

## Comparative Clinical Evaluation of Early Post Operative Pain with and Without Port Site Local Anaesthetic Infiltration during Laparoscopic Cholecystectomy.

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### Abstract

**Background.** To compare early post operative pain following laparoscopic cholecystectomy(LC) with or without port site infiltration of local anaesthetic(LA).

**Methods.** A total of 100 patients were enrolled in this study. Patients were divided in two groups. In group I, patients were subjected to port site infiltration of ropivacaine and in group II, patients were not subjected to any drug. Post operative pain was assessed using visual analogue scale(VAS) and a comparison was made between two groups for various parameters.

**Results.** The consumption of analgesics (both NSAIDS and opioids) were significantly less in patients who received pre incisional port site infiltration of local anaesthetic.

**Conclusion.** Pre incisional port site infiltration of ropivacaine is safe, effective and affordable method for pain relief after laparoscopic cholecystectomy.

**Keywords.** Laparoscopic cholecystectomy(LC), Local anaesthetic(LA), Visual analogue scale(VAS), Non steroidal anti inflammatory drugs(NSAIDS).

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### I. Introduction

Laparoscopic cholecystectomy is now an established form of treatment for patients with symptomatic cholelithiasis. The first successful laparoscopic cholecystectomy was performed by Erich Muhe in Germany in 1985. Now laparoscopic cholecystectomy has replaced open cholecystectomy in many parts of the world with the advantages of reduced post operative pain, reduced hospital stay, decreased morbidity, earlier return to work and cost effective. However, it is not completely painless<sup>1</sup>. The type of pain after laparoscopic cholecystectomy differs considerably from that seen after open cholecystectomy. Whereas open cholecystectomy results mainly in parietal pain, patients complain more of visceral pain after laparoscopic cholecystectomy<sup>2</sup>. Various methods of analgesia have been introduced which include intravenous or intramuscular NSAIDS, intraperitoneal local anaesthesia<sup>3</sup>, local anesthetic infiltration of the wound<sup>4</sup>, intraperitoneal saline<sup>5</sup>, adequate removal of the insufflation gas, heated gas, low pressure gas<sup>6</sup>. Peripheral use of local anaesthetics after laparoscopic surgery may therefore be more likely to provide clinically relevant post operative pain relief in the early post operative period. Pre incisional or pre emptive analgesia with long acting local anaesthetics theoretically achieves peripheral blockage of pain stimuli, which is more advantageous than treating pain after it occurs. Bupivacaine and ropivacaine have been used as local anaesthetics for somatovisceral blockage with satisfactory results<sup>7-9</sup>. But only few comparative studies are available for assessing their efficacy in early postoperative pain relief following laparoscopic cholecystectomy. Therefore, we conducted a study to evaluate and compare early postoperative pain following laparoscopic cholecystectomy with or without port site local anaesthetic infiltration and to compare the clinical outcome in these two group of patients.

### II. Material And Methods

The study was conducted in post graduate department of surgery, Government medical college Jammu on 100 patients of either sex undergoing laparoscopic cholecystectomy. Patients were divided into two groups comprising 50 each.

**Group-I.** Patients in this group were subjected to port site infiltration of 20ml of 0.75% ropivacaine before making skin incisions.

**Group-II.** Patients in this group were not subjected to any drug.

**Exclusion criteria.**

1. Patients with hypersensitivity to ropivacaine.
2. Patients less than 14 years and more than 70 years of age.
3. Pregnancy.
4. Patients taking class III antiarrhythmic drugs.
5. All other contraindications to laparoscopic cholecystectomy.

Patients in group I were subjected to hypersensitivity test one day before surgery. After endotracheal intubation, pneumoperitoneum was achieved by closed technique. The proposed port sites were infiltrated with 20ml of 0.75% ropivacaine, 6ml each for 10mm ports and 4ml each for 5mm ports. The drug was infiltrated into subcutaneous tissue, fascia, muscle layers and parietal peritoneum. Laparoscopic cholecystectomy was performed using conventional four trocar technique.

Postoperative pain was assessed using visual analogue scale(VAS), consisting of 10cm scale representing varying intensity of pain from 0 (no pain) to 10 (worst possible pain). Score of 1-3 was taken as mild, 4-7 as moderate and >7 as severe. Pain was assessed at 3<sup>rd</sup>, 6<sup>th</sup>, 12<sup>th</sup> and 24 hours after surgery. The postoperative pain assessment included pain at port sites, shoulder pain or pain at any other site. Postoperative pain (at VAS >3) was managed by intramuscular injection of diclofenac 75mg and on persistence of pain intravenous nalbuphine 10mg was given. These injections were repeated at an interval of 8 hrs if required.

The following parameters were evaluated in both group of patients.

1. Time to first request of analgesia.
2. The total number of doses of injection diclofenac 75mg given in first 24hrs at VAS >3.
3. The total number of doses of injection nalbuphine 10mg given in first 24hrs at VAS >3.
4. The incidence of shoulder pain.
5. The complications were looked in the intraoperative and postoperative period including.

Cardiovascular,

Respiratory,

Neurological,

Nausea and vomiting,

Allergic reactions and any other.

The data was analysed and the results were reported as mean and standard deviation for quantitative variables and percentages for qualitative variables. Difference in percentages among groups was assessed using chi square test. Statistical significance among mean differences was evaluated using one way analysis of variance. A p value of <0.05 was considered statistically significant.

**III. Results**

100 patients scheduled for elective laparoscopic cholecystectomy were divided into two groups: Group I patients were administered 20ml of 0.75% ropivacaine at port sites before making skin incision and group II patients were not subjected to any drug. Following observations were made and analysed statistically.

**Table No 1.** Comparison of various parameters between study group and control group.

Parameter	Group I (n=50)	Group II (n=50)
Mean age in yrs/Range	37.12 ± 7.80 (16-60)	39.82 ± 9.88 (17-61)
Sex (male:female)	15:35	14:36
Mean weight in Kgs/Range	60.76 ± 3.94 (52-69)	61.88 ± 4.94 (49-70)
Mean duration of surgery in mins/Range	60.20 ± 15.90 (40-115)	61.90 ± 18.94 (35-120)
Time between extubation in mins and first analgesic dose/Range	438.90 ± 190.80 (165-750)	184.40 ± 46.27 (95-380)
Total number of doses of injection diclofenac administered in first 24 hrs	42	91
Total number of doses of injection nalbuphine administered in first 24 hrs	2	56

10 patients from group I and 45 patients from group II had moderate pain, an i.m injection of diclofenac 75mg was administered. Injection nalbuphine was not administered to any patient.

13 patients from group I and 30 patients from group II had moderate pain. Injection diclofenac was administered to 12 patients in group I and injection nalbuphine to 1 patient who previously had recieved injection diclofenac.

30 patients in group II were administered diclofenac injection and among them 25 patients had persistent pain who were later administered with nalbuphine injection.

10 patients from group I and 27 from group II had moderate pain. Injection diclofenac was administered to all patients in group I, among them one patient had persistent pain which later received injection nalbuphine.

11 patients from group II were administered injection diclofenac and in 16 patients injection nalbuphine was administered because they already had received diclofenac injection 6 hrs earlier.

10 patients from group I and 5 from group II had moderate pain, which received injection diclofenac. Patients in group II had adjuvant analgesia with injection nalbuphine on persistence of pain.

Total number of doses of injection diclofenac administered in first 24 hrs after extubation in group I was 42 and in group II it was 91.

Total number of doses of injection nalbuphine administered in first 24 hrs after extubation was 2 in group I and 56 in group II.

**Table No 2.** Complications/ Side effects.

Complications	Group I patients	Group II patients
Cardiovascular	-	-
Respiratory	-	-
Neurological	-	-
Nausea and vomiting	3	8
Allergic reactions	-	-
Any other	-	-

#### IV. Discussion

Laparoscopic cholecystectomy is one of the most frequently performed elective general surgical procedures. It is now an established form of treatment for patients with symptomatic gallstones. It has several advantages: a smaller and more cosmetic incision, less pain, reduced blood loss, shorter hospital stay and early return to work.

However, there is still a significant degree of abdominal pain in the immediate postoperative period. The pain reaches a peak within the first few hours following the operation but diminishes with time<sup>10</sup>. The origin of pain after laparoscopic cholecystectomy is multifactorial with pain arising from the incision sites (somatic pain), from the gallbladder bed (visceral pain) and as a consequence of pneumoperitoneum<sup>11</sup>.

The present study was undertaken in the post graduate department of surgery, Government medical college jammu comprised of 100 patients undergoing laparoscopic cholecystectomy. Patients were randomly divided into two groups: Group I (study group) and Group II (control group) of 50 patients each.

Patients in group I received 20ml of 0.75% ropivacaine preincisional. Patients in group II were not given any drug or placebo. Both the groups were comparable in age, sex, weight, comorbidity and duration of surgery.

There are different routes to administer local anaesthetic drugs; some researchers have shown that local parietal anaesthesia is effective in controlling postoperative pain<sup>12-13</sup>, while others have shown that it is not effective. A significant number of trials have examined the intraperitoneal administration of local anaesthesia in laparoscopic cholecystectomies as regards to postoperative pain and narcotic analgesic consumption with promising results<sup>14-16</sup>.

The timing of administration of the local anaesthetic during surgery is a matter of debate; several studies have examined this point with controversial results as some showed no statistical difference regarding the time of discharge and the post operative pain while other studies support the belief that the timing of periportal administration of ropivacaine is crucial.

In our study the proposed port sites were infiltrated with 20ml of 0.75% ropivacaine and postoperative pain was assessed using visual analogue scale.

Mean duration between extubation and first analgesic dose in group I was  $438.90 \pm 190.80$  mins and in group II it was  $184.40 \pm 46.27$  mins, which was statistically significant ( $p < 0.05$ ).

The results are comparable to those of Bhardwaj et al 2002 and Mraovic et al 1995 who reported a pain relief upto 8 hrs postoperatively.

The consumption of opioids was 2% in group I and 99% in group II. The results of our study are consistent with those of Theodoros E. Pavlidis et al 2003 who used diclofenac 75mg as analgesic for the relief of early postoperative pain and injection meperidine 50mg as adjuvant analgesic on persistence of pain despite diclofenac administration. The consumption of opioids in study group was 32% and in control group it was 48%. According to study conducted by Yu-Yin Liu, Chun-Nan Yeh et al. 2009 who reported significant decrease in immediate postoperative pain and reduced requirement of meperidine following port site ropivacaine infiltration. The results of our study are also consistent with those of Renam Cardoso Candemil et al 2011 who

reported reduction in postoperative pain as well as consumption of pethidine after infiltration of port sites with ropivacaine.

## V. Conclusion

Our study suggests that preincisional port site infiltration of ropivacaine is safe, effective and affordable method for pain relief after laparoscopic cholecystectomy. Its efficacy reduces the sufferings of patients with pain and reduces the requirement of injectable NSAIDs. There is significant difference in requirement of nalbuphine administration, thereby further reducing the incidence of nausea and vomiting associated with nalbuphine. The short term benefit of local infiltration with ropivacaine explains the lower parenteral analgesic use.

Preincisional or pre emptive analgesia with long acting local anaesthetics achieves peripheral blockage of pain stimuli, which is more advantageous than treating pain after it occurs.

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