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# Evaluation of the analgesic effect of Intraperitoneal instillation of lidocaine with and without meperidine versus non-steroidal anti-inflammatory drugs during and after gynecological laparoscopic procedures

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## **Abstract**

**Background:** Drugs are used in a wide range to control pain as they are easy to apply by any route, fast, and effective. Also, they do not need special skills or techniques. But it may be dangerous if overdoses are given, leading to addiction or withdrawal symptoms, especially if used alone without sedation or muscle relaxant.

**Methods:** In this study, two hundred cases were classified into four groups of patients undergoing minor laparoscopic procedures as diagnostic, ovarian drilling, adhesiolysis, ovarian cystectomy, ectopic pregnancy, endometriosis ablation, etc. Every group included 50 patients. Group I received intraperitoneal lidocaine. Group II received intraperitoneal lidocaine with meperidine. Group III received intramuscular NSAID drugs (diclofenac sodium) 75 mg. Group IV received intraperitoneal saline. Postoperative pain was assessed using a numeric pain rating scale. A highly significant difference between Group II and Group I or III was seen when the pain score across the four groups was examined at 0, 2, and 6 hours postoperatively. Comparing Group IV to the other groups, it is highly significant (high score). When the pain scores from the four groups were assessed at 12 hours postoperatively, groups I and II revealed a significant difference compared to group III. Comparing Group IV to the other groups reveals it is highly significant. So, We concluded that the "intraperitoneal lidocaine with or without meperidine" procedure was simple, risk-free, and without side effects. In contrast to non-steroidal anti-inflammatory drugs, intraperitoneally administered lidocaine, both with and without meperidine, significantly reduces postoperative discomfort after minor gynecologic laparoscopic surgery.

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## **INTRODUCTION**

Minor gynecological laparoscopic surgeries need the appropriate basic and special equipment to make challenging procedures technically viable and safe. A

suction and irrigator probe, two or three forceps, and a bipolar electrocoagulator are sufficient for most surgeries. Semi-reusable and reusable instruments are now readily available because of the operative laparoscopy industry's rapid growth. Cost and efficacy are taken into account while choosing the right instruments because having too many instruments might complicate operations and increase field clutter (1)

Hence, laparoscopy describes the surgical strategy and is linked to pain in addition to that brought on by intra-abdominal damage. Nonetheless, compared to the same surgical operation made possible via a laparotomy, discomfort experienced after laparoscopy is substantially less and lasts less time. The procedure's overall costs are lower, and the long-term morbidity is lower (2).

Early hospital discharge has been made possible by decreased pain, provided that the medication used to treat the pain is not simultaneously used to prohibit discharge due to nausea, ileus, or decreased consciousness and autonomous function. The early discharge also compromises the effectiveness of strong analgesics and makes it challenging to adequately assess and treat post-laparoscopy pain (3).

As they are simple to administer via any method, quick, and practical, drugs are used widely to manage pain. They don't also require any specialized knowledge or expertise. However, if an overdose is administered, especially if it is used without sedation or a muscle relaxant, it could be harmful and cause addiction or withdrawal symptoms. They are also pricey. These substances can be categorized as opioids, cyclo-oxygenase inhibitors, non-steroidal anti-inflammatory drugs, anti-depressants, anti-convulsants, neuroleptic agents, corticosteroids, and systemic administration of local anesthesia (4).

**The study aimed** to examine the effects of intraperitoneal lidocaine (local anesthesia)

following minor gynecological laparoscopic procedures with and without meperidine and non-steroidal anti-inflammatory medicines (NSAIDs).

## **Patients and methods**

### **Study design:**

This study is a comparative interventional study in a randomized manner conducted at United Doctors Hospital, Jeddah, and Sajir General Hospital, KSA, in the period from July 2021 to January 2023. It included 200 patients.

### **Inclusion criteria:**

200 cases were classified into four patients undergoing minor laparoscopic procedures: diagnostic, ovarian drills, adhesiolysis, ovarian cystectomy, ectopic pregnancy, endometriosis ablation, etc. Every group included 50 patients.

**Group I** received intraperitoneal lidocaine. **Group II** received intraperitoneal lidocaine with meperidine. **Group III** received intramuscular NSAID drugs (diclofenac sodium ) 75mg. **Group IV** received intraperitoneal saline.

### **Exclusion criteria:**

Laparoscopic hysterectomy and myomectomy patients were omitted. Cardiovascular, metabolic, hepatic, and vascular disorders were prohibited in the patients. Regular analgesic users and those with allergies to meperidine or lidocaine were excluded from the study.

Each patient underwent a standard gynecological examination and a general, abdominal, and local one. Patients were instructed verbally and in writing on how to complete the pain evaluation questionnaires during the pre-assessment session.

Preoperative tests: CBC, liver and kidney functions, coagulation profile (PT and PTT), and fasting blood sugar.

## Methods:

All operations were performed in the same manner, under general anesthesia.

***Analgesia for the four groups was as follows:***

### ***(1) Group I (n = 50 patients):***

They received 20 cm lidocaine 2% (400 mg) injected into the intraperitoneal cavity at the end of surgery.

### ***(2) Group II (n = 50 patients):***

They received 20 cm lidocaine 2% (400 mg) intraperitoneally and 50 mg of meperidine diluted to 10 ml by normal saline injected into the intraperitoneal cavity at the end of surgery in the same manner.

### ***(3) Group III (n = 50 patients):***

They received non-steroidal anti-inflammatory drug (declofenac sodium 75 mg intramuscularly) after recovery.

### ***(4) Group IV (n = 50 patients):***

They received 20 ml normal saline intraperitoneally at the end of the surgery in the same manner.

## Assessment of pain:

With the help of the facial rating scale, postoperative pain was evaluated. six faces in a pictogram, each with a different expression—from pleased or smiling to teary—are displayed. This scale is appropriate for patients with communication issues, such as young children, elderly patients, confused patients, or patients who do not speak the local language. In each group, the pain level was measured at recovery at two, six, and twelve hours. analysis of data Using Epi-Info version 6 and SPP for Windows version 8 for data entry, verification, and analysis.

## Results

Age, weight, and height were equivalent amongst the study groups ( $p > 0.05$ ). Laparoscopic diagnostic procedures, ovarian cystectomy, drilling, IUd extraction, and adhesiolysis are among the mentioned indications for laparoscopy in table 1 and 2, respectively. Table (3) contrasts the duration of the operation. The length of the operation varied between the analyzed groups, with group II having the least time and group I having the longest. When the pain scores from the four groups were compared at the halfway point after surgery, group II had a significantly lower score than either group I or group III ( $p 0.001$ ). Comparing Group IV to the other groups, Group IV has a very significant (high score) result (8.5 0). ( $p < 0.001$ ). Comparing the pain scores of the four groups at 2 hours postoperatively revealed a significantly significant difference in group II (3 0.2) as opposed to the group I (4.36 0.6) or group III (5.3 0.5) ( $p 0.001$ ). Comparing Group IV to the other groups, it is extremely significant (7 0;  $p 0.001$ ). When the pain scores for the four groups were examined at 6 hours postoperatively, group II (2 0) demonstrated a significantly significant difference when compared to group I (2.4 0.4) or group III (3.3 0.4) ( $p 0.001$ ). Comparing Group IV (6 0) to the other groups, the difference is highly significant ( $p 0.001$ ). Comparison of the pain score between the four groups after 12 hours postoperatively revealed a highly significant difference in groups I and II compared with group III ( $1 \pm 0$  and  $1 \pm 1$  versus  $2 \pm 0.1$ ) ( $p < 0.001$ ). Group IV is highly significant compared to the other groups ( $p < 0.001$ ). (Table 4).

**Table (1): Demographic characteristics**

	I	II	III	IV
<b>Age (years)</b>	31.8 ± 3	32.1 ± 4	32 ± 4	31.6 ± 3
<b>Weight (kg)</b>	67.1 ± 6.1	66.5 ± 4.2	64.5 ± 9	65.9 ± 7
<b>Height (cm)</b>	160 ± 11	159 ± 12	158 ± 15	159 ± 11.9

ANOVA test

**Table (2): Indications for laparoscopy**

Indications	I (n = 50)		II (n = 50)		III (n = 50)		IV (n = 50)	
	No	%	No	%	No	%	No	%
<b>Diagnostic</b>	12	24	15	30	17	34	20	40
<b>Ovarian cystectomy</b>	10	20	7	14	8	16	5	10
<b>Drilling</b>	18	36	20	40	15	30	16	32
<b>Extraction of IUD</b>	7	14	5	10	8	16	6	12
<b>Adhesiolysis</b>	3	6	3	6	2	4	3	6
<b>Ectopic pregnancy</b>	1	2	2	4	1	2	1	2

ANOVA test

**Table (3): Operative time among study groups**

Operative time (minutes)	I	II	III	IV
<b>Mean ± SD</b>	48.1 ± 9	45.5 ± 10	46.1 ± 11	47.1 ± 10
<b>Range</b>	40-60	40-60	40-60	40-60

ANOVA test

**Table (4): postoperative Pain score**

<b>Pain score after ½ hour</b>	<b>Mean ± SD (range)</b>
<b>I</b>	6.2 ± 0.5 (5-7)
<b>II</b>	4.5 ± 0.5 (4-5)
<b>III</b>	7.5 ± 0.5 (7-8)
<b>IV</b>	8.5 ± 0
<b>Pain score after 2 hours</b>	<b>Mean ± SD (range)</b>
<b>I</b>	4. Mean ± SD (range)
<b>II</b>	3 ± 0.2 (3-4)
<b>III</b>	5.3 ± 0.5 (5-6)
<b>IV</b>	7 ± 0

<b>Pain score after 6 hours</b>	<b>Mean <math>\pm</math> SD (range)</b>
<b>I</b>	2.4 $\pm$ 0.4 (2-3)
<b>II</b>	2 $\pm$ 0
<b>III</b>	3.3 $\pm$ 0.4 (3-4)
<b>IV</b>	6 $\pm$ 0
<b>Pain score after 12 hours</b>	<b>Mean <math>\pm</math> SD (range)</b>
<b>I</b>	1 $\pm$ 1
<b>II</b>	1 $\pm$ 0
<b>III</b>	2 $\pm$ 0.1 (3-4)
<b>IV</b>	5 $\pm$ 0

$p < 0.001$

## **Discussion**

Following laparoscopic operations, acute postoperative pain is typical. After laparoscopy, using local anesthetics for postoperative pain reduction may enhance initial pain management and reduce the requirement for postoperative analgesia (5).

Improved early postoperative pain management is crucial because some laparoscopic surgeries are done on a day-case or fast-track basis. Laparoscopic day-case surgery may be made more common by using local anesthetic infiltration for postoperative analgesia (6).

Many analgesics have been researched in the quest for the ideal postoperative regimen. Local anesthetic drugs have potential theoretical and practical benefits for day-case surgery. The use of local anesthetics to relieve peripheral discomfort during laparoscopic procedures has been studied in more than 60 published trials. Nonetheless, despite the abundance of published data, the results of these trials are challenging to evaluate due to the range of clinical situations, medications, doses, application sites, comparators, and reported pain effects (7).

The main goal of the current study was to assess non-steroidal anti-inflammatory drugs (NSAIDs) and intraperitoneal local anesthesia with and without meperidine for analgesics following minor gynecological laparoscopic procedures.

The current study was conducted on patients receiving quick diagnostic or minimally invasive surgical gynecologic laparoscopic procedures. We predicted that these operations would take about the same time to complete.

Comparison of the pain scores across the four groups in our study at 30 minutes, 2 hours, and 6 hours postoperatively revealed a significant difference in group II compared with group I or III. Group IV is highly significant (high score) compared to the other groups.

When the pain scores from the four groups were assessed at 12 hours postoperatively, groups I and II revealed a significant difference compared to group III. In comparison to the other groups, Group IV is very important.

Due to the handling during surgery and the irritation of the diaphragm by dissolved carbon dioxide, this form of surgery resulted in significant postoperative discomfort.

The abdominal wall holes made for the trocars also contributed less to the somatic component of the pain. Other than nausea and vomiting in the patients, which may have been caused by lidocaine or other factors, no side effects were noted. Drugs can be easily, safely, and without side effects administered intraperitoneally for analgesia. (8)

The primary benefit of utilizing local anesthetics is that they do not have the side effects of opioids, which can cause recovery and hospital discharge to be delayed. Common side effects include pruritis, drowsiness, impaired gastrointestinal motility recovery, and postoperative nausea. Also, if the use of opioids is avoided by using local anesthetics during the postoperative period, the time it takes for bowel function to return may be shortened (9).

For minimally invasive procedures like gynecological laparoscopy, local anesthetics have been injected into the peritoneal cavity (10).

Meperidine's local anesthetic effects after subarachnoid delivery seem comparable to lidocaine's. Along with having a local anesthetic effect when administered alone, meperidine has also been proven to increase the block level generated by another established local anesthetic (11).

In our study, lidocaine and meperidine administered intraperitoneally showed efficacy and decreased pain scores at each period tested compared to IM NSAIDs.

After local anesthetic and an opioid have been administered, the intraperitoneal cavity is a useful postoperative analgesia route. In our clinical study of 200 patients undergoing minor laparoscopic procedures, patients who received a combination of intraperitoneal meperidine 50 mg and intraperitoneal lidocaine 400 mg showed significantly lower pain scores at rest when compared to patients who received an intramuscular non-steroidal administration.

Rapid peritoneal distension may be accompanied by blood vessel tearing, traumatized nerve traction, and the release of inflammatory mediators. The pain is present often after laparotomy, and both laparotomy and laparoscopy are associated with persistent pneumoperitoneum, sometimes for three days (12).

**Hohlrieder et al. (2017)** discovered that whereas 70% of patients experienced the most pain 24 hours following gynecological laparoscopic surgery, only 1% of patients experienced it two hours after the procedure. (13).

### **Conclusion**

It is easy, secure, and free from side effects to administer intraperitoneal lidocaine with or without meperidine. Compared to non-steroidal anti-inflammatory medicines, intraperitoneally administered lidocaine, both with and without meperidine, effectively lessens postoperative discomfort following minor gynecologic laparoscopic surgery.

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