

# AFTER LAPAROSCOPIC SURGERY, INTRAPERITONEAL ANALGESIA IS USED TO RELIEVE POSTOPERATIVE PAIN

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## Abstract

**Background:** Post-laparoscopy pain is still a worry even though laparoscopic surgery is less invasive and causes less post-operative pain. Laparoscopic operations' postoperative pain has been shown to be reduced by intraperitoneal (IP) instillation of local anaesthetics. In this research, the effectiveness of intraperitoneal instillation of dexmedetomidine in reducing postoperative pain was compared to that of bupivacaine and bupivacaine alone. **Materials and Methods:** 72 patients who had signed up for laparoscopic procedures were split into two groups of 36 patients each at random. Before removing the trocars, Group B patients received bupivacaine (30ml,0.25%) and 2 ml of normal saline, and Group BD patients received bupivacaine (30ml,0.25%) and dexmedetomidine (1mcg/kg), reduced to 2 ml. Visual Analogue Score (VAS) data were collected for up to 24 hours postoperatively. Side affects and postoperative analgesic needs were noted. **Result:** In the first 24 hours following surgery, group BD's Visual Analogue Score (VAS) was considerably lower than that of group B's. When compared to group B, group BD consumed fewer analgesics overall and had a postponed time to the first analgesic requirement, which was statistically significant. **Conclusion:** Dexmedetomidine and bupivacaine intraperitoneally infused is an efficient and secure way to lessen discomfort following laparoscopic procedures.

## INTRODUCTION

Compared to open treatments, laparoscopic surgeries have many benefits. They include less bleeding, improved cosmetic outcomes, reduced postoperative pain, quick hospital stays, and lower costs.<sup>[1,2]</sup> Because of the aforementioned benefits, laparoscopic surgeries have become more popular lately. After laparoscopic procedures, postoperative pain management continues to be a significant problem. Effective pain management encourages early ambulation, which greatly lowers the risk of pulmonary embolism and deep venous thrombosis.<sup>[3]</sup> This improves the patient's capacity for taking deep breaths, lowering their chance of developing pneumonia and pulmonary complications like atelectasis. Visceral and musculoskeletal pain are two types of post-laparoscopy pain. The surgical treatment, tissue damage, and nerve endothelial stretching that result in the visceral component.<sup>[4]</sup> Phrenic nerve endings become irritated by the stretching of the peritoneum and diaphragmatic muscle filaments caused by pneumoperitoneum. This nerve travels along the same path as the nerves that supply the arm, so it may cause shoulder pain.

Due to the holes drilled into the abdominal wall for trocar entry, discomfort has a somatic component.<sup>[5]</sup> There are many ways to manage postoperative pain, but it is still difficult to avoid and treat the pain. According to reports, about half of all surgical procedures fail to properly manage postoperative pain.<sup>[6]</sup> As a result, a multimodal strategy that combines local anaesthetics with adjuvants may help to enhance the level of analgesia without causing any negative side effects.<sup>[7]</sup> This research sought to determine whether intra-peritoneal bupivacaine and dexmedetomidine could lessen postoperative discomfort following laparoscopic procedures. The postoperative pain ratings were the main measure of success. Evaluation of postoperative analgesic needs and side effects was one of the secondary results.

## MATERIALS AND METHODS

This prospective, double-blind, randomized, and controlled research was carried out in the Department of Anaesthesiology at the World College of Medical Sciences Research and Hospital, Jhajjar in collaboration with the general surgery

department. A total of 72 individuals between the ages of 44 and 68 registered for laparoscopic procedures. All patients were split into two groups and given the opportunity to give their informed permission in writing. Patients were listed for cholecystectomy or laparoscopic appendectomy. Exclusion criteria for the research included deep pelvic endometriosis, inflammatory bowel disease, pregnancy, and genital malignancies. All patients had their medical histories taken, and general, abdomen, and local pelvic exams were performed. Pre-anesthesia examinations and routine tests, including coagulation profile, random blood sugar level, liver and renal function tests, and total blood count tests, were performed. Patients received explanations on how to use the VAS.[8] The two categories were randomly chosen for each patient: 36 patients in Group-B received bupivacaine, and 36 patients in Group-BD received bupivacaine combined with dexmedetomidine. All patients received the standard intraoperative anesthetic, analgesic, and antiemetic upon entering the operating theatre. Once a carbon dioxide pneumoperitoneum had been established, laparoscopic operation was begun. Three accessory trocars were inserted after Trendlenburg's position was done at a 30 degree angle. (two lateral pelvic and one suprapubic). The intraabdominal pressure was held to less than 15 millimetres Hg. Before the trocars were removed at the conclusion of the procedure, 32 ml of the research drug was injected intraperitoneally. Prior to the removal of the trocars, Bupivacaine (30ml, 0.25%) and dexmedetomidine (1mcg/kg, diluted to 2 ml) were administered in Groups B and BD, respectively. All operations were carried out by a surgeon who was unaware of the composition of the study drug that was injected. At 0.5, 1, 4, 8, 12, 16, and 24 hours after surgery, the

postoperative discomfort was measured using the Visual Analogue Score (VAS). A 1gm IV injection of paracetamol was given to patients with VAS >4 as an emergency analgesic. The elapsed time between the first postoperative analgesic need and the overall number of analgesics needed, as well as the occurrence of side effects like nausea and vomiting in the first 24 hours following surgery, were all noted. Mean, standard deviation, number, and percent were used to express all statistics. The Statistical Package for Social Sciences (SPSS/version 18) programme was used to conduct the statistical study. To evaluate two groups, the t-test was used for numerical data and the Chi square test for categorised data.  $P < 0.05$  was regarded as being noteworthy.

## RESULTS

Basic characteristics like age, body mass index, and length of surgery did not significantly vary between the two studies groups [Table 1]. In terms of measuring postoperative pain, group BD experienced less pain than group B at various time points following laparoscopic, which was statistically significant (see [Table 2]. By observing the amount of analgesia necessary and the time it took to administer the first dose, postoperative analgesia was evaluated. The time needed for the first emergency analgesia was significantly longer in group BD than in group B ( $164.3 \pm 29.06$  minutes versus  $309.8 \pm 21.36$  minutes). In comparison to group B ( $3.7 \pm 1.3$ gm), group BD ( $1.3 \pm 0.7$ gm) required considerably less paracetamol in [Table 3]. Patients in group BD had substantially fewer side effects, such as nausea, vomiting, and shoulder pain, than patients in group B, according to [Table 4].

**Table 1: Shows the data on demographics.**

Variables	Group B	Group BD	P-value
Age in years	48.5±9.65	47.6±10.21	0.62
Weight in kg	59.4±11.6	61.7±9.87	0.42
Height in cm	160.6±14.42	162.8±15.04	0.28
Duration in surgery in minute	69.6±11.2	71.8±12.6	0.16

**Table 2: Shows the Visual Analog Score, or VAS.**

Time (hrs.)	Group B	Group BD	P-value
At 0.5	4.2±1.3	3.5±0.5	<0.04
At 1	5.7±1.2	3.8±0.6	<0.03
At 4	5.8±1.8	3.2±0.6	<0.04
At 8	4.7±1.4	3.5±0.7	<0.05
At 12	4.4±1.7	2.8±0.8	<0.02
At 16	5.4±1.4	3.2±1.1	<0.01
At 24 hrs.	3.8±1.4	2.4±0.8	<0.04

**Table 3: Shows the comparison of postoperative pain between the two study groups.**

Postoperative analgesia	Group B	Group BD	P-value
Time for 1 <sup>st</sup> analgesia in minute	164.3±29.06	309.8±21.36	<0.04
Amount of paracetamol needed in gm	3.7±1.3	1.3±0.7	0.0.3

**Table 4: Shows the adverse consequences.**

Variables	Group B(n)	Group BD(n)
Nausea	9	3

Vomiting	7	4
Shoulder pain	5	1

## DISCUSSION

Due to the fact that laparoscopic cholecystectomy is a day case procedure, sufficient analgesia and a speedy recovery are crucial. The most frequent side effects of laparoscopic procedure are postoperative pain and nausea. Although it varies greatly between patients, the pain hits its peak within six hours of the procedure and then gradually lessens over the course of a few days.<sup>[9,10]</sup> The best pain relief in the postoperative period has been achieved using a variety of techniques, but intraperitoneal instillation of local anaesthetic agents has theoretical and practical benefits over other approaches.<sup>[11]</sup> Laparoscopic surgery began using intraperitoneal instillation of local anaesthetics with adjuvants in the early 1990s.<sup>[12]</sup> There is peritoneal inflammation and neuronal rupture during laparoscopic procedures as a result of gas insufflations and elevated intraperitoneal pressure, and there is a linear connection between abdominal compliance and the resulting severity of post-operative pain. So, because it blocks visceral afferent signals and alters visceral nociception, we opt for the intraperitoneal approach.<sup>[13,14]</sup> By affecting proteins linked with nerve membranes and by preventing the release and activity of prostaglandins, which stimulate nociceptors and lead to inflammation, local anaesthetic drugs provide antinociception. Effective analgesic is provided by 0.25% bupivacaine intraperitoneal instillation. We have combined bupivacaine with dexmedetomidine to extend the analgesic effect's continuance. Prior to the removal of the trocars in the current research, local anaesthetics were injected intraperitoneally. In the first 24 hours after operation, VAS pain scores significantly decreased in the Bupivacaine-dexmedetomidine group. With the Bupivacaine-dexmedetomidine group, postoperative nausea, vomiting, and shoulder discomfort were less common. In their research, Narchi et al. discovered that intraperitoneal instillation of local anaesthetics is more efficient at reducing pain in patients having diagnostic laparoscopy for up to 48 hours after surgery.<sup>[15]</sup> In patients undergoing laparoscopic cholecystectomy, Golubovic et al,<sup>[16]</sup> evaluated the analgesic effects of intraperitoneal instillation of bupivacaine and tramadol. They came to the conclusion that intraperitoneal instillation of bupivacaine or tramadol, or a combination of the two, is an effective method for managing pain. According to Bisgaard et al., IP analgesic instillation could potentially prevent the visceral pain experienced after laparoscopic cholecystectomy.<sup>[17]</sup> The outcomes of these studies appear to be consistent with the clinical trials results. Our findings are consistent with a study by Ahmed et al,<sup>[18]</sup> that found that intraperitoneal instillation of

mepiridine or dexmedetomidine combined with bupivacaine 0.25% significantly reduces the postoperative analgesic requirements and decreases the incidence of shoulder pain in patients undergoing laparoscopic gynaecological surgeries. Tramadol or clonidine combined with intraperitoneal bupivacaine was found to be more efficacious than bupivacaine alone in Memis et al,<sup>[19]</sup> study of the effects of these drugs on post-operative pain following total abdominal hysterectomy. In a prior study on gynecologic laparoscopy, Goldstein et al. found that when compared to placebo in patients undergoing laparoscopic gynecologic surgery, intraperitoneal instillation of 20 mL of either 0.5% bupivacaine or 0.75% ropivacaine reduced the need for postoperative analgesia and prevented postoperative pain.<sup>[20]</sup> Bupivacaine was found to be successful in reducing postoperative pain when compared to the instillation of 100 mL of normal saline alone, according to research by Arden D et al.<sup>[21]</sup> In contrast to ropivacaine alone, Ranjita et al. found that intraperitoneal ropivacaine with dexmedetomidine can provide better postoperative analgesia following complete laparoscopic hysterectomy.<sup>[22]</sup> These findings support the present research. In the group that got local intraperitoneal instillation analgesia with dexmedetomidine, early mobilisation was feasible.

## CONCLUSION

We draw the conclusion that intraperitoneal instillation of bupivacaine combined with dexmedetomidine during laparoscopic procedures significantly reduces the postoperative pain and significantly reduces the need for analgesics in the postoperative period as compared to the control group without any side effects.

### Limitation of the study

The fact that pain varies from person to person and is significantly influenced by each individual's pain threshold and perception is one drawback of the research. The instruments used to quantify pain were arbitrary.

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