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Outcome of Early Vs Delayed Laparoscopic Cholecystectomy in Acute Cholecystitis

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Abstract
Background: *Acute cholecystitis is a common surgical condition usually caused by gallstone obstruction of the cystic duct. Laparoscopic cholecystectomy is the standard treatment; however, the optimal timing of surgery remains controversial. This study aimed to compare the outcomes of early versus delayed laparoscopic cholecystectomy in patients with acute cholecystitis.*
Methods: *This comparative study was conducted in the Department of General Surgery at Integral Institute of Medical Sciences and Research, Lucknow, from January 2023 to January 2025. A total of 100 patients diagnosed with acute cholecystitis were included in the study. Patients were divided into two groups: Group A (50 patients) underwent early laparoscopic cholecystectomy within 72 hours of admission, while Group B (50 patients) underwent delayed laparoscopic cholecystectomy after 6–8 weeks of conservative management. Outcomes such as operative time, intraoperative complications, conversion to open surgery, postoperative complications, and duration of hospital stay were compared.*
Results: *Early laparoscopic cholecystectomy showed shorter operative time and reduced hospital stay compared with delayed surgery. The delayed group showed a slightly higher incidence of dense adhesions and conversion to open cholecystectomy. Postoperative complications were comparable in both groups.*
Conclusion: *Early laparoscopic cholecystectomy is a safe and effective treatment for acute cholecystitis and is associated with shorter hospital stay and faster recovery. Therefore, early surgery should be preferred whenever feasible.*
Keywords: *Acute cholecystitis, laparoscopic cholecystectomy, early cholecystectomy, delayed cholecystectomy, gallstone disease.*

I. Introduction

Acute cholecystitis is one of the most common surgical emergencies encountered in clinical practice and usually occurs as a complication of gallstone disease due to obstruction of the cystic duct by gallstones. The obstruction leads to inflammation, distension, and infection of the gallbladder. Patients commonly present with right upper quadrant abdominal pain, fever, nausea, vomiting, and a positive Murphy's sign (1). Acute cholecystitis represents a significant proportion of emergency surgical admissions worldwide.

Ultrasonography is the most commonly used imaging modality for confirming the diagnosis of acute cholecystitis. Characteristic findings include gallstones, gallbladder wall thickening, pericholecystic fluid collection, and a positive sonographic Murphy's sign (2). Early diagnosis and appropriate treatment are important to prevent complications such as empyema, gangrene, perforation, and generalized peritonitis.

Laparoscopic cholecystectomy has become the gold standard treatment for symptomatic gallstone disease and acute cholecystitis. Compared with open surgery, laparoscopic cholecystectomy offers several advantages such as reduced postoperative pain, shorter hospital stay, faster recovery, and improved cosmetic outcomes (3).

Traditionally, the management of acute cholecystitis involved initial conservative treatment with antibiotics and supportive therapy followed by delayed cholecystectomy after 6–8 weeks once the inflammation subsided. This approach was adopted due to concerns regarding operative difficulty and complications when surgery was performed during the acute inflammatory phase (4).

However, advances in laparoscopic techniques and improved surgical expertise have encouraged surgeons to perform early laparoscopic cholecystectomy within 72 hours of symptom onset. Early surgery has been shown to reduce the total duration of hospitalization and prevent recurrent attacks of cholecystitis during the waiting period (5).

Several randomized trials and meta-analyses have demonstrated that early laparoscopic cholecystectomy is safe and feasible with complication rates comparable to delayed surgery (6). Early

intervention may also prevent the development of dense adhesions and fibrosis around the gallbladder that can occur during the interval period and make delayed surgery technically more difficult (7).

Recent clinical guidelines, such as the Tokyo Guidelines, also recommend early laparoscopic cholecystectomy as the preferred treatment for acute cholecystitis in suitable patients (8). Nevertheless, delayed surgery is still practised in some institutions due to concerns about operative complications and technical difficulties.

Therefore, further studies are required to compare the outcomes of early and delayed laparoscopic cholecystectomy in patients with acute cholecystitis. The present study was conducted in the Department of General Surgery at Integral Institute of Medical Sciences and Research, Lucknow, to evaluate and compare the outcomes of early versus delayed laparoscopic cholecystectomy with respect to operative time, intraoperative complications, conversion to open surgery, postoperative complications, and duration of hospital stay.

II. Materials And Methods

Study Design and Setting

This prospective comparative study was conducted in the Department of General Surgery at Integral Institute of Medical Sciences and Research, Lucknow, India. The study aimed to evaluate and compare the outcomes of early versus delayed laparoscopic cholecystectomy in patients diagnosed with acute cholecystitis.

Study Duration

The study was carried out over a period of two years, from January 2023 to January 2025.

Sample Size

A total of 100 patients diagnosed with acute cholecystitis and admitted to the Department of General Surgery during the study period were included.

Study Population

Patients presenting with clinical and radiological features suggestive of acute cholecystitis were evaluated. Diagnosis was based on clinical symptoms such as right upper quadrant abdominal pain, fever, nausea or vomiting, positive Murphy's sign, and confirmed by ultrasonographic findings including gallbladder wall thickening, pericholecystic fluid, and the presence of gallstones.

Inclusion Criteria

- Patients aged 18 years and above
- Patients diagnosed with acute cholecystitis based on clinical and ultrasonographic findings
- Patients willing to participate and provide informed consent
- Patients fit for laparoscopic surgery

Exclusion Criteria

- Patients with choledocholithiasis or obstructive jaundice
- Patients with gallbladder malignancy
- Patients unfit for surgery due to severe comorbid conditions
- Pregnant women
- Patients with previous upper abdominal surgery

Grouping of Patients

The 100 patients included in the study were divided into two groups:

- **Group A (Early Laparoscopic Cholecystectomy):**

50 patients underwent laparoscopic cholecystectomy within 72 hours of onset of symptoms.

- **Group B (Delayed Laparoscopic Cholecystectomy):**

50 patients were initially managed conservatively with antibiotics, analgesics, and supportive treatment, followed by laparoscopic cholecystectomy after an interval of 6–8 weeks once the acute inflammation had subsided.

Preoperative Evaluation

All patients underwent detailed clinical examination and routine investigations including complete blood count, liver function tests, renal function tests, blood glucose levels, and coagulation profile. Ultrasonography of the abdomen was performed in all cases to confirm the diagnosis.

Surgical Procedure

Laparoscopic cholecystectomy was performed under general anesthesia using the standard four-port technique. Intraoperative findings such as adhesions, gallbladder wall thickness, difficulty in dissection, bile duct injury, and need for conversion to open cholecystectomy were recorded.

Outcome Measures

The following parameters were assessed and compared between the two groups:

- Operative time
- Intraoperative complications
- Conversion to open cholecystectomy
- Postoperative complications (bile leak, wound infection, bleeding)
- Duration of hospital stay
- Time to return to normal activities

Postoperative Follow-Up

Patients were monitored during the hospital stay and followed up in the outpatient department for postoperative complications and recovery.

Statistical Analysis

Data were collected and entered into Microsoft Excel and analyzed using statistical software. Quantitative variables were expressed as mean ± standard deviation, while qualitative variables were presented as percentages. The Chi-square test and Student's t-test were used to compare variables between the two groups. A p-value of <0.05 was considered statistically significant.

III. Results And Observations

A total of **100 patients** diagnosed with acute cholecystitis were included in the study conducted at the Department of General Surgery, Integral Institute of Medical Sciences and Research, Lucknow. The patients were divided into two equal groups:

- **Group A:** Early Laparoscopic Cholecystectomy (within 72 hours) – 50 patients
- **Group B:** Delayed Laparoscopic Cholecystectomy (after 6–8 weeks) – 50 patients

The following observations were recorded and analysed.

Table 1: Age Distribution of Patients

Age Group (Years)	Early LC (n=50)	Delayed LC (n=50)	Total
18–30	8	6	14
31–40	12	10	22
41–50	14	16	30
51–60	10	12	22
>60	6	6	12
Total	**50**	**50**	**100**

Observation: Most patients were in the **41–50 years** age group.

Table 2: Gender Distribution

Gender	Early LC (n=50)	Delayed LC (n=50)	Total
Male	18	20	38
Female	32	30	62
Total	**50**	**50**	**100**

Observation: Acute cholecystitis was more common in **females (62%)** compared to males.

Table 3: Operative Time Comparison

Operative Time (Minutes)	Early LC (n=50)	Delayed LC (n=50)
Mean ± SD	62 ± 12	74 ± 15

Observation: Mean operative time was **shorter in the early laparoscopic cholecystectomy group**.

Table 4: Conversion to Open Cholecystectomy

Conversion	Early LC (n=50)	Delayed LC (n=50)
Yes	3 (6%)	6 (12%)
No	47 (94%)	44 (88%)
Total	**50**	**50**

Observation: Conversion to open surgery was **higher in the delayed surgery group**.

Table 5: Intraoperative Complications

Complication	Early LC (n=50)	Delayed LC (n=50)
Bleeding	2	4
Bile duct injury	0	1
Dense adhesions	5	12
None	43	33

Observation:Dense adhesions and operative difficulty were more common in delayed cholecystectomy.

Table 6: Postoperative Complications

Complication	Early LC (n=50)	Delayed LC (n=50)
Wound infection	2	5
Bile leak	1	2
Fever	3	4
None	44	39

Observation: Postoperative complications were **slightly higher in the delayed group**.

Table 7: Duration of Hospital Stay

Hospital Stay (Days)	Early LC (n=50)	Delayed LC (n=50)
Mean ± SD	3.2 ± 1.1	5.6 ± 1.8

Observation: Early laparoscopic cholecystectomy was associated with a **shorter hospital stay**.

Table 8: Return to Normal Activities

Time to Return to Normal Activity	Early LC (n=50)	Delayed LC (n=50)
≤7 days	34	20
8–14 days	14	22
>14 days	2	8

Observation: Patients who underwent early surgery resumed normal activities earlier than those in the delayed group.

IV. Discussion

Acute cholecystitis is a common complication of gallstone disease and is frequently encountered in surgical practice. The optimal timing of laparoscopic cholecystectomy has been extensively studied, and increasing evidence supports early surgical intervention (1).

In the present study, the majority of patients were in the age group of 41–50 years. Similar age distribution has been reported in other studies, indicating that gallstone disease is more prevalent among middle-aged individuals (2). The present study also demonstrated a higher incidence among females compared to males. This female predominance is well documented and is related to hormonal influences such as estrogen, which increases cholesterol saturation in bile and promotes gallstone formation (3).

The mean operative time was shorter in patients undergoing early laparoscopic cholecystectomy compared to those undergoing delayed surgery. This may be explained by the development of fibrosis and dense adhesions around the gallbladder during the waiting period in delayed cases. Lo et al. also reported that delayed cholecystectomy may be technically more difficult due to chronic inflammatory changes (9).

In the present study, the conversion rate to open cholecystectomy was slightly higher in the delayed group. This may be attributed to severe adhesions and distorted anatomy in Calot's triangle. Similar findings were reported by Gutt et al., who observed increased operative difficulty in delayed surgery (10).

Intraoperative findings in this study showed a higher incidence of dense adhesions in the delayed group. During the interval period between conservative management and delayed surgery, persistent inflammation can lead to fibrosis and adhesion formation, making dissection more challenging (6).

Postoperative complications such as wound infection, bile leak, and postoperative fever were slightly more frequent in the delayed group. Previous studies have also shown that early laparoscopic cholecystectomy is a safe procedure with acceptable complication rates when performed by experienced surgeons (5).

Another significant observation in the present study was the shorter hospital stay in patients who underwent early laparoscopic cholecystectomy. Early surgery eliminates the need for repeated hospital admissions and reduces the risk of recurrent gallstone-related complications while waiting for surgery. Siddiqui et al. and Lai et al. also reported similar findings in their studies comparing early and delayed surgery (11,12).

Overall, the findings of the present study support the growing evidence that early laparoscopic cholecystectomy is a safe and effective treatment for acute cholecystitis. Early surgical intervention is associated with shorter hospital stay, faster recovery, and comparable complication rates when compared with delayed laparoscopic cholecystectomy.

V. Conclusion

Early laparoscopic cholecystectomy is a safe and effective treatment for acute cholecystitis. It is associated with shorter operative time, reduced hospital stay, and faster recovery compared to delayed surgery. Therefore, early laparoscopic cholecystectomy should be preferred in the management of acute cholecystitis whenever feasible.

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