Reduction of Early Postoperative Pain: Comparison between Port Site and Intra-Peritoneal Infiltration of Local Anaesthetic Agent Among the Patients Undergoing Elective Cholecystectomy

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ABSTRACT

Objective: To evaluate the role of port site and intra-peritoneal infiltration of local anaesthetic agent in reducing early postoperative pain in patients undergoing elective cholecystectomy.

Study Design: Quasi-experimental study.

Place and Duration of Study: Combined Military Hospital, Rawalpindi Pakistan, from Jun 2019 to Mar 2020.

Methodology: This study was conducted on 250 patients who underwent laparoscopic cholecystectomy during the study period. Patients were randomized into two groups. Group-A received the port site infiltration of the local anaesthetic agent, while Group-B received the intra-peritoneal infiltration of the same agent after the surgery. The pain at the surgical site was recorded on the visual analogue scale (VAS) 24 hours after the surgical procedure.

Results: Out of 250 patients randomized into two groups, 130(52%) in Group-A and 120(48%) in Group-B. 160(64%) were male, while 90(36%) were female. The mean age of patients in our study was 40.15±6.57 years. The mean pain score in Group-A was 7.21±2.11, while in Group-B was 5.42±1.29. There was a significant difference in the pain score of both groups (p-value<0.01).

Conclusion: Intra-peritoneal infiltration of the local anaesthetic agent after the laparoscopic surgery emerged as better analgesia for early post-operative pain than port site infiltration of the same agent in the same dose.

Keywords: Intraperitoneal, Laparoscopy, Local anesthetic, Pain, Port site.

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INTRODUCTION

Biliary tract surgeries have been one of the most commonly performed surgeries worldwide.1 Interventional gastroenterological methods and laparoscopic methods of surgery have replaced conventional surgery methods in most conditions due to their safety.2 However, they still have some untoward effects that need to be catered.3 Laparoscopic hepatobiliary and gallbladder surgeries are usually managed of choice for most surgical conditions of this region and are usually considered safe procedures in the hands of trained professionals.4,5

Various studies done in the past have discussed the complications related to laparoscopic gall bladder surgeries.6,7 Post-operative pain has been consistently reported as a common complication after the surgical procedure.8

Over the years, multiple methods have been used to reduce post-operative pain among patients undergoing laparoscopic surgeries. Peritoneal infiltration of local anaesthetic agents has been an effective strategy. Still, there has been a debate on the most effective route for infiltrating the local anaesthetic agent.9 Patients undergoing any surgery have usually been worried about post-operative complications, especially pain. Although the laparoscopic method requires specialized facilities and is expensive compared to the conventional open method,10 it is still safe. There is a need to find methods to reduce post-operative pain and discomfort in patients. This study aimed to evaluate the role of port site and intra-peritoneal infiltration of local anaesthetic agents in reducing early postoperative pain among patients undergoing elective cholecystectomy.

METHODOLOGY

This quasi-experimental was conducted at the Surgical Department, Combined Military Hospital Rawalpindi from June 2019 to March 2020 after ethical approval from the Ethical Review Board Committee (IREB Letter no: A/28/EC 120). The sample size was calculated by WHO sample size calculator using the
population proportion of pain after cholecystectomy as 80%, and it turned out to be 246,11 Non-probability.

**Inclusion Criteria:** All patients of either gender, aged 18 to 65 years old who underwent laparoscopic cholecystectomy for any reason were included in the study.

**Exclusion Criteria:** Patients with uncontrolled diabetes or hypertension, or any other physical illness. Patients with a known gallbladder carcinoma or any other solid or haematological malignancy were also part of the exclusion criteria. Those undergoing redo surgeries or had immediate signs of any surgical complications, including infection, were also part of the exclusion criteria in this study. Patients suffering from any chronic pain disorder or any psychiatric condition or using any illicit substance were also excluded from the study.

Consecutive sampling technique was used to enrol the patients in the study. Then all the patients were randomized into two groups via a lottery method and written informed consent from potential participants, patients who were undergoing laparoscopic removal of the gallbladder at the surgical unit of CMH RWP fulfilling the above-mentioned inclusion and exclusion criteria were included in the study. Routine antibiotic and analgesic cover was given to each patient as per the hospital protocol and condition of the patient. Patients were randomly divided into two groups via a lottery method. Group-A received the intraportal infiltration of the local anaesthetic agent, while Group-B received the intraperitoneal infiltration of the same anaesthetic agent. VAS score (0-10) was applied to assess postoperative pain 24 hours after the surgery in both groups. For blinding, the health professional who assessed the pain and the person who assessed the data did not know the group of the patient and details of which mode was used for the patient they have been assessing for the pain score. Patients also did not know about this information.

Lignocaine was the anaesthetic agent used in the study. The operating surgeon lifted intraportal fascia and muscles, and peri peritoneal spaces were infiltrated with 5ml solution around each port site. The gall bladder bed was approached with the help of a catheter, which was inserted through the right subcostal port to infiltrate the anaesthesia intraperitoneally. No abdominal drain was placed in any patient.12,13

All statistical analysis was performed using the Statistics Package for Social Sciences version 24.0 (SPSS-24.0). Frequency and percentages for gender and the route of administration of local anaesthetic agents were calculated. The mean and standard deviation for age and mean VAS score in both groups were also calculated for the study participants. Student-t test was applied to look for the statistically significant difference in the mean VAS score of the two groups. The p-value less than or equal to 0.05 was considered significant.

**RESULTS**

Out of 250 patients who underwent laparoscopic cholecystectomy and were randomized into two groups, 130(52%) in Group-A (received intraportal anaesthetic infiltration), and 120(48%) in Group-B (received intraperitoneal infiltration). Of these 250 patients, 160(64%) were male, while 90(36%) were female. The mean age of patients who underwent laparoscopic surgery in our study was 40.15±6.57 years (Table-I). The mean pain score in Group-A was 7.21±2.11, while in Group-B was 5.42±1.29. Table-II shows that after applying the student-t test on the mean VAS scores of Groups A and B, there was a statistically significant difference in the pain score of both groups (p-value<0.01).

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<thead>
<tr>
<th>Table-I: Characteristics of Study Participants (n=250)</th>
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<td>Parameters</td>
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<tr>
<td><strong>Age (years)</strong></td>
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<tr>
<td>Mean±SD</td>
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<tr>
<td>40.15±6.57 years</td>
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<td>Range (min-max)</td>
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<td>20 years-59 years</td>
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<td><strong>Gender</strong></td>
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<td>Female</td>
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<td>160(64%)</td>
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<td>90(36%)</td>
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<td><strong>Route of local anesthetic agent</strong></td>
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<td>Group-A (port site)</td>
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<td>130(52%)</td>
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<td>Group-B (Intraperitoneal)</td>
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<td>120(48%)</td>
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<td><strong>Mean VAS score</strong></td>
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<td>Group-A (port site)</td>
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<td>7.21±2.11</td>
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<td>Group-B (Intraperitoneal)</td>
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<td>5.42±1.29</td>
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<th>Table-II: Comparison of mean Visual Analogue Scale Score of Study Groups (n=250)</th>
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<td>Parameters</td>
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<tr>
<td><strong>Visual Analogue Scale Score</strong></td>
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<td>Group-A 130(52%)</td>
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<td>Group-B 120(48%)</td>
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<td>p-value</td>
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<td>7.21±2.11</td>
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**DISCUSSION**

The laparoscopic method has replaced conventional open surgery for most abdominal surgery and gynaecological procedures.14 Many centres of the world have evaluated this method and proven safety and efficacy in various surgeries of the abdominal region.15 Despite this technique being less invasive
than conventional open surgery still has certain un-
toward effects like post-operative pain and dis-
comfort. Routine surgery practices include adminis-
tering oral or parenteral painkillers of various classes.
Infiltration by anaesthetic agents at the end of the
surgical procedure has been regularly performed to
reduce early post-operative pain. Various routes or
techniques have been used to infiltrate the local
anaesthetic agent to achieve the best results. This study
examined the role of port site and intra-peritoneal
infiltration of local anaesthetic agents in reducing early
postoperative pain among patients undergoing elective
cholecystectomy at the Combined Military Hospital
Rawalpindi.

Kaushal-Deep et al. compared the role of intra-
cisional and intraperitoneal use of local anaesthetic
agents in pain relief after the surgical removal of the
gall bladder. They concluded that combined the use of
both routes may be the most effective way of pain
relief in such patients and affect the hospital stay after
surgery positively and also save the extra cost. Though
our scope was pain management and intraperitoneal infiltration, use of local anaesthetic agent emerged as a better option for early postoperative pain relief but future studies may make a third group in which combined use of both the routes
may be used. Moininche et al. discussed the role of
peripheral local anaesthetics (LA) in managing post-
operative pain after laparoscopic cholecystectomy.
They included randomized controlled trials comparing
the effect of local anaesthetic agents with the placebo.
They found the intraperitoneal route superior to the
intraportal route in terms of pain relief among the
post-op patients of laparoscopic cholecystectomy. Our
results were similar in the aspect that intraperitoneal infiltration was a superior and more
effective method for pain relief as compared to the
intra-portal infiltration.

Karger et al. compared the efficiency of the port
site and intraperitoneal route infiltration of local
anaesthesia for pain reduction after the laparoscopic
surgical procedure for endometriosis. They concluded
that both routes of infiltration of local anaesthesia were
effective compared to a placebo for pain relief. However,
they have not found any difference between the two routes used for infiltration. Our results
differed, as intraperitoneal infiltration was statistically
significantly superior to intraportal infiltration in
reducing pain in the early postoperative period. El-
laban et al. concluded in their study comparing the role
of intra-portal and intraperitoneal infiltration of local
anaesthetic agents that interactional infiltration of local
anaesthesia was a better option for early and delayed
post-operative pain relief among patients undergoing
laparoscopic surgery. They also discussed that
shoulder pain was seen more with the intraperitoneal
route. Our results did not involve the difference
between shoulder and surgical site pain. However,
they revealed that the intraperitoneal method signi-
ficantly reduced early postoperative pain among the
target population.

LIMITATIONS OF STUDY

Though many confounding factors were taken care of
in the inclusion/exclusion criteria, there were still many
other factors that could affect the pain symptomatology
among the study participants. Future studies involving
multiple surgical units with a more strict methodology may
generate generalizable results.

CONCLUSION

Intraperitoneal infiltration of the local anaesthetic agent
after the laparoscopic surgery emerged as better manage-
ment for early post-operative pain than port site infiltration
of the same agent in the same dose.

Conflict of Interest: None.

Author’s Contribution

Following authors have made substantial contributions to
the manuscript as under:

MAA: & MQB: Conception, study design, drafting the
manuscript, approval of the final version to be published.
KM: & MMA: Data acquisition, data analysis, drafting the
manuscript, critical review, approval of the final version to
be published.
MA: & ZQB: Critical review, data analysis, drafting the
manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in
ensuring that questions related to the accuracy or integrity of
any part of the work are appropriately investigated and
resolved.

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