

Effect of Intra-Peritoneal Instillation of Bupivacaine Injection in Patients Undergoing Elective Laparoscopic Cholecystectomy

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ABSTRACT

Aim: To assess the outcome of intra-peritoneal instillation of bupivacaine injection in patients undergoing laparoscopic cholecystectomy.

Methods: This Descriptive case series was carried out in 150 consecutive patients undergoing laparoscopic cholecystectomies for gall stone disease in Services institute of Medical Sciences, from December 2012 to June 2013.

Results: Out of 150 patients 66(44%) were male and 84(56%) were females with their mean age 39.76 ± 2.31 . 13(8.67%) of the patients had hospital stay of <9 hours, 134(89.33%) had post-operative stay between 9-18 hours, 3(2%) had stay between 18-24 hours and no patient with >24 hours. Mean post-operative pain as measured by visual analogue scale was found to be 2.86 ± 1.72 .

Conclusion: Intra-peritoneal instillation of bupivacaine injection in patients undergoing laparoscopic cholecystectomy is found considerably good, feasible and may be promoted for use in routine clinical practices to make laparoscopic cholecystectomy more safe and effective.

Keywords: Laparoscopic cholecystectomy, intra-peritoneal instillation, bupivacaine injection.

INTRODUCTION

Laparoscopic operative procedures have revolutionized abdominal surgery. There are several advantages of it like: a smaller and more cosmetic incision, reduced blood loss and shorter postoperative hospital stay¹. Laparoscopic cholecystectomy is the treatment of choice for symptomatic cholelithiasis. Although there are clear benefits compared with open surgery, postoperative pain after Laparoscopic cholecystectomy remains an issue. Pain can prolong hospital stay and lead to increased morbidity.^{1,2} After laparoscopic cholecystectomy patients complain more of visceral pain as a result of stretching of the intra-abdominal cavity, peritoneal inflammation and phrenic nerve irritation caused by residual carbon dioxide in the peritoneal cavity³. In open cholecystectomy the type of pain results mostly in parietal pain⁴.

There is no general agreement on effective postoperative pain control. Different regimens have been proposed to relieve pain after laparoscopic surgery, such as non-steroidal anti-inflammatory drugs, local wound anesthetics, intra peritoneal anesthetics, intra peritoneal saline, gas drainage, heated gas, low-pressure gas and nitrous oxide pneumoperitoneum⁵. Administration of intra peritoneal local anesthetic, either during or after surgery, is used by many surgeons⁶. This technique was first evaluated in patients undergoing

gynecological laparoscopic surgery. Its application in laparoscopic cholecystectomy was initially examined in a randomized trial in 1993². This technique is safe, simple without side effects, reduces additional analgesia requirement and results in decreased hospital stay⁶.

The aim and objective of the study was to assess the outcome of intra-peritoneal instillation of bupivacaine injection in laparoscopic cholecystectomy in order to reduce procedure related morbidity in terms of postoperative pain and hospital stay. If found effective in large number of cases, can be promoted to be used in routine clinical practice.

MATERIALS AND METHODS

This descriptive case series was carried out in the surgical unit II, Services institute of medical sciences, Lahore. A total number of 150 consecutive patients who were fulfilling the inclusion criteria were included in this study with 95% confidence level, 5% margin of error and taking expected percentage of good outcome i.e. 90% after 24 hours of intra-peritoneal instillation of bupivacaine injection in patients undergoing laparoscopic cholecystectomy. Non probability purposive sampling technique was used.

All the consecutive patients including males and females with age between 20–50 years having symptomatic gallstones requiring elective laparoscopic cholecystectomy diagnosed on ultrasonography were included in this study while all patients who were allergic to local anesthetic agents or diagnosed acute cholecystitis preoperatively or

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requiring per-operative cholangiogram or common bile duct exploration with dilated biliary passage or raised alkaline phosphatase or requiring conversion to open procedure were excluded from the study.

Patients fulfilling the inclusion criteria were recruited from OPD department. A detailed history was taken including demographic data (age, sex and address). Patients were requested to sign an informed consent. They were assured regarding confidentiality, expertise used for the particular procedure and were educated for an anticipated better outcome. The effect modifiers like age was controlled through stratification. Laparoscopic cholecystectomy was done under general anaesthesia. 100mg of bupivacaine diluted in 100ml of saline was used. Fifteen minutes before the end of procedure the intra-peritoneal instillation was made under the surface of both domes of the diaphragm, the gall bladder bed and the dissected Callot's triangle keeping the patient in head down 20° & right tilt 20° position.

The instillation was done with the help of an irrigation cannula. Postoperative patients were assessed for pain using visual analogue scale and analgesic requirement both non-narcotics and narcotics and number of hours the patient remained admitted (hospital stay) was noted. The intensity of the pain was recorded for all patients using visual analogues score (VAS) at 0,9,18 and 24 hours after the surgery. The outcome was assessed after 24 hours of surgery as excellent, good, fair and poor.

All the collected data was entered and analyzed using SPSS version 17.0. The study variables were age and outcome. The variables were analyzed using simple descriptive statistics, calculating mean and standard deviation for numerical values like age and number of days of hospital stay. Frequency and percentages were calculated for qualitative variables like sex and outcome in terms of (excellent, good, fair and poor).

RESULTS

Most of the patients 64(42.66%) were recorded between 41-50 years of age, 52(34.67%) were recorded between 31-40 years, 34(22.67%) were recorded between 20-30 years, mean age was calculated as 39.76±2.31.

Table 1: Age distribution of the patients (n=150)

Age in years	n	%age
21-30	34	22.67
31-40	52	34.67
41-50	64	42.66
Total	150	100

Distribution of age among the patients were shown in the table above (Table 1). Gender distribution of the patients shows 66(44%) male and 84(56%) females. Hospital stay after laparoscopic cholecystectomy was recorded in hours found to be < 9 hours in 13(8.67%), 134(89.33%) patients had stayed for 9-18 hours, 3(2%) stayed for 18-24 hours and no patient was recorded with >24 hours stay at hospital. The outcome according to operational definition was analyzed and recorded, presented in Table No. 4, where 13(8.67%) had excellent results with 0 intensity of pain (after 24 hours) stayed <9 hours and had no need of additional analgesia, 134(89.33%) had good outcome with 1-3 intensity of pain on VAS and also no need of additional analgesia, while only 3(2%) stayed for 18-24 hours in the hospital because of 4-7 intensity of pain (Table 2).

Table 2: Outcome of intra-peritoneal instillation of bupivacaine injection (n=150)

Hospital stay	VAS score	n	%age	Out-come
<9 hours	00	13	8.67	Very good
9-18 hours	1-3	134	89.33	Good
18-24 hours	4-7	03	2	Fair
>24 hours	8-10	00	00	Poor

DISCUSSION

Laparoscopic cholecystectomy has become an established form of treatment for patients with symptomatic gall stones. Although thought to result in less postoperative pain. Studies conducted by Rademaker BM and Joris J have shown that patients undergoing laparoscopic cholecystectomy may experience considerable pain after laparoscopic cholecystectomy^{7,8}.

In start, no general agreement was found on effective postoperative pain control. The various methods used with variable success were NSAID'S⁹ infiltration of wound with local anaesthetics¹⁰ and intermittent intramuscular narcotics¹¹. Administration of intra peritoneal local anesthetic, either during or after surgery, is used by many surgeons⁶.

We planned this study to assess the outcome of intra-peritoneal instillation of bupivacaine injection in laparoscopic cholecystectomy in order to reduce procedure related morbidity in terms of postoperative pain and hospital stay and on the basis of its significant efficacy, this technique may be promoted for its use in routine clinical practice. In our study, we found excellent results in 13(8.67%), who had no pain intensity and also no need of additional analgesia and further the patients also stayed for <9 hours and discharged early while 89.33%(n=134) patients were recorded with good outcome and stayed at hospital for 9-18 hours with 1-3 intensity of

pain on VAS while only 3(2%) had 4-7 intensity of pain and stayed upto 24 hours in the hospital.

The findings of our study are closely in agreement with a study conducted by Maharjan SK⁵ who recorded 10% excellent outcome and 90% good outcome, fair and poor outcome was recorded 0%. The slight difference in the current study and above study was that we recorded only 2% of the patients fair outcome and this difference is not significant.

Jiranantar V¹² conducted a study to find out the effectiveness of intra-peritoneal instillation of bupivacaine for postoperative laparoscopic cholecystectomy pain relief, especially specific pain (visceral pain, shoulder pain and epigastric pain). Eighty ASA (American Society of Anesthesiologists) 1 and 2 patients were randomly assigned to receive either 20 ml of 0.5 per cent bupivacaine (n=39) or the same volume of saline (n=41) instilled under direct vision into the hepato-diaphragmatic space, near and above the hepatoduodenal ligament and above the gall bladder bed at the end of surgery. The intensity of visceral pain, shoulder pain and epigastric pain was assessed at 1, 6, 24 and 48 h after surgery using a visual analogue scale (100mm VAS) and verbal rating "Prince Henry" pain scale (VRS). Surprisingly, they concluded that intra-peritoneal instillation of bupivacaine does not show any advantage for postoperative analgesia after laparoscopic cholecystectomy. On the other hand, Hernández-Palazón J and colleagues¹³ assessed the analgesic effect of the intraperitoneal administration of bupivacaine and morphine in patients undergoing laparoscopic cholecystectomy, there were 30 patients in each group: Group 1, physiological saline 30 mL; Group 2, bupivacaine 0.25% 30 mL; Group 3, bupivacaine 0.25% 30 mL plus morphine 2 mg. In addition, Group 2 received 2 mg intravenous (i.v.) morphine in 2 mL saline, and Groups 1 and 3, 2 mL saline intravenously. The postoperative analgesic requirement was assessed by the total dose of metamizol administered by an i.v. patient-controlled analgesia (PCA) device.

Pain, vital signs, supplemental analgesic consumption and side-effects were recorded for all patients for 24 h, and concluded that in patients undergoing laparoscopic cholecystectomy, the intra-peritoneal administration of morphine plus bupivacaine 0.25% reduced the analgesic requirements during the first 6 postoperative hours compared with the control group. However, the combination of intra-peritoneal bupivacaine 0.25% and i.v. morphine was more effective for treatment of pain after laparoscopic cholecystectomy. In another study, Mraović B, Jurisić T, Kogler-Majerić V and Sustić A¹⁴ in 1997 determine the effects of intra-peritoneal administration of bupivacaine on pain after

laparoscopic cholecystectomy were studied in a prospective, double-blind, randomised trial and concluded that reducing pain with intraperitoneal bupivacaine is effective, easy to administer, and without side-effects.

However, the outcome of intra-peritoneal instillation of bupivacaine injection in laparoscopic cholecystectomy in order to reduce procedure related morbidity in terms of postoperative pain and hospital stay is significantly good and found effective in large number of cases, and this technique may be promoted for use in routine clinical practices.

CONCLUSION

The intra-peritoneal instillation of bupivacaine injection reduces both the post-operative pain and the hospital stay in patients undergoing laparoscopic cholecystectomy and is found considerably good and may be promoted for use in routine clinical practices to make laparoscopic cholecystectomy more safe and effective.

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