

Comparative Analysis of Post Laparoscopic Cholecystectomy Abdominal Pain in Patients with and without Abdominal Drain in Uncomplicated Cholecystectomy

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ABSTRACT

Objective: To compare abdominal pain experienced by patients with and without a subhepatic drain placed after uncomplicated laparoscopic cholecystectomy.

Study Design: Prospective comparative study.

Place and Duration of Study: General Surgery Department of Combined Military Hospital Rawalpindi, Pakistan from Aug 2023 to Feb 2024.

Methodology: One hundred and eighty-two patients who underwent uncomplicated elective laparoscopic cholecystectomy for symptomatic gallstones were included in the study, and split into two equal groups of 91 patients each. In Group-A, the subhepatic drain was placed during the surgery, and in Group-B, no drain was placed. Assessment of intra-abdominal pain in both groups was done with the help of Visual Analogue Scale (VAS).

Results: The mean age of 182 patients was 47.88 ± 9.5 years. Seventy-five (41.2%) were male, and 107 (58.8%) were female. Twenty-four hours after the surgery, significant abdominal pain was present in 22(24.1%) patients with subhepatic drain and only 4(4.3%) patients without drain. Median intra-abdominal pain in Group-A was 3(1), and in Group-B, it was 2(1). No significant difference was observed between the two groups regarding the development of nausea/vomiting, fever, perihepatic collection, and surgical site infection (SSI) in the postoperative period.

Conclusion: After performing uncomplicated elective laparoscopic cholecystectomy, subhepatic drain is associated with increased intra-abdominal pain without offering any significant advantage.

Keywords: Abdominal Pain, Laparoscopic Cholecystectomy, Subhepatic Drain.

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INTRODUCTION

Cholelithiasis is a common pathology related to the gall bladder. Its global prevalence reaches up to 10-15% in the white adult population.¹ The prevalence of cholelithiasis in southern Pakistan ranges up to 9.03%.² Female are at increased risk as compared to the male counterparts.³ Other risk factors for developing cholelithiasis include age, pregnancy, sedentary lifestyle, and obesity.⁴

Diagnosis is mostly an incidental finding while doing a diagnostic workup for some other pathology, as nearly 80% of the people have asymptomatic disease at the time of diagnosis.⁵ Important clinical symptoms of gallstones include episodic right upper abdominal or epigastric pain, nausea, vomiting, indigestion, and bloating.⁶ Cholecystectomy is the recommended standard surgical procedure of choice. Before 1991, cholecystectomy was performed via an

open approach, which was associated with significant post-operative pain and delayed return to normal routine activities. The approach later became laparoscopic, which is now considered as a Gold Standard surgical method to treat symptomatic gallstones.⁷

Placement of subhepatic drains considered an early and effective alarm system that not only helps to diagnose any perihepatic collection but also performs a therapeutic role to drain it before it gets infected and helps the surgeon to monitor its output. However, it is now being opposed by many surgeons who are performing laparoscopic cholecystectomies routinely. They are against the idea that routine use of subhepatic drain after uncomplicated laparoscopic cholecystectomy is of any benefit. Rather, many surgeons link unjustified use of subhepatic drain with significant post-surgery abdominal pain and discomfort resulting in prolonged hospital stay and delay in return to normal routine activities.⁸ These drains are also been blamed for increasing the risk of post-surgery surgical site infections.^{9,10}

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We conducted this study to compare abdominal pain experienced by patients with and without a subhepatic drain placed after uncomplicated laparoscopic cholecystectomy.

METHODOLOGY

This comparative study was conducted at the General Surgery Department of Combined Military Hospital Rawalpindi, Pakistan from Aug 2023 to Feb 2024 after obtaining approval granted by the Hospital Ethical Review Committee.

Inclusion Criteria: Patients aged between 30 to 70 years, of either gender, diagnosed with symptomatic gallstones and scheduled for elective laparoscopic cholecystectomy were included.

Exclusion Criteria: Patients who developed any complication related to gallstones, including acute cholecystitis, acute biliary pancreatitis, choledocholithiasis with obstructive jaundice or cholangitis, patients with chronic liver disease, coagulation disorder, neurological disorder, any absolute or relative contraindication for the laparoscopic surgery, and those who developed any unanticipated complication during the surgery, like unexpected bleeding, injury to the liver or other abdominal viscera, injury to the common bile duct, hepatic duct, named vessel, or uncontrolled bile leak, were excluded.

WHO Calculator was used to calculate sample size, anticipating pain with the subhepatic drain in 21.17% patients, pain without the subhepatic drain in 5.88% patients.^{11,12} Based on these, the total sample size of 182 patients, with 91 patients in each group was computed.

Patients were selected through non-probability consecutive sampling and divided into two equal groups by using the paper lottery method prior to the surgery. Written informed consent was obtained from all patients included in the study. A single dose of broad-spectrum antibiotic was given via intravenous route in all patients at the time of induction of anesthesia. The standard four-port technique was adopted for all patients. Throughout the surgery, all protocols were strictly followed to ensure safe dissection and minimize the risk of any intraoperative complication. The gall bladder was removed and delivered outside the body enclosed in a secure and sterile plastic bag via the epigastric port. Next, in Group-A, the passive subhepatic drain (18F) was placed via a right-sided 5 mm lumbar port along the

anterior axillary line and secured with silk suture. The collection bag was attached to the drain. In Group-B, no subhepatic drain was placed at the end of the surgery. After recovery from anesthesia, all patients were shifted to the surgical ward for post-operative care. Clear oral fluid sips were started after patients became fully alert and awake and early mobilization out of bed was advised. In the first 24 hours post-surgery, all patients received 12 hourly repeated intravenous doses of acetaminophen and ketorolac for pain management. Broad-spectrum antibiotics were also injected via the intravenous route in the first 24 hours post-surgery as per departmental guidelines. Twenty-four hours after surgery, patients were examined by the operating team and queried about the presence and severity of abdominal pain as per the Visual Analogue Scale (VAS), which was the primary endpoint of the study. For our study, we defined significant pain as Pain severity of ≥ 4 , as per VAS.¹³ Furthermore, the presence of nausea/vomiting, fever, and significant perihepatic collection (>100 ml) 24 hours post-surgery were also assessed. Patients having significant pain or unexplained tenderness in right upper quadrant were suspected of having significant perihepatic collection which was further confirmed by quantifying the drain output or using ultrasound abdomen. Overall patient's satisfaction in terms of post-operative pain control was also assessed. Patients were also evaluated for developing any surgical site infection (SSI) within 07 days post-surgery. The presence of fever, bruising/erythema/other signs of inflammation around the wound, clear/hemo-serous/purulent discharge from the wound, and wound gaping/abscess/tissue breakdown were all considered clinical features of SSI. Each of these variables served as the secondary endpoint of the study.

Statistical Package for Social Sciences (SPSS) version 23 was used for data analysis. Quantitative variables were represented using Mean $\pm$ SD. Frequency and percentages of categorical variables were calculated. Chi-Square test was used to compare categorical variables. Shapiro-Wilk test was used to assess the normal distribution of data (VAS score) and the data was not normally distributed. Independent-Samples for normally distributed data and Mann-Whitney U test was used in non-normally distributed data. A p -value of ≤ 0.05 was considered significant.

RESULTS

One hundred and eighty-two patients were included in the study and divided into two groups of

91 patients each. In Group-A, the subhepatic drain was placed during uncomplicated laparoscopic cholecystectomy. In Group-B, no subhepatic drain was placed. The comparison of baseline characters between the two groups is tabulated below in Table-I.

Table-I: Comparison of Baseline Characteristics between Study Groups (n=182)

Characteristics	Group-A (n=91) n(%)		Group-B (n=91) n(%)	p-value
Gender	Male	36(39.6%)	39(42.8%)	0.65
	Female	55(60.4%)	52(57.1%)	
Age in years, Mean±SD	48.0±9.3		47.7±9.7	0.79

A comparison of postoperative parameters in terms of frequency of nausea/vomiting, fever, and perihepatic collection 24 hours after surgery, as well as the frequency of surgical site infection (SSI) within 07 days post-surgery, is shown in Table-II.

Table-II: Comparison of Post-Operative Parameters Between Study Groups (n=182)

Post-operative parameters	Group-A (n = 91) n(%)	Group-B (n=91) n(%)	p-value
Nausea/vomiting	8(8.7%)	7(7.6%)	0.78
Fever	9(9.8%)	7(7.6%)	0.60
Perihepatic collection	3(3.2%)	4(4.3%)	0.70
Surgical Site Infection	1(1.0%)	0(0.0)	0.31

The primary endpoint of the study was to compare the two groups in terms of post-operative abdominal pain. Twenty-four hours after surgery, significant abdominal pain was present in 22(24.1%) patients from Group-A and only in 4(4.3%) patients from Group-B ($p \leq 0.05$, odd ratio 6.9, 95% confidence interval 2.2-21). The mean pain score as per VAS in Group-A was 3.4 ± 0.93 , and in Group-B was 1.07 ± 1.0 ($p \leq 0.05$). Sixty-nine (75.8%) patients in Group-A were satisfied in terms of post-operative pain control as compared to 87(95.6%) patients in Group-B ($p \leq 0.05$). This comparison is tabulated below in Table-III.

Table-III: Comparison of Postoperative Abdominal Pain and Patient Satisfaction Between Study Groups (n=182)

Variables	Group-A (n = 91) n (%)	Group-B (n = 91) n (%)	p-value
Abdominal pain (VAS ≥ 4)	22(24.1%)	4(4.3%)	<0.001
Visual Analogue Scale (VAS) score, Median (IQR)	3(1)	2(1)	<0.001
Patient Satisfaction	69(75.8%)	87(95.6%)	<0.001

DISCUSSION

Cholelithiasis is one of the most common pathologies linked with gall bladder, and its incidence along with its related complications is on a steadily increasing trend globally. As per international data, the prevalence of gallstone disease has doubled in the last 3 decades.¹⁴ It is a common problem in developed countries, imposing a significant financial strain on the healthcare system.¹⁵ At the time of diagnosis, most individuals are asymptomatic. However, 11% to 23% of them become symptomatic in the next 09 to 20 years.¹⁶ Symptomatic gallstone causes abdominal pain, nausea, vomiting, and indigestion and if left untreated can result in serious and even fatal complications.^{17,18}

The recommended treatment for symptomatic gallstone disease is cholecystectomy. The first open cholecystectomy was performed in Berlin by a German Surgeon in 1882.¹⁹ Later on, in the early 1990s, the trend of performing cholecystectomy via laparoscopic approach started setting in, and now it is the Gold Standard surgical method to treat symptomatic gallstones. In the past, while performing open cholecystectomies, surgeons would frequently place a prophylactic subhepatic drain as an early warning system to detect and remove any perihepatic collection following surgery. After the switch from the open to a laparoscopic approach, the same practice of placing a subhepatic drain even after performing uncomplicated surgery was continued and supported by many surgeons. Nowadays, many surgeons are against the idea of placing a prophylactic subhepatic drain in every uncomplicated laparoscopic cholecystectomy surgery by arguing that the presence of abdominal drains significantly increases postoperative pain, resulting in delayed mobility of the patient, increases hospital stay, and late return to the normal routine life activities.

In this study, we did a comparative analysis of abdominal pain after elective uncomplicated laparoscopic cholecystectomy with and without placing a subhepatic abdominal drain. Our study results revealed that the presence of a prophylactically placed subhepatic drain is associated with an increase in post-surgery abdominal pain and the results are statistically significant, with a p -value of ≤ 0.05 . Furthermore, we didn't find any significant difference between the two groups regarding post-surgery nausea/vomiting, fever, perihepatic collection, and development of surgical site infection. Our study's findings are consistent with current literature. Picchio

et al. discouraged using subhepatic drain in routine, criticizing it to be a cause of increased hospital stay without providing any significant benefit.²⁰ Bostanci *et al.* concluded that subhepatic drain don't provide any discernible benefit to the patients and its routine use should be discouraged.²¹ Xu *et al.* and Yang *et al.* came to the conclusion that subhepatic drain results in increased postoperative abdominal pain without any additional benefit.^{22,23} However, Fathi *et al.* and Yang *et al.* contradict the results of our study by concluding that subhepatic drains are associated with reduced postoperative pain and shoulder tip pain.^{24,25}

The current study's findings lend credence to the idea that routine use of a prophylactic sub-hepatic drain placed after uncomplicated laparoscopic cholecystectomy is associated with increased post-surgery abdominal pain without offering any significant advantage that can support this practice. Increased abdominal pain associated with subhepatic drain leads to decreased mobility and delayed return to the normal daily routine, revoking the whole idea of minimally invasive surgery.

LIMITATIONS OF STUDY

The current study has certain limitations including a relatively small sample size and single-center study, yet it is sufficient to draw the inference and make the conclusion. More large-scale prospective randomized controlled studies are needed and recommended to validate the results of this study.

CONCLUSION

The use of subhepatic drains after performing uncomplicated laparoscopic cholecystectomy is associated with increased abdominal pain without offering any additional benefit in the post-surgery period. Its routine use is unjustified and ought to be discouraged. However, it can be used in selective cases if the surgeon is expecting any bile leakage or fluid collection in the perihepatic space, keeping in mind the fact that it may not drain what it is supposed to drain and may only provide a false sense of security to the operating surgeon.

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Authors Contribution

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

AH & IA: Conception, study design, drafting the manuscript, approval of the final version to be published.

MAK & AT: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MMT & AH: Conception, data acquisition, 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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