

Early Laparoscopic Cholecystectomy for Acute Calculous Cholecystitis: What is the Optimal Timing?

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ABSTRACT

<i>Objective</i>	<i>To assess the outcome of optimal timing of early laparoscopic cholecystectomy in cases of acute calculous cholecystitis.</i>
<i>Study design</i>	<i>Descriptive case series.</i>
<i>Place & Duration of study</i>	<i>Shaukat Omer Memorial (Fauji Foundation) Hospital and Hill-Park General Hospital Karachi, from April 2010 to November 2011.</i>
<i>Methodology</i>	<i>Clinical records of 164 patients who underwent early laparoscopic cholecystectomy in acute calculous cholecystitis were retrieved and categorized into two groups according to the timing of surgery from the onset of symptoms (A, who had laparoscopic cholecystectomy within 72 hours; B, who had laparoscopic cholecystectomy after 72 hours). Outcome of interests were conversion to open procedure, postoperative complications and length of hospital stay. The SPSS version 11 was utilized for data analyses. Chi-square test was used to assess qualitative and unpaired Student t test was employed for quantitative data. A value of $p < 0.05$ was considered statistically significant.</i>
<i>Results</i>	<i>The mean (+SD) age was 40.42 +12.42 year. There were 21 (12.8%) males and 143 (87.2%) females with male to female ratio being 1:6.8. Comparing the two groups, the conversion rates (2.9% versus 13.6%, $p=0.012$), postoperative complications (1.9% versus 10.2%, $p=0.026$), and length of hospital stay (2.34 versus 3.93 days, $p<0.001$) were significantly reduced in group A.</i>
<i>Conclusion</i>	<i>The early laparoscopic cholecystectomy within 72 hours minimizes the conversion rates and postoperative complications, and shortens the length of hospital stay in cases of acute calculous cholecystitis.</i>
<i>Key words</i>	<i>Acute cholecystitis, Laparoscopic cholecystectomy, Postoperative complications.</i>

INTRODUCTION:

The management of acute calculous cholecystitis has been reformed from conservative approach to early cholecystectomy over a period of several decades.¹ Various randomized controlled trials showed that early cholecystectomy is cost effective and reduces postoperative morbidity and hospital

stay, as well as promotes rapid recovery.^{2,3} This notion has also been applied in laparoscopic era, and currently early laparoscopic cholecystectomy is considered to be a safe and effective management strategy in cases of acute calculous cholecystitis.⁴

Although, early laparoscopic cholecystectomy has proven superior to delayed approach, the optimal timing of this surgical modality is still debatable and controversies exist in literature. Soffer et al encountered no clinically relevant differences in terms of conversion rates, operative times, or postoperative length of stay in patients who were

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operated within 48 hours as compared to those in whom laparoscopic cholecystectomy was performed on post-admission days 3-7.⁵ On the contrary, a randomized controlled trial by Gonzalez-Rodriguez et al demonstrated a significant reduction in conversion rates, length of hospital stay, and postoperative complications in early laparoscopic cholecystectomy group (i.e. performed within 72 hours of presentation).⁶

This study was aimed to assess the outcome of optimal timing of early laparoscopic cholecystectomy in acute calculous cholecystitis in terms of conversion rates, postoperative complications and length of hospital stay.

METHODOLOGY:

This retrospective descriptive study was conducted at Shaukat Omer Memorial (Fauji Foundation) Hospital and Hill-Park General Hospital, Karachi. Clinical records of all the patients who underwent early laparoscopic cholecystectomy for acute calculous cholecystitis from April 2010 to November 2011 were retrieved. They were categorized into two groups (A and B) according to the timing of surgery from the onset of symptoms. Group A encompassed those in whom laparoscopic cholecystectomy was performed within 72 hours of presentation, whereas group B comprised of those in whom laparoscopic cholecystectomy was carried out after 72 hours.

A standard four port laparoscopic cholecystectomy was performed in all patients. After creating a pneumoperitoneum with open technique (via 10 mm Hasson trocar) at the infra-umbilical location, camera was inserted into the abdominal cavity through the same trocar. Another 10 mm trocar (dissecting) was placed under vision in the epigastric region followed by insertion of two 5 mm lateral retracting ports.

Dissection was carried out in usual fashion. Cystic duct and artery dissected, doubly clipped and cut. Gall bladder separated from liver bed via diathermy hook. Obscure anatomy of Calots triangle and dense adhesions of gall bladder necessitated conversion to open cholecystectomy. In all patients, drain was placed in Morrison's pouch and gall bladder was removed from umbilical port.

Data were entered in proforma which included patient's demographics (age and gender), group of patients (A and B), conversion to open procedure (yes or no), postoperative complications (yes or no), and length of hospital stay (in days). Postoperative complications were further classified into bile leak, visceral injuries, and residual collection.

All statistical analyses were performed using statistical package SPSS for Windows program (Version 11, 2002, SPSS Inc., Chicago, IL, USA). Quantitative data were expressed as mean \pm SD (standard deviation) and analyzed with unpaired Student *t* test. Frequencies and percentages were utilized to express categorical data and evaluated with Chi-square test. The significance level was set at *p* value < 0.05 .

RESULTS:

A total of 181 patient's records were retrieved. Out of these, 17 were excluded due to incomplete data. The mean (+SD) age of rest of 164 patients was 40.42 \pm 12.42 year. There were 21 (12.8%) males and 143 (87.2%) females with male to female ratio of 1:6.8. Out of 164 patients, early laparoscopic cholecystectomy within 72 hours (group A) was executed in 105 (64%) and after 72 hours (group B) in 59 (36%) patients. A significant difference observed between both groups in terms of conversion (*p*=0.012) and overall postoperative complications (*p*=0.026) (Table I).

Table I: Conversion to Open Cholecystectomy and Postoperative Complications

	Group A (Early Cholecystectomy within 72 hours) (n=105)	Group B (Early Cholecystectomy after 72 hours) (n=59)	<i>p</i> -value*
Conversion to open cholecystectomy	03 (2.9%)	08 (13.6%)	0.012
Postoperative Complications	02 (1.9%)	06 (10.2%)	0.026
1. Bile leak	02 (1.9%)	04 (6.8%)	0.189
2. Residual collection	01 (1%)	04 (6.8%)	0.057

*Chi-square test.

Table II: Length of Hospital Stay

	Group A (Early Cholecystectomy within 72 hours) (n=105)	Group B (Early Cholecystectomy after 72 hours) (n=59)	p-value*
Length of hospital stay (in days)	2.34 (+0.718)	3.93 (+1.230)	<0.001

Data are shown as mean followed by (+SD) in parentheses. *Unpaired student *t* test.

No visceral injuries were encountered in this study. Although statistically insignificant, both postoperative bile leak and residual collections were frequently observed in group B patients (Table I). All postoperative bile leaks were managed conservatively, whereas residual collections in five patients were treated with percutaneous drainage by pig-tail catheter. There was also highly significant statistical difference observed while comparing the total length of hospital stay between groups ($p<0.001$) (Table II).

DISCUSSION

The results revealed that early laparoscopic cholecystectomy within 72 hours for acute calculous cholecystitis had significant reduction in conversion rates, overall postoperative complications and length of hospital stay. Early laparoscopic cholecystectomy provides beneficial effects in cases of acute cholecystitis.⁴ Despite this, it remains a most significant risk factor for conversion, postoperative complications, which in turn, increases the duration of hospital stay.⁷ All of these morbidities have been ascribed to the timing of surgery from the onset of disease in literature.⁸

Within few hours of the onset of acute cholecystitis, cholecystectomy is easily performed as a consequence of inflammatory edema that provides a plane of cleavage.⁹ Delayed early laparoscopic cholecystectomy demonstrates a linear relationship between technical difficulties and timing of surgery, as mentioned by Catani et al in their series.¹⁰ Therefore, it has been suggested that early laparoscopic cholecystectomy within 72 hours of disease presentation may offer less technical difficulties, and thus consequently, reduces the conversion rates and postoperative complication, and shortens the length of hospital stay.⁷ In this study, major proportion of morbidities were encountered in patients with delayed early laparoscopic cholecystectomy (>72 hours) group.

Conversion of early laparoscopic cholecystectomy is a well established occurrence with ranging from 5-31% in literature.¹¹⁻¹³ These inconsistent results

are attributed to differences in patient demographics, severity of inflammation, surgeon's experience, and timing of early laparoscopic cholecystectomy. In this study, significant conversion rates were encountered in delayed early cholecystectomy group (13.6%) as compared to those in whom early laparoscopic cholecystectomy was performed within 72 hours of presentation (2.9%), which is nearly comparable to the study conducted by Gonzalez-Rodriguez et al.⁶ Koo and Thirlby also encountered less conversion rates in patients who underwent early laparoscopic cholecystectomy within 72 hours of symptoms.⁸ The reasons of conversion include the dense adhesion of gall bladder and fibrosis/infiltration of Calot's triangle.¹¹ In this study, obscure anatomy of Calot's triangle and dense adhesion of gall bladder were also the causes of conversion.

The overall postoperative complications were significant in delayed laparoscopic (>72 hours) group in this study; group A had 1.9% and group B had 10.2% complication rates. This shows that the complication rates were least in patients who were operated before 72 hours. Shuja et al encountered 6% of postoperative complications in patients who had early laparoscopic cholecystectomy within 72 hours as compared to delayed (72-96 hours) group (11.5%).¹⁴ Gonzalez-Rodriguez and colleagues also observed statistically significant difference in postoperative complications between the groups in their case series (<72 hours versus >72 hours; 8.8% versus 17.7%).⁶ Furthermore, majority of complications (bile leak and residual collection) in this study were limited to group B patients who had early laparoscopic cholecystectomy 72 hours after presentation. All were managed conservatively. Al-Mulhim also encountered no serious morbidities in his case study of laparoscopic cholecystectomy of acute cholecystitis.¹⁵

As a result of high conversion rates and postoperative complications, the average length of hospital stay was statistically significant in group B patients in this study. Gonzalez-Rodriguez et al also encountered significantly increase average duration of hospital stay in patients who had early

laparoscopic cholecystectomy after 72 hours as compared to those in whom cholecystectomy was performed within 72 hours.⁶

The main limitation of this study is its retrospective nature. In order to provide scientific evidence of optimal timing of early laparoscopic cholecystectomy in cases of acute calculous cholecystitis, randomized controlled trials are needed.

CONCLUSIONS

The early laparoscopic cholecystectomy within 72 hours minimizes the conversion rates and postoperative complications, and shortens the length of hospital stay in cases of acute calculous cholecystitis.

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