

Original Research Article

Early versus delayed cholecystectomy in acute cholecystitis: a comparative study in a tertiary care hospital

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ABSTRACT

Background: For patients with acute cholecystitis the timing of operative intervention has two broad approaches-early cholecystectomy and elective or delayed cholecystectomy. The main advantage of early cholecystectomy is that, it offers a definitive treatment during the same admission and avoids the problem of failed conservative treatment. The present study is an endeavour to discuss and to compare the outcome of management of acute cholecystitis with early and delayed cholecystectomy.

Methods: 100 patients with clinical diagnosis of acute cholecystitis, admitted in the surgical wards of Gauhati Medical College and Hospital during the period of 1st July 2017 to 30th June 2018 were selected for the study. 40 patients underwent early cholecystectomy (within 7 days of onset of symptoms) and 60 patients underwent elective or late cholecystectomy (after a gap of 6-8 weeks from the acute attack).

Results: In the present series the average duration of surgery was 90.37±11.96 minutes in the early group and 65.3±7.83 minutes for the elective group which is found to be statistically significant (p value<0.05). In the early surgery group 8.33% required conversion to open surgery. In the elective surgery group 3.63% required conversion. Wound infection, biliary leakage, bile duct injury, and respiratory tract infection was found to be statistically not significant between the two groups.

Conclusions: Early cholecystectomy is feasible and safe for acute cholecystitis and is better method of treatment because of its shorter hospital stay, which is a major economic benefit to both the patient and health care system.

Keywords: Early cholecystectomy, Laparoscopic cholecystectomy, Delayed cholecystectomy

INTRODUCTION

Acute cholecystitis is a fairly common condition, consisting of acute inflammation of gallbladder and usually associated with abdominal pain, vomiting, tenderness, fever. The management of acute cholecystitis has come a long distance in the last few centuries. The first successful open cholecystectomy was performed by a German surgeon Carl Langenbuch in 1882.¹ Cholecystectomy in acute stage of the disease was performed by an English surgeon Walton in 1923. The introduction of laparoscopic cholecystectomy by Erich Muhe on September 1985 revolutionized the management

of patients with symptomatic gallstone disease.² While laparoscopic cholecystectomy was established as superior to open cholecystectomy for patients with acute cholecystitis the timing of operative intervention remained controversial. Two broad strategies exist- early cholecystectomy and elective or delayed cholecystectomy. Early cholecystectomy, while variably defined throughout the surgical literature, usually refers to cholecystectomy performed on the initial admission within 24 hours to 7 days from the onset of symptoms. Johansson et al (2003), Papi et al (2004), Strasberg et al (2008) and Gurusamy et al (2009) in their study consider early cholecystectomy within 7 days of onset of

symptoms.³⁻⁶ Other current literature suggests that early laparoscopic cholecystectomy for acute cholecystitis should be performed within 72 hours from the onset of symptoms, defining a rigid 72 hours boundary.⁷⁻⁹ In elective or delayed cholecystectomy, acute inflammation is allowed to settle down for 6-8 weeks prior to the surgical intervention.^{3,4} The main advantage of early cholecystectomy is that, it offers a definitive treatment during the same admission and avoids the problem of failed conservative treatment and complication like empyema, gangrene and perforation. The 2013 Tokyo Guidelines and the Society of American Gastrointestinal and Endoscopic Surgeon (SAGES) guidelines suggest early laparoscopic cholecystectomy within 24-72 hours of diagnosis for patients with acute cholecystitis.¹⁰ The present study is an endeavour to discuss and to compare the outcome of management of acute cholecystitis with early (within 7 days of onset of symptoms) and elective or delayed (6-8 weeks after an acute attack) cholecystectomy.

METHODS

100 patients with clinical diagnosis of acute cholecystitis, admitted in the surgical wards of Gauhati Medical College and Hospital during the period of 1st July 2017 to 30th June 2018 were selected for the study. The patients were interviewed for detailed clinical history according to a definite proforma. All the patients were examined and underwent routine blood investigations. Abdominal USG was performed in all the cases.

Inclusion criteria

Patients above 12 years of age of both sexes with clinical features of acute cholecystitis; patients with features of acute cholecystitis on USG (thick, edematous gallbladder wall, pericholecystic fluid collection).

Exclusion criteria

Patients with choledocholithiasis; acute cholecystitis in pregnancy; patients with co-morbid conditions like pulmonary and cardiac problems.

Patients were randomly divided into two groups. 40 patients were selected for early cholecystectomy (within 7 days of onset of symptoms) and 60 patients for elective cholecystectomy (after a gap of 6-8 weeks from the acute attack). Preference of the patient regarding the option of early or elective surgery and open or laparoscopic surgery was also taken into consideration. All acute cases received initial treatment which consists of bed rest, IV fluids/ electrolytes, IV antibiotics/ antispasmodics/ analgesics.

Mode of treatment

Early cholecystectomy: (surgery done within seven days of onset of symptoms).

Conservative treatment followed by elective cholecystectomy (surgery done after 6 to 8 weeks following expectant management of acute symptoms).

The response of the patients to conservative treatment was noted till the date of discharge. Any complication that occurred during conservative treatment and following surgery was noted.

The complications looked for were:

Abscess formation, empyema; increase in size of the lump, impending perforation; development and or increase in jaundice; septicaemia; re-attack of acute cholecystitis following conservative treatment. Post-operative complications like: wound infection, respiratory tract infection, prolonged ileus, fever, biliary fistula or leak.

Total hospital stay

The total hospital stays of the patient from the day of admission till the day of discharge are noted.

Statistical analysis

Statistical analysis was performed by the SPSS version 21.0. Continuous variables were presented as mean±SD and categorical variables were presented as absolute numbers and percentage. Normally distributed continuous variables and categorical variables were compared using appropriate statistical test. P value less than 0.05 was taken as significant.

RESULTS

The highest incidence of the disease was found to be between the ages of 41 to 50 years. The average age of the patient was found to be 40.2 years. The disease was predominant in the females, 74 out of 100 and the female to male ratio was 2.85:1.

In the present study the most common symptoms and clinical findings were pain abdomen (100%), nausea and vomiting (85%), fever (64%), lump abdomen (21%), jaundice (12%) and tenderness (82%). In 40 cases out of 100 cases early cholecystectomy (within 7 days) was done and elective surgery was performed in the rest of the 60 cases (6-8 weeks after the acute episode).

Out of the 40 patients who underwent early cholecystectomy adhesions were present in most of the cases, between the gallbladder and greater omentum, transverse colon and duodenum. The gallbladder was found to be edematous in all cases. Dissection in the Calot's triangle was done without much difficulty in all patients who underwent successful laparoscopic procedure. 5 patients (12.5%) had developed postoperative complications. Among the rest of the 60 patients who underwent elective cholecystectomy after

6-8 weeks, none had any intra operative difficulty except for variable anatomy and obscuration of the anatomy by previous fibrosis. 7 patients (11.67%) had developed complications.

Table 1: Treatment modalities undertaken.

Treatment modality	Early cholecystectomy	Delayed cholecystectomy
Open cholecystectomy	04	05
Laparoscopic cholecystectomy	33	53
Laparoscopic converted to open cholecystectomy	3	2
Total	40	60

Duration of surgery

In the present series the average duration of surgery was 90.37±11.96 minutes in the early group and 65.3±7.83

minutes for the elective group which was found to be statistically significant (p value <0.05).

Wound infection

Postoperative wound infection was seen in 3 patients (7.5%) in the early group and in 1 patient (1.67%) in the elective group. These infections were controlled by antiseptic dressing and change of antibiotics according to culture and sensitivity report.

Bile duct injury

Intra operative bile duct injury was seen in 1 patients (2.5%) in the early group and 1 patient (1.67%) in the elective group.

Others

Upper respiratory tract infection (URTI) was seen in 1 patient (2.5%) in the early group and in 3 patients (5%) in the elective group. 2 patients (3.3%) had post-operative fever in the elective group.

Table 2: Complications noted in the study groups.

Complication	Early cholecystectomy (n=40)	Late cholecystectomy (n=60)	P value	Significance
Wound infection	3	1	>0.05	Not significant
Biliary injury	1	1	>0.05	Not significant
Upper respiratory tract infection	1	3	>0.05	Not significant
Fever	0	2	>0.05	Not significant

Conversion from laparoscopic to open surgery

In the early surgery group 8.33% (3 out of 36 patients) required conversion to open surgery. In the elective surgery group 3.63% (2 out of 55 patients) required conversion. This conversion rate is comparable with other published data and found to be statistically insignificant.

The main reasons for conversion were difficulty in gallbladder exposure, dense adhesions obscuring the anatomy of Calot’s triangle.

Hospital stay

For the patient who had undergone early cholecystectomy, the average duration of the hospital stay was 9.625±2.02 days. The shortest duration of the hospital stay was 7 days and longest was 15 days.

For the patient who had undergone elective cholecystectomy, the average duration of the hospital stay was 13.2±3.19 days. The shortest duration of the hospital stay was 9 days and longest was 17 days.

Mortality

In this study of 100 patients with acute cholecystitis, of which 40 patients underwent early cholecystectomy and rest of the 60 cases who were treated by elective surgery, had no mortality

DISCUSSION

The present study comprises of 100 patients undergoing treatment for acute cholecystitis in Gauhati Medical College and Hospital during the period of 1st July 2017 to 30th June 2018. An attempt has been made to discuss the age incidence, sex incidence, symptomatology and the outcome of the treatment modalities in terms of conversion rate, duration of surgery, different complications, hospital stay and mortality.

Age incidence

In the present study, the incidence of acute cholecystitis is highest between 41-50 years of age with an average of 40.2 years which is comparable with other studies.

Somasekar et al in their study of 156 patients reported a mean age of 54 years.¹¹ Kolla et al in a series of 40 patients reported a mean age of 40 years.¹²

Sex incidence

In our study, out of 100 patients 74 were female and 26 were male and the female and male ratio is 2.85:1 which is comparable with other study. Cameron et al in their series of 109 patients found that 76 were females and 33 were males.¹³ Kolla et al in their series of 40 patients found that 32 were females and 8 were males, with female to male ratio of 4:1.¹²

Symptomatology

De Camp et al observed that majority of the patient with acute cholecystitis present with pain abdomen (99.7%); 23% presented with jaundice.¹⁴ Abdominal lump and rigidity was seen in 49% patient. In the present study the most common symptoms and clinical findings were pain abdomen (100%), nausea and vomiting (85%), fever (64%), lump abdomen (21%), jaundice (12%) and tenderness (82%) which is comparable with other studies.

Treatment

Papi et al, Somasekar et al, Cameron et al, De Camp et al, advocated early cholecystectomy for acute cholecystitis.^{4,11,13,14} The reasons for advocating early cholecystectomy are- less duration of hospital stay, decreased morbidity, avoids readmission to the hospital and decreased overall costs of treatment. The 2013 Tokyo guidelines support early surgery on first presenting admission as the optimal management strategy for patients with non-severe acute cholecystitis. The Tokyo guidelines also provide recommendations specific to the grade of cholecystitis severity. Patients with mild (grade I) acute cholecystitis should be managed with cholecystectomy early on first presenting admission. For patients with moderate cholecystitis (grade II), early cholecystectomy is also recommended as the preferred management strategy but it stresses the point that, at the surgeon level, delaying surgery may be reasonable if the surgeon is not comfortable with difficult laparoscopic cholecystectomy where severe local inflammation is encountered.⁹

Although surgery within the 'golden 72 hours' period from the onset of symptoms has been suggested; such early surgery is not always possible in clinical practice due to various difficulties in our set up. In such cases early surgery is performed according to the next available operating list which was within 7 days of onset of symptoms.

Conversion from laparoscopic to open surgery

No significant difference in conversion rates between the two groups was recorded in different studies made by

Johansson et al, Kolla et al, Verma et al, Gul et al.^{3,12,15,16} In the present series the conversion rate from laparoscopic to open surgery was 3 out of 36 in early group versus 2 out of 55 in the delayed group which is comparable with the published data and found to be statistically insignificant.

Duration of surgery

Johansson et al in their study found no significant difference in operating time, [early surgery was 98 (range 30- 355) min versus delayed 100 (45 to 280) minutes].³ Gul et al in their prospective, comparative study in acute cholecystitis found statistically significant difference ($p < 0.05$) in the mean operating time (98.83 minutes in early group and 80.67 minutes in the delayed group).¹⁶ Yadav et al in their prospective randomized clinical in patients with acute calculus cholecystitis found that average operating time in early group was significantly longer than the delayed group (107.8 minutes versus 76.7 minutes, $p < 0.05$).¹⁷ In the present series the average duration of surgery was 90.3 ± 11.96 minutes in the early group and 65.3 ± 7.83 minutes for the elective group which is comparable with other published data.

Complications

Wound infection, biliary leakage, upper respiratory tract infection, prolonged ileus and fever are the main postoperative complication associated with both early and elective cholecystectomy in acute cholecystitis. Bile duct injury as an intra-operative complication is of major concern in both the groups.

According to Linden et al and Ahmed et al low grade wound infection is the most common postoperative complication and it is more common in patients with early cholecystectomy.^{18,19} Johansson et al (5), Kolla et al reported no significant difference in wound infection rate between the early and delayed surgery group in acute cholecystitis.^{3,12} The wound infection rate in the present study 7.5% versus 1.67% between the two group is comparable with the other published data and found to be statistically insignificant ($p > 0.05$).

Kolla et al reported the incidence of bile duct injury in 1 patient in the early surgery group.¹² Gurusamy et al in their series found that the bile duct injury rate was lower in the early group (0.5%) than in the delayed group (1.4%).⁶ Gul et al in their series found that none of the patients in either group had bile duct injury.¹⁶ Gutt et al in their series noticed bile leakage in 3 patients in early group and 1 patient in the delayed group.²⁰ Incidence of biliary injury in the present study (1 of 40 versus none out of 60) is comparable with the other published data in both early and elective group and found to be statistically insignificant ($p > 0.05$).

Kolla et al reported overall postoperative complication rate of 15% in early group and 20% in delayed group.¹²

Verma et al and Gul et al reported no significant difference in overall complication rate in either group.^{15,16} Saber et al found that overall complication rate was a little bit higher in the early laparoscopic cholecystectomy group but the distribution was still insignificant.²¹ In the present series 5 patients had post-operative complications in the early surgery group and 7 patients in the elective group. The overall complication rate is similar with the other published data in both early and elective group and statistically insignificant ($p>0.05$).

Hospital stay

In the present series the mean total hospital stay was 9.625 ± 2.02 days in the early group and 13.2 ± 3.19 days for the elective group. The longer period of hospital stay in the elective group is due to mainly readmission. Papi et al in their meta-analysis reported that total hospital stay was shorter in the early surgery group (9.6 ± 2.5 days versus 17.8 ± 5.8 days; $p<0.0001$).⁴ Gurusamy et al said that the total hospital stay was about 4 days shorter in early cholecystectomy group compared with delayed group.⁶

Mortality

There was no mortality in both groups in the present study. It is in consistency with Mishra et al, Cameroon et al, Gurusamy et al who also noticed no mortality in their studies.^{6,13,22}

CONCLUSION

Acute cholecystitis is most commonly caused by obstruction of the cystic duct by an impacted stone in cystic duct or in the neck of the gallbladder associated with secondary inflammation due to bacterial infection. Acute cholecystitis is more common in females and commonly seen between 4th to 5th decades of life. However, it may occur in all age groups and childhood is not an exception. Pain is the most common presenting symptom followed by nausea and vomiting, fever, lump abdomen and jaundice. Ultrasonography is the mainstay in the diagnosis of acute cholecystitis.

Regarding treatment of acute cholecystitis opinion varies with different school of thought. The result of early cholecystectomy is excellent in the present study, when done within 7 days of onset of symptoms. Main complication in this group is wound infection though the rate is quite low. The incidence of bile duct injury and biliary leakage is almost similar in both the groups

In conclusion, early cholecystectomy is feasible and safe for acute cholecystitis and is better method of treatment because of its shorter hospital stay, which is a major economic benefit to both the patient and health care system. Early cholecystectomy has the advantage in terms of quick definitive treatment of the disease on first hospital admission and avoids the problems of failed

conservative management and recurrent symptoms. But early cholecystectomy should be considered as a planned procedure following adequate resuscitation and complete assessment of the associated co-morbidity through the investigation and confirmation of the diagnosis.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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