Original Article

Comparative Outcomes of Early Versus Late Laparoscopic Cholecystectomy Following ERCP in Patients with Cholelithiasis and Choledocholithiasis: A Prospective Randomized Controlled Study

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Abstract

Background: Cholelithiasis with coexisting choledocholithiasis presents a common clinical challenge. While endoscopic retrograde cholangiopancreatography (ERCP) is widely accepted for the management of common bile duct (CBD) stones, the optimal timing for subsequent laparoscopic cholecystectomy (LC) remains contentious. This study aimed to evaluate and compare the outcomes of early versus late LC following ERCP in terms of hospital stay, operative time, complication rates, and overall treatment success. **Material and Methods:** A prospective randomized controlled trial was conducted over 18 months at TMMC&RC, Moradabad. Sixty-eight patients with cholelithiasis and choledocholithiasis who underwent successful ERCP were enrolled and randomly allocated to two groups: early LC (within 72 hours post-ERCP) and late LC (6-8 weeks post-ERCP). Patient demographics, clinical parameters, intraoperative findings, postoperative outcomes, and complication rates were analyzed and compared. **Results:** Both groups were comparable in terms of age and gender distribution. The mean age was 37.26 years in the early group and 36.21 years in the late group ($p = 0.618$). Female patients predominated in both groups (early: 85.3%, late: 88.2%). Mean total hospital stay was significantly longer in the early group (8.0 days) compared to the late group (6.26 days) ($p < 0.0001$). Postoperative stay did not differ significantly (early: 3.62 days, late: 3.26 days; $p = 0.103$). Both groups had a 100% cure rate with no conversions to open surgery or major postoperative complications. **Conclusion:** Early LC after ERCP is a safe and effective approach with clinical outcomes comparable to delayed surgery. While early LC leads to a longer overall hospital stay, it offers the advantage of reduced risk for recurrent biliary events and may be preferable when feasible. These findings support the adoption of early LC as a standard practice following ERCP in appropriately selected patients.

Keywords: Laparoscopic cholecystectomy, ERCP, choledocholithiasis, cholelithiasis, early surgery, delayed surgery, randomized controlled trial.

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Introduction

Gallstones (cholelithiasis) and common bile duct stones (choledocholithiasis) are prevalent hepatobiliary conditions that often coexist, especially in middle-aged individuals and women.[1] The widespread use of ERCP has revolutionized the management of CBD stones; however, the timing of definitive gallbladder removal remains a subject of clinical debate.[1]

Traditionally, delayed LC, performed 4-6 weeks after ERCP, has been the norm to allow inflammation to subside.3 Nevertheless, recent evidence indicates that early LC, within 72 hours post-ERCP, may reduce hospital readmissions, surgical difficulty, and recurrent biliary complications such as cholangitis and pancreatitis.[1] Conversely, logistical constraints and clinical preferences still lead many surgeons to opt for delayed interventions.[2]

This study was undertaken to provide evidence-based clarity on this issue by directly comparing the outcomes of early versus late LC in patients who had undergone successful ERCP for cholelithiasis with choledocholithiasis.

Materials and Methods

Study Design and Setting: This randomized controlled study was conducted in the Department of General Surgery at TMMC&RC, Moradabad, over a period of 18 months.

Inclusion Criteria:

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- Age >18 years
- Patients with both gallbladder and CBD stones
- Successful ERCP with complete clearance of CBD stones
- Fitness for elective LC

Exclusion Criteria:

- Malignant biliary obstruction
- Isolated choledocholithiasis without cholelithiasis
- Previous LC
- Patients undergoing bile duct exploration

Sample Size Calculation: Using a power of 80% and alpha of 0.05, with expected cure rate differences of 0.13 (0.97 vs 0.84), the calculated sample size was 34 patients per group, totalling 68.

Intervention: Patients were randomly allocated into two groups:

Group A (Early LC): Underwent LC within 72 hours after ERCP.

Group B (Late LC): Underwent LC 6 to 8 weeks post-ERCP.

Data Collection and Statistical Analysis: Demographic details, clinical data, operative findings, hospital stay, complications, and outcomes were recorded. Statistical analysis was done using SPSS. Continuous variables were compared using t-tests; categorical variables were analysed with chi-square tests. A p-value <0.05 was considered statistically significant.

Results

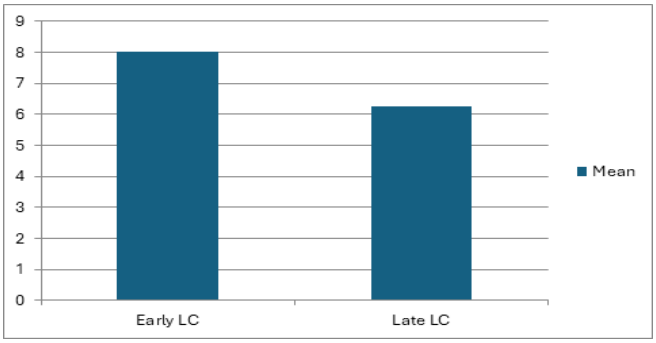
Demographics: Both groups had similar demographic profiles with no statistically significant differences in age (p = 0.618) or gender (p = 0.059).

Hospital Stay: The early LC group had a significantly longer total hospital stay (mean 8.00 ± 0.00 days) compared to the late LC group (mean 6.26 ± 0.75 days, p < 0.0001). Postoperative hospital stay did not show a significant difference.

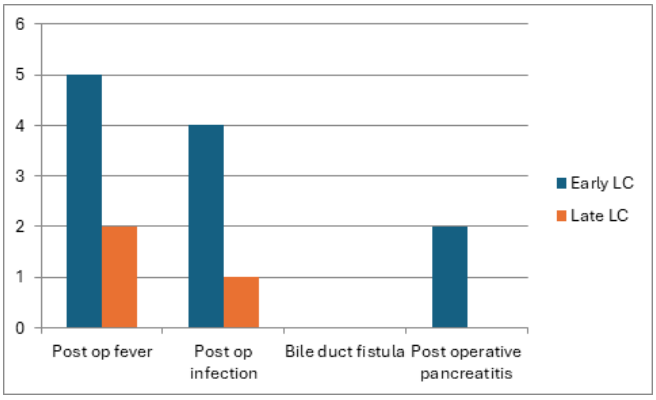
Table 1: Mean hospital stay in both the groups

Groups	N	Minimum	Maximum	Mean	Std. Deviation
Early LC	34	8.00	8.00	8.0000	.00000
Late LC	34	6.00	9.00	6.2647	.75111
t-test	13.471				
p-	0.0001*				

*p- <0.05 is sig



Post OP Complication: In Early LC group, more number of patients (14.7%, 11.8% and 5.9%) suffered from post-operative fever, infection and pancreatitis respectively; than late LC group (5.9%, 2.9% and 0%), with considerable variation.



Post OP Drainage: Mean post-operative drainage was more in early LC (2.62) than late LC (2.26), with no considerable variation.

Table 2: Post-op complications

Complications	Early LC		Late LC	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Post op fever	5	14.7	2	5.9
Post op infection	4	11.8	1	2.9
Bile duct fistula	0	0	0	0
Post-operative pancreatitis	2	5.9	0	0
x^2	1.117			
p-	0.023*			

*p- <.05 is sig

Table 3: Mean Post op drainage in both the groups

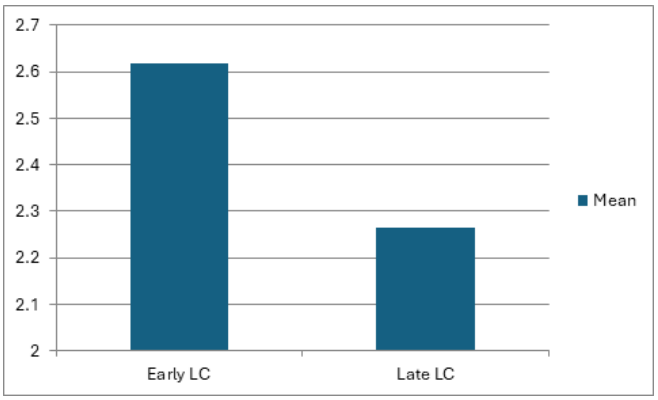
Groups	N	Minimum	Maximum	Mean	Std. Deviation
Early LC	34	2.00	5.00	2.6176	1.04489
Late LC	34	2.00	5.00	2.2647	.75111
t-test	1.612				
p	.116*				

*p- >.05 is insig

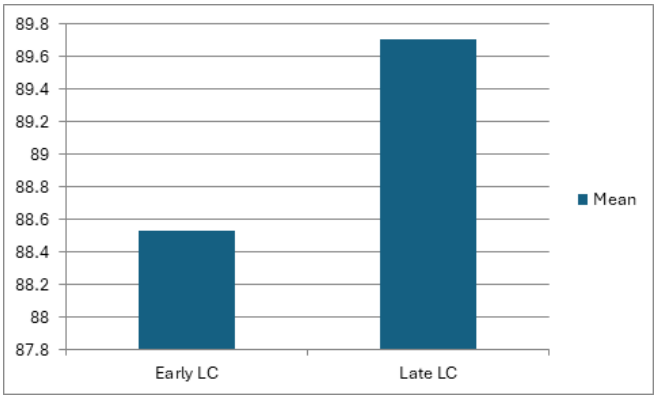
Table 4: Mean Operation time in both the groups

Groups	N	Minimum	Maximum	Mean	Std. Deviation
Early LC	34	40.00	140.00	88.5294	22.94689
Late LC	34	45.00	180.00	89.7059	25.43385
t-test	-.209				
p	.836*				

*p- >.05 is insig



Mean Operation Time: Mean operation time was less in early LC (88.52) than late LC (89.71), with no considerable variation.



Surgical Outcomes:

No conversions to open surgery were noted in either group.

Operative difficulty and intraoperative blood loss were comparable.

No bile duct injuries or major complications occurred.

All patients were discharged without re-intervention, indicating 100% treatment success in both arms.

Discussion

This study confirms the safety and feasibility of early LC following ERCP in patients with cholelithiasis and choledocholithiasis. Despite a longer hospital stay, early LC minimizes the interval between diagnosis and definitive treatment, potentially reducing the risk of recurrent biliary events.

These findings are consistent with previous trials that observed reduced operative difficulty, comparable complication rates, and improved patient satisfaction with early LC. Delayed LC, while traditionally favored, may expose patients to risks of cholangitis, recurrent biliary colic, and pancreatitis during the waiting period.

Furthermore, early LC may result in resource optimization and reduced cumulative healthcare costs when factoring in readmissions and emergency care.

Limitations:

Single-center study

Limited sample size

Lack of long-term follow-up data on recurrence and quality of life

Conclusion

Early laparoscopic cholecystectomy following ERCP is a safe, effective, and efficient approach for managing patients with cholelithiasis and choledocholithiasis. Although it may involve a slightly longer hospital stay, early LC eliminates the risk of interval complications and readmissions, supporting its adoption as a preferred strategy in suitable patients.

Further large-scale multicentric trials with longer follow-up periods are recommended to confirm these findings and establish formal clinical guidelines.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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