Original Research Article

DOI: http://dx.doi.org/10.18203/2349-2902.isj20181144

Irrigation with Bupivacaine at surgical bed for postoperative pain relief after laparoscopic cholecystectomy

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Received: 14 February 2018 Accepted: 09 March 2018

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ABSTRACT

Background: Laparoscopy involves insufflation of the abdomen by gas, so that the scope (usually 6-10 mm in diameter) can view the intra-abdominal contents without being in direct contact with the viscera or tissues. Surgical procedures can be carried out by instruments produced through one or more additional ports.

Methods: This study was conducted in 60 patients aged 30-50 years. The patients were divided into two Groups A: 0.5 Bupivacaine, B: Saline intraperitoneal instillation; 30 patients in each group undergoing elective surgery.

Results: This study was undertaken to compare the post-operative analgesic effect of 20 mL 0.5% Bupivacaine given intraperitoneally at the end of laparoscopic surgery with control 0.9% saline 20 mL at Bupivacaine group had better postoperative pain relief in the first six hours with no complications.

Conclusions: 0.5% Bupivacaine irrigation at the surgical bed is effective for cholecystectomy for postoperative pain relief.

Keywords: Anaesthesia, Bupivacaine, Intraperitoneal, Saline

INTRODUCTION

The gold standard treatment for benign gallbladder disease is Laparoscopic cholecystectomy, characterised by short hospital stay.^{1,2,3} Laparoscopic cholecystectomy has improved surgical outcome in terms of reduced pain convalescence compared to conventional cholecystectomy.^{1,2} However, the postoperative pain is considerable. In laparoscopic cholecystectomy, pain is derived from multiple situations: incision pain (somatic), deep intra-abdominal pain (visceral), and shoulder pain (visceral pain due to phrenic nerve irritation).^{3,4} Pain management with multiple analgesic and opioids has been reported with variable success. 1,2,4 The main cause for staying overnight in the hospital the day of surgery in 17% to 41% of the patients, pain and the primary reason is why the patients have a longer convalescence.^{5,6} The study aims at evaluating the use of the irrigation of a local anaesthetic at surgical bed, such as bupivacaine, for postoperative pain reduction.

METHODS

This study was a prospective study conducted on 60 consenting patients who met a predefined criterion of either sex, electively posted for laparoscopic cholecystectomy. For the period 18 months from November 2015 to April 2017. At the Department of General Surgery, JSS Medical College and Hospital, Mysuru, Karnataka, India.

Inclusion Criteria

Age 20-65 years, weight <80 kg of either sex, elective cases and ASA I or II physical status.

Exclusion criteria

Age >65 years, poor general condition, weight >80 kg, anticipated difficult airway and emergency surgery, recent MI (<3 months prior to surgery), ASA III or IV Physical status, acute cholecystitis and those who cannot understand VAS.

Sixty patients who underwent elective laparoscopic cholecystectomy were prospectively randomized into 2 groups by lottery method, with concealment of the random sequence, test group and placebo group. The experimental group was irrigated with 20 cc of bupivacaine 0.5% in normal saline solution which was placed under Group A. Intra peritoneal instillation of local anesthetics at the end of the procedure in the trendelenburg position with the trocars intact. In the control or placebo group, 20cc of normal saline solution without bupivacaine was irrigated.

At the surgical bed after laparoscopic cholecystectomy which was placed under Group B. In the post-operative room using the Visual analogue scale (VAS), post-operative pain was assessed starting from the first hour of surgery, hourly till four hours post op and thereafter at 6-hour, 8-hour, 12 hours and 24 hours after the surgery. Post operatively, the heart rate, blood pressure and respiratory rate assessed at the above times.

Nausea, vomiting, need of any rescue analgesics for pain, any voiding problems, respiratory difficulties if any was documented. Rescue medication 75 mg Diclofenac will be given on VAS 4, Inj. EMESET will be given intraveously for vomiting. The time taken for the use of first dose of rescue analgesic was monitored post-operatively.

RESULTS

The mean age of the cease in our study was 46.2 years. There was no statistical difference between the two groups with a p value more than 0.05 (Figure 1).

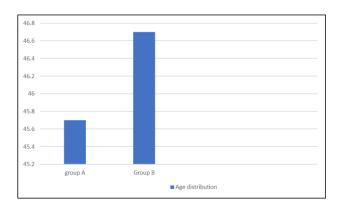


Figure 1: Age distribution.

In the present study most, cases were females (62%) as compared to males 38%, there was no statistical

difference between the two groups with a p value more than 0.05 (Figure 2).

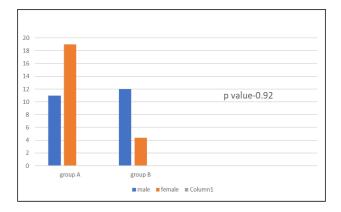


Figure 2: Gender distribution.

In the present study we had no complications related to intra-peritoneal irrigation, the bile leak and the stone fall were related to the surgery there was no statistical difference between the two groups with a p value 0.886 hence the two groups were comparable (Table 1).

Table 1: Intra OP complications.

| Group | Frequency | % | Valid % | Cumulative | |
|------------|------------|----|------------|------------|------|
| Group A | Nil | 27 | 82.8 | 82.8 | 82.8 |
| | Bile leak | 3 | 10.3 | 10.3 | 93.1 |
| | Stone fall | 3 | 10.3 | 10.3 | 100 |
| | Total | 30 | 100 | 100 | |
| Group B | Nil | 28 | 90.3 | 90.3 | 90.3 |
| | Bile leak | 2 | 6.5 | 6.5 | 100 |
| | Total | 30 | 100 | 100 | |

There were no significant complications in both the groups; post-operative complications that were seen were unrelated to the study (Table 2).

Table 2: Post op complications.

| | Nausea | Vomiting | Voiding problems | Respiratory difficulties |
|------------|--------|----------|------------------|--------------------------|
| Group A | 5 | 2 | 0 | 1 |
| Group B | 2 | 2 | 0 | 0 |

There was no statistical difference between the two groups in terms of need for an anti-emetic with a p value 0.88 hence the two groups were comparable (Table 3).

There was statistical difference between the two groups in terms of post-operative time at which the first dose of recue analgesic used 77 percent in the test group needed analgesia after 2 hours as compared to 93 % in the saline (Table 4).

There was statistical difference between the two groups in terms of post-operative pain which was lesser in the group which received Bupivacaine up to the first 12 hours (Table 5).

Table 3: Antiemetic usage.

| Group | Antiemetic used | Frequency | Percent | Valid percent | Cumulative percent |
|---------|-----------------|-----------|---------|---------------|--------------------|
| Group A | No | 25 | 82.8 | 82.8 | 82.8 |
| | Yes | 5 | 17.2 | 17.2 | 100 |
| Group B | No | 29 | 93.5 | 93.5 | 93.5 |
| | Yes | 1 | 6.5 | 6.5 | 100 |

Table 4: Post-operative time at which the first dose of rescue analgesic used.

| Post-operative time at which first dose of rescue analgesic used | Group A | Group B |
|--|---------|---------|
| Hour 0 | 0 | 2 |
| Hour 1 | 3 | 28 |
| Hour 2 | 23 | |
| Hour 3 | 4 | |

Table 5: Pain after surgery at various intervals.

| | 1 hour after surgery | 2 hours after surgery | 3 hours after surgery | 4 hours after surgery | 6 hours after surgery | 12 hours after surgery | 24 hours after surgery |
|---------|-------------------------|--------------------------|--------------------------|-----------------------|--------------------------|------------------------------|------------------------------|
| Group A | 0.36 | 3.73 | 1.66 | 1.66 | 1.6 | 1.36 | 2.8 |
| Group B | 1.8 | 3.23 | 1.866 | 1.66 | 1.86 | 3.6 | 3.5 |
| P value | < 0.005 | < 0.005 | < 0.005 | 1 | < 0.005 | < 0.005 | < 0.005 |

DISCUSSION

The peritoneum is the serous membrane that covers the abdominal cavity and most of the intra-abdominal organs. It is a very delicate layer highly susceptible to damage and it is not designed to cope with variable conditions such as the dry and cold carbon dioxide. During laparoscopic surgery, postoperative pain is multifactorial in origin, and therefore, multimodal therapy may be needed to optimise pain relief. Improved postoperative pain management using opioid- sparing regimens may facilitate a high success rate of outpatient laparoscopic cholecystectomy.

The accurate assessment of pain is difficult because of its individual threshold, subjectivity, and difficulty in measurement. In this study we compared the post-operative pain relief in laparoscopic cholecystectomy cases using intra peritoneal Bupivacaine 0.5% and saline.

Cholelithiasis is characteristically a disease of middleaged women. In the present study majority of the patients were in the age group of 40-50years. The mean age in our study was 46.2 years (Figure 1).

The number of females in the study was more compared to that of males in both the study groups; overall this may be explained by the fact that the disease has a female preponderance (Figure 2). In a study by Novacek showed that female gender is the most important risk factors and the rates of gallstones are two to three times higher among women than men which correlates with the present study.⁷

Bile leak was seen in 16% of which 10 % were interval cholecystectomies, 2% were intrahepatic gall bladders (Table 1).

Local anaesthetic techniques are part of the multimodal approach to postoperative pain management. The main advantage of using local anaesthetics is that they do not have the adverse effects of opioids, which may delay recovery and discharge from hospital. These effects include post- operative nausea, sedation, impairment of return of gastrointestinal motility, and pruritus. In addition, time to return of bowel function in the postoperative period may be reduced when the use of opioids is obviated by administering local anaesthetics. The adverse effects noted by us were nausea and vomiting, which were also similar in both the study groups.

In the present study found that there was a significant difference in the study groups with respect to the time for intake of rescue analgesic consumption (Table 4). Similar results were obtained by Chundrigar et al in their study.⁸

In the present study we found out that the difference in the VAS scores of the two treatment groups at the four time points across the 12 hour time period is significant (p value <0.05) (Table-5).

Almost all the studies available in literature compared either one of the commonly used local anaesthetic with a placebo like normal saline or the different concentrations of same local anaesthetic with each other.

Chundrigar et al noted pain relief upto 2 hours post op with the intraperitoneal administration of 0.25% Bupivacaine, although in the present study we could note pain relief upto 12 hours post op. This may be due to the fact that we instilled the local anaesthetic in the trendelenburg position at the end of surgery which may have resulted in better dispersion of the drug and hence the beneficial effect upto 12 hour post op.

Narchi et al found intraperitoneal local anaesthetics to be more effective in reducing pain upto 48 hours postoperatively in patients undergoing diagnostic laparoscopy. 9 Also instillation of local anaesthetics in the supine position prevented its flow over the coeliac plexus and phernic nerve endings. Rademaker et failed to demonstrate any reduction in postoperative pain. 10 A possible explanation of the failed effect given by them was the small amount of local anaesthetics used as compared to Narchi et al.10 Using 20 ml of 0.5% Bupivacaine, Pasqulucci et al noted a decrease in pain probably due to a complete block of afferents using higher concentrations and volumes than used by other authors. 11 They found beneficial pain relief upto 24 hours post op.

In the present study we used 20 ml of 0.5% Bupivacaine and we found significant pain relief only upto 12 hours.

CONCLUSION

Laparoscopic cholecystectomy is associated with considerable pain in the post-operative period. Given the expanding role of ambulatory surgery and need to facilitate an earlier hospital discharge, improving postoperative pain control has become an important issue for all anaesthesiologists and surgeons. Intraperitoneal local anaesthetic instillation is an effective, cheap and non-invasive method for early post op pain relief in laparoscopic cholecystectomy cases.

The need of rescue analgesics, and overall analgesic consumption in the first 12 hours lesser in the Bupivacaine groups. The adverse effects as well as duration of hospital stay were similar in both the groups. Shoulder tip pain was statistically insignificant in both the study groups. No cases in the present study had any signs or symptoms of local anaesthetic toxicity in any manner. Bupivacaine can be used effectively and safely for intraperitoneal instillation for post-operative pain relief. No adverse effects related to Bupivacaine were

noted. The adverse effects noted by us were nausea and vomiting, which were also similar in both the study groups.

ACKNOWLEDGEMENTS

Authors would like to thank the Department of General surgery, JSS Medical College for helping the authors to carry out this study. Authors would like to extend their thanks to their patients who are a continuous source of inspiration.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Ravishankar N, Kumar AA, Vasudevaiah T, Shivkumar S. Irrigation with Bupivacaine at surgical bed for postoperative pain relief after laparoscopic cholecystectomy. Int Surg J 2018;5:1538-42.