

RESEARCH ARTICLE

Effect of High-volume Low-concentration Intraperitoneal Bupivacaine on Patients Undergoing Post-laparoscopic Cholecystectomy Analgesia

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ABSTRACT

Background: The present study was conducted for assessing high-volume low-concentration intraperitoneal bupivacaine for post-laparoscopic cholecystectomy analgesia.

Materials and Methods: A total of 100 patients scheduled to undergo laparoscopic cholecystectomy were enrolled. All subjects were kept on fasting 8 hours before surgery. Premedication in the form of i.v. midazolam, fentanyl and ondansetron were given. All the subjects were divided into two study groups as follows: Group A- Normal saline group and Group B- Bupivacaine group. All the surgical procedure was carried under the hands of skilled and experienced surgeons. After surgery, all the patients were subsequently transferred to the recovery area. Duration of analgesia and time to rescue analgesia was recorded in all the patients. All the results were recorded and assessed by SPSS software.

Results: Group A and group B had mean age of 38.4 and 36.9 years, respectively. There were 32 males and 18 females among group A and 31 males and 19 females in group B. Group A and group B had mean weight of 77.9 and 81.8 Kg, respectively. Group A and group B had mean height of 174.6 and 171.8 cm respectively. Mean duration of analgesia and mean quantity of rescue analgesic requirement was significantly better among patients of group B.

Conclusion: Intraperitoneal irrigation with high-volume low-concentration bupivacaine significantly enhances duration of analgesia.

Keywords: Bupivacaine, Cholecystectomy, Laparoscopic.

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INTRODUCTION

Acute inflammation of the gallbladder is defined as acute cholecystitis (AC), which is most caused by gallstones. The mortality incidence is 0 to 10%, and the incidence of morbidity is 17% in patients with AC. Laparoscopic cholecystectomy (LC) indicates whether the patient can withstand surgery, with conservative treatment. Cholecystectomy is a treatment specifically designed for AC, with urgent LC being the technique of choice for AC.¹⁻³ Urgent LC is performed in the first week of disease onset, and delayed LC is performed 6 to 8 weeks after initial medical treatment and improvement. Some studies have shown that early cholecystectomy should be recommended as it provides a definitive solution for hospitalization, faster recovery times, and a more complete return to early work. Effective post-operative analgesia after LC remains a clinical challenge. Recently, intraperitoneal instillation of different local anaesthetics (LAs) has been gaining popularity for post-operative analgesia in LC. Most of the studies have used

bupivacaine irrigation of peritoneal cavity in low volume (20–100 mL) and high concentration (0.5–0.125%). However, their analgesic action is effective for only a few hours in the post-operative period.⁴⁻⁶ Hence; the present study was conducted for assessing high-volume low-concentration intraperitoneal bupivacaine for post-laparoscopic cholecystectomy analgesia.

MATERIALS AND METHODS

A total of 100 patients scheduled to undergo laparoscopic cholecystectomy were enrolled. Inclusion criteria for the present study included: Patients of ASA Grade I/II, Patients within the age range of 25 to 55 years, Patients with absence of any other co-morbid condition, Patients with negative history of any known drug allergy and Patients who gave informed consent. All subjects were kept on fasting 8 hours before surgery. Premedication in the form of i.v. midazolam, fentanyl and ondansetron were given. All the subjects were divided into two study groups as follows:

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Table 1: Demographic data

Variable	Group A	Group B
Mean age (years)	38.4	36.9
Male (n)	32	31
Female (n)	18	19
Mean weight (Kg)	77.9	81.8
Mean height (cm)	174.6	171.8

Table 2: Variables

Variable	Group A	Group B	p-value
Duration of analgesia	0.08 hours	5.6 hours	0.000*
Mean quantity of rescue analgesia (mg)	143.8	18.4	0.001*

*: Significant

Table 3: Comparison of VAS

VAS – time interval	Group A	Group B	p- value
30 minutes	2.9	1.7	0.85
2 hours	2.6	1.1	0.00*
4 hours	2.8	1.1	0.00*
6 hours	2.9	1.1	0.00*
12 hours	2.8	1.3	0.00*
24 hours	2.9	1.2	0.00*

: Significant

Group A- Normal Saline Group and Group B- Bupivacaine Group

All the surgical procedure was carried under the hands of skilled and experienced surgeons. After surgery, all the patients were subsequently transferred to the recovery area. Visual analogue scale (VAS) on a scale of 0 to 10 was used for assessing the pain with 0 indicating no pain and 10 indicating most severe unbearable pain. Duration of analgesia and time to rescue analgesia was recorded in all the patients. All the results were recorded and assessed by SPSS software.

RESULTS

Group A and group B had mean age of 38.4 years and 36.9 years respectively. There were 32 males and 18 females among group A and 31 males and 19 females in group B (Table 1). Group A and group B had mean weight of 77.9 and 81.8 Kg respectively. Group A and group B had mean height of 174.6 and 171.8 cm, respectively. Mean duration of analgesia and mean quantity of rescue analgesic requirement was significantly better among patients of group B.

DISCUSSION

Pathologies of the gallbladder routinely are evident in the form of gallstones. These gallstones comprise of vital health problem; especially in developing nations. In Indian communities, the incidence of gallbladder stones and gallstone diseases varies considerably. For example, in north Indian region, gallstone diseases are most seven times more common in comparison to south Indian region. In the last couple of decades, the introduction of laparoscopic techniques has

reformed the gallstone removal procedures (cholecystectomy). Laparoscopic surgery is routinely regarded as better in comparison to the classical open technique because of differential advantages.⁵⁻⁷ Laparoscopic cholecystectomy (LC) is often regarded as gold standard across the globe in surgical management of gallstone diseases. More than seventy percent of the emergency cholecystectomy cases are LCs. The benefits of LC include decreased hospital stay, faster return to work, reduced postoperative pain, enhanced cosmetic results, and decreased mortality in comparison of open cholecystectomy procedures.^{8,9} Hence; the present study was conducted for assessing high-volume low-concentration intraperitoneal bupivacaine for post-laparoscopic cholecystectomy analgesia.

Group A and group B had mean age of 38.4 years and 36.9 years, respectively. There were 32 males and 18 females among group A and 31 males and 19 females in group B. Group A and group B had mean weight of 77.9 Kg and 81.8 Kg, respectively. Group A and group B had mean height of 174.6 cm and 171.8 cm, respectively. Our results were in concordance with previous authors findings. In a study carried out by Jain S et al, authors assessed the efficacy of intraperitoneal instillation of high-volume low-concentration bupivacaine for post-operative analgesia in LC. They evaluated 60 patients and divided them into two study groups with 30 patients in each group (Table 2 and 3). Group S comprised of patients in which normal saline was used while group B comprised of patients in which bupivacaine was added. Mean duration of anesthesia among subjects of group S was significantly lower in comparison to group B. They also observed that mean requirement of rescue analgesia was significantly lowered in Group B subjects. They concluded that intraperitoneal instillation of high-volume low-concentration bupivacaine was significantly effective in controlling postoperative pain.¹⁰

Mean duration of analgesia and mean quantity of rescue analgesic requirement was significantly better among patients of group B. In another study conducted by Gumusoglu AY et al, authors evaluated the effectiveness of intraperitoneal bupivacaine among patients requiring urgent LC. They enrolled a total of 57 subjects and randomly divided them into two study groups- study group (Bupivacaine group) and control group. They concluded that bupivacaine caused significantly more effective post-surgical pain control and decreased the evidence of analgesic consumption.¹¹ In another study conducted by Vijayaraghavalu S *et al.*, assessed and compared the effectiveness of intraperitoneal instillation of bupivacaine and normal saline on postsurgical variables after laparoscopic cholecystectomy. They assessed 60 subjects and divided them into two study groups- Group B: plain bupivacaine 0.5% and Group N: Normal saline. They reported that Bupivacaine was comparatively more efficacious in relieving postsurgical pain. At the same time, it prolonged the need for rescue analgesia.¹²

CONCLUSION

Intraperitoneal irrigation with high-volume low-concentration bupivacaine significantly enhances duration of analgesia.

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