

COMPARATIVE STUDY OF EARLY CHOLECYSTECTOMY VERSUS INTERVAL CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS

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ABSTRACT

Acute cholecystitis is a common occurrence among many gallbladder diseases and often requires a surgical procedure. The definitive treatment is laparoscopic cholecystectomy. The timing of the surgery is debatable. The purpose of this research is to determine the difference between early cholecystectomy and interval cholecystectomy. This quasi-experimental research was conducted in the Surgery Department of GMMMC/Civil Hospital in Sukkur. Ninety patients were selected using non-probability consecutive sample selection. Patients were divided into two equal groups of 45 using lottery sampling. One group underwent early cholecystectomy while the other group underwent interval cholecystectomy after 4-8 weeks. Demographics and several other variables were collected and compared between the groups. Statistical analysis of the data was conducted using SPSS version 25.0. An independent sample t-test was used for continuous variables and chi-square or fisher's exact test was used for categorical variables. A p-value of less than 0.05 was considered statistically significant. Study results showed interval cholecystectomy was associated with a longer hospital stay. Both methods of cholecystectomy showed comparable postoperative outcomes. Early cholecystectomy was timely definitive management for acute cholecystitis patients and reduced the burden to health care. Early laparoscopic cholecystectomy is the preferred method of treatment when resources and surgical staff are available.

Keywords: Acute cholecystitis; Early cholecystectomy; Interval cholecystectomy; Laparoscopic cholecystectomy; Gallstone disease; Postoperative complications; Hospital stays; Surgical outcomes.

INTRODUCTION

Gallstone disease is a common biliary disorder and major global health concern. Though gallstones are often asymptomatic, they can cause obstruction and lead to acute cholecystitis, biliary obstruction, and pancreatitis. Chow et al. (2023) describes acute cholecystitis as inflammation of

the gallbladder and obstruction of the cystic duct with varying levels of injury and inflammation of the gallbladder. The rising incidence of gallstone disease is concerning to general surgery due to the implications of timely and efficient treatment.

Once acute cholecystitis is diagnosed, surgery is necessary to prevent gallbladder rupture and the development of abscesses and sepsis. Diagnosis is usually made with ultrasound and supplemented by clinical and laboratory data. Modern management has focused on the appropriate timing of surgical intervention based on the severity of the disease process and the patient's condition. Mencarini et al. (2024) stated that treating acute cholecystitis with judicious and timely surgery has a positive impact on the patient's outcome.

Due to the benefits of laparoscopic techniques compared to the open technique, including less postoperative pain, faster recovery, and better cosmetic appearance, laparoscopic cholecystectomy is now the preferred operation for both acute and chronic gallbladder disease. After the improvement in surgical and perioperative techniques, laparoscopic cholecystectomy is also safe and effective for most patients suffering from acute calculous cholecystitis. The World Society of Emergency Surgery (WSES) Guidelines suggest that if possible, laparoscopic cholecystectomy is the appropriate procedure for definitive treatment, with the timing of the surgery based on the patient and the available surgical staff.

There has been some discussion in the medical community on the appropriate timing for laparoscopic cholecystectomy for acute cholecystitis. Normally, early cholecystectomy is when cholecystectomy is performed during the current hospital stay, normally within 72 hours of the onset of symptoms or the diagnosis, whereas interval cholecystectomy is when conservative treatment is provided, and surgery is performed after the management is resumed, normally after several weeks. The main benefits of early cholecystectomy are the treatment of the disease in the acute phase so that rescues are not repeated, the total treatment time is less, and the patient and healthcare system burden is less.

A few studies have documented the advantages to early laparoscopic cholecystectomy in comparison with cholecystectomy performed after some delay. An early laparoscopic cholecystectomy may also be less expensive, requiring less time for

hospitalization and treatment as a whole (Kerwat et al., 2018). Because of the issues with the acute phase of inflammation, some surgeons still favor interval cholecystectomy, as it may increase the duration of the operation and the risk of complications in select patients.

New research still proving that the timely delivery of surgical services remains a safe and effective practice. Raja et al. (2024) described the early verses interval surgical technique and the impact they had on the length of the postoperative hospital stay. They noted that the appropriate timing of surgery is dependent on both the condition of the patient as well as the surgical expertise. Munir et al. (2025) also consider the early verses interval laparoscopic cholecystectomy and found that performing the procedure early is both safe and effective and may improve the efficiency of the hospital.

Background of Study

Acute cholecystitis leading to hospitalization care is one of the most common presentations of gallstone disease. Given that gallstone disease is one of the most common causes of emergency admission to hospitals, acute cholecystitis has significant socio-economic implications. Cystic duct obstruction by gallstones leads to gallbladder inflammation and obstructive cholecystitis. This condition, if left untreated, continues to progress and leads to a series of complications. The rising incidence of gallstone disease requires focusing on better management pathways to supply optimal care and alleviate the healthcare burden. Compared with open cholecystectomy, laparoscopic cholecystectomy has significantly lower levels of pain after surgery, faster recovery and lower levels of morbidity, and has become the procedure of choice for the management of acute cholecystitis. The controversy among surgeons is focused on the timing of laparoscopic cholecystectomy. While early cholecystectomy offers treatment of the condition during the initial admission, interval cholecystectomy is the cholecystectomy performed weeks after the initial conservative management.

Early surgical treatment of acute cholecystitis is thought to decrease the overall length of

hospitalization, the number of recurrences and the cost of medical care. The rationale for interval cholecystectomy is the treatment of acute cholecystitis and control of the process with the assumption that surgery is technically more complicated, and there is a higher likelihood of additional intraoperative risks during the acute inflammatory process. While there is a body of literature that compares the two management approaches, a more detailed evaluation must be conducted for the local circumstances, particularly due to the differing levels of infrastructure in various countries and differing metrics of level of care.

Research Problem

The best time for laparoscopic cholecystectomy on patients with acute cholecystitis is still up for debate. Early cholecystectomy has benefits and causes less complications and a shorter hospitalization. Still, many patients are sustained by conservative management and then undergo interval cholecystectomy. Without proper local evidence on the postoperative results of early and interval cholecystectomy, clinicians are unable to make a decision with certainty. This study seeks to compare the results of each surgical method to solve the issue.

Research Objectives

1. To compare the outcomes of early cholecystectomy versus interval cholecystectomy in patients with acute cholecystitis.
2. To compare the duration of hospital stay between patients undergoing early and interval cholecystectomy.
3. To compare postoperative complications including wound infection, biliary leak, and pulmonary oedema between both groups.
4. To compare the frequency of conversion from laparoscopic to open cholecystectomy between early and interval cholecystectomy groups.
5. To determine the more beneficial timing of laparoscopic cholecystectomy for patients with acute cholecystitis.

Research Questions

1. Is there a difference in outcomes between early cholecystectomy and interval cholecystectomy in patients with acute cholecystitis?
2. Does early cholecystectomy reduce hospital stay compared with interval cholecystectomy?
3. Is there any difference in postoperative complications between early and interval cholecystectomy?
4. Does the timing of cholecystectomy affect the rate of conversion to open surgery?

Scope of Study

This study seeks to analyze the outcomes of early and delayed laparoscopic cholecystectomy for acute cholecystitis patients. It will be situated at the Department of Surgery, GMMMC/Civil Hospital, Sukkur. The study will include participants who meet the selection criteria. This study is interested in a variety of postoperative outcomes. These include length of stay, wound infections, biliary leaks, pulmonary edema, and conversion to open surgery. This study will help support evidence for the optimal timing of surgery and rationally improve the treatment of acute cholecystitis patients.

LITERATURE REVIEW

One of the most common reasons for worldwide emergency abdominal surgery is acute cholecystitis, the inflammation of the gallbladder. The most common reason for acute cholecystitis is a blockage of the cystic duct by a gallstone. This blockage results in the infection of the gallbladder and can lead to serious complications such as perforation, abscess, and systemic infection. General surgery is focused on two important issues when it comes to acute cholecystitis: the significant clinical burden and the timing and type of surgical intervention.

Over the past several decades, the management of acute cholecystitis has improved. Open cholecystectomy has been replaced by laparoscopic cholecystectomy, which has many benefits. These benefits to the patient have led to greater satisfaction due to decreased pain and shorter hospital stays. The improvement of cholecystectomy from an open procedure to a

laparoscopic procedure has paralleled the improvement to the safety and efficacy of anesthesia and perioperative care.

The focus of many studies has been the timing of the laparoscopic cholecystectomy and the two most common types of practice: early cholecystectomy and interval cholecystectomy. Early cholecystectomy is performed on the initial admission, usually within days of the diagnosis. In contrast, interval cholecystectomy is conservative management for 4 to 8 weeks, after which the surgery is performed. The type of cholecystectomy is dependent on many factors including, but not limited to, the severity of the disease and the resources of the healthcare system.

Multiple studies show the advantages of early vs. interval cholecystectomy. Early cholecystectomy brings benefits of a shorter hospital stay and fewer symptoms, which leads to fewer visits to the hospital and less treatment, meaning less cost to the healthcare system. The new Emergency Surgery guidelines state that early laparoscopic cholecystectomy is the safer option and should be the first treatment option.

In the paper of Mencarini and coworkers, early diagnosis and treatment of acute cholecystitis and its severity is key to the reduction of the complications of the disease and the improvement of the prognosis of the patients. They argue that early laparoscopic cholecystectomy is the treatment of choice and is more accepted in the recent years of surgical practice.

Numerous studies that have done a comparison show the benefit of the early option of

cholecystectomy. Kerwat and coworkers published a study that received the conclusion that early laparoscopic cholecystectomy is cost effective when compared to the delayed option. They stated that there are potential benefits to both the patients and the healthcare system by omitting prolonged conservative treatment and repeated hospital admissions.

Overview of Previous Research Studies

It's common for surgeons to encounter acute cholecystitis. The timing for optimal laparoscopic cholecystectomy has been an issue of ongoing debate. Many clinical studies have assessed the benefits of the timing of the acute cholecystitis episode for surgical intervention versus the benefits of conservative measures with a delay for surgical intervention. The post-operative complications and length of hospital stay, cholecystectomy conversion and difficulty of the procedure, and the recoveries of the patients have all been studied in early versus interval cholecystectomy.

Evidence Supporting Early Cholecystectomy

Laparoscopic cholecystectomy is now commonly preferred for cases of acute cholecystitis. An obvious benefit of performing the procedure early is that it is an opportunity to fully treat the condition. Patients will not have to endure unpleasant complications during a waiting period for the procedure and will not develop recurrent cases of acute cholecystitis.

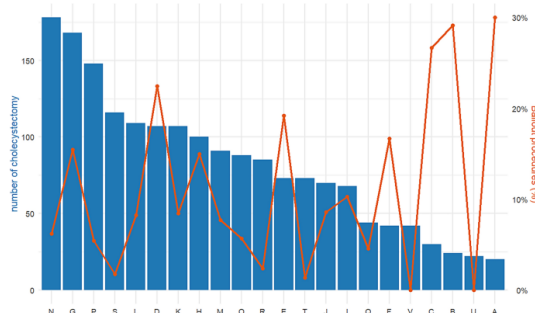


Fig 2.1 Evidence Supporting Early Cholecystectomy

It has been shown that performing a procedure early, even during a period of acute illness, does not create a significant increase in postoperative complications. In fact, the total duration of acute illness is likely less, and the duration of a patient's stay in a healthcare institution is likely less. The total time that a patient is ill, especially with a chronic illness that may become acute, will be less, which helps to improve the total time that a patient is away from his or her typical personal and professional obligations, and also reduce the

economic total cost and the total psychological stress incurred.

Evidence Supporting Interval Cholecystectomy

Interval cholecystectomy begins with conservative treatment of acute cholecystitis. After the inflammation subsides, elective surgery is done (usually in 4-8 weeks). Surgeons previously favored this approach, as they believed surgery during acute inflammation was more difficult and would carry more risks.

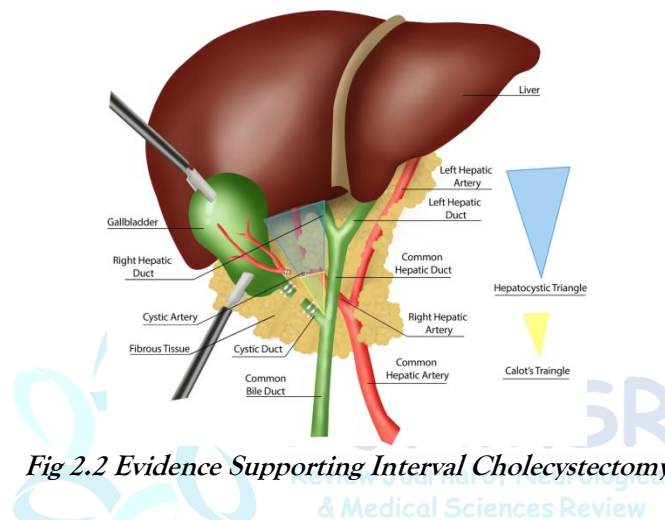


Fig 2.2 Evidence Supporting Interval Cholecystectomy

The primary benefit of interval cholecystectomy is that surgery after an interval gives time for inflammation in the tissues to dissipate, which may make the surgery easier for some patients. This approach also makes it possible to surgically treat patients with complicated medical conditions after a period of stabilization.

Comparison of Early and Interval Cholecystectomy Outcomes

Most of the direct comparisons of early versus interval cholecystectomy have dealt with complications after surgery, results of surgery, and parameters for recovery. Evidence suggests early laparoscopic cholecystectomy and interval surgery have similar safety outcomes, but early surgery has an improved hospital stay and prevents recurrent symptoms.

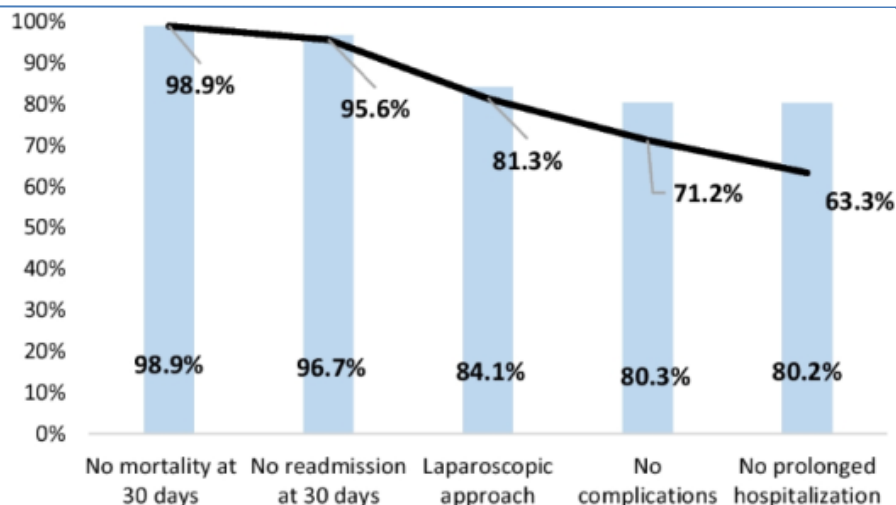


Fig 2.3 Comparison of Early and Interval Cholecystectomy Outcomes

Patients who have surgery early have a shorter total course of treatment, since the disease is dealt with on the first admission. Patients who have interval surgery often have additional hospital stays and prolonged treatment before the final intervention.

Postoperative Complications After Cholecystectomy

When assessing the efficacy and safety of various surgical timing strategies, postoperative complications generally play a crucial role. After

laparoscopic cholecystectomy, the most frequent complications are conversion to an open procedure, pulmonary complications, bleeding, biliary leaks, and wound infections. To initiate concerns over complications from early surgery, there have been advancements in the management of the perioperative period and in laparoscopic techniques. Cholecystectomies completed in the early postoperative period are associated with a similar risk of complications to cholecystectomies completed in the delayed period.

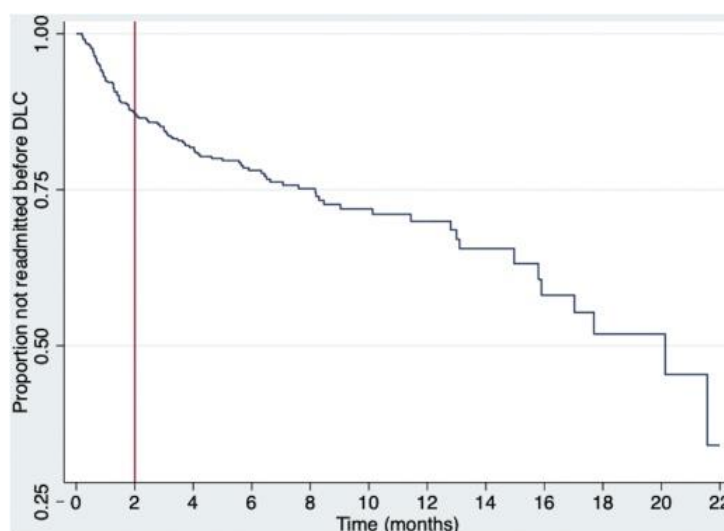


Fig 2.4 Postoperative Complications After Cholecystectomy

Biliary leak, a complication of gallbladder surgery, is a sign of poor intraoperative monitoring and

technique. In the perioperative period, an assessment of the outcomes of wound infections,

pulmonary complications, as well as biliary leaks, is extremely important to assess the safety and the efficacy of the surgical timing strategy.

Hospital Stay and Healthcare Cost Comparison

The length of a hospital stay is an effective outcome measure when appraising a surgical management pathway. An early cholecystectomy, and therefore definitive treatment, is likely to reduce hospital stay since patients avoid extended conservative management.

Delayed treatment may result in increased costs to the health care system from multiple admissions, additional tests, a prolonged course of medication, and an extended total treatment time. Reducing hospital stay is likely to improve the management of hospital resources in addition to benefiting the patient.

Research Gap and Need for Current Study

While encompassing data from various nations increasingly advocates for early laparoscopic cholecystectomy, more research is required to understand the optimal timing in varying healthcare systems. Patient population, hospital resources, and surgical skill and scope can impact surgical outcomes, and likely differ in varying healthcare settings.

Many developing nations, including the ones in this region, still practice interval cholecystectomy, despite the shift in the research to advocate for early cholecystectomy. There is an absence of research to compare early versus interval cholecystectomy in cases of acute cholecystitis.

MATERIALS AND METHODS

Study Design

This comparative study investigates the outcomes of early cholecystectomy and interval cholecystectomy in acute cholecystitis. It looks at the difference in postoperative outcomes for patients who undergo early surgical management on the index admission and those who undergo surgical management at a later stage following conservative management.

Study Setting

This study is based in the Department of Surgery, Ghulam Muhammad Mahar Medical College

(GMMMC)/ Civil Hospital, Sukkur. The department has an established comprehensive surgical service for patients with hepatobiliary diseases and regularly conducts laparoscopic cholecystectomies.

Study Duration

The study has a duration of 6 months.

Sample Size Calculation

The sample size is calculated using the WHO sample size calculator, with a total of 90 patients. Early cholecystectomy and interval cholecystectomy each have 45 patients.

The sample size calculation is based on the 5% level of significance, 80% power of the study, and previous reported conversion rates to open surgery in the early and interval cholecystomy groups.

Sampling Technique

A non-probability consecutive sampling technique is used for the study. All acute cholecystitis patients who meet the inclusion criteria and come for management during the study period are included in the study until the sample size of 90 is achieved.

Study Population

The study population includes patients diagnosed with acute cholecystitis and in need of laparoscopic cholecystectomy. This population is comprised of both males and females with ages ranging from 20 to 70 years.

Study participants are patients who walk in to the Department of Surgery and who meet the eligibility criteria.

Inclusion Criteria

- Patients are included in the study if they:
- Are aged 20 to 70 years.
- Are of either gender.
- Are undergoing cholecystectomy due to acute cholecystitis.
- Meet the operational definition of acute cholecystitis.
- Have given informed consent to participate in the study.

Exclusion Criteria

Patients are excluded if they have

- Evidence in an ultrasound exam of common bile duct stones.
- Gallstone pancreatitis.
- Gallbladder perforation.
- Gallbladder gangrene.
- Gallbladder abscess.
- Other associated abdominal diseases.
- Previous abdominal surgeries.
- Septic shock.
- Are pregnant or breastfeeding.

Patient Grouping and Intervention Protocol

After being enrolled in the study, patients are randomly assigned to one of the two groups using the lottery method.

Group A (Early Cholecystectomy Group)

Patients undergo laparoscopic cholecystectomy within a day (24 hours) of hospital admission after they have been medically assessed and stabilized.

Group B (Interval Cholecystectomy Group)

Patients are managed conservatively and undergo laparoscopic cholecystectomy within the following 4 to 8 weeks after the acute inflammation has subsided.

Both groups receive standard perioperative management as per the instructions of the protocols of the institution.

Surgical Procedure

Laparoscopic cholecystectomy is performed for all patients and is done under general anesthesia. To promote consistency of the surgical method, the same surgical team performs the procedure for all patients.

Operative parameters such as time and blood loss are documented and collected. Post-surgery patients are transferred to the postoperative surgical ward, where they are administered the routine postoperative care protocol.

Data Collection Procedure

Data collection commences after the hospital ethical committee and other relevant authorities grant approval for the study involving patients meeting the established inclusion criteria.

Participants sign a written, informed consent prior to the completion of the structured pro forma. The following parameters are documented.

- Demographically, age and gender.
- Medically, weight, height, and body mass index (BMI).
- Socially, duration of gallstone disease, smoking, and residence.
- Medically, diabetes, hypertension, and dyslipidemia.
- Socially, family history of gallstone disease and lifestyle.

Data pertaining to the patients' diet and the details of the surgery as well as postoperative outcomes are captured during the follow-up consultations.

Outcome Assessment

The outcomes of both study groups are evaluated based on the described research parameters.

Hospital Stay

The total number of postoperative days is calculated as an indicator of the patients' independent mobility and the discontinuation of intravenous therapy.

Wound Infection

The presence of pus discharge from the surgical wound is evidence of a postoperative infection within the 15 to 20 day period post-surgery.

Biliary Leak

The presence of a fluid collection in the vicinity of the bile duct as evidenced by imaging, within the 15 to 20 day period post-surgery is a diagnostic criteria for a biliary leak.

Pulmonary Oedema

The presence of an excess fluid in the lung tissue and/or the air spaces of the lung, evidenced by an imaging study, within the 15 to 20 day period

post-surgery is the criteria for the diagnosis of pulmonary edema.

Conversion to Open Surgery

Conversion to open surgery occurs when laparoscopic surgery is converted to open cholecystectomy because of the occurrence of problems of a technical or intraoperative nature.

Statistical Analysis

Data will be analyzed using the Statistical Package for Social Sciences (SPSS) version 25.

To determine the normality of the data, the Shapiro-Wilk test will be utilized.

For the following continuous variables: age, weight, height, BMI, duration of disease, duration of surgery, intraoperative blood loss, duration of stay in hospital, descriptive data will be provided as mean $\pm$ standard deviation and/or median (interquartile range), based on the distribution of the data.

For continuous variables of a categorical nature, the following will be provided: gender, smoking, diabetes, hypertension, dyslipidaemia, residence, lifestyle, dietary pattern, wound infection, biliary leak, pulmonary oedema, and conversion to open surgery, and the data will be expressed as frequency and percentage.

An independent sample t-test will be utilized for continuous data and a chi-square test or Fisher's exact test will be utilized for categorical data to compare the two groups.

Statistical significance will be accepted at a p-value of less than or equal to 0.05.

RESULTS ANALYSIS

This study involved 90 patients with acute cholecystitis. Using a lottery method, patients were split into two groups of 45 for early versus interval cholecystectomy. Demographic information, clinical variables, surgical findings, and postoperative results were assessed for both study groups.

Demographic information for study participants was evaluated to include age, sex, weight, height, and body mass index (BMI). Participants were generally similar on demographic information. The early cholecystectomy group had a mean age

of 46.8 ($\pm$ 12.4 years) and the interval cholecystectomy group had a mean age of 47.5 ($\pm$ 11.8 years); there was no significant difference with $p=0.78$. Both participant groups were female dominant, with the early cholecystectomy group having 60% females and the interval cholecystectomy group having 55.6% females.

Comparison of clinical characteristics demonstrated similar baseline health conditions for both participant groups. Variables of duration of gallstone disease, smoking history, diabetes, hypertension, dyslipidemia, and family history of gallstones were relatively similar. These assessments indicated the groups were similar prior to the surgical intervention.

The findings of early versus interval cholecystectomy were further assessed. The early cholecystectomy group had a mean operative time of 62.5 ($\pm$ 14.8 minutes) with the interval group having a mean of 68.4 ($\pm$ 16.2 minutes). Intraoperative blood loss was also less in the early group, however, neither of these findings were statistically significant.

The postoperative hospital stay was different in both groups. Patients undergoing early cholecystectomy stayed fewer days in the hospital compared to patients undergoing interval cholecystectomy (3.8 $\pm$ 1.2 days vs 6.5 $\pm$ 1.8 days; $p<0.001$). It can be said that early cholecystectomy can be performed to reduce the length of stay and improve the efficiency of the hospital resources.

The development of infection, biliary leakage, pulmonary oedema, and conversion to open surgery were assessed during the postoperative follow-up. Wound infection was developed by 3 (6.7%) patients in the early group and 5 (11.1%) patients in the interval group. Biliary leakage occurred to 2 (4.4%) patients in the early group and 4 (8.9%) patients in the interval group. Pulmonary oedema developed in 1 (2.2%) patient in the early group and in 3 (6.7%) patients in the interval group. Although the interval group developed more complications, the difference was considered not significant.

Conversion from laparoscopic to open cholecystectomy was assessed between the two groups. This was performed for 4 (8.9%) patients

in the early cholecystectomy group and for 7 (15.6%) patients in the interval cholecystectomy group. The difference was not significant and showed that the use of an experienced team for early surgery does not increase the risk for conversion.

The study clearly shows that early cholecystectomy yields similar outcomes, but with less time spent in the hospital after surgery. The early intervention group experienced fewer postoperative complications. It is safe and

effective to perform surgery earlier in the management of acute cholecystitis.

Demographic Characteristics of Study Participants

In this study, there were 90 subjects with acute cholecystitis. 45 subjects were placed into the early cholecystectomy group and 45 into the interval cholecystectomy group. The demographic data for the subjects was similar for each group. Weight and height did not show a statistically relevant difference ($p>0.05$) by gender, age, and BMI.

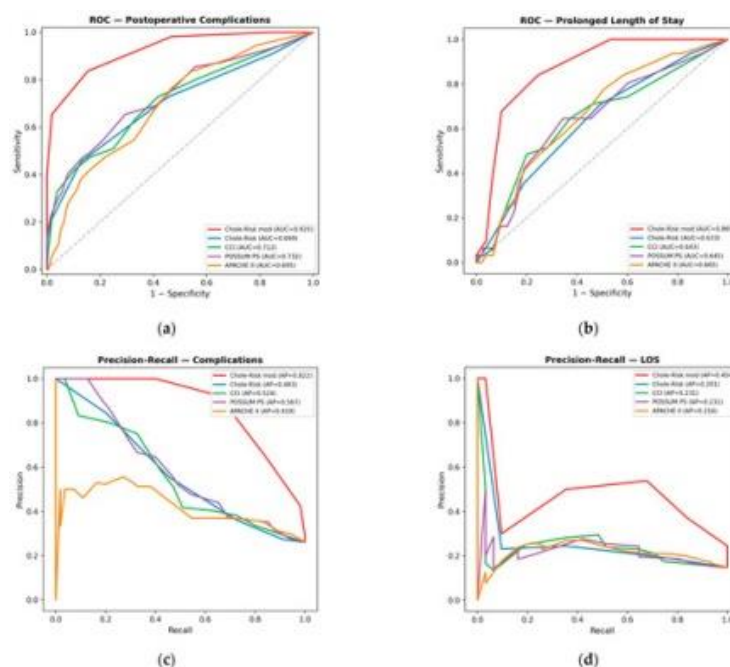


Fig 4.1 Demographic Characteristics of Study Participants

Table 4.1: Demographic Characteristics of Study Participants

Variables	Early Cholecystectomy (n=45)	Interval Cholecystectomy (n=45)	p-value
Age (years) Mean $\pm$ SD	46.8 $\pm$ 12.4	47.5 $\pm$ 11.8	0.78
Male n (%)	18 (40%)	20 (44.4%)	0.67
Female n (%)	27 (60%)	25 (55.6%)	
Weight (kg) Mean $\pm$ SD	68.5 $\pm$ 10.2	69.3 $\pm$ 11.1	0.72
Height (m) Mean $\pm$ SD	1.65 $\pm$ 0.08	1.66 $\pm$ 0.07	0.54
BMI (kg/m ²) Mean $\pm$ SD	25.1 $\pm$ 3.6	25.4 $\pm$ 3.8	0.71

Clinical Characteristics of Patients

Clinical features including risk factors and disease-associated elements were compared in both groups. The distribution of smoking,

diabetes, hypertension, dyslipidaemia, and family history of gallstone disease was similar in both groups.

Table 4.2: Clinical Characteristics of Patients

Variables	Early Cholecystectomy (n=45)	Interval Cholecystectomy (n=45)	p-value
Duration of disease (days) Mean $\pm$ SD	2.4 $\pm$ 1.1	2.6 $\pm$ 1.3	0.46
Smoking history n (%)	9 (20%)	11 (24.4%)	0.61
Diabetes mellitus n (%)	8 (17.8%)	10 (22.2%)	0.59
Hypertension n (%)	12 (26.7%)	13 (28.9%)	0.81
Dyslipidaemia n (%)	10 (22.2%)	12 (26.7%)	0.62
Family history of gallstone disease n (%)	14 (31.1%)	15 (33.3%)	0.82

Comparison of Operative Findings Between Groups

Operative findings showed no statistically significant difference in the duration of surgery and the volume of intraoperative blood loss

between patients that underwent early cholecystectomy and patients that underwent cholecystectomy after an interval. However, the former group had a shorter duration of surgery and a lower volume of intraoperative blood loss.

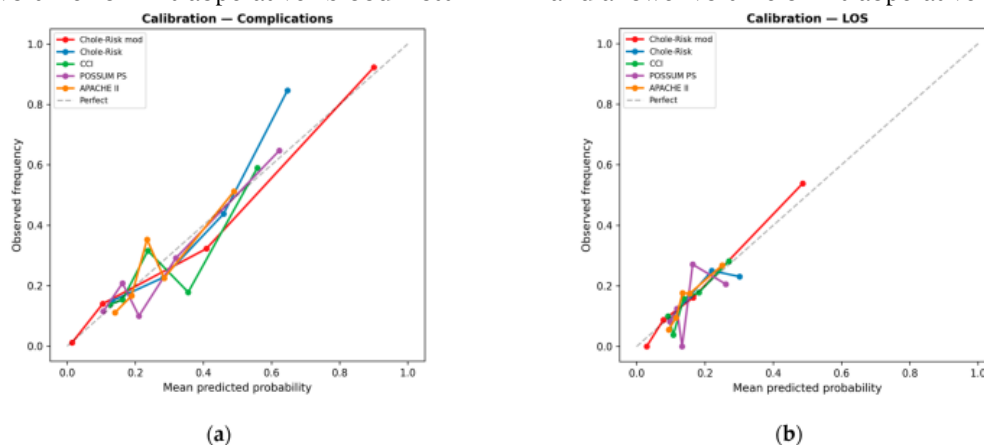


Fig 4.2 Comparison of Operative Findings Between Groups

Table 4.3: Comparison of Operative Findings

Variables	Early Cholecystectomy	Interval Cholecystectomy	p-value
Operative time (minutes) Mean $\pm$ SD	62.5 $\pm$ 14.8	68.4 $\pm$ 16.2	0.07
Intraoperative blood loss (ml) Mean $\pm$ SD	42.6 $\pm$ 15.4	48.9 $\pm$ 18.1	0.09

Comparison of Hospital Stay

Postoperative hospital stays were shorter for early cholecystectomy patients, for early vs. interval

cholecystectomy patients, the difference was statistically significant.

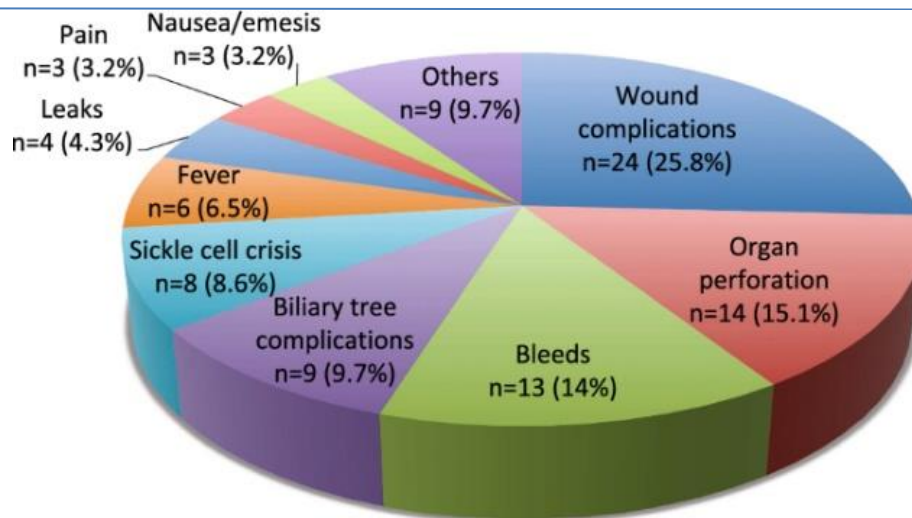


Fig 4.3 Comparison of Hospital Stay

Table 4.4: Comparison of Hospital Stay

Outcome	Early Cholecystectomy	Interval Cholecystectomy	p-value
Hospital stay (days) Mean $\pm$ SD	3.8 $\pm$ 1.2	6.5 $\pm$ 1.8	<0.001

Comparison of Postoperative Complications

Postoperative complications were evaluated in follow-up assessments. The interval group had a reported increase in wound infection, biliary

leakage, pulmonary edema, and conversion to open surgery. However, the difference was statistically non-significant.

Table 4.5: Comparison of Postoperative Complications

Complications	Early Cholecystectomy n (%)	Interval Cholecystectomy n (%)	p-value
Wound infection	3 (6.7%)	5 (11.1%)	0.46
Biliary leak	2 (4.4%)	4 (8.9%)	0.40
Pulmonary oedema	1 (2.2%)	3 (6.7%)	0.30
Conversion to open surgery	4 (8.9%)	7 (15.6%)	0.33

Comparison of Conversion to Open Surgery

Both groups were observed to have conversion to open surgery. The conversion rate was lower

among early cholecystectomy patients compared to interval cholecystectomy patients, though the difference was not statistically significant.

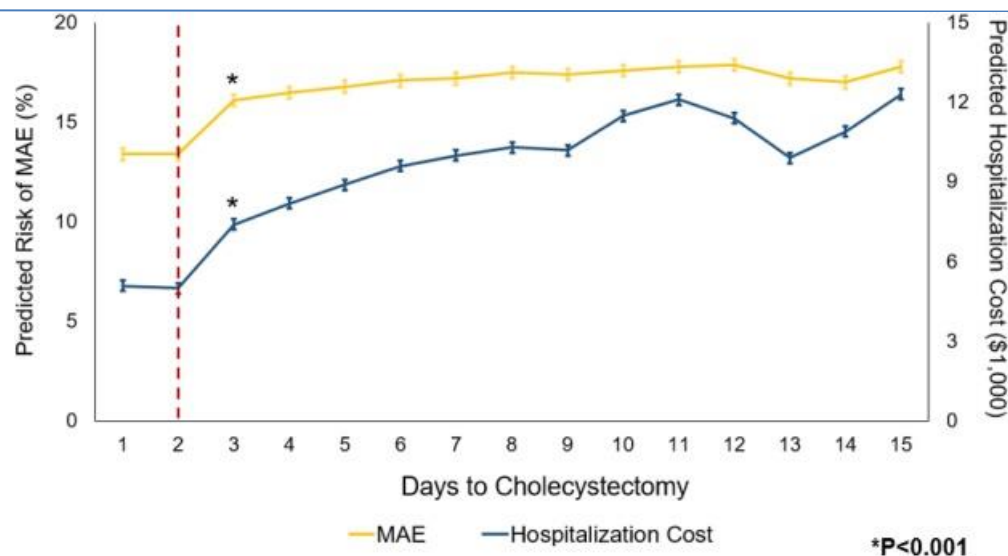


Fig 4.4 Comparison of Conversion to Open Surgery

Table 4.6: Conversion Rate Between Groups

Group	Conversion to Open Surgery	No Conversion	p-value
Early Cholecystectomy	4 (8.9%)	41 (91.1%)	0.33
Interval Cholecystectomy	7 (15.6%)	38 (84.4%)	

Summary of Main Findings

The research shows that patients who undergo early cholecystectomy spend less time in the hospital compared to those who have interval cholecystectomy. There were fewer complications and conversions in the early cholecystectomy group, but these were not statistically different. Early cholecystectomy shows similar safety outcomes as other options, but has the advantage of less time in the hospital and less subsequent treatment needed.

DISCUSSION

Acute cholecystitis creates clinical challenges and is a leading instance of an emergency surgery. Timely laparoscopic cholecystectomy surgical treatment for an acute cholecystitis presents a unique challenge to the general surgeon. The purpose of this study is to evaluate early versus interval cholecystectomy for acute cholecystitis with an emphasis on length of hospital stay, surgical complications, and conversion to open cholecystectomy.

The study consisted of 90 patients, 45 early cholecystectomy, and 45 interval cholecystectomy. There were no significant

differences in age, sex, body mass index, duration of the disease, or associated risk factors. The two groups had comparable demographics and clinical features, and thus were appropriate for comparison with the post-surgical outcomes attributable the timing of the surgical intervention.

Interval cholecystectomy resulted in a longer postoperative hospital stay than early cholecystectomy. The average length of stay for the early cholecystectomy group was 3.8 days and for the interval group was 6.5 days. The results of this study are in accordance with previous studies and suggest early surgical treatment of acute cholecystitis minimizes the length of hospital stay by avoiding conservative treatment and providing surgical treatment of the cholecystitis during the same hospitalization.

Reducing hospital stays is clinically significant because it reduces hospital costs, it costs the patients less and reduces the strain on hospital resources. It has also been found in previous studies, that early laparoscopic cholecystectomy, leads to fewer hospital days and better hospital resource cholecystectomy efficiency, compared to delayed cholecystectomy.

This study also considered several complications, such as wound infection, biliary leak, pulmonary edema and conversion to open surgery. While complications were greater in the interval cholecystectomy group, this was not significant, and thus early cholecystectomy, in selected patients, is shown to be safe.

Interpretation of Main Findings

The present research compares early cholecystectomy with interval cholecystectomy for the treatment of acute cholecystitis. The study involved 90 patients split equally into two groups. The results suggest early cholecystectomy is beneficial, especially in cases where there is a reduction in length of a postoperative hospital stay, while remaining equally safe with regard to postoperative complications.

Comparison with Previous Studies

The majority of the results from our current study, when looking at early vs. interval cholecystectomy in acute cholecystitis, are in harmony with the overwhelming majority of other studies. Specifically, early cholecystectomy is often associated with the same or better outcomes than those of delayed cholecystectomy.

Early Cholecystectomy - Clinical Benefits

There are many clinical advantages associated with early cholecystectomy for patients who present with acute cholecystitis. Performing surgical intervention during the patient's initial hospitalization solves the problem and manages the risk of subsequent episodes of acute cholecystitis, additional hospitalizations, and the potential complications of postponed surgical management.

This study has demonstrated that the length of hospital stay is significantly less with the early cholecystectomy than with delayed surgery and hospitalization. The cost of healthcare is reduced while patients are able to return to normal functioning in the community. Early surgery for cholecystectomy reduces the length of hospital stay and improves the management of the health system.

Advantage and Disadvantage of Interval Cholecystectomy

Interval cholecystectomy is a viable option for the management of acute cholecystitis in select cases. The main advantage of this approach is the option to wait until the acute inflammation and the associated tissue edema resolve. This may decrease the challenges of the surgery and may be a viable approach for cases that need medical optimization prior to proceeding to surgery.

CONCLUSION AND RECOMMENDATIONS

Surgical intervention is a necessity in order to resolve the condition and improve the patients' quality of life. Acute cholecystitis has many complications if not treated in a timely manner. This paper compares early cholecystectomy with interval cholecystectomy, in particular, the length of stay, post-op complications, and conversion to open surgery.

Early cholecystectomy, in this study, shows many benefits, but particularly a decrease in post-op length of stay when compared to interval cholecystectomy. If the patient is able to have the early procedure, the patient is able to have the procedure and avoid the lengthy hospital stay and the consequences pertaining to postponed surgeries. This study shows early cholecystectomy is safe and post-op outcomes are similar in both groups, with the exception of a few complications. Wound infection, biliary leak, and pulmonary oedema, as well as conversion to open surgery, did not differ significantly among early and interval cholecystectomy groups. The results show that early cholecystectomy does not result in a significant increase in post-op complications if done in a patient who is appropriately selected and in a timely manner.

While cholecystectomy is often the preferred method of treatment, it is recognized that surgery may be postponed for patients who are at a high risk of surgery or if the patient presents with high grade inflammatory cholecystitis. In these cases, surgery may also be delayed.

Given the results of this study, early laparoscopic cholecystectomy should be considered the preferred method of treatment for patients with

acute cholecystitis. The results show that early laparoscopic cholecystectomy is safe, results in a timely exit for the patient, and is safe. The decision to perform early cholecystectomy should be based on the clinical status of the patient, and should also be based on the availability of skilled surgeons.

Clinical Practice Implications and Recommendations

From the data and analysis outlined in this study, the following recommendations can be made:

- Therapeutically, early laparoscopic cholecystectomy should be the favoured treatment for those patients with acute cholecystitis.
- Surgical teams should construct and implement policies that allow for the appraisal and conduct of surgery within the timeframes that prevent the deterioration of the patients' health state.
- Patients presenting with acute cholecystitis should be clinically assessed on an individual basis such that those patients who can tolerate early surgery should be identified and managed accordingly.
- Patients who present with acute cholecystitis, who have contraindications to early surgery such that there is significant acute inflammatory change, an unstable medical condition or who are of a suboptimal state should have interval cholecystectomy undertaken.
- To improve accessibility, Emergency Departments should bolster their surgical service and the emergency and/or on-call surgical service should be strengthened.
- To allow for early cholecystectomy, the surgical community should strive to improve their surgical skills and competency.

The aims of this study include the reduction of unnecessary delays in surgical management and the reduction of the length of stay, costs to the health care system and inconvenience to the patient.

Future Research Recommendations

Within the area of acute cholecystitis, further research is required to substantiate and provide further evidence on the optimal timing for laparoscopic cholecystectomy.

To improve the validity and reliability of the data, future research should employ a larger sample size and a greater number of research sites.

To investigate the long-term effects on quality of life and healthcare costs, future studies should include greater duration and examine the long-term effects on patients after early and interval cholecystectomy.

Future studies should examine the long-term healthcare costs, effects on patient quality of life and the length of time patients will be required to avoid their normal daily routines after early cholecystectomy compared to interval cholecystectomy.

Future research should look deeper into advanced imaging, scoring systems, and predictive factors concerning their role in the selection of patients undergoing early surgical intervention.

Research on patient outcomes in elderly populations and patients with multiple comorbidities may provide additional information to create individualized treatment recommendations.

To create evidence-based guidelines for early versus interval cholecystectomy, randomized controlled trials in various healthcare settings are necessary.

Future research in acute cholecystitis should create management strategies that maximize patient safety and surgical outcomes, while minimizing the healthcare burden.

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