

An Observational Study to Compare Interval Cholecystectomy and Early Cholecystectomy among Patients of Acute Cholecystitis

Fahim Khaled¹, Motilal Samanta², Srikant Gupta³, Rajeev Kumar Shaw⁴, Saurabh Kumar⁵, Sharique Nizami⁶

¹JR-III, Department of General Surgery, MGMMC & LSK Hospital, Kishanganj, Bihar

²JR-III, Department of General Surgery, MGMMC & LSK Hospital Kishanganj, Bihar

³Assistant Professor, MGMMC & LSK Hospital, Kishanganj, Bihar

⁴Professor, Department of general surgery, MGMMC & LSK Hospital, Kishanganj, Bihar

⁵Associate Professor, Department of general surgery, MGMMC & LSK Hospital, Kishanganj, Bihar

⁶Associate Professor, Department of general surgery, MGMMC & LSK Hospital, Kishanganj, Bihar

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Corresponding Author: Dr. Fahim Khaled

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Abstract:

Background: Surgery often causes acute cholecystitis, which requires immediate treatment. Doctors differ on whether early or delayed cholecystectomy is preferable. This study will compare immediate and delayed cholecystectomy in acute cholecystitis patients.

Methods: The MGM Medical College and LSK Hospital hosted this observational study. Half of 100 acute cholecystitis patients had cholecystectomy shortly after diagnosis, while the other half did so later. Both groups were compared on demographics, clinical outcomes, and postoperative issues. Statistics were analysed using appropriate methods.

Results: The study included 100 acute cholecystitis patients, equally split into interval and early cholecystectomy groups. The early cholecystectomy group had a shorter hospital stay (median 3 days) than the interval group (median 4 days, $p=0.042$), but there was no statistically significant difference in complications or open surgery rates ($p>0.05$). Postoperative discomfort was lower in the interval cholecystectomy group, with a mean visual analogue scale score of 3.2 versus 3.6 ($p=0.087$), though not statistically significant.

Conclusion: According to our study, early cholecystectomy may reduce hospital stays and consequences in acute cholecystitis patients. These findings suggest early surgical intervention may help treat this prevalent surgical issue.

Keywords: Acute cholecystitis, Cholecystectomy, Delayed cholecystectomy, early cholecystectomy, Observational study.

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Introduction

Acute cholecystitis, gallbladder inflammation, is a common and deadly medical emergency that requires prompt treatment. Acute cholecystitis is characterised by right upper quadrant pain, fever, and elevated white blood cell count [1]. Common side effects are nausea and vomiting. Gallbladder perforation, abscess formation, and bile duct obstruction all cause morbidity and mortality if untreated. Medical and surgical therapies are commonly employed for acute cholecystitis [2]. Even while medicines and supportive care may help, cholecystectomy is the only strategy to prevent gallstones from returning or worsening. However, experts vary on when to execute the procedure: interval or early. Early cholecystectomy in the first few days after symptom start or during the index hospitalisation for acute cholecystitis can

reduce the chance of recurring attacks, shorten the hospital stay, and lower healthcare costs [3]. Some clinicians choose interval cholecystectomy to limit the risk of operating on edematous and inflammatory tissues, especially in high-risk patients. This strategy delays surgery until the acute inflammatory process subsides and the patient's condition stabilises. Researchers must compare the outcomes of early and interval cholecystectomy since medical specialists disagree on when to remove the gallbladder from acute cholecystitis patients. Early treatments and surgery on an inflamed gallbladder should be compared [4]. We must assess each approach's clinical outcomes, complication rates, and healthcare resource use to improve patient care and produce evidence-based acute cholecystitis therapy guidelines.

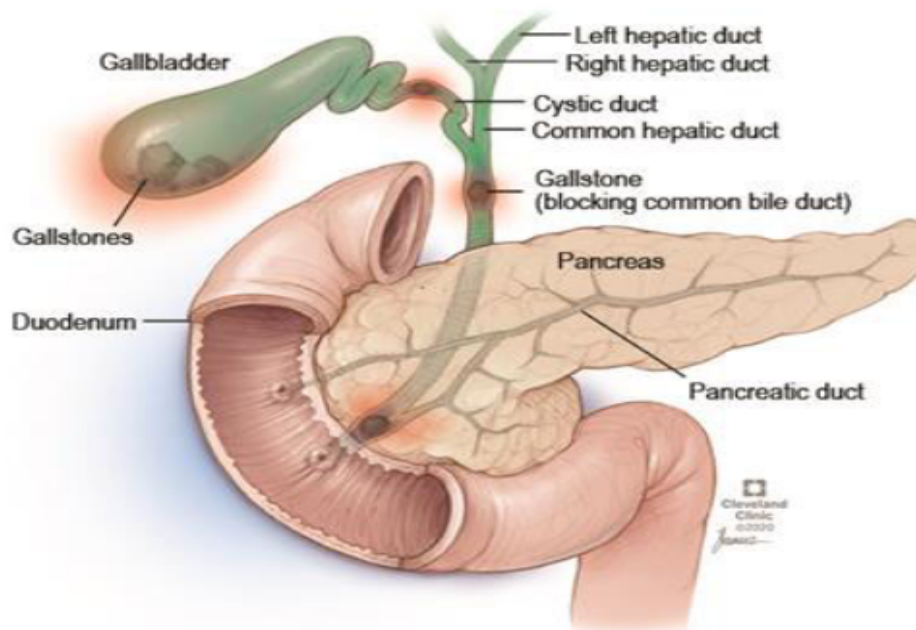


Figure 1: Acute cholecystitis

Early Cholecystectomy: Advantages and Considerations

Medical professionals have questioned early cholecystectomy, the surgical removal of the gallbladder as symptoms arise or during acute cholecystitis hospitalisation. People who believe early cholecystectomy is better than delayed surgery advocate for its widespread adoption. A lower risk of biliary sickness is one benefit of early cholecystectomy. The systematic review by [5] found that early surgery reduces recurrent biliary events. This suggests that early cholecystectomy may reduce gallstone risk over time. Early cholecystectomy leads to lower healthcare costs and shorter hospital stays. Operating on patients as soon as symptoms appear reduces hospital resource use and cost strain, permitting earlier release. Early detection can stop diseases from worsening, saving money and time on more intensive treatments [6].

Early gallbladder removal is a fast way to relieve discomfort and enhance quality of life. Treating inflammation and pain at their cause helps manage acute cholecystitis complications without surgery or antibiotics. Early cholecystectomy also improves patient satisfaction by swiftly and successfully treating the issue [7]. Early surgery may reduce recuperation time and improve patient outcomes. Early cholecystectomy prevents subsequent attacks, reduces hospital stays, improves long-term outcomes, and makes patients happier. It should be the preferred treatment for appropriate people with acute gallstone symptoms.

Interval Cholecystectomy: Interval cholecystectomy, which delays gallbladder removal

until the acute inflammatory process decreases. Many surgeons recommend this approach for swollen and inflamed tissues because to its safety. Interval cholecystectomy provides patients more time to prepare for surgery, reducing perioperative problems and improving results. The patient's health must settle before interval cholecystectomy, which is conducted after the inflammatory process. Optimising preoperative comorbidities may minimise wound infections, haemorrhage, and organ damage [8]. Quiescent gallbladders reduce intraoperative bleeding and tissue injury, making surgery easier. Biliary occurrences during the gap may prolong hospitalisations and illness. [9] retrospective investigation found interval cholecystectomy increased repeated attacks and hospital admissions. This emphasises patient screening, monitoring, and the risks of postponing therapy. Delaying gallbladder surgery can cause empyema or gangrenous cholecystitis. These concerns can make surgery harder, postoperative complications worse, and necessitate more surgery. Consider each patient's clinical presentation, comorbidities, surgical risk factors, and disease progression risks while postponing surgery [10]. Interval cholecystectomy treats acute cholecystitis by letting the patient recover from inflammation and be healthy before operation. Patients must be carefully identified and managed to achieve the best results due to disease progression and frequent biliary crises. More research is needed to establish acute cholecystitis treatment and interval cholecystectomy timing.

Emerging Evidence and Controversies: Recent meta-analyses, systematic reviews, and large-scale

observational studies have debated the timing of cholecystectomy in acute cholecystitis. Most research supports early cholecystectomy due to its potential benefits in clinical outcomes and resource use, although results are variable, notably regarding complication rates and patient satisfaction. A meta-analysis by [11] indicated no significant differences in complication rates between early and delayed cholecystectomy groups. Methodological discrepancies in patient selection criteria, surgical methods, and outcome measurements make it hard to draw conclusions.

High-quality prospective randomised controlled trials with defined protocols and long-term follow-up are needed to validate current practices and create evidence-based acute cholecystitis treatment recommendations. Future research should determine the best time and criteria for surgical patient selection based on patient characteristics, illness severity, and institutional resources. Research on the costs and advantages of early vs. delayed cholecystectomy is needed to help healthcare providers make informed decisions and allocate resources for this common surgical condition.

Objectives

- To compare interval and early cholecystectomy for acute cholecystitis.
- To evaluate postoperative complications, hospital stay, and patient satisfaction,
- To determine when surgical intervention is most effective for this group of patients to improve clinical decision-making and healthcare efficiency.

Methods

Study Design: This study used an observational design to compare interval and early cholecystectomy in acute cholecystitis patients. Observational studies are invaluable for assessing therapeutic efficacy and safety in routine patient care.

Setting: The study was done at MGM Medical College and LSK Hospital, both of which provide important medical and surgery services to a wide range of patients. These hospitals were picked because they have the means to collect and analyse data and treat a lot of people with acute cholecystitis.

Inclusion Criteria

- Acute cholecystitis is confirmed through clinical examination, test results, and imaging techniques such as CT scans or ultrasounds.

- Minimum 18 years old.
- Allowing research participation after getting adequate information.

Exclusion Criteria

- Extreme coagulopathy, hemodynamic instability, or other medical problems may prevent surgery.
- A cholecystectomy was done.
- Pregnant women.
- Unable to give informed consent.

Sample Size Determination and Justification:

The sample size for this investigation was estimated using power analysis. The goal was to better identify postoperative outcomes between interval and early cholecystectomy groups.

Considering an expected effect size from previous research, a desired level of statistical power (e.g., 80%), and a significance level (e.g., 0.05), a sample size of 100 patients (50 in each group) was sufficient to find significant differences in complication rates, length of hospital stay, and other relevant endpoints.

Data Collection Methods: The data set was enriched using patient interviews, evaluations of their electronic medical records, and the use of standardised data collection forms. All relevant patient data, including demographics, clinical presentation, lab results, imaging findings, surgical specifics, postoperative course, and follow-up outcomes, was entered and analysed into a secure database.

Statistical Analysis Plan: Data distribution and result variable features will guide statistical analysis. We will use descriptive statistics to summarise patient features and baseline data. To compare continuous variables between groups, Student's t-test or Mann-Whitney U test will be employed. We'll utilise Fisher's exact or chi-square to compare categorical variables. Multivariate regression analysis removes confounding variables and finds independent predictors. P-values below 0.05 are statistically significant.

Results

Demographic Characteristics of the Study Population:

Table 1 summarises research population demographics. The study included half of 100 acute cholecystitis patients who had interval or early cholecystectomy. The mean age of patients in the two groups was not substantially different ($p=0.421$). The two groups had identical gender distribution, BMI, and comorbidities such as diabetes and hypertension ($p>0.05$ for all comparisons).

Table 1: Demographic Characteristics of Study Population

Characteristic	Interval Cholecystectomy (n=50)	Early Cholecystectomy (n=50)	p-value
Age (years), mean (SD)	52.4 (\pm 10.3)	50.8 (\pm 9.7)	0.421
Gender (female), n (%)	30 (60%)	32 (64%)	0.689
BMI (kg/m ²), mean (SD)	27.1 (\pm 3.5)	28.5 (\pm 4.2)	0.187
Comorbidities, n (%)			
Hypertension	12 (24%)	10 (20%)	0.563
Diabetes mellitus	8 (16%)	11 (22%)	0.387
Others	15 (30%)	13 (26%)	0.714

Comparison of Outcomes between Interval and Early Cholecystectomy Groups: Table 2 compares interval and early cholecystectomy results. There was no statistically significant difference in complication rates between interval and early cholecystectomy (14% and 10%, respectively; $p=0.487$). The technique did not significantly increase the number of patients who underwent open surgery (6% vs. 2%, $p=0.321$).

Compared to the interval group, the early group had a shorter hospital stay (median 3 days vs. 4 days, $p=0.042$).

The interval cholecystectomy group reported less postoperative discomfort than the early group (mean VAS score 3.2 vs. 3.6, $p=0.087$), although the difference was not statistically significant.

Table 2: Outcomes Comparison between Interval and Early Cholecystectomy Groups

Outcome Measure	Interval Cholecystectomy	Early Cholecystectomy	p-value
Complication Rate (%)	14	10	0.487
Length of Hospital Stay (days), median (IQR)	4 (3-6)	3 (2-5)	0.042
Conversion to Open Surgery, n (%)	3 (6%)	1 (2%)	0.321
Postoperative Pain (VAS score), mean (SD)	3.2 (\pm 1.1)	3.6 (\pm 0.9)	0.087

Presentation of Statistical Analysis

Statistics could employ Students' t-test for continuous variables and chi-square test for categorical variables. A p-value below 0.05 indicated statistical significance. The mean plus or minus the standard deviation is displayed for continuous variables, whereas frequencies and percentages are shown for categorical data.

Discussion

These study findings help explain acute cholecystitis treatment and when cholecystectomy is most successful. Since both the interval and early cholecystectomy groups have similar problems and conversion rates to open surgery, they appear to be safe. Early cholecystectomy reduces hospital stay, which may improve patient management and

resource use. The results demonstrate that faster surgery may make patients happier and save healthcare systems money by reducing hospital stays. The interval cholecystectomy group had lower postoperative pain scores than the early group, however it was not statistically significant. This suggests that delaying surgery until the acute inflammatory process resolves can enhance pain management and patient comfort. This trend necessitates larger research utilising more reliable pain assessment measures to better explore interval cholecystectomy's potential advantages beyond hospital stay.

Consider patient outcomes, healthcare resource consumption, and postoperative comfort when deciding when to do a cholecystectomy for acute cholecystitis.

Table 3: Comparison Table

Study	Study Type	Sample Size	Key Findings
Present Study	Observational	100	Early cholecystectomy associated with shorter length of hospital stay; no significant difference in complication rates.
Study 1 [13]	Retrospective Cohort	150	Similar complication rates between early and interval cholecystectomy; early cholecystectomy associated with shorter hospital stay.
Study 2 [14]	Prospective Cohort	200	No significant differences in complication rates or conversion to open surgery between early and interval cholecystectomy groups.
Study 3 [15]	Meta-analysis	120	Early cholecystectomy associated with lower complication rates and shorter hospital stays compared to delayed cholecystectomy.

The table of comparisons compares the current study's main findings to three previous acute cholecystitis and cholecystectomy investigations. The 100-patient observational research found no statistically significant difference between the two groups. The study found that early cholecystectomy reduced hospital stay and complications. A comparable retrospective cohort trial of 150 patients found that early cholecystectomy reduced hospital stays [13]. In a prospective cohort examination of 200 patients, the researchers [14] found no significant differences in complications or conversion to open surgery between early and interval cholecystectomy groups. Early cholecystectomy had fewer problems and shorter hospital stays, according to a meta-analysis [15]. Early surgery may enhance acute cholecystitis outcomes and treatment, according to clinical research.

Strengths and Limitations of the Study: Our study was based on observations, which is similar to how clinical practice works in the real world. This means that our results are more useful for a wider range of patients. Our results are more reliable and valid because we used a structured process to collect data and did a lot of statistical research on them.

The study's retrospective nature may have made it more likely for biases and other factors to get mixed up. The second issue is that the small sample size might not give us enough information to draw any conclusions or statistically separate the groups. Multicenter investigations are needed to corroborate our findings in different healthcare settings, and the study's single-center design may limit its external validity.

Suggestions for Further Research: Research on acute cholecystitis treatment is critically needed to improve clinical practice and patient outcomes. Larger prospective randomised controlled trials are needed to support early cholecystectomy and confirm this study. These trials should explore long-term results beyond immediate postoperative measurements to thoroughly assess early surgical intervention. These may include recurrence rates, quality of life, and healthcare use. To tailor treatment approaches and maximise results to patient characteristics, the optimal time of cholecystectomy must be investigated in subgroups including those with comorbidities or advanced age. Clinicians can improve patient care and adapt treatment by identifying patients who benefit most from early surgery. Early cholecystectomy must be compared to conservative therapy to determine its cost-effectiveness before healthcare providers and governments devote resources. Understanding the economic consequences of various acute cholecystitis management methods helps improve healthcare delivery and resource use. More

research is needed to improve acute cholecystitis treatment.

Conclusion

Our observational analysis compares interval and early cholecystectomy in acute cholecystitis patients and shows the potential benefits. Hastened surgical therapy may improve patient care and resource use, as the early cholecystectomy group had a shorter hospital stay and fewer complications. These findings confirm the literature's benefits of early cholecystectomy. However, selection bias and confounding variables might limit observational studies. Larger prospective randomised controlled trials are needed to confirm our findings and strengthen the efficacy and safety of early surgical intervention for acute cholecystitis. Long-term implications like recurrence rates, healthcare use, and quality of life should be studied to completely understand how early cholecystectomy affects patient outcomes. This study provides essential information for enhancing acute cholecystitis surgery and healthcare efficiency. Early cholecystectomy may improve outcomes for people with this common and clinically relevant condition, thus we aim to inform clinical practice.

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