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## INTRAPERITONEAL COMBINING HYDROCORTISONE WITH BUPIVACAINE IN LAPAROSCOPIC SLEEVE GASTRECTOMY

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### Keywords:

*Sleeve gastrectomy, laparoscopy, pain, intraperitoneal, Bupivacaine, Hydrocortisone*

### Abstract

**Background:** Pain after sleeve gastrectomy is associated with increased mortality. Patient recovery is often aided by pain relief efforts. For postoperative pain relief, local anesthetics may be injected into the peritoneum via the ports either before the procedure begins or just before the incision is closed. Pain after laparoscopic cholecystectomy was lessened with the use of hydrocortisone administered intraperitoneally. Pain was managed during surgery using intraperitoneal injections of bupivacaine, levobupivacaine, lignocaine, and ropivacaine.

**Objective:** The purpose of this study was to evaluate the efficacy of intraperitoneal hydrocortisone and bupivacaine in treating postoperative pain after laparoscopic sleeve gastrectomy.

**Methods:** Patients of both sexes who are middle-aged and have a body mass index of more than 35 kg/m<sup>2</sup> and are scheduled for laparoscopic sleeve gastrectomy under general endotracheal tube anesthesia at King Hussein hospital, KHMC, Amman, Jordan between February 2021 and February 2022 will be included in our retrospective study.

The subjects will be randomly split in two. At the conclusion of the procedure, subjects in Group I will receive intraperitoneal injections of 125 mg of 0.5% plain isobaric bupivacaine with 25 ml of isotonic normal saline 0.9%, and subjects in Group II will receive intraperitoneal injections of 125 mg of 0.5% plain isobaric bupivacaine with 100 mg hydrocortisone. The results will include the time of initial pain relief demand and VAS scores for pain at 0, 3, 5, 8, 10, and 24 hours postoperatively on a scale from 0 to 10 (with 0 representing no pain and 10 being the worst possible pain).

Normally continuous variables will be investigated using Student's t-test and non-normally ones using Mann-Whitney U-test. Categorical variables will be investigated using the Chi-square test.

**Results:** VAS demonstrated a remarkable reduction at 5, 8 and 10 hrs. after surgery in Group II [1,1,1] vs. Group I [2,2,3]. There was a significant lengthened time of the first pain relief demand in Group II (1.53 hrs.) vs. Group I (1.23 hrs.). P<0.05.

**Conclusion:** Intraperitoneal hydrocortisone with bupivacaine administration showed improved analgesia after sleeve gastrectomy with a diminution in pain relief need time.

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## Introduction

Obesity may be effectively managed by the use of bariatric surgery. In comparison to open surgery, bariatric surgery performed laparoscopically results in much less discomfort<sup>(1)</sup>. It is essential for obese patients to have adequate perioperative pain management in order to have better surgical outcomes. Following surgery, systemic analgesia with non-opioid medications offers a greater margin of safety. Opiates, nonsteroidal anti-inflammatory drugs, and the instillation of local anesthetics in patients undergoing laparoscopic surgery are some of the many methods available for the management of pain<sup>(2,3)</sup>.

When the laparoscopic procedure first begins or just before the incision is closed, it is possible for local anesthetics to be injected intraperitoneally through the ports. They are either injected into the operating bed or sub diaphragmatically, or they are delivered through the trocar site across the visceral peritoneum. Shoulder discomfort is experienced less often when local anesthetics are injected sub-diaphragmatically because of this effect<sup>(1)</sup>. In order to provide satisfactory levels of pain relief throughout the various surgical procedures, varying dosages of the local anesthetics bupivacaine, levobupivacaine, lignocaine, and ropivacaine were injected intraperitoneally<sup>(2)</sup>. In a number of the postoperative procedures, patients received steroid medication to alleviate their pain. After a laparoscopic cholecystectomy, the administration of hydrocortisone into the peritoneal cavity helped reduce discomfort<sup>(3,4)</sup>.

Following laparoscopic bariatric surgery, the purpose of our study was to evaluate the impact on pain alleviation that the combination of intraperitoneal hydrocortisone and intraperitoneal bupivacaine may have.

## Methods

This retrospective, randomized and double blind investigation included 125 subjects, aged 23-55 years old, with a body mass index of more than 35 kg/m<sup>2</sup>, classed I by the American Society of Anesthesiologists, of both sexes and scheduled for laparoscopic sleeve gastrectomy under general endotracheal tube anesthesia at King Hussein hospital, KHMC, Amman, Jordan, during the period from February 2021 to February 2022, after obtaining written informed consents from all participants and approval from our local ethical and research board review committee of the Jordanian Royal medical services. Subjects with sensitivity to amide local anesthetics or hydrocortisone and on steroids during one day before surgery were ruled out.

Fentanyl was administered at a dose of 2 mcg/kg during the induction of anesthesia, and further Fentanyl doses of 0.5 mcg/kg were administered as required. The intra-abdominal pressure was maintained at 10–12 mmHg while the CO<sub>2</sub> pneumoperitoneum was being performed. After the completion of the procedure and the removal of any insufflated CO<sub>2</sub>, the participants were split into two groups in a completely arbitrary manner. At the conclusion of the procedure, the subjects in Group I (n=62) were given 125 mg of 0.5% (25 ml) plain isobaric bupivacaine with 25 ml of isotonic normal saline 0.9% through intraperitoneum, and the subjects in Group II (n=63) were given 125 mg of 0.5% (25 ml) plain isobaric bupivacaine with 100 mg of hydrocortisone mixed with 25 ml of isotonic saline 0.9%. The result included the patient's score on the Verbal Analog Scale (VAS) for pain as well as the time at which they requested their first dose of pain medication on the first postoperative day. Before the incision was closed, 10 milliliters of bupivacaine with a concentration of 0.25% was injected into the areas where the laparoscopic ports were introduced.

The Verbal Analog Scale (VAS) was used to assess the level of postoperative pain experienced by study participants in the recovery room at 0 hour, 3, 5, 8, 10, and 24 hours using a scale ranging from 0 to 10. (0: no pain and 10: the most severe pain). The patient received intravenous dosages of 500 mg of paracetamol at regular intervals.

In the study of statistics, the normally continuous variables were examined using the student's t-test. The Mann–Whitney U-test was used in order to do research on abnormally continuous variables. The Chi-square test was used

in order to analyze categorical variables. A statistic was deemed statistically significant if the P value was less than 0.05.

## Results

The inquiry included the participation of 125 subjects. In regards to the characteristics of the subjects and the time period during which it was in operation, there was no statistically significant difference between the two groups. Table I.

**Table I. Subjects characteristics**

Characteristic		G I	G II
Patients number		62	63
Peritoneal instillation	Bupivacaine	Yes	Yes
	Hydrocortisone	No	Yes
Average age (years old)		41.2	43.4
Sex	Females	29	26
	Males	33	37
Body weight (kg) average		119.3	118.5
BMI (kg/m <sup>2</sup> ) average		39.2	41.4
Period of operation (hour) average		1.03	1.0

There were no significant differences in VAS scores between the two groups at 0 hour [3,3], 3 hours [2,2], or 24 hours [3,3] following surgery. In comparison to Group I [2,2,3], Table II shows that Group II [1,1,1] saw a significant decrease in their overall pain score at 5, 8, and 10 hours following surgery.

**Table II. Visual Analog Scale**

	G I	G II	P
VAS at 0 hour, average (range)	3 (1-4)	3 (1-2)	> 0.05
VAS at 3 hours, average (range)	2 (1-5)	2 (1-4)	> 0.05
VAS at 5 hours, average (range)	2 (1-5)	1 (1-4)	< 0.05
VAS at 8 hours, average (range)	2 (1-4)	1 (1-3)	< 0.05
VAS at 10 hours, average (range)	3 (1-5)	1 (1-3)	< 0.05
VAS at 24 hours, average (range)	3 (1-5)	3 (1-4)	> 0.05

Table III shows that the amount of time that passed before Group II patients asked for pain treatment was longer than it was for Group I patients (1.53 hours vs 1.23 hours),  $P < 0.05$ .

**Table III. Time to first pain relief demand request**

	GI	G II	P
Time to first pain relief demand (hour)	1.23	1.53	< 0.05

## Discussion

The possibility of experiencing pain during a laparoscopic sleeve gastrectomy might mitigate the benefits of laparoscopy as a less invasive surgical method. The recovery from a laparoscopic procedure was associated with a reduction in postoperative discomfort. It is essential for bariatric subjects to reach the post-surgery period without experiencing any risks, which is why it is essential for the leftover pain to be reduced after bariatric operations<sup>(5)</sup>. Effective management of postoperative pain may reduce the number of risks associated with oral feeding resumed

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so soon after surgery. Pain treatment supports early movement, which reduces the chance of deep vein thrombosis and pulmonary embolism and improves the subject's capacity for deep respirations, which in turn reduces the risk of lung hazards such as atelectasis and pneumonia <sup>(6)</sup>.

Pain after laparoscopic procedures may be caused by a number of different sources. Multimodal control is necessary for optimal analgesia. Following laparoscopic procedures, patients received analgesia with intraperitoneal instillation of various drugs with local anesthetics. These analgesics included bupivacaine with morphine or meperidine, levobupivacaine with epinephrine, and lignocaine with tenoxicam, among others <sup>(1)</sup>. According to the findings of our study, intraperitoneal hydrocortisone that was combined with bupivacaine provided more effective pain relief after surgery than intraperitoneal bupivacaine by itself, despite the fact that the initial pain relief need time was much longer. The addition of hydrocortisone to bupivacaine confers additional benefits over the use of bupivacaine alone. These benefits come from the steroid's ability to reduce pain through mechanisms such as the attenuation of bradykinin production, the reduction of phospholipase enzymes, the attenuation of cyclooxygenase and lipoxygenase mediators of the inflammatory pathway, and the attenuation of other inflammatory mediators like interleukin 6 and tumor necrosis factor <sup>(7)</sup>.

In the same way as the intraperitoneal instillation of hydrocortisone solely before gas insufflation in laparoscopic cholecystectomy may minimize discomfort after surgery without posing any risks after surgery, our investigation's findings suggest that this approach may be effective <sup>(8)</sup>. Compared to our study, the analgesic effects of intraperitoneal hydrocortisone in combination with bupivacaine for the treatment of postoperative pain in gynecological operations are greater than those of bupivacaine used on its own <sup>(9)</sup>. Intraperitoneal bupivacaine combined with hydrocortisone and administered prior to CO<sub>2</sub> insufflation was found to be as effective in reducing postoperative pain as intraperitoneal bupivacaine administered alone, and it did so without causing any adverse effects in patients undergoing laparoscopic cholecystectomy. However, this study is not comparable to ours because intraperitoneal instillation was performed at different times, whereas in our study, intraperitoneal <sup>(10)</sup>.

In laparoscopic cholecystectomy, intraperitoneal hydrocortisone with bupivacaine showed significantly lower VAS scores at 6 hours than bupivacaine only. Additionally, the need for opiates was lower in the hydrocortisone group than in the hydrocortisone bupivacaine group <sup>(7-11)</sup>, which is consistent with our findings. Time for the pain relief demand was lengthened in the hydrocortisone bupivacaine group than in the bupivacaine group, comparable to others with laparoscopic gynecological operation <sup>(9,12)</sup>, but not similar with others who investigated hydrocortisone compared to bupivacaine because we used drug combinations and not just hydrocortisone by itself <sup>(8,13)</sup>. Glucocorticoids reduce pain and inflammation by regulating inflammatory responses via genomic and non-genomic pathways. In order to lessen the discomfort that patients experienced following surgery, corticosteroid dexamethasone was administered. Mechanisms include the inhibition of tissue levels of bradykinin and the production of neuropeptides from nerve endings; the diminution in prostaglandin synthesis with the suppression of the synthesis of the cyclooxygenase isoform-2 in peripheral tissues and in the central nervous system; and the suppression of other mediators of inflammatory hyperalgesia such as tumor necrosis factor- $\alpha$ , interleukin-17b, and interleukin-6. All of these mechanisms work together <sup>(12-13)</sup>. Instillation of corticosteroids may help alleviate the early discomfort that occurs after surgery, which was caused by irritation of the peritoneum.

## Conclusion

Instillation of intraperitoneal bupivacaine alone did not show any correlated side effects, but intraperitoneal instillation of hydrocortisone in conjunction with bupivacaine demonstrated more effective analgesia after surgery than the instillation of intraperitoneal bupivacaine alone, with lengthened time of pain relief demand after surgery.

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**References**

1. Ghada FA, Hosam H, Said MS, et al. Effect of Adding Hydrocortisone to Intraperitoneal Bupivacaine in Laparoscopic Bariatric Surgery. *Anesth Essays Res.* Jan-Mar 2020;14(1):137-42.
2. Alvarez A, Singh PM, Sinha AC. Postoperative analgesia in morbid obesity. *Obes Surg* 2014;24:652-9.
3. Mitra S, Khandelwal P, Roberts K, et al. Pain relief in laparoscopic cholecystectomy – A review of the current options. *Pain Pract* 2012;12:485-96.
4. Choi YS, Shim JK, Song JW, et al. Combination of pregabalin and dexamethasone for postoperative pain and functional outcome in patients undergoing lumbar spinal surgery: A randomized placebo-controlled trial. *Clin J Pain* 2013;29:9-14.
5. Alsulaimy M, PUNCHAI S, Ali FA, et al. The utility of diagnostic laparoscopy in post-bariatric surgery patients with chronic abdominal pain of unknown etiology. *Obes Surg* 2017;27:1924-8.
6. Bamgbade OA, Oluwole O, Khaw RR. Perioperative analgesia for fast-track laparoscopic bariatric surgery. *Obes Surg* 2017;27:1828-34.
7. Sharma M, Kharbuja K, Sharma NR. Intraperitoneal hydrocortisone plus bupivacaine versus bupivacaine alone for pain relief after laparoscopic cholecystectomy: A randomized controlled trial. *J Lumbini Med* 2015;3: 41-4.
8. Amini S, Sabzi Sarvestani A. Comparing the impact of intraperitoneal hydrocortisone with bupivacaine on postoperative pain after laparoscopic cholecystectomy. *Anesth Pain Med* 2014;4:e17206.
9. Asgari Z, Mozafar-Jalali S, Faridi-Tazehkand N, et al. Intraperitoneal dexamethasone as a new method for relieving postoperative shoulder pain after gynecologic laparoscopy. *Int J Fertil Steril* 2012;6:59-64.
10. Sarvestani AS, Amini S. Intraperitoneal hydrocortisone plus bupivacaine administration for pain relief after laparoscopic cholecystectomy, a comparison with bupivacaine alone. *J Surg Trauma* 2014;2:6-11.
11. Abdulla AM. Effect of intraperitoneal hydrocortisone -ropivacaine for post-operative analgesia in laparoscopic gynecological surgery. *AAMJ* 2014;3:387-400.
12. Khaled MG, Rabab MH, Sabry IA. Efficacy of intraperitoneal bupivacaine, hydrocortisone, and magnesium sulfate in different combinations for pain relief after laparoscopic ovarian cystectomy: a double-blind randomized controlled trial. *Minerva Anestesiologica* 2020 ;86(1):14-22.
13. Rakesh C, Hema LD, Aparanji K. THE EFFECTIVENESS OF INTRAPERITONEAL HYDROCORTISONE ON POST-OPERATIVE PAIN IN LAPAROSCOPIC CHOLECYSTECTOMY. *J. Evolution Med. Dent. Sci./eISSN- 2278-4802, pISSN- 2278-4748/ Vol. 8/ Issue 17/ Apr. 29, 2019.*