

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

Muhammad Ahsan Ayaz, Muhammad Qasim Butt, Khalid Mehmood, Muhammad Mohsin Ayaz*, Maryam Abbas**, Zainab Qasim Butt***

Department of Surgery, Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Department of Urology, Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, **Department of Haematology, Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, ***Department of Surgery, Armed Forces Institute of Dentistry/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

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 intraperitoneal 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: Intraperitoneal 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.

How to Cite This Article: Ayaz MA, Butt MQ, Mehmood K, Ayaz MM, Abbas M, Butt ZQ. Reduction of Early Postoperative Pain: Comparison between Port Site and Intra-Peritoneal Infiltration of Local Anaesthetic Agent among the Patients Undergoing Elective Cholecystectomy. *Pak Armed Forces Med J* 2023; 73(4): 973-976. DOI: <https://doi.org/10.51253/pafmj.v73i4.4534>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

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 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

Correspondence: Dr Muhammad Ahsan Ayaz, Department of Surgery, Combined Military Hospital Rawalpindi Pakistan
Received: 16 Jun 2020; revision received: 23 Aug 2021; accepted: 09 Sep 2021

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 sub-costal 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).

Table-I: Characteristics of Study Participants (n=250)

Parameters	n(%)
Age (years)	
Mean±SD	40.15±6.57 years
Range(min-max)	20 years-59 years
Gender	
Female	160(64%)
Male	90(36%)
Route of local anaesthetic agent	
Group-A (port site)	130(52%)
Group-B (Intraperitoneal)	120(48%)
Mean VAS score	
Group-A (port site)	7.21±2.11
Group-B (Intraperitoneal)	5.42±1.29

Table-II: Comparison of mean Visual Analogue Scale Score of Study Groups (n=250)

	Group-A 130(52%)	Group-B 120(48%)	<i>p</i> - value
Visual Analogue Scale Score	7.21 ±2.11	5.42±1.29	<0.001

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 untoward effects like post-operative pain and discomfort.^{4,5} Routine surgery practices include administering 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-incisional 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.¹⁶ 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.¹⁷ 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.¹⁸ 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.⁷ Our results did not involve the difference between shoulder and surgical site pain. However, they revealed that the intraperitoneal method significantly 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 management 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.

REFERENCES

1. Vitale A, Lai Q. New trends and perspectives in hepatobiliary surgery: preface. *Transl Gastroenterol Hepatol* 2018; 3(1): 99-100. <https://doi.org/10.21037/tgh.2018.11.06>
2. Artifon EL, Loureiro JF, Baron TH, Fernandes K, Kahaleh M, Marson FP. Surgery or EUS-guided choledochoduodenostomy for malignant distal biliary obstruction after ERCP failure. *Endosc Ultrasound* 2015; 4(3): 235-243.
3. Hong KS, Noh KT, Min SK, Lee HK. Selection of surgical treatment types for intrahepatic duct stones. *Korean J Hepatobiliary Pancreat Surg* 2011; 15(3): 139-145.
4. Radunovic M, Lazovic R, Popovic N, Magdelinic M, Bulajic M, Radunovic L, et al. Complications of Laparoscopic Cholecystectomy: Our Experience from a Retrospective Analysis. *Open Access Maced J Med Sci* 2016; 4(4): 641-646.

Reduction of Early Postoperative Pain

5. Taki-Eldin A, Badawy AE. Outcome of Laparoscopic Cholecystectomy in Patients with Gallstone Disease at a Secondary Level Care Hospital. *Arq Bras Cir Dig* 2018; 31(1): e1347. <https://doi.org/10.1590/0102-672020180001e1347>.
6. Afzal M, Rehman S, Butt MQ. Complications of Laparoscopic Cholecystectomy: An Analysis of 400 Consecutive Cases. *Pak Armed Forces Med J* 2014; 64(4), 546-550.
7. El-Labban GM, Hokkam EN, El-Labban MA, Morsy K, Saadl S, Heissam KS. Intra-incisional vs intraperitoneal infiltration of local anaesthetic for controlling early post-laparoscopic cholecystectomy pain. *J Minim Access Surg* 2011; 7(3): 173-177. <https://doi.org/10.4103/0972-9941.83508>
8. Kaushal-Deep SM, Anees A, Khan S, Khan MA, Lodhi M. Randomized controlled study of intra-incisional infiltration versus intraperitoneal instillation of standardized dose of ropivacaine 0.2% in post-laparoscopic cholecystectomy pain: Do we really need high doses of local anesthetics-time to rethink! *Surg Endosc* 2018; 32(7): 3321-3341. <https://doi.org/10.1007/s00464-018-6053-z>.
9. Yong L, Guang B. Intraperitoneal ropivacaine instillation versus no intraperitoneal ropivacaine instillation for laparoscopic cholecystectomy: A systematic review and meta-analysis. *Int J Surg* 2017; 44(3): 229-243. <https://doi.org/10.1016/j.ijsu.2017.043>.
10. Palaz Ali O, Ibis AC, Gurtekin B. Financial Aspects of Bile Duct Injuries. *Med Sci Monit* 2017; 23(1): 5264-5270. <https://doi.org/10.12659/MSM.907532>
11. Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington: National Academies Press; 2011, Available at: <https://pubmed.ncbi.nlm.nih.gov/22553896/>
12. Abdallah NM, Salama AK, Ellithy AM. Effects of preincisional analgesia with surgical site infiltration of ketamine or levobupivacaine in patients undergoing abdominal hysterectomy under general anesthesia; A randomized double blind study. *Saudi J Anaesth* 2017; 11(3): 267-272. <https://doi.org/10.4103/1658-354X.206794>
13. Gao Z, Cui F, Cao X, Li X, Li T. Local infiltration of the surgical wounds with levobupivacaine, dexibuprofen, and norepinephrine to reduce postoperative pain: A randomized, vehicle-controlled, and preclinical study. *Biomed Pharmacother* 2017; 92(3): 459-467. <https://doi.org/10.1016/j.biopha.2017.05.038>.
14. Lewis TL, Furness HN, Miller GW, arsons N, Seers K, Underwood M, et al. Adoption of a novel surgical innovation into clinical practice: protocol for a qualitative systematic review examining surgeon views. *BMJ Open* 2018; 8(4): e020486. <https://doi.org/10.1136/bmjopen-2017-020486>
15. Kawiński A, Dziki Ł, Trzcinski R, Dziki A, Mik M. Is there still a place for open surgery in the treatment strategy of rectal cancer? *Prz Gastroenterol* 2018; 13(4): 289-292.
16. Kaushal-Deep SM, Lodhi M, Anees A, Khan S, Khan MA. Randomised prospective study of using intraoperative, intra-incisional and intraperitoneal ropivacaine for the early discharge of post-laparoscopic cholecystectomy patients as a day case in a cost-effective way in government setup of low-income and middle-income countries: Opening new horizons. *Postgrad Med J* 2019; 95(1120): 78-84. <https://doi.org/10.1136/postgradmedj-2018-135662>.
17. Møiniche S, Jørgensen H, Wetterslev J, Dahl JB. Local anesthetic infiltration for postoperative pain relief after laparoscopy: a qualitative and quantitative systematic review of intraperitoneal, port-site infiltration and mesosalpinx block. *Anesth Analg* 2000; 90(4): 899-912.
18. Kargar R, Minas V, Gorgin-Karaji A, Shadjoo K, Padmehr R, Mohazzab A, et al. Transversus abdominis plane block under laparoscopic guide versus port-site local anaesthetic infiltration in laparoscopic excision of endometriosis: a double-blind randomised placebo-controlled trial. *BJOG* 2019; 126(5): 647-654. <https://doi.org/10.1111/1471-0528.15502>.