Section: Anesthesiology

Research

ASSESSMENT OF HIGH-VOLUME LOW CONCENTRATION INTRAPERITONEAL BUPIVACAINE FOR POST LAPAROSCOPIC CHOLECYSTECTOMY ANALGESIA

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Abstract

Background: To assess high volume low concentration intraperitoneal bupivacaine for post laparoscopic cholecystectomy analgesia. **Materials and Methods:** 56 patients undergoing LC were divided into two (n = 28) groups. In Group I, intraperitoneal irrigation was done with 500 ml of normal saline. In Group II, 20 ml of 0.5% (100 mg) bupivacaine was added to 480 ml of normal saline for intraperitoneal irrigation. Numeric pain rating scale (NRS), duration of analgesia, total rescue analgesic requirement, presence of shoulder pain, nausea and vomiting were recorded. **Result:** The mean age in group I patients was 42.6 years and in group II was 40.7 years. The mean weight was 54.3 Kgs in group I patients and 52.9 kgs in group II patients. Duration of surgery was 56.3 minutes in group I and 57.8 in group II. MAC of isoflurane was 107.2 in group I and 106.4 in group II. Propofol requirement was 0.91 mg in group I and 0.94 mg in group II. Duration of analgesia was 0.08 hours in group I and 19.1 hours in group I. NRS at extubation at 1 hour was 0.85 in group I and 1.16 in group II, at 4 hours was 1.45 in group I and 2.24 in group II, at 8 hours was 1.54 in group I and 1.40 in group II, at 12 hours was 1.42 in group I and 1.78 in group II and at 24 hours was 1.26 in group I and 1.22 in group II. The difference was non- significant (P> 0.05). Shoulder pain was seen in 5 in group I and group II and nausea/vomiting 7 in group I and 6 in group II. The difference was non- significant (P> 0.05). **Conclusion:** High-volume low-concentration of intraperitoneal bupivacaine significantly increases post operative duration of analgesia and reduces opioid requirement after LC.

INTRODUCTION

Laparoscopic cholecystectomy (LC) is the treatment of choice for a wide spectrum of gallbladder diseases. A major benefit of using laparoscopy for upper gastrointestinal surgery is that it avoids an upper abdominal incision. Such incisions hinder postoperative pulmonary rehabilitation, cause surgical wound pain, and increase the total medical cost. Increased experience with this technique has altered some of the previous contraindications for LC such as patients with end-stage renal disease, liver cirrhosis, and severe cardiovascular disease.[1] Patients undergoing laparoscopic cholecystectomy experience less post-operative pain than conventional cholecystectomy. Still pain remains the predominant complaint after LC in the initial 24 hours postoperatively.[2] Effective post-operative analgesia after LC remains a clinical challenge. Modalities for reducing the postoperative pain are perioperative administration of the opioid analgesics, local anesthetic infiltration of the incision sites, and peritoneal cavity irrigation with local anesthetics.[3] It is still a challenge for the experts to provide effective post-LC analgesia. Recently, intraperitoneal instillation of different local anaesthetics (LAs) has been gaining popularity for post-operative analgesia in LC.[4] In some studies, highly concentrated bupivacaine in low volumes, i.e. 20 ml in 100 ml normal saline was used to achieve post-LC analgesia; but the duration of post-operative analgesia was not sufficiently long.[5,6] Large volumes can reach all the areas in the sub-hepatic region and produce adequate analgesia, which can be the ultimate reason for promising results in the study, using large volumes of diluted local anesthetic.[7,8] We planned present study to assess high volume low concentration

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intraperitoneal bupivacaine for post laparoscopic cholecystectomy analgesia.

MATERIALS AND METHODS

Fifty- six ASA grade I and II patients of either sex, between 20-60 years of age undergoing elective LC under general anaesthesia after considering the utility of the study and obtaining approval from ethical review committee of the institute were selected in the study. All enrolled patients voluntarily gave their written consent.

Demographic data was entered in case sheet. Patients were divided into 2 groups. Each group had 28 patients. In group I, intraperitoneal irrigation was done with 500 ml of normal saline. In group II, 20 ml of 0.5% (100 mg) bupivacaine was added to 480 ml of normal saline for intraperitoneal irrigation during and after surgery. Post-operative pain was assessed by numeric pain rating scale (NRS). Duration of analgesia (DOA), total rescue analgesic requirement (intravenous tramadol), presence of shoulder pain, nausea and vomiting were recorded for the initial 24 hours post-operatively. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

The mean age in group I patients was 42.6 years and in group II was 40.7 years. The mean weight was 54.3 Kgs in group I patients and 52.9 kgs in group II patients. Duration of surgery was 56.3 minutes in group I and 57.8 in group II. MAC of isoflurane was 107.2 in group I and 106.4 in group II. Propofol requirement was 0.91 mg in group I and 0.94 mg in group II. The difference was non- significant (P> 0.05) [Table 1].

Duration of analgesia was 0.08 hours in group I and 19.1 hours in group I. NRS at extubation at 1 hour was 0.85 in group I and 1.16 in group II, at 4 hours was 1.45 in group I and 2.24 in group II, at 8 hours was 1.54 in group I and 1.40 in group II, at 12 hours was 1.42in group I and 1.78 in group II and at 24 hours was 1.26 in group I and 1.22 in group II. The difference was non- significant (P> 0.05) [Table 2].

Shoulder pain was seen in 5 in group I and group II and nausea/vomiting 7 in group I and 6 in group II. The difference was non- significant (P> 0.05) [Table 3].

Table 1: Baseline characteristics

Parameters	Group I (28)	Group II (28)	P value
Mean age (years)	42.6	40.7	0.92
Mean weight (Kgs)	54.3	52.9	0.85
Duration of surgery (min)	56.3	57.8	0.97
MAC of isoflurane	107.2	106.4	0.91
Propofol requirement (mg)	0.91	0.94	0.82

Table 2: Comparison of parameters

Parameters	Group I	Group II	P value
Duration of analgesia (hours)	0.08	19.1	0.001
NRS at extubation			
1 hour	0.85	1.16	0.17
4 hours	1.45	2.24	
8 hours	1.54	1.40	
12 hours	1.42	1.78	
24 hours	1.26	1.22	

Table 3: Comparison of shoulder pain and nausea/ vomiting

Parameters	Group I	Group II	P value
Shoulder pain	5	5	1
Nausea/vomiting	7	6	0.94

DISCUSSION

Laparoscopic cholecystectomy (LC) has become the standard procedure for the treatment of gallbladder lesions.[9,10] Short hospital stay and decreased postoperative pain are the benefits of laparoscopic technique as compared to open cholecystectomy. Still, within first 24 postoperative hours, patients mostly complain of pain.[11,12] Numerous opioids as well as non-opioid analgesics have been used in order to reduce post-LC pain, with variable success rates.[13] Pain is of parietal origin in open cholecystectomy. About 17-41% of the patients who underwent LC have to stay for at least only one day in the hospital due to postsurgical pain; and these patients take long time for rehabilitation.[14] We planned present study to assess high volume low concentration intraperitoneal bupivacaine for post laparoscopic cholecystectomy analgesia.

Our results showed that the mean age in group I patients was 42.6 years and in group II was 40.7 years. The mean weight was 54.3 Kgs in group I patients and 52.9 kgs in group II patients. Duration of surgery was 56.3 minutes in group I and 57.8 in group II. MAC of isoflurane was 107.2 in group I and 106.4 in group II. Propofol requirement was 0.91 mg in group I and 0.94 mg in group II. Manan et al,[15] assessed efficacy of large volumes of diluted intraperitoneal bupivacaine in post-

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laparoscopic cholecystectomy analgesia. Two equal groups with 55 patients each were formed. Normal saline 500 ml in group A, and mixture of 20 ml 0.5% bupivacaine in 480 ml normal saline in group II, was used to irrigate peritoneal cavity. Final outcome of the study was the comparison of pain-free duration. Postoperatively, numerical rating scale (NRS) score at various intervals and total analgesics requirement within 24 hours after the procedure were included in the secondary outcomes. Both groups were comparable for age, weight, gender, duration of surgery. Postoperative analgesia duration was 0.99 ±0.51 hours in group A and 16.53 ±2.65 hours in group-II.

Duration of analgesia was 0.08 hours in group I and 19.1 hours in group I. NRS at extubation at 1 hour was 0.85 in group I and 1.16 in group II, at 4 hours was 1.45 in group I and 2.24 in group II, at 8 hours was 1.54 in group I and 1.40 in group II, at 12 hours was 1.42in group I and 1.78 in group II and at 24 hours was 1.26 in group I and 1.22 in group II. Jain et al,[16] evaluated the effectiveness of intraperitoneal instillation of high-volume low-concentration bupivacaine for post-operative analgesia in LC. Sixty patients undergoing LC were included in this prospective, double-blind, randomised study. Patients were divided into two (n = 30) groups. In Group I, intraperitoneal irrigation was done with 500 ml of normal saline. In Group II, 20 ml of 0.5% (100 mg) bupivacaine was added to 480 ml of normal saline for intraperitoneal irrigation during and after surgery. Post-operative pain was assessed by numeric pain rating scale (NRS) at fixed time intervals. Duration of analgesia (DOA), total rescue analgesic requirement (intravenous tramadol), presence of shoulder pain, nausea and vomiting were recorded for the initial 24 h post-operatively. Mean DOA in Group I was 0.06 ± 0.172 h (3.6 ± 10.32 min) and that in Group II was 19.35 ± 8.64 hours. Cumulative requirement of rescue analgesic in 24 hours in Group I was 123.33 ± 43.01 mg and that in Group II was 23.33 ± 43.01 mg. There was no significant difference in incidence of shoulder pain, nausea and vomiting between the groups.

Toleska et al,[17] conducted a study on 50 individuals and observed that visual analogue scale (VAS) scores were statistically significantly lower at all times in bupivacaine compared to saline group. There were statistically significant differences in VAS scores between bupivacaine group and saline group at all the time points, i.e. 1 hour, 4 hours, 8 hours, 12 hours and 24 hours postoperatively.

CONCLUSION

High-volume low-concentration of intraperitoneal bupivacaine significantly increases post operative duration of analgesia and reduces opioid requirement after LC.

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