mg/kg IV.
6. Propofol (sleeping dose) IV.
7. Succinylcholine 2mg/kg IV.

Maintenance with Isoflurane 1.2% MAC and Rocurronium 0.6mg/kg IV. Fentanyl 50µg was given after the delivery of the fetus.

Neuromuscular blockade reversal done using Neostigmine 0.03mg/kg and Atropine 0.04mg/kg.

**Study Procedure**

As previously mentioned, the patients were divided randomly into three groups each of received one of our three drugs concerned in this study.

After induction of anaesthesia and clamping of the umbilical cord 50µg fentanyl and one of three analgesic drugs was given:

1- Group K received ketorolac 30mg diluted in 100 ml normal saline over 20 minutes.
2. Group P received Pethidine 50 mg IM.
3. Group N received Nefopam 20mg diluted in 100ml normal saline over 20 minutes.

The blinded technique was ensured by preparing the medication by another colleague.

At the end of the operation, after skin closure, isoflurane was turned off and neuromuscular blockade reversed with Neostigmine and Atropine. Patients were intermittently stimulated verbally or with gentle tactile stimulation, extubated safely when they met the standardized Extubation criteria and transferred to the Post-Anaesthesia Care Unit.

Pain score was taken 0, 1, 3 and 6 hours postoperatively using VRS-4.

Complains other than pain such as nausea and vomiting recorded.

**Statistical analysis**

The collected data was handled and analysed by IBM© SPSS© (Statistical Package for the Social Sciences) Statistics Version 23. Chi-square was the test used for analysing categorical data, with Fisher's Exact test modification when needed. Ordinal logistic regression model was formulated to predict the odd's ratio for developing severe pain. All analyses were done with 95% confidence intervals (CI). *P*-values less than 0.05 were considered statistically significant throughout this study.

**Results**

There was no statistically significant association between study groups and pain scores at zero postoperative time, as there was equal distribution of moderate pain across the groups, while severe pain was not observed in ketorolac group, as shown in Table (2).

**Table (2): Distribution of the study groups according to pain score at zero postoperative time**

| Study group | Pain score at zero postoperative time | | | | | | Total | | *P*-value |
|---|---|---|---|---|---|---|---|---|---|
| | Mild | | Moderate | | Severe | | | | |
| | No. | % | No. | % | No. | % | No. | % | |
| Ketorolac | 39 | 34.5 | 1 | 33.3 | 0 | 0.0 | 40 | 33.3 | |
| Nefopam | 37 | 32.7 | 1 | 33.3 | 2 | 50.0 | 40 | 33.3 | 0.792 |
| Pethidine | 37 | 32.7 | 1 | 33.3 | 2 | 50.0 | 40 | 33.3 | |
| Total | 113 | 100.0 | 3 | 100.0 | 4 | 100.0 | 120 | 100.0 | |

Fisher's Exact Test

There was no statistically significant association between the three study groups and pain scores at one hour postoperatively, as there were no moderate and one severe pain in ketorolac group, two moderate and one severe pain in Nefopam group, one moderate and no severe pain in Pethidine group, as shown in Table (3)

**Table (3): Distribution of the study groups according to pain score one hour postoperatively**

| Study group | Pain score one hour postoperatively | | | | | | Total | | *P*-value |
|---|---|---|---|---|---|---|---|---|---|
| | Mild | | Moderate | | Severe | | | | |
| | No. | % | No. | % | No. | % | No. | % | |
| Ketorolac | 38 | 35.2 | 0 | 0.0 | 1 | 50.0 | 39 | 34.5 | |
| Nefopam | 34 | 31.5 | 2 | 66.7 | 1 | 50.0 | 37 | 32.7 | 0.512 |
| Pethidine | 36 | 33.3 | 1 | 33.3 | 0 | 0.0 | 37 | 32.7 | |
| Total | 108 | 100.0 | 3 | 100.0 | 2 | 100.0 | 113 | 100.0 | |
| Fisher's Exact Test | | | | | | | | | |

There was a statistically significant association between the three study groups and pain scores at six hours, the difference was in Nefopam group, as it had lowest mild pain, 7 cases of moderate (same in ketorolac), but all severe pain cases received Nefopam, as show in Table (4).

**Table (4): Distribution of the study groups according to pain score six hours postoperatively**

| Study group | Pain score six hours postoperatively | | | | | | Total | | *P*-value |
|---|---|---|---|---|---|---|---|---|---|
| | Mild | | Moderate | | Severe | | | | |
| | No. | % | No. | % | No. | % | No. | % | |
| Ketorolac | 28 | 38.9 | 7 | 38.9 | 0 | 0.0 | 35 | 37.2 | |
| Nefopam | 16 | 22.2 | 7 | 38.9 | 4 | 100.0 | 27 | 28.7 | 0.022 |
| Pethidine | 28 | 38.9 | 4 | 22.2 | 0 | 0.0 | 32 | 34.0 | |
| Total | 108 | 72 | 18 | 100.0 | 4 | 100.0 | 94 | 100.0 | |
| Fisher's Exact Test | | | | | | | | | |

Tracking the efficacy of each analgesic during follow up revealed that ketorolac and Pethidine had close relation, and the number of mild pain cases were comparable in both groups, while in Nefopam group there was more decline of mild cases shifting towards moderate and severe pain, especially after 3 hours.

Association between N/V and study groups, was studied against postoperative time intervals, and the only statistically significant association was higher nausea at zero postoperative time in Pethidine group, in addition it was noticed that no patients received ketorolac and had vomiting, and most cases of vomiting was in Pethidine group, as illustrated in Figure (1).

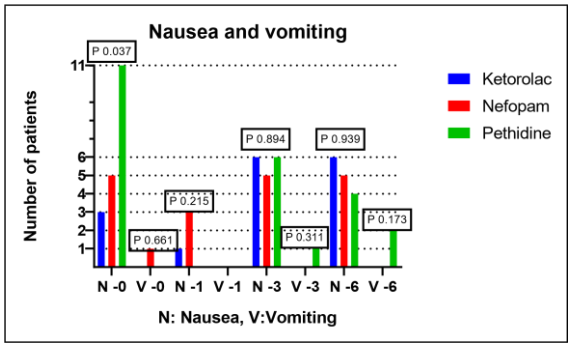


**Figure 1: Distribution of the study groups according to nausea, vomiting and postoperative time.**

Further analysis using ordinal logistic regression model investigated the probability of ketorolac and Nefopam, each compared to Pethidine in causing severe pain postoperatively at different time intervals, it revealed that ketorolac seemed to be protective against severe pain compared to Pethidine it all intervals except at 6 hours, as it increased the risk by 1.719 times. While Nefopam was similar to Pethidine group at zero time, but at the succeeding intervals, reaching an odd's ratio of 5.492 times risk for having severe pain after 6 hours.

This was the only statistically significant odd's ratio, as shown in Figure (2) and Table (5).

**Table (5): Risk stratification for more severe pain at different postoperative time intervals in comparison to Pethidine group**

| Study group | Postoperative time | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Zero | | 1 hour | | 3 hours | | 6 hours | |
| | Odd's ratio | *P*-value | Odd's ratio | *P*-value | Odd's ratio | *P*-value | Odd's ratio | *P*-value |
| Ketorolac | 0.309 | 0.319 | 0.973 | 0.985 | 0.670 | 0.618 | 1.719 | 0.425 |
| Nefopam | 1.00 | 0.999 | 3.191 | 0.325 | 2.095 | 0.275 | 5.492 | 0.010 |
| Ordinal logistic regression | | | | | | | | |

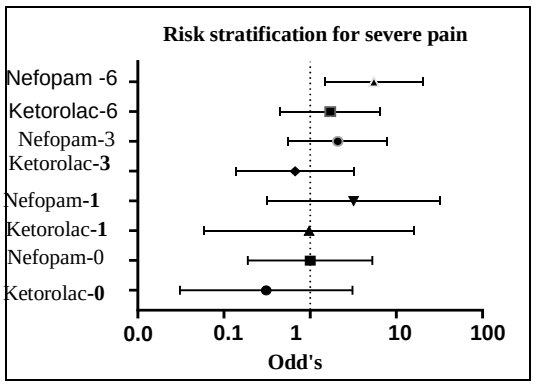


**Figure (2): Forest plot illustrating odd's ratios for severe postoperative pain according time intervals and in comparison to Pethidine group**

**Discussion:**

Opioids are considered the cornerstone of managing pain postoperatively for severe pain (26), but they have many adverse effects such as Post-Operative nausea and vomiting, pruritus, somnolence and respiratory depression (27)

This study compared between Pethidine, ketorolac and Nefopam, taking in consideration the availability of the drugs in operating theatre facilities.

Following the results obtained in this study using VRS, there was no statistical difference in pain scores. at 0 hour, 1 hour and 3 hours among the groups with p-values 0.792, 0.512 and 0.474, respectively. At 6 hours, the significance was in the N group while the P and K groups showed close correlation in pain scores with *P*-value <0.022.

Post-Operative nausea and vomitthing, the only significance was in nausea at 0 hour in Pethidine group (*P*-value=0.037). Nausea and vomiting, after pain, is the most common adverse effect of caesarean section, such that it is reported in more than 66% of the patients undergoing caesarean section (28, 29).

Other studies found that Nefopam 20mg was equipotent to morphine 6-12mg and Pethidine 50mg, while ketorolac is equipotent to 12mg morphine (32,33).

Study by Pailin Kasemsim MD included 580 cases in a study comparing the analgesic effects between ketorolac 30mg and Pethidine 50mg intravenously after NA in caesarean section and observed VAS at 3, 6, 12, and 24 hours (32). All over the period of observation both groups had no statistical significance (*P*>0.05). PONV were higher in the Pethidine group at 3 and 6 hours. This study supports the results of the previous study in that ketorolac had equal efficacy to Pethidine with safer side effect profile.

While in a meta-analysis about using single dose ketorolac whether oral (10mg), or IM (30mg) or Pethidine IM (100mg) for postoperative pain relief. Pain evaluated over 4-6 hours using Visual Analogue Scale, Verbal Rating Score and Numeric Pain Score. 8 studies of Pethidine, 6 studies of IM ketorolac and 8 of oral ketorolac included, some studies where placebo controlled while others used morphine 10mg IM in comparison. When studies were combined using quantitative methods, the concluded that little difference found between morphine, Pethidine and IM ketorolac with oral ketorolac being least effective and highest in adverse effect profile.

Despite using different route in ketorolac administration and higher Pethidine dose (100mg), meta-analysis supports this study results regarding equianalgesic effect of Pethidine and ketorolac (33).

In study of revised a meta-analysis using thirteen clinical trials with 782 subjects. Subjects received either 30mg or 60mg ketorolac via IV or IM routes. Early(<24hours) and late(48hours) postoperative pain was evaluated. Using egger regression, single dose ketorolac was found to decrease early pain -0.64(-1.11 to -0.8) but not late pain -0.29(-0.88 to 0.29) in 60mg group only. Unlike the results in this study 30mg ketorolac lack the current evidence of significant pain relief postoperatively. PONV was less in 60mg group with an odds ratio of 0.49, that shows close relation to the study results (34).

A study conducted by Md. Burahn Uddin deduced that using ketorolac 15mg IM is safer than Pethidine 100mg IM, better tolerated but the latter appeared more effective analgesic. After major surgeries, subjects were divided into two groups, one received 30mg ketorolac IM every 6 hours and the other received Pethidine 100mg IM 6 hourly. Pain was evaluated using VAS and VRS after 1, 6, 12, 24 and 48 hours. Ketorolac and Pethidine showed equianalgesic effects at 12th and 48th hour using VAS score and by VRS score at 1$^{st}$ and 48th hour postoperatively. At 6 and 24 hours exhibited better analgesic effect.

This was in opposite to the conducted study results that showed at 6 hours both had equianalgesic effects. PONV in this study was not mentioned (32).

While comparison between morphine, ketorolac and their combination in a large study where 500 patients received 0.1mg/kg morphine and 503 patients received ketorolac 30mg. 50% pain relief accomplished in the morphine group compared to 31% in ketorolac group (confidence interval 95%). The group received their combination showed decrease in morphine consumption and fewer side effects. In other words, morphine more efficacious than Ketorolac, unlike the results in this study despite using equipotent doses (35).

The effect of intraoperative Nefopam infusion on postoperative pain was studied by Merle JC in urologic surgeries. In this study group 1 and 2 received Nefopam 20mg as bolus and 80 mg, 120 mg infusion over 24 hours, respectively. Group 3 received boluses of normal saline. All received Patient Control Analgesia (PCA)-morphine as additional analgesia and pain was assessed using VAS over 24 hours as primary outcome. Morphine consumption was the secondary outcome. Pain was not statistically different between groups not that significant. No statistical difference was found between groups regarding morphine consumption significant. Patients needed morphine during the same period whether they received Nefopam or not.

Despite using different method for Nefopam administration in the conducted study, bolus VS infusion. Parallel results were obtained in that Nefopam is not an efficient analgesia for postoperative pain (36).

Another study, also reviewed Nefopam for postoperative pain, but as adjuvant to PCA-morphine. While use of 20mg Nefopam for group, two doses of 20mg Nefopam for D group and placebo for C group. Primary outcome was morphine consumption over 24 hours. Secondary outcomes were time to first rescue, pain score and adverse effects. Group S and D showed reduced morphine consumption 18 hours in postoperative period with no statistical difference to group C not significant. Time to first rescue drug, pain scores and satisfaction were similar in all groups. PONV was not significant. In spite of using a higher bolus dose, 40mg, pain scores were similar to the placebo group was significant indicating that Nefopam is not appropriate as a sole postoperative analgesia. This conclusion supports the results in this study but it showed that Nefopam may be beneficial in reducing opioids consumption. PONV incidence was also similar in both studies (37).

In one study compared between an interscalene block and Nefopam as a single dose in treating postoperative pain done by Hyun Jung Koh study of patients undergoing arthroscopic rotator cuff repair were divided into 4 groups: Nefopam only NX, Nefopam with scalene block NB, without Nefopam CX and scalene block only CB. Pain was assessed using VAS before operation, immediately after, 30 minutes, 12 hours, 24 hour and 48 hours. In early postoperative period there was no statistical difference between the NX and CX group in using rescue drugs up to 12 hours($P$>0.058). Nefopam efficacy in early postoperative analgesia in NB and CB couldn't be asses since pain usually doesn't develop within 12 hours. The incidence of PONV in all groups were similar. Hyun Jung Koh concluded, Nefopam is insufficient at relieving postoperative pain, unlike this study which stated that Nefopam is sufficient at relieving pain in the 1st three hours only (38).

Ju Hwan Lee conducted a study in laparoscopic cholecystectomy where he used fentanyl 50µg alone in group 1 and in combination with Nefopam 20 mg and 40mg in group 2 and 3, respectively. VAS used to evaluate pain at 10 minutes, 1 hour, 2 hours, 6 hours and 12 hours after patients' arrival to PACU. Group 2 and 3 showed better pain score than group 1 at 10 minutes, 2 hours and 6 hours more significant while the pain score at 1 hour and 12 hours were similar among the groups.

The results in the conducted study were the opposite, pain scores, using 20mg Nefopam, at 1 hour showed no statistical difference in comparison to Pethdine not significant, but at 6 hours Nefopam was the least efficient. PONV was lower in one group compared to others. The conducted study also showed using 20mg Nefpaom has low incidence of PONV (39).

**Limitations**

1. Small Sample Size.
2. Short Follow-Up Duration.
3. Two-Center Study.
4. Limited Pain Assessment Tool.

**Conclusion**

Regarding early postoperative pain (<24 hours), Pethidine is efficient at managing postoperative pain after Caesarean Section, but has a higher incidence of postoperative nausea and vomiting.

Ketorolac revealed comparable analgesic effects to pethidine with lower side effect profile making it a good alternative to Pethidine.

Nefopam was not efficient at controlling postoperative pain compared to abovementioned drugs with similar side effect profile to that of ketorolac.

**Recommendations**

1. Further studies are needed to evaluate alternative pain management modalities.
2. Ketorolac is recommended as alternative to Pethidine in pain relief.
3. Nefopam is not sufficient at controlling postoperative pain.

**Conflicts of Interest:** The authors declare no conflict of interest.

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**Authors' contributions**

Study conception & design: (Alaa H. Al-Taei). Literature search: (Marwa A. Qasim). Data acquisition: (Marwa A Qasim). Data analysis & interpretation: (Marwa A. Qasim & Alaa H. Al-Taei). Manuscript preparation: (Ala'a H. Al-Taei). Manuscript editing & review: (Marwa A. Qasim & Alaa H. Al-Taei).

**Authors' declaration**

We confirm that all the Figures and Tables in the manuscript belong to the current study. Besides, the Figures and images, which do not belong to the current study, have been given permission for re-publication attached to the manuscript. Authors sign on ethical consideration's Approval-Ethical Clearance: The project was approved by the local ethical committee in (Place where the research was conducted or samples collected and treated) according to the code number (12) on (01/ 11/ 2018).

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# مقارنة بين المسكنات الأفيونية وغير الأفيونية للألم بعد الجراحة( الولادة القيصرية)

**مروة عبدالخالق قاسم[1] ، علاء هادي الطائي[2]**

[1]مستشفى إبن البلدي للأطفال والنسائية، دائرة صحة الرصافة، وزارة الصحة، بغداد العراق.
[2]مستشفى غازي الحريري للجراحات التخصصية، دائرة مدينة الطب، وزارة الصحة، بغداد العراق.

**الخلاصة**

**الخلفية العلمية:** يعتبر تسكين الألم الوقائي باستخدام المواد الأفيونية حجر الزاوية في تخفيف آلام ما بعد الجراحة. ومع ذلك، فإنه يحمل آثارًا جانبية غير مرغوب فيها. لذلك فأن النهج الحديث يعتمد على استخدام طرق أخرى بدلاً من ذلك.تم إجراء الكثير من الدراسات والأبحاث لتقييم فعالية كيتورولاك ونيفوبام ومدة تسكين الألم وآثارهما الجانبية.

**الهدف :**دراسة مستقبلية لتقييم فعالية ومدة عمل كيتورولاك 30 مجم ونيفوبام 20 مجم في تخفيف آلام ما بعد الجراحة بالمقارنة مع بيثيدين 50 مجم في المرضى الخاضعين لعملية الولادة القيصرية تحت التخدير العام.

**المنهجية :** تم تضمين 120 مريضًا في هذه الدراسة. تم تقسيمهم عشوائيًا إلى 3 مجموعات. تلقى الجميع أحد الأدوية الثلاثة المشاركة في الدراسة. تم تقييم الألم بعد الجراحة باستخدام مقياس التقييم اللفظي -4 حتى 6
ساعات بعد الوصول إلى وحدة العناية بعد الجراحة. تلقى المرضى أدوية الإنقاذ عندما كانوا يعانون من
ألم معتدل.

**النتائج :** أظهر الكيتورولاك نتائج مماثلة لتلك التي أظهرها البيثيدين مع آثار جانبية أقل. من ناحية أخرى، كان النيفوبام أقل كفاءة بشكل ملحوظ إحصائيًا في تخفيف آلام ما بعد الجراحة مقارنة بالبيثيدين.

**الاستنتاج :**يمكن استخدام جرعة واحدة من الكيتورولاك بمفردها في إدارة آلام ما بعد الجراحة بفعالية مماثلة للبيثيدين وغثيان وقيء أقل. النيفوبام ليس بنفس فعالية البيثيدين وليس من الحكمة استخدامه كدواء مسكن وحيد.

**الكلمات المفتاحية :**آلام ما بعد الجراحة، مسكنات الألم، الولادة القيصرية، التخدير العام، الكيتورولاك، النيفوبام، البيثيدين، مقياس التقييم اللفظي-4.