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IMPACT OF SURGICAL TIMING ON PERIOPERATIVE OUTCOMES IN ACUTE CHOLECYSTITIS: A PROSPECTIVE COMPARISON OF EARLY VERSUS DELAYED LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT **Introduction:** Acute cholecystitis is a common surgical emergency, yet the optimal timing of laparoscopic cholecystectomy remains debated. This study aimed to compare perioperative outcomes of early versus delayed laparoscopic cholecystectomy in patients with acute cholecystitis.**Methods:** This prospective observational case series was conducted at a tertiary care center over 18 months. Sixty patients with acute calculous cholecystitis were enrolled and divided into two groups: Group A underwent early laparoscopic cholecystectomy within 72 hours of symptom onset (n=30), while Group B underwent delayed surgery at 6-12 weeks after initial conservative management (n=30). Primary outcome was operative time; secondary outcomes included conversion rate, complications, hospital stay, and readmissions. Data were analyzed using appropriate statistical tests with $p<0.05$ considered significant.**Results**: Both groups had comparable baseline characteristics. Mean operative time was significantly shorter in Group A (68.4±14.2 minutes versus 82.6±16.8 minutes, p=0.001). Hospital stay was reduced in the early group (3.6±1.3 days versus 6.2±1.8 days, p<0.001). Dense adhesions were more frequent in delayed surgery (47% versus 27%, p=0.036), with higher intraoperative blood loss (112±38 ml versus 78±24 ml, p=0.018). Conversion rates (6.7% versus 13.3%, p=0.389) and total complications (13.3% versus 23.3%, p=0.336) showed trends favoring early surgery though not statistically significant. Importantly, 13.3% of patients awaiting delayed surgery experienced interval biliary complications. No mortality occurred in either group.**Conclusion:** Early laparoscopic cholecystectomy within 72 hours significantly reduces operative time and hospital stay compared to delayed surgery at 6-12 weeks, with comparable safety profile. For medically stable patients with Grade I-II acute cholecystitis, early intervention should be considered the preferred management strategy, aligning with contemporary international guidelines.

KEYWORDS : Acute cholecystitis, laparoscopic cholecystectomy, early surgery, delayed surgery, surgical timing, perioperative outcomes, Tokyo Guidelines, conversion rate, hospital stay, prospective study

INTRODUCTION

Acute cholecystitis remains a frequent surgical emergency, accounting for significant morbidity and healthcare utilization worldwide.[1] Predominantly triggered by cystic duct obstruction from gallstones, this inflammatory process can escalate to life-threatening complications including gangrene, perforation, and sepsis. The optimal timing of surgical intervention, however, continues to spark debate among surgeons despite decades of accumulated experience.[2]

Laparoscopic cholecystectomy has emerged as the definitive treatment since the 1990s, offering advantages of reduced postoperative pain, shorter hospitalization, and accelerated recovery compared to open surgery.[3] Yet the critical question persists: when should we operate? Two competing strategies dominate current practice—early intervention within 72 hours of symptom onset versus delayed surgery after 6-12 weeks of conservative management.

The traditional delayed approach stemmed from concerns that operating within an inflamed, edematous surgical field would increase technical difficulty, conversion rates, and perioperative complications. Proponents advocated allowing inflammation to resolve, theoretically creating clearer tissue planes and reducing operative hazards. However, this strategy carries its own risks. Evidence suggests that 20-30% of patients awaiting interval cholecystectomy experience recurrent biliary events—including repeat cholecystitis, pancreatitis, or cholangitis—necessitating emergency readmission.[4–5]

Contemporary guidelines have shifted toward favoring early intervention. The Tokyo Guidelines 2018 recommend early laparoscopic cholecystectomy for Grade I and II acute cholecystitis in medically fit patients,[6] while the World Society of Emergency Surgery 2020 guidelines similarly endorse this approach based on evidence of comparable complication rates with reduced total hospital stay.[7] The physiological rationale suggests that early surgery during the edematous phase may actually be technically easier than operating after dense fibrotic adhesions develop.[8]

Despite these recommendations, conflicting evidence persists in the literature. Recent studies demonstrate paradoxical findings—some reporting shorter operative times with early surgery, others showing the opposite.[1–3] Conversion rates, complication profiles, and quality of life outcomes vary considerably across published series.[2] The intermediate period between early and delayed surgery remains particularly poorly characterized, with emerging data suggesting this may represent a high-risk window for intervention.[2]

In resource-constrained settings like India, where surgical capacity may limit immediate intervention, understanding the temporal relationship between symptom onset and surgical outcomes becomes crucial for optimizing patient selection and resource allocation. This study aims to evaluate whether the timing of laparoscopic cholecystectomy significantly influences perioperative outcomes in acute cholecystitis, comparing early versus delayed approaches in our institutional experience.

MATERIALS AND METHODS

Study Design and Setting

This prospective observational case series was conducted in the Department of General Surgery at LN Medical college and JK hospital, Bhopal, a tertiary care teaching hospital, over a period of 18months. The study protocol received ethical clearance from the Institutional Ethics Committee, and written informed consent was obtained from all participants prior to enrollment.

Study Population

Consecutive patients presenting to the emergency department with acute calculous cholecystitis were screened for eligibility. The diagnosis was established based on the Tokyo Guidelines 2018 criteria,[6] requiring the presence of local signs of inflammation (Murphy's sign, right upper quadrant tenderness), systemic inflammatory response (fever >38°C, elevated C-reactive protein, leukocytosis >10,000/mm³), and confirmatory imaging findings on ultrasonography.

Inclusion Criteria

- Age 18-70 years
- Confirmed diagnosis of acute calculous cholecystitis per Tokyo Guidelines

- American Society of Anesthesiologists (ASA) physical status I-III
- Hemodynamically stable patients suitable for laparoscopic intervention
- Willingness to participate with informed consent

Exclusion Criteria
- Acalculous cholecystitis
- Suspected or confirmed gallbladder malignancy
- Common bile duct stones requiring endoscopic retrograde cholangiopancreatography (ERCP)
- Acute biliary pancreatitis
- IV-V)
- Previous upper abdominal surgery
- Pregnancy
- Perforated cholecystitis with biliary peritonitis
- Patient refusal or inability to provide consent
- Lost to follow-up before completion of study period

Study Groups
Eligible patients were allocated into two groups based on the timing of surgical intervention:

Group A (Early Laparoscopic Cholecystectomy): Patients undergoing surgery within 72 hours of symptom onset (n=30)

Group B (Delayed Laparoscopic Cholecystectomy): Patients undergoing surgery 6-12 weeks after initial conservative management and resolution of acute inflammation (n=30)

Group allocation was determined by a combination of patient presentation timing, surgical expertise availability, and operating room capacity. Patients presenting within the therapeutic window for early intervention who consented to immediate surgery were assigned to Group A. Those presenting beyond 72 hours, patients preferring conservative management, or those with temporary contraindications underwent initial medical therapy followed by interval cholecystectomy (Group B).

Initial Management Protocol
All patients received standardized initial treatment comprising intravenous fluid resuscitation, broad-spectrum antibiotics (third-generation cephalosporin with metronidazole), analgesics and antiemetics as needed, and serial clinical and laboratory monitoring. For Group B patients, antibiotics were continued until clinical improvement and normalization of inflammatory markers, followed by discharge with outpatient follow-up and elective surgery scheduling at 6-12 weeks.

Surgical Technique and Data Collection
All procedures were performed by the same surgical team using a standardized four-port laparoscopic technique under general anesthesia, adhering to the critical view of safety protocol. The critical view of safety was documented intraoperatively, with both the cystic duct and cystic artery clearly identified as the only two structures entering the gallbladder before clipping (Figure 1). Conversion to open cholecystectomy was undertaken when deemed necessary for patient safety due to unclear anatomy, uncontrolled bleeding, or technical limitations.

Comprehensive data were prospectively recorded including demographic details, comorbidities, symptom duration, clinical severity (Tokyo Guidelines grading), laboratory parameters, and ultrasonography findings. Intraoperative variables documented comprised operative time (skin incision to closure), degree of inflammation and adhesions, complications, conversion rate, and estimated blood loss. Postoperative parameters included length of hospital stay, complications (wound infection, bile leak, intra-abdominal collection), and 30-day readmission rates. All specimens underwent histopathological examination for diagnostic confirmation.
The primary outcome measure was operative time, while secondary outcomes included conversion rate, intraoperative and postoperative complications, length of hospital stay, and readmission rates. Data analysis was performed using SPSS version 26.0, with continuous variables expressed as mean ± standard deviation and compared using independent t-test or Mann-Whitney U test as appropriate. Categorical variables were analyzed using chi-square or Fisher's exact test. Statistical significance was set at $p<0.05$.

RESULTS
A total of 60 patients with acute calculous cholecystitis underwent laparoscopic cholecystectomy during the study period and were included in the final analysis. No patients were lost to follow-up. The study cohort comprised 30 patients in Group A (early laparoscopic cholecystectomy) and 30 patients in Group B (delayed laparoscopic cholecystectomy).

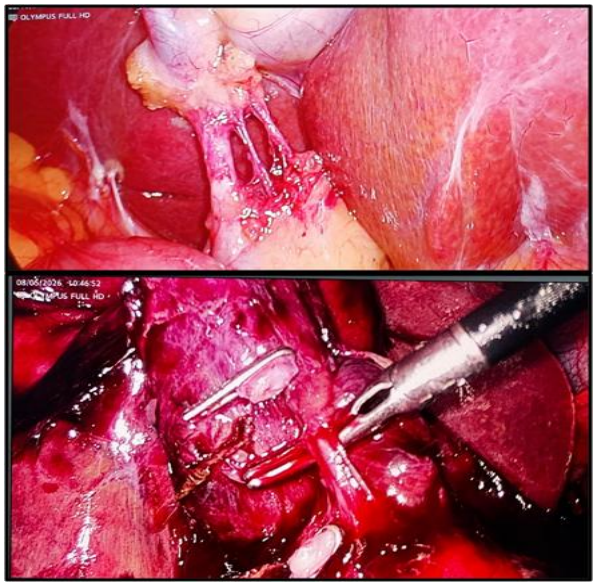

Figure 1: Critical View of Safety Achieved in Early Laparoscopic Cholecystectomy *(a) and (b) — Intraoperative laparoscopic photographs demonstrating optimal dissection of Calot's triangle with two structures clearly identified entering the gallbladder — the cystic duct and cystic artery — confirming achievement of the Critical View of Safety (CVS) prior to clipping and division. Note the well-defined, relatively clear tissue planes characteristic of early surgical intervention within 72 hours of symptom onset*

Baseline Characteristics
The demographic profile and baseline characteristics were comparable between both groups, ensuring homogeneity for meaningful comparison (Table 1). The mean age was 44.2 ± 13.8 years in Group A versus 46.7 ± 14.2 years in Group B (p=0.487). Female preponderance was observed in both groups, with 67% in Group A and 63% in Group B (p=0.754), consistent with the established epidemiology of gallstone disease. Body mass index, prevalence of comorbidities including diabetes mellitus and hypertension, and ASA physical status classification showed no statistically significant differences between groups.

The Tokyo Guidelines severity grading revealed that majority of patients in both groups had Grade I cholecystitis (63% vs 60%), with Grade II disease accounting for 33% and 37% in Groups A and B respectively (p=0.682). Grade III cholecystitis was minimal in both groups. Preoperative laboratory parameters including total leukocyte count, C-reactive protein levels, and liver function tests were similar across groups. Ultrasonographic findings demonstrated comparable gallbladder wall thickness (4.8 ± 1.2 mm vs 4.6 ± 1.4 mm, p=0.562) and presence of pericholecystic fluid.

TABLE 1: Baseline Demographic and Clinical Characteristics Intraoperative Outcomes

Parameter	Group A (Early) n=30	Group B (Delayed) n=30	p-value
Age (years), mean ± SD	44.2 ± 13.8	46.7 ± 14.2	0.487
Gender, n (%)			
- Male	10 (33%)	11 (37%)	0.754
- Female	20 (67%)	19 (63%)	
BMI (kg/m²), mean ± SD	28.4 ± 5.2	29.1 ± 6.4	0.621
Comorbidities, n (%)			
- Diabetes mellitus	5 (17%)	6 (20%)	0.739
- Hypertension	8 (27%)	9 (30%)	0.774
- Coronary artery disease	2 (7%)	3 (10%)	0.640
ASA Physical Status, n (%)			
- ASA I	18 (60%)	16 (53%)	0.792
- ASA II	10 (33%)	12 (40%)	

- ASA III	2 (7%)	2 (7%)	
Tokyo Guidelines Grade, n (%)			
- Grade I	19 (63%)	18 (60%)	0.682
- Grade II	10 (33%)	11 (37%)	
- Grade III	1 (3%)	1 (3%)	
Laboratory Parameters			
- TLC (cells/mm³)	11,240 ± 2,450	10,890 ± 2,680	0.588
- CRP (mg/dL)	8.4 ± 3.2	7.9 ± 3.6	0.556
Ultrasonography			
- GB wall thickness (mm)	4.8 ± 1.2	4.6 ± 1.4	0.562
- Pericholecystic fluid, n (%)	16 (53%)	14 (47%)	0.605

Significant differences emerged in intraoperative parameters between early and delayed surgery groups (Table 2). The mean operative time was 68.4 ± 14.2 minutes in Group A compared to 82.6 ± 16.8 minutes in Group B, demonstrating a statistically significant difference (p=0.001). This finding suggests that early surgery was technically more efficient, likely due to less fibrotic tissue and clearer anatomical planes during the edematous phase of inflammation.

Conversion to open cholecystectomy occurred in 2 patients (6.7%) in Group A and 4 patients (13.3%) in Group B (p=0.389). The primary reasons for conversion included dense adhesions obscuring Calot's triangle anatomy in 4 cases, uncontrolled bleeding in 1 case, and suspected bile duct injury requiring open exploration in 1 case. Though conversion rate was higher in the delayed group, the difference did not reach statistical significance in this cohort.

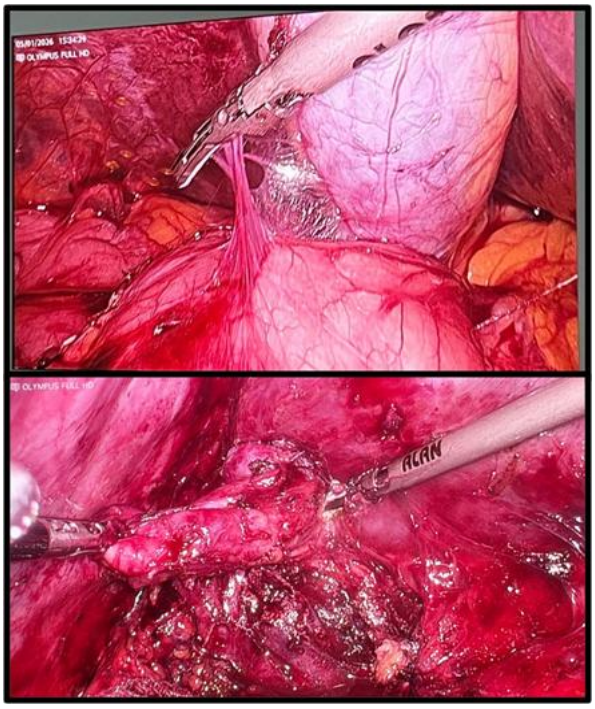

Figure 2: Dense Adhesions and Intraoperative Complications in Delayed Laparoscopic Cholecystectomy (a) and (b) — Intraoperative laparoscopic photographs from Group B (delayed surgery) illustrating dense fibrotic adhesions obscuring Calot's triangle anatomy. The obliterated surgical planes and adherent omentum/surrounding structures represent the sequelae of organized chronic inflammation, significantly increasing operative difficulty and contributing to higher conversion rates and blood loss in the delayed group.

Intraoperative complications were encountered in 5 patients (8.3%) overall. Bleeding requiring additional hemostatic measures occurred in 1 patient in Group A versus 3 in Group B (p=0.301). One bile duct injury was identified intraoperatively in Group A and managed with immediate repair without long-term sequelae. The degree of inflammation and adhesions was graded intraoperatively, with dense adhesions noted more frequently in the delayed group (47% vs 27%, p=0.036). Representative intraoperative images illustrating these contrasting findings — optimal Critical View of Safety in early surgery versus dense adhesion-related complications in delayed surgery — are shown in Figures 1 and 2. Mean estimated blood loss was 78 ± 24 ml in Group A versus 112 ± 38 ml in Group B (p=0.018).

TABLE 2: Comparison of Intraoperative Outcomes

Parameter	Group A (Early) n=30	Group B (Delayed) n=30	p-value
Operative time (minutes), mean ± SD	68.4 ± 14.2	82.6 ± 16.8	0.001*
Conversion to open, n (%)	2 (6.7%)	4 (13.3%)	0.389
Intraoperative complications, n (%)	2 (6.7%)	3 (10%)	0.640
- Bleeding requiring intervention	1 (3.3%)	3 (10%)	0.301
- Bile duct injury	1 (3.3%)	0 (0%)	0.313
- Bowel injury	0 (0%)	0 (0%)	-
Dense adhesions, n (%)	8 (27%)	14 (47%)	0.036*
Estimated blood loss (ml), mean ± SD	78 ± 24	112 ± 38	0.018*
Gallbladder perforation, n (%)	2 (6.7%)	1 (3.3%)	0.552

Postoperative Outcomes

Postoperative recovery parameters demonstrated notable differences between groups (Table 3). The mean length of hospital stay was significantly shorter in Group A (3.6 ± 1.3 days) compared to Group B (6.2 ± 1.8 days), yielding a p-value of <0.001. This represents a clinically meaningful reduction in hospitalization duration with early intervention, translating to reduced healthcare costs and earlier return to daily activities.

Total postoperative complications occurred in 4 patients (13.3%) in Group A and 7 patients (23.3%) in Group B (p=0.336). Wound infections developed in 2 patients (6.7%) in the early group versus 3 patients (10%) in the delayed group (p=0.640). Bile leak was observed in 1 patient in Group A and 2 patients in Group B (p=0.552), all managed conservatively with percutaneous drainage and endoscopic stenting. Intra-abdominal collections requiring intervention occurred in 1 case in each group.

Readmission within 30 days of discharge occurred in 1 patient (3.3%) in Group A compared to 2 patients (6.7%) in Group B (p=0.552). Reasons for readmission included wound infection in 2 cases and port-site seroma requiring aspiration in 1 case. No mortality was recorded in either group during the study period or 30-day follow-up. Importantly, during the waiting period for delayed surgery, 4 patients (13.3%) experienced recurrent biliary events requiring emergency department visits, though none necessitated emergency cholecystectomy.

Histopathological examination confirmed acute cholecystitis in all specimens, with chronic cholecystitis changes noted in 73% of Group B specimens, reflecting the interval between acute episode and delayed surgery, compared to 23% in Group A (p<0.001).

TABLE 3: Comparison of Postoperative Outcomes

Parameter	Group A (Early) n=30	Group B (Delayed) n=30	p-value
Hospital stay (days), mean ± SD	3.6 ± 1.3	6.2 ± 1.8	<0.001 *
Total complications, n (%)	4 (13.3%)	7 (23.3%)	0.336
- Wound infection	2 (6.7%)	3 (10%)	0.640
- Bile leak	1 (3.3%)	2 (6.7%)	0.552
- Intra-abdominal collection	1 (3.3%)	1 (3.3%)	1.000
- Postoperative bleeding	0 (0%)	1 (3.3%)	0.313
30-day readmission, n (%)	1 (3.3%)	2 (6.7%)	0.552
Recurrent biliary events during waiting period, n (%)	N/A	4 (13.3%)	-
Mortality, n (%)	0 (0%)	0 (0%)	-

DISCUSSION

Our prospective analysis of 60 patients undergoing laparoscopic cholecystectomy for acute cholecystitis demonstrates that surgical timing significantly influences perioperative outcomes. The most important finding was a 14.2-minute reduction in operative time with early intervention (p=0.001), reflecting basic differences in tissue characteristics between acute swelling and chronic scarring phases of inflammation. This observation is supported by recent multicenter data showing similar patterns,[1] though the exact magnitude varies across different hospitals.[3] The improved surgical efficiency during the early period likely comes from tissue planes that remain relatively clear despite active inflammation, whereas delayed surgery must deal with organized scar tissue that makes dissection more difficult and

landmarks harder to identify.

Gallbladder inflammation develops through predictable stages. Initial blockage of the cystic duct triggers acute inflammation with increased blood flow, white blood cell infiltration, and tissue swelling within 72 hours. Surgery during this early phase, while challenging due to inflammation, benefits from tissue layers that are still relatively intact. In contrast, waiting beyond six weeks allows the healing process to progress through stages involving scar tissue formation and dense adhesions. Our finding of significantly more adhesions in delayed cases (47% versus 27%, p=0.036) confirms this time-related change. These intraoperative findings are illustrated in Figure 2, which demonstrates the dense fibrotic adhesions and obscured anatomy encountered during delayed cholecystectomy, in contrast to the clear tissue planes and easily achieved Critical View of Safety seen in early surgery (Figure 1). These fibrous changes directly lead to increased surgical difficulty, shown by higher blood loss during surgery (112 ml versus 78 ml, p=0.018) and doubled conversion rates, though the conversion difference did not reach statistical significance in our study. Interestingly, published studies show varying results for operative time. While our data support early surgery being faster, some reports show the opposite.[3] This contradiction likely reflects differences in which patients get selected for early emergency surgery—potentially including sicker patients who need urgent intervention regardless of ideal timing. Additionally, surgeon experience, hospital policies, and willingness to convert to open surgery influence these measurements differently across centres. A large study of over 3,000 patients provides day-by-day analysis showing that operative time progressively increases beyond 72 hours,[4] supporting the idea of an optimal window rather than a strict cut off.

The most clinically important finding concerns length of hospital stay—early surgery reduced average hospitalization by 2.6 days (p<0.001). This reduction has substantial implications for healthcare costs, particularly in resource-limited settings where surgical bed availability restricts patient access. Beyond immediate cost savings, the delayed strategy carries hidden expenses through complications during the waiting period. Our observation that 13.3% of patients awaiting delayed surgery experienced repeat gallbladder problems matches reported readmission rates approaching 30% in some studies.[5–9] Each repeat episode requires emergency evaluation, imaging, antibiotics, and potentially hospital admission—costs that eliminate the theoretical advantages of scheduled elective surgery. From the patient's perspective, early surgery removes the anxiety and ongoing symptoms associated with waiting for treatment while managing active gallstone disease.

The complication rate showed a trend favouring early surgery (13.3% versus 23.3%), though this was not statistically significant. This finding requires careful interpretation given our relatively small sample size, which likely lacked power to detect differences in uncommon events. The pattern nonetheless remains consistent with larger studies.[10] The one bile duct injury in our early group represents an inherent risk of laparoscopic cholecystectomy regardless of timing. The injury's recognition during surgery and successful repair emphasizes the importance of careful surgical technique following safety principles regardless of when surgery occurs. Quality of life studies add another dimension—patients having early surgery show better scores at six months,[2] while surgery during the intermediate period (1-6 weeks) produces the worst outcomes, combining technical challenges with incomplete inflammation resolution.

Tissue examination under the microscope revealed striking differences in chronic inflammation (73% delayed versus 23% early, p<0.001), providing objective evidence supporting our surgical observations. This change from acute to chronic inflammation with scar tissue formation directly corresponds with the technical difficulties seen during surgery, validating the rationale for early intervention before these changes become established.

Our findings must be viewed within study limitations. The non-randomized design, though reflecting real-world practice, introduces potential bias despite similar baseline characteristics between groups. Sample size limits our ability to detect differences in uncommon complications. Single-centre experience may restrict how broadly our findings apply, particularly to hospitals with different levels of surgical expertise or resources. The lack of long-term follow-up beyond 30 days and formal quality of life assessment represents missed opportunities. Future studies should use randomized methods with adequate sample sizes, include quality of life measurements, perform cost-effectiveness analyses, and include intermediate-period groups to provide complete guidance across all relevant timeframes.

Despite these limitations, our data provide meaningful evidence supporting early laparoscopic cholecystectomy as optimal management for appropriately selected patients with acute cholecystitis. Implementation requires institutional commitment to emergency surgical capability, experienced surgical teams, and protocols that prioritize acute gallbladder disease. In settings where immediate surgery is not practical, efforts should focus on minimizing delays within the favourable early window rather than defaulting to long intervals. The evidence increasingly shows that when surgery occurs fundamentally affects outcomes[6–7] with early intervention offering advantages in surgical efficiency, resource use, complication prevention, and avoiding problems during waiting periods. For medically stable patients with Grade I-II cholecystitis, early laparoscopic cholecystectomy represents evidence-based standard care.

CONCLUSION

This prospective study demonstrates that the timing of laparoscopic cholecystectomy significantly influences outcomes in acute cholecystitis. Early intervention within 72 hours offers clear advantages over delayed surgery performed at 6-12 weeks, including shorter operative time (68.4 versus 82.6 minutes, p=0.001), reduced hospital stay (3.6 versus 6.2 days, p<0.001), and fewer dense adhesions (27% versus 47%, p=0.036). Additionally, 13.3% of patients awaiting delayed surgery experienced interval complications requiring emergency visits.

These findings align with current international guidelines favoring early cholecystectomy[6–7] and support its implementation in Indian surgical practice. The biological advantage of operating during the acute edematous phase, before scar tissue formation, translates to improved surgical efficiency and better resource utilization. Early surgery also eliminates the physical and psychological burden of managing symptomatic disease during prolonged waiting periods.

Successful implementation requires institutional commitment to emergency surgical capability, experienced laparoscopic teams, and appropriate patient selection based on Tokyo Guidelines severity grading. For medically stable patients with Grade I-II acute cholecystitis, early laparoscopic cholecystectomy should be considered the preferred management strategy. While study limitations include modest sample size and single-center design, our data contribute meaningful evidence supporting the paradigm shift toward early definitive surgical management of acute cholecystitis.

REFERENCES

1. Sravanthi R, Jadhav RK, Srujana G. Outcomes of early versus delayed laparoscopic cholecystectomy in acute cholecystitis: a multicenter prospective cohort study. Int J Curr Pharm Rev Res. 2025;17(7):741-744.
2. Şahin AG, Alçı E. Impact of surgical timing on postoperative quality of life in acute cholecystitis: a comparative analysis of early, intermediate, and delayed laparoscopic cholecystectomy. Surg Endosc. 2025;39:2489-2497. doi:10.1007/s00464-025-11620-9
3. Shetty HS, Amar DN. A randomized controlled study on early and delayed laparoscopic cholecystectomy in acute calculus cholecystitis. Int Surg J. 2025;12(3):333-338. doi:10.18203/2349-2902.isj20250564
4. Mansor S, Zaidi A, Habibullah M, Hourani R, Aldali Y, Ghali MS, et al. Early laparoscopic cholecystectomy for acute cholecystitis: when do risks seem imminent? Asian J Endosc Surg. 2025;18:e70052. doi:10.1111/ases.70052
5. Gurusamy KS, Davidson C, Gluud C, Davidson BR. Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. Cochrane Database Syst Rev. 2013;(6):CD005440. doi:10.1002/14651858.CD005440.pub3
6. Okamoto K, Suzuki K, Takada T, Strasberg SM, Asbun HJ, Endo I, et al. Tokyo Guidelines 2018: flowchart for the management of acute cholecystitis. J Hepatobiliary Pancreat Sci. 2018;25(1):55-72. doi:10.1002/jhbp.516
7. Pisano M, Allievi N, Gurusamy K, Borzellino G, Baldi C, Agresta F, et al. World Society of Emergency Surgery updated guidelines for the diagnosis and treatment of acute calculus cholecystitis. World J Emerg Surg. 2020;15:61. doi:10.1186/s13017-020-00336-x
8. Roulin D, Saadi A, Di Mare L, Demartines N, Halkic N. Early versus delayed cholecystectomy for acute cholecystitis: are the 72 hours still the rule? A randomized trial. Ann Surg. 2016;264(5):717-722. doi:10.1097/SLA.0000000000001886
9. Wu XD, Tian X, Liu MM, Wu L, Zhao S, Zhao L. Meta-analysis comparing early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Br J Surg. 2015;102(11):1302-1313. doi:10.1002/bjs.9886
10. Lyu Y, Cheng Y, Wang B, Zhao S, Chen L. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: an up-to-date meta-analysis of randomized controlled trials. Surg Endosc. 2018;32(12):4728-4741. doi:10.1007/s00464-018-6400-0