MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2025.4.121.125

OPEN ACCESS

Key Words
Acute cholecystitis, early cholecystectomy, hospital stay delayed cholecystectomy, complications

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Received: 20th April 2025
Accepted: 18th May 2025
Published: 28th June 2025

Citation: Vinu Gopinath and S. Sathyavani, 2025. Outcomes in Early vs Delayed Laparoscopic Cholecystectomy for Acute Cholecystitis an Observational Study. Res. J. Med. Sci., 19: 121-125, doi: 10.36478/makrjms. 2025. 4.121.125

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Outcomes in Early vs Delayed Laparoscopic Cholecystectomy for Acute Cholecystitis an Observational Study

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ABSTRACT
The study aims to evaluate and compare the clinical outcomes of early and delayed laparoscopic cholecystectomy in patients with acute cholecystitis. Thirty patients, with acute cholecystitis, who had undergone laparoscopic cholecystectomy were studied. The patients were to have undergone early laparoscopic cholecystectomy if they had their surgery within 72 hrs of the initial presentation of the symptoms. All those patients, who underwent the surgery after 4 weeks, were considered to be in the delayed laparoscopic cholecystectomy group. The early and delayed groups had 19 and 11 patients respectively. The overall occurrence of intraoperative complications was found to be similar in both groups. It was 84.2% in the early laparoscopic cholecystectomy group and in comparison, it was 90.9% in the delayed group. Major bleeding in the early group was 21.1% and that of the delayed group was 18.2%. The bile and gallstone spillage, in our study, among the early and delayed groups were 47.4 and 72.7%, respectively. In our study, the drain requirement in the delayed group was 63.6%, while it was 52.6%, in the early group. The duration of surgery on average was140.5 min in the early group when compared to 95.5 min in the delayed group. There were no statistically significant differences in the outcomes of early and delayed laparoscopic cholecystectomy in patients with acute cholecystitis regarding complications. Duration of surgery was more and length of hospital stay less in early group.

INTRODUCTION

Acute cholecystitis is a common condition that most surgeons come across in their practice. Studies conducted in North India showed that the prevalence of gallstone disease, including asymptomatic cases, is around 6-8%[1,2]. Assuming that 1 to 4% of them would become symptomatic and complicated, there would be a large number of patients requiring hospitalization and many of them, surgery. With the introduction of laparoscopy surgery, the surgical community witnessed the evolution of Laparoscopic Cholecystectomy (LC), which gives the surgeon a better angle of vision and magnification of the structures. LC is now the gold standard for all gall bladder surgeries[3].

LC results in fewer complications, reduced mortality and reduced hospital stay[4,6]. But the timing of the surgery has long been a subject of debate. The timing of the surgery for acute cholecystitis is believed to have a bearing on the morbidity and mortality, duration of the surgery and hospital stay. The updated Tokyo guidelines in 2013 opened the doors to the possibility of early surgical management of acute cholecystitis[7]. With increasing training in laparoscopy, surgeons have started to attempt the procedure. However, the vast majority shirk away due to a preconceived notion of a difficult perioperative period[8].

In this study, we have compared the outcomes of early and delayed laparoscopic cholecystectomy for acute cholecystitis.

MATERIALS AND METHODS

The study sample consisted of thirty patients, diagnosed with acute cholecystitis who have undergone laparoscopic cholecystectomy in our department. A diagnosis of acute cholecystitis was made based on clinical and radiological criteria. Criteria for an acute episode include the following: Right hypochondrial tenderness, Murphy's sign, leucocytosis, gall bladder oedema/thickening and pericholecystic fluid on ultrasonography. Patients with common bile duct stones, previous surgeries and pancreatitis were excluded from the study. The study was conducted during the period from June 2012 to June 2014. Approval was obtained from the institutional ethics committee. Study was ethically conducted in accordance with Declaration of Helsinki. Informed consent was obtained from all participants. The patients were divided into two groups. The early group patients were those who had their surgery within 72 hrs of the initial presentation of the symptoms. Patients, who underwent the surgery after 4 weeks, were considered to be in the delayed group. The delayed group patients were managed conservatively with intravenous fluids, analgesics and antibiotics for acute cholecystitis in their index admissions. The decision to operate early or late was taken by the primary surgeon in charge of the patient.

The total number of patients, who underwent early laparoscopic surgery was 19, while the number, who underwent delayed laparoscopic surgery was 11. The study was a comparative study, partly retrospective and partly prospective. The statistical data were analysed using SPSS software by t-test and z-test. The level of significance was kept at <0.05.

RESULTS AND DISCUSSION

Study groups: The distribution of age showed that the majority of the patients were in their 6th decade of life or older. There were 57.9% in the early group and 72.8% in the delayed group and. There were only 3 patients (1 in the early group and 2 in the delayed group), who presented before the age of 30 (Fig. 1).

Timing of surgery: The average time for surgery among the early group was 51.3 hrs following presentation with symptoms. The earliest was within 40 hours and all were done within 70 hrs. Among the delayed group, participants were taken up for surgery on average, around the 31st day with the latest being 40 days (Table 1).

Complications: The intraoperative complications were similar in the early and delayed groups. If minor bleeding was excluded from the list, the early group had 26.3% and the delayed group 36.3%. There were no bile duct or visceral injuries in either of the two groups. Major bleeding (defined as a drop in Hb>2g dL^{-1} or transfusing of more than 2 units of blood) was encountered in 4 of the early group patients and 2 of the delayed group. Stone and bile spillage was seen in 9 and 8 cases, respectively, in the early and delayed groups (Table 2).

There were no post-operative complications in the delayed group. Bile leak was encountered in 2 of the early group patients.

Intraoperative findings: Adhesions were encountered in most of the patients in both groups (79% in the early group and 54.6% in the delayed group; p>0.05). There were 2 anatomical variations in the early group.

Duration of surgery: The majority of the patients in the delayed group had their procedure performed within 2 hrs (72.7%), while most of the patients in the early group took longer than 2 hours (74.3%). The average duration of surgery in the early group was

Table 1: Timing of surgery

	Early cholecystectomy	Delayed cholecystectomy
Average time	51.3 hrs	31.5 days
Range	40-70 hrs	30-40 days

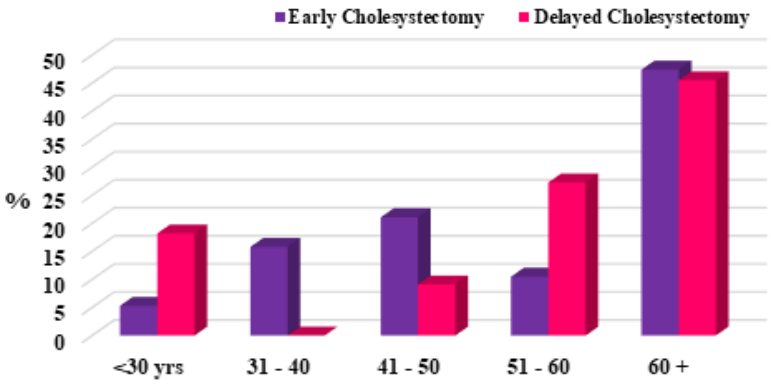

Fig. 1: Age in decades

Table 2: Complications

Intra-operative complications	Early cholecystectomy	Delayed cholecystectomy	p-value
Present	16 (84.2%)	10 (90.9%)	
Absent	3 (15.8%)	1 (9.1%)	
Major bleeding	4 (21.1%)	2 (18.2%)	>0.05
Minor bleeding	11 (57.9%)	6 (54.6%)	>0.05
Bile suct Injury	0	0	
Gallstone, bile spillage	9 (47.4%)	8 (72.7%)	>0.05
Visceral injuries	0	0	
Conversion	1 (5.3%)	0	

Table 3: Duration of surgery

Operative Duration	Early cholecystectomy	Delayed cholecystectomy	p-value
<60 min	0	0	
60-120 min	3 (15.8%)	8 (72.7%)	>0.05
121-180 min	12 (63.2%)	3 (27.3%)	>0.05
>180 min	4 (21.1%)	0	

140.5 min, while it was only 95.5 min in the delayed group. This was a statistically significant difference (Table 3).

Length of hospital stay: 84.3% of the patients in the early group were discharged within 8 days, while more than half of the delayed group patients had a hospital stay above 8 days (54.6%); p = 0.025. There is a significant decrease in the length of hospital stay in the early group.

Cholecystectomy or the removal of the gallbladder is one of the most commonly performed procedures in the general surgery department. The most common indication remains the inflammation of the gallbladder termed acute cholecystitis. Treatment for the condition has seen rapid progress in the last few decades, fuelled mainly by the introduction of laparoscopy which has shown decreased morbidity, complications and hospital stay[4].

Some of the earlier studies by Thomas B Hugh and R Schmitz have shown that the incidence of cholecystitis is common in the fourth and fifth decades of life[9]. A recent study conducted in India has shown that there was a shift from middle-aged females to younger women in their twenties[10]. Similar findings were obtained in our study with a higher proportion of female patients in both groups.

While laparoscopic cholecystectomy has become the gold standard for acute cholecystitis, the timing of surgery has been the subject of many studies. In the pre-laparoscopic surgery era, early surgery had no increased complication or death rate in comparison with delayed surgery[11]. On the contrary, it had been seen that delaying the surgery could increase the rate of gallstone-related complications[1,12]. The proponents of delayed laparoscopic cholecystectomy have said that inflammation in Calot's triangle can make dissection difficult if done early, while those of early surgery believe, fibrotic adhesions in delayed surgery cases, are fraught with complications[13,14]. A meta-analysis has concluded that laparoscopic cholecystectomy is possible for up to 7 days after the onset of acute cholecystectomy.

In our study, among the 30 participants, 19 underwent early laparoscopic cholecystectomy (within 72 hrs of admission). The other 11 underwent delayed surgery at a later admission; an average of 31 days from the index presentation. The delayed group patients were managed conservatively during the first admissions with fluids, analgesics and antibiotics.

The presence of co-morbidities among patients with acute cholecystitis is a factor which can change the course of a patient and therefore the management of the patient. Studies have shown diabetes mellitus

and hypertension to be risk factors for gallstone disease[15,16]. Diabetes mellitus has also been associated with poor outcomes. In our studies, the groups were well matched for diabetes while hypertensive patients were more in the early group. Despite the presence of risk factors, our study has shown similar outcomes concerning complications.

The intraoperative complications that occurred were noted during the surgery. They were the presence of major and minor bleeding, bile duct injuries and bile and gallstone spillage. Conversion from a laparoscopic procedure into an open procedure was also analysed. The overall occurrence of intraoperative complications was looked at. They were found to be similar among both groups. It was 84.2% in the early laparoscopic cholecystectomy group and in comparison, it was 90.9% in the delayed group.

One-third of all major complications in laparoscopic cholecystectomy are bleeding-related[17]. Bleeding could be intra-operative when it is due to vascular or visceral injury, or post- operative when the most common cause is slippage of a ligature or clip. Uncontrolled bleeding has been reported in various series from 2-10 %, though the actual figures could be much higher[18]. All the cases of major bleeding were due to inadvertent injury to the cystic artery. Dissection was difficult in cases of inflammation in Calot's triangle or due to adhesions. Our study showed no significant difference in complications between the two groups.

The bile and gallstone spillage, in our study, among the early and delayed groups were 47.4 and 72.7% respectively. None of our patients developed any complications as a result of the spillage. There was a solitary conversion to open procedure, which was in the early group. Conversion rates in the two groups are similar in other studies[16]. The main reason for conversion in the early surgery is inflammation in Calot's triangle and fibrotic adhesions in delayed surgery[1,13,14]. In early cases, the gall bladder is often friable and would tear when grasped leading to considerable oozing. These two factors have been responsible for a higher conversion in early cases[3]. The study by Gurusamy *et al*.[5] also noted no significant difference between early vs delayed cholecystectomy.

Similarly, post-operative complications like bile leak or wound infections among the two groups were found to be not significant. Similar results have been reported in studies by Choi *et al*.[19] and Chandler et al.[20].

One would expect a longer duration of surgery when laparoscopic cholecystectomy is done in the setting of acute cholecystitis. Studies have also noted the increased duration of surgery in early cholecystectomy[3,12]. In our study, we noticed a statistically significant increase in the duration of surgery in the early group. A retrospective study, showed a significantly less duration of surgery in early laparoscopic cholecystectomy, as opposed to delayed surgery[21]. The hospital stay has been noted to be lower in the early group. This is because the delayed group has two treatment phases, one for conservative management of acute inflammation and the other for the procedure. Studies by Gurusamy *et al*.[5] have noted hospital stay in the early group was lower by 4 days. Our study showed that the average duration of hospital stay for the early group is significantly less than that of delayed group.

Limitations of the Study: Limitations of the study included a small sample size. The results of the study will hopefully set the stage for larger-scale clinical studies and further cost analysis which was not performed in this study.

CONCLUSION

There was no statistically significant difference in outcomes between early and delayed laparoscopic cholecystectomy for acute cholecystitis regarding complications. Duration of surgery for early cholecystectomy is noted to be significantly more than delayed surgery while length of hospital stay has been found to be significantly less in the early surgery group.

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