

**A COMPARATIVE STUDY OF CLINICAL OUTCOME IN EARLY AND INTERVAL
CHOLECYSTECTOMY IN ACUTE CALCULOUS CHOLECYSTITIS**

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ABSTRACT

Background: One of the frequently occurring diseases in the developed countries of the world - Acute cholecystitis. There is always a lack of agreement regarding timing of the operation in treatment of acute cholecystitis, since the advent of laparoscopic cholecystectomy. Hence, this study aims to compare both early and delayed or interval cholecystectomy in acute calculous cholecystitis

Material and Methods: A prospective observational study of 30 cases diagnosed to have acute calculous cholecystitis from November 2022 to November 2023

All the subjects admitted to the Department of General Surgery, Sree Mookambika Institute of Medical Sciences for Acute Calculous Cholecystitis form the subjects of the study

Result: suggests that total hospital stay duration in the interval cholecystectomy group is significantly high. Hospital stays post-operatively is more in the early cholecystectomy group, but this isn't significant as this variation may be due to chance as the p-value of it is >0.05.

Conclusion: Early cholecystectomy during acute cholecystitis appears to be safe and shortens the total hospital stay. Provided that the surgery has taken within 5–7 days of the onset of the disease, the surgeon experienced, and excellent operating facilities are available, good results achieved. Nevertheless, the open conversion rate in laparoscopic cholecystectomy is higher in early than in delayed elective surgery

Keywords: laproscopy, cholecystitis

INTRODUCTION:

One of the frequently occurring diseases in the developed countries of the world - Acute cholecystitis. There is always a lack of agreement regarding timing of the operation in treatment of acute cholecystitis, since the advent of laparoscopic cholecystectomy. The optimal timing of laparoscopic cholecystectomy in the treatment

of acute cholecystitis remains controversial. Hence, the timing of surgery has been the topic of interest in my study.

Mühe (under direct scope vision) first performed laparoscopic cholecystectomy in 1985. Subsequently, the same procedure using a video-laparoscope, used today, was carried out by Mouret in 1987 and was spread worldwide from Europe and the United States by Dubois and Perissat. ^[1]Two approaches are available for the treatment of acute cholecystitis –

- a) Early cholecystectomy - performed within 72 hours of the onset of disease.
- b) Delayed or interval cholecystectomy - performed 6 to 8 weeks after initial medical treatment with anti-microbial agents.

The exact timing of surgery, potential benefits, and cost-effectiveness of laparoscopic cholecystectomy in the treatment of acutely inflamed gallbladder have not been established and continue to be controversial.^[2]In the presence of acute inflammation, LC becomes more challenging and difficult because of edema, exudate, adhesions with adjoining structures, and distension of gallbladder, friability of tissues, unclear and distorted ductal and vascular anatomy ^[3], hypervascularity, congestion, and dissemination of infection.

These risk factors predispose for the suboptimal outcome and high conversion rate to open cholecystectomy in early cholecystectomy. In delayed cholecystectomy, there is a risk of recurrence of symptoms requiring and emergency surgery, overall prolonged hospital stay, and higher hospital costs.

Hence, this study aims to compare both early and delayed or interval cholecystectomy in acute calculous cholecystitis.

MATERIALS AND METHODS

A prospective observational study of 30 cases diagnosed to have acute calculous cholecystitis from November 2022 to November 2023

All the subjects admitted to the Department of General Surgery, Sree Mookambika Institute of Medical Sciences for Acute Calculous Cholecystitis form the subjects of the study. All the subjects were informed about the procedure and consent taken before participating in the study. All subjects who are diagnosed to have Acute Calculous Cholecystitis form the subjects of the study.

Exclusion criteria

- Subjects with common bile duct stones (choledocholithiasis), acute pancreatitis, previous upper abdominal surgery, or severe concomitant medical problems and significant systemic disease deeming them unfit for laparoscopic surgery were excluded from the study.
- Pregnancy/ Breast-feeding mothers.

Subjects were divided into 2 study groups, and they were categorized as Group A & Group B based on their presentation to OPD with the duration of onset of disease (within or more than 72 hours). Early laparoscopic cholecystectomy performed in subjects of group A within 72 hours of the onset of symptoms. Delayed or interval cholecystectomy planned in subjects of group B who presented after 72 hours of the onset of symptoms, after 6-8 weeks after the initial treatment with intravenous fluids, antibiotics, and analgesics.

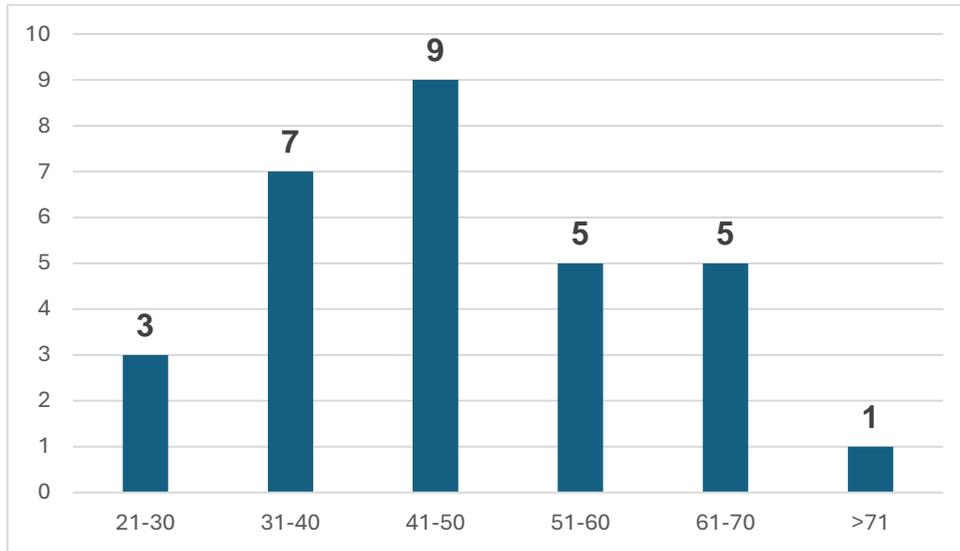
RESULTS

TABLE NO 1: AGE DISTRIBUTION (n=30)

Age group (years)	Number of subjects (n = 30)	Percentage (%)
21-30	3	10
31-40	7	22
41-50	9	30
51-60	5	18
61-70	5	16
>71	1	4

The most commonly presented age group is 31 to 50 years in our study.

GRAPH NO 1: AGE DISTRIBUTION

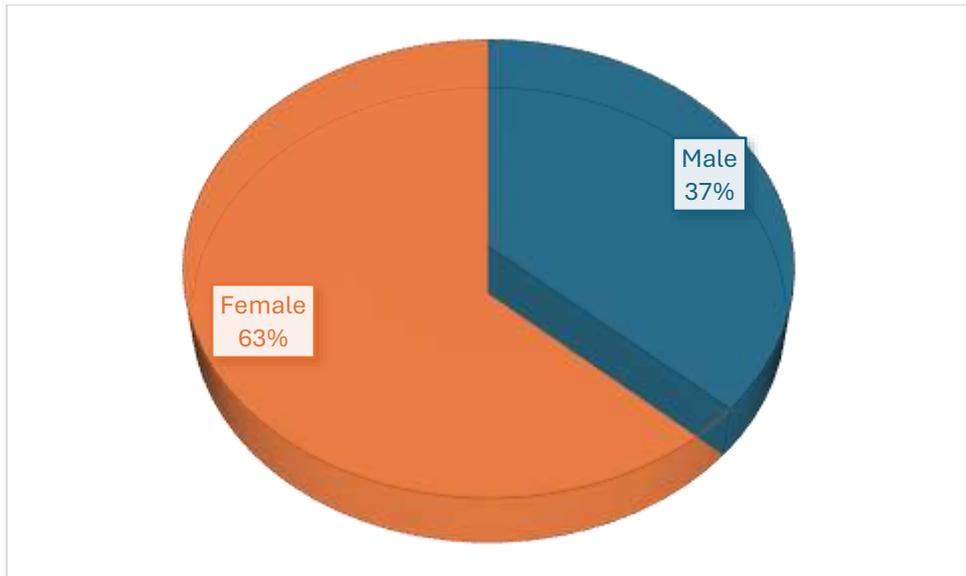


The most commonly presented age group is 31 to 50 years in our study group, with 52% of the subjects belonging to this age group with a mean age of 48.4 ± 14.2 years.

TABLE NO 2: GENDER DISTRIBUTION (n=30)

Sex	No. of subjects (n = 30)	Percentage (%)
Male	11	36
Female	19	64
Total	30	100

GRAPH NO 2: GENDER DISTRIBUTION



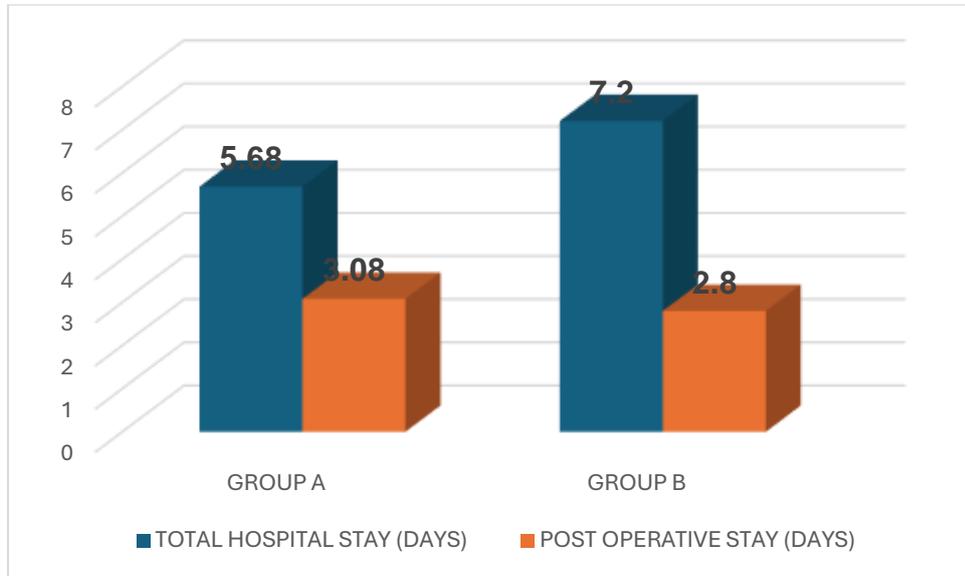
Female subjects in the study were predominant, with 64 % of total cases, while male subjects were 36 % of total subjects.

TABLE NO 3: AVERAGE LENGTH OF HOSPITAL STAY

	GROUP A	GROUP B	P VALUE
TOTAL HOSPITAL STAY (DAYS)	5.68 ± 0.85	7.2 ± 0.71	<0.05
POST OPERATIVE STAY (DAYS)	3.08 ± 0.95	2.8 ± 0.58	0.22

The total duration of hospital stay in the immediate cholecystectomy group is 5.68 ± 0.85 days, while in the interval cholecystectomy group, it is 7.2 ± 0.71 days with P-value <0.05. Postoperative hospital stay in the immediate cholecystectomy group is 3.08 ± 0.95 days, and in the interval cholecystectomy group, it is 2.8 ± 0.58 with P-value <0.05.

GRAPH NO 3: AVERAGE LENGTH OF HOSPITAL STAY



It suggests that total hospital stay duration in the interval cholecystectomy group is significantly high. Hospital stays post-operatively is more in the early cholecystectomy group, but this isn't significant as this variation may be due to chance as the p-value of it is >0.05.

TABLE NO 4: INTRA OPERATIVE FINDINGS, INTRA OP & POST OP COMPLICATIONS

(n=30)

		GROUP A	GROUP B
Intra Op Findings	GB Adhesion	6 (40%)	2 (13%)
	GB Congestion	4 (26%)	1 (6.66%)
	GB Perforation	2 (13%)	0
Intra Op Complications	Bile/Stone Spillage	4 (26%)	1 (6.66%)
	Hemorrhage	3 (20%)	1 (6.66%)
	CBD Injury	0	0
	Conversion to Open Surgery	1 (6.66%)	0
Post Op Complication	Bile Leakage	1 (6.66%)	0
	Wound Infection	1 (6.66%)	0
	Hemorrhage	0	0

Intra-operative adhesion, congestion, inflammation, and perforation were found in a higher number of subjects who underwent immediate cholecystectomy, as well as intra-operative and post-operative complications, which were also high in numbers in early laparoscopic cholecystectomy group.

DISCUSSION:

In Acute calculous cholecystitis, the mean age of presentation in this study was found to be 48.4 ± 14.2 years of total subjects, with the common age group of presentation being 41-50 years of age. In the studies mentioned above, the most common age group of presentations being 40 to 59 years of age. The age group of presentation in this study is 31 – 50 years, which is in agreement with the NIS (nationwide inpatient sample) 2005-2009.

In this study, the incidence for acute calculous cholecystitis was seen in 36% of male subjects and 64% of female subjects, showing female predominance, which is in agreement with all the mentioned studies showing predominantly female population. This study is in agreement with the above meta-analysis with an open conversion rate of 6.66% in the early group. In this study, average operative duration was found to be 87.04 minutes in the early cholecystectomy group and delayed cholecystectomy group; it is 70.56 minutes with a p-value of <0.05 , which is suggestive of significant shorter operative duration in interval cholecystectomy.

Mean operative time is 80 to 100 minutes in the early laparoscopic cholecystectomy group, while it is 60 to 80 minutes in the interval laparoscopic cholecystectomy group in this study.

Siddiqui *et al.* analyzed four clinical studies consisting of 375 subjects and found shorter hospital stay in early laparoscopic cholecystectomy and longer operation time in early laparoscopic cholecystectomy, but they found no difference observed significantly between early and delayed laparoscopic cholecystectomy groups in terms of conversion rates. ^[4]

However, considering the shorter hospitalization duration and lesser treatment costs, early laparoscopic cholecystectomy still seems advantageous over delayed intervention. In a prospective randomized study, they have found more per-operative and postoperative complication rate in early cholecystectomy group than delayed cholecystectomy group similar to the study. ^[5]

Out of the 15 cases of early cholecystectomy, one subject had developed low output ($<200\text{cc}$) biliary fistula, which seen as a bile leak in the drain, which was left in-situ. Both subjects were managed conservatively with *Inj. Hyoscine bromide* and fatty meals. The drain output gradually reduced, and after removal of the drain when the production was

negligible, subjects were discharged. The further follow up of these subjects was uneventful, and follow up ultrasonography abdomen didn't show any collection or abnormality in the gallbladder bed. No subjects from the interval cholecystectomy group had developed a biliary fistula.

Given the inflammatory process taking place in the porta hepatis, early conversion to open cholecystectomy should consider when proper delineation of anatomy is not clear or when progress can't make out laparoscopically. With substantial inflammation, a partial cholecystectomy, transecting the gallbladder at the infundibulum with cauterization of the remaining mucosa, is acceptable to avoid injury to the common bile duct.

Some subjects present with acute cholecystitis but have a prohibitively high operative risk. For these subjects, a percutaneously placed cholecystostomy tube should be considered. Frequently performed with ultrasound guidance under local anesthesia with some sedation, cholecystostomy can act as a temporizing measure by draining the infected bile.

Percutaneous drainage of bile results in an improvement in symptoms and physiology, allowing a delayed cholecystectomy 3 to 6 months after medical optimization. In subjects with cholecystostomy tubes, when fluoroscopy shows a patent cystic duct, the cholecystostomy tube can be removed and the decision for cholecystectomy determined by the subject's ability to tolerate surgical intervention.^[65]

In this study, the overall requirement of antibiotics and analgesics was significantly higher in the interval cholecystectomy group as compared to the early cholecystectomy group.

Subjects after interval cholecystectomy returned to work early during the postoperative period as compared to immediate cholecystectomy, but higher overall morbidity in subjects planned for interval cholecystectomy seen due to recurrence of symptoms during conservative period.

Due to the minimal sample size and lack of systematic decision models, cost analysis could not be done adequately in this study. Subjects are not being charged for operative interventions/hospital stay, and most of the medications are available free of cost in our hospital, so the cost-effectivity of immediate and interval cholecystectomy cannot be compared correctly in this study. In this study, we found higher total morbidity related expenses in the interval cholecystectomy group.

In a study on the cost-utility of early versus delayed laparoscopic cholecystectomy for acute cholecystitis, Wilson *et al.* showed that early laparoscopic cholecystectomy is less costly and results in a better quality of life.^[6]

A meta-analysis of randomized and other studies performed by Lau and colleagues (2006) concluded that early surgery was more cost-effective because of reduced overall length of hospital stay and avoidance of readmissions for recurrent cholecystitis or biliary colic.^[7]

In this study, no mortality noted in either of the group.

Early laparoscopic cholecystectomy is, therefore, the preferred surgical technique for subjects with acute cholecystitis.^[8]

A non-randomized, prospective study by Tzovaras and colleagues (2006) assessed 129 subjects undergoing laparoscopic cholecystectomy for acute cholecystitis into two groups and found no significant difference in conversion rate, morbidity, or postoperative hospital stay among these groups and thus suggest that the benefits of early cholecystectomy are not limited to subjects who seen within 72 hours of symptom onset.^[9]

Early cholecystectomy during acute cholecystitis appears to be safe and shortens the total hospital stay. Provided that the surgery has taken within 5–7 days of the onset of the disease, the surgeon experienced, and excellent operating facilities are available, good results achieved. Nevertheless, the open conversion rate in laparoscopic cholecystectomy is higher in early than in delayed elective surgery. If an initial surgery not indicated, one should wait approximately six weeks for the inflammation to subside before operating.^[10]

CONCLUSION:

Although in clinical practice, many surgeons still prefer initial conservative management routinely for subjects with acute cholecystitis, the conclusion to be drawn from the data from various studies at present is that early cholecystectomy with a laparoscopic approach is the treatment of choice for acute calculous cholecystitis.^[11]

LIMITATIONS OF THIS STUDY:

The major drawback of this study is that the results cannot extrapolate to the general population as the sample size is limited, and lack of systematic decision models in this study. The sample size should be increased furthermore to apply the results obtained to the general population.

FINANCIAL SUPPORT AND SPONSORSHIP:

Nil.

CONFLICTS OF INTEREST:

There are no conflicts of interest

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