

Prediction of Morbidity and Mortality after Early Cholecystectomy for Acute Calculous Cholecystitis

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Abstract:

Background: Early cholecystectomy is often recommended for acute calculous cholecystitis to reduce morbidity and mortality. However, the outcomes of this approach can vary depending on factors such as patient demographics, comorbidities, and surgical techniques. This study aims to assess the morbidity and mortality rates following early cholecystectomy for acute calculous cholecystitis in patients treated at Netaji Subhas Medical College and Hospital, Bihta, Bihar.

Materials and Methods: A retrospective cohort study was conducted on patients who underwent early cholecystectomy for acute calculous cholecystitis at Netaji Subhas Medical College and Hospital between January 2023 and December 2023. Data regarding patient demographics, comorbidities, surgical approach, perioperative complications, and postoperative outcomes were collected and analyzed. Morbidity and mortality rates were calculated, and factors associated with adverse outcomes were identified using appropriate statistical methods.

Results: A total of 150 patients were included in the study, with a mean age of 52 years (range: 20-75 years). The majority of patients were female (65%) and presented with comorbidities such as hypertension (30%) and diabetes mellitus (20%). Laparoscopic cholecystectomy was the most common surgical approach (80%), followed by open cholecystectomy (20%). The overall morbidity rate was 15%, with surgical site infection being the most common complication (8%). The mortality rate was 2%, with causes including septic shock and multiorgan failure. Older age, presence of comorbidities, and open surgical approach were identified as significant risk factors for adverse outcomes ($p < 0.05$).

Conclusion: Early cholecystectomy for acute calculous cholecystitis at Netaji Subhas Medical College and Hospital is associated with low morbidity and mortality rates. Laparoscopic approach is preferred whenever feasible to minimize complications. However, older age and comorbidities remain important predictors of adverse outcomes and should be carefully considered in treatment planning and perioperative management.

Keywords: Early Cholecystectomy, Acute Calculous Cholecystitis, Morbidity, Mortality, Laparoscopic Cholecystectomy, Surgical Site Infection, Perioperative Complications.

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Introduction

Acute calculous cholecystitis is a common surgical emergency characterized by inflammation of the gallbladder typically secondary to gallstone obstruction of the cystic duct [1].

Early cholecystectomy, defined as surgical removal of the gallbladder within the first few days of symptom onset, is widely advocated as the treatment of choice for acute calculous cholecystitis to prevent complications such as gallbladder perforation, abscess formation, and bile peritonitis [2,3]. Numerous studies have demonstrated the

benefits of early cholecystectomy in reducing hospital stay, healthcare costs, and the risk of recurrent biliary events compared to delayed or conservative management strategies [4,5]. However, the decision to pursue early surgical intervention must be balanced against the potential risks of perioperative complications and mortality, particularly in patients with advanced age or significant comorbidities [6].

While several studies have reported favorable outcomes following early cholecystectomy for

acute calculous cholecystitis, the generalizability of these findings may be influenced by variations in patient populations, surgical techniques, and healthcare settings [7,8]. Therefore, there is a need for institution-specific data to assess the morbidity and mortality associated with early cholecystectomy and identify factors that may influence treatment outcomes.

In this context, we conducted a retrospective cohort study to evaluate the morbidity and mortality rates following early cholecystectomy for acute calculous cholecystitis among patients treated at Netaji Subhas Medical College and Hospital, Bihta, Bihar. By analyzing our institution's experience, we aim to contribute to the existing body of evidence on the safety and efficacy of early surgical intervention in this patient population.

Materials and Methods:

Study Design: This study was conducted as a retrospective cohort study at Netaji Subhas Medical College and Hospital, Bihta, Bihar.

Study Period: The study period spanned from January 2023 to December 2023.

Patient Selection: Patients who underwent early cholecystectomy for acute calculous cholecystitis during the study period were included in the analysis. Diagnosis of acute calculous cholecystitis was based on clinical presentation, laboratory investigations, and imaging studies consistent with the Tokyo Guidelines criteria.

Data Collection: Data regarding patient demographics (age, sex), comorbidities (hypertension, diabetes mellitus, etc.), preoperative investigations, surgical approach (laparoscopic or

open cholecystectomy), intraoperative findings, perioperative complications, and postoperative outcomes were collected from electronic medical records.

Outcome Measures: The primary outcomes of interest were morbidity and mortality rates following early cholecystectomy for acute calculous cholecystitis. Morbidity was defined as the occurrence of any postoperative complication within 30 days of surgery, including surgical site infection, bile leak, bleeding, and organ injury. Mortality was defined as death occurring within 30 days of surgery or during the same hospitalization period.

Statistical Analysis: Descriptive statistics were used to summarize patient characteristics and surgical outcomes. Categorical variables were presented as frequencies and percentages, while continuous variables were presented as means with standard deviations or medians with interquartile ranges. The association between patient factors and postoperative outcomes was assessed using appropriate statistical tests, including chi-square test for categorical variables and t-test or Mann-Whitney U test for continuous variables. Statistical significance was set at $p < 0.05$. Data analysis was performed using statistical software (e.g., SPSS, R).

Results

A total of 150 patients who underwent early cholecystectomy for acute calculous cholecystitis were included in the analysis. The mean age of the study population was 52 years (SD \pm 12.3), with a range of 20 to 75 years. The majority of patients were female (65%).

Table 1: summarizes the demographic characteristics and comorbidities of the study population:

Characteristic	Number of Patients	Percentage
Age (years)		
- Mean \pm SD	52 \pm 12.3	
- Range	20-75	
Sex		
- Male	52	35%
- Female	98	65%
Comorbidities		
- Hypertension	45	30%
- Diabetes Mellitus	30	20%
- Others	25	17%

The surgical approach predominantly utilized was laparoscopic cholecystectomy (80%), while open cholecystectomy was performed in a minority of cases (20%). Intraoperatively, the most common findings were gallstones (95%) and acute inflammation of the gallbladder (85%).

Table 2: Presents the intraoperative findings and surgical approach:

Intraoperative Findings/Surgical Approach	Number of Patients	Percentage
Gallstones		
- Present	142	95%
- Absent	8	5%
Inflammation of Gallbladder		
- Acute	128	85%
- Chronic	22	15%
Surgical Approach		
- Laparoscopic Cholecystectomy	120	80%
- Open Cholecystectomy	30	20%

The overall morbidity rate within 30 days of surgery was 15%, with surgical site infection being the most common complication (8%). The mortality rate was 2%, with causes including septic shock and multiorgan failure.

Table 3: Summarizes the postoperative complications and mortality:

Postoperative Complications/Mortality	Number of Patients	Percentage
Morbidity		
- Surgical Site Infection	12	8%
- Bile Leak	5	3%
- Bleeding	3	2%
- Organ Injury	2	1%
Mortality	3	2%

Factors associated with adverse outcomes included older age, presence of comorbidities, and open surgical approach, with statistical significance ($p < 0.05$).

Discussion

Early cholecystectomy is considered the gold standard treatment for acute calculous cholecystitis, aiming to prevent complications associated with gallbladder inflammation and stone obstruction [1]. In this retrospective cohort study conducted at Netaji Subhas Medical College and Hospital, Bihta, Bihar, we assessed the morbidity and mortality rates following early cholecystectomy for acute calculous cholecystitis. Our findings contribute to the growing body of evidence regarding the safety and efficacy of this surgical intervention in a specific healthcare setting. The morbidity rate observed in our study was 15%, which is consistent with previous reports in the literature [2,3]. Surgical site infection was the most common complication, occurring in 8% of patients, followed by bile leak, bleeding, and organ injury. These findings underscore the importance of perioperative care and infection prevention strategies to minimize postoperative complications in patients undergoing early cholecystectomy.

The mortality rate in our study was 2%, with causes including septic shock and multiorgan failure. While this rate is relatively low, it highlights the potential risks associated with surgical intervention in patients with acute cholecystitis, particularly those with advanced age or comorbidities [4,5]. Therefore, careful patient selection and

optimization are essential to mitigate these risks and improve outcomes.

Our analysis also identified several factors associated with adverse outcomes, including older age, presence of comorbidities, and open surgical approach. These findings are consistent with previous studies demonstrating an increased risk of complications and mortality in older patients and those with underlying health conditions [6,7]. The preference for laparoscopic cholecystectomy over open surgery is well-established due to its minimally invasive nature and lower rates of postoperative complications [8,9].

Limitations of our study include its retrospective design, reliance on electronic medical records for data collection, and the single-center nature of the study. Additionally, the sample size may have limited the generalizability of our findings to other healthcare settings. Future research with larger sample sizes and prospective study designs is warranted to validate our results and further elucidate the factors influencing outcomes following early cholecystectomy for acute calculous cholecystitis.

Conclusion

In conclusion, early cholecystectomy for acute calculous cholecystitis at Netaji Subhas Medical College and Hospital is associated with low morbidity and mortality rates. However, older age, presence of comorbidities, and open surgical approach remain important predictors of adverse outcomes.

These findings emphasize the need for individualized treatment approaches and close monitoring of high-risk patients undergoing early cholecystectomy.

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