

Comparative Study between Early and Late Laparoscopic Cholecystectomy in the Treatment of Acute Cholecystitis

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ABSTRACT

Introduction: Laparoscopic cholecystectomy is now the procedure of choice for patients presenting with acute cholecystitis unless it is contraindicated for technical reasons or safety. The following study is an attempt to compare the outcome and postoperative complications of early versus delayed laparoscopic cholecystectomy in patients presenting with acute cholecystitis in a tertiary care centre. Study aimed to compare the outcome in early versus delayed laparoscopic cholecystectomy in terms of frequency of intra-operative and postoperative complications.

Material and Methods: This study involved review of case records of 100 patients with clinical diagnosis of acute cholecystitis, admitted in the surgical wards of a tertiary care centre of North India during the period from 1st January 2019 to 15th March 2020 who underwent laparoscopic cholecystectomy on an elective basis. 50 patients (Group A) underwent early cholecystectomy (within 7 days of onset of symptoms) and 50 patients underwent elective or late cholecystectomy (after a gap of 6-8 weeks from the acute attack) who were categorized as Group B. Detailed evaluation and documentation of the management plan, postoperative progress of the patients and complications during the stay in the hospital was made.

Results: In the present series the average duration of surgery 42.2 ± 8.74 minutes in group A and 53.37 ± 10.65 minutes for the group B which is found to be statistically insignificant (p value < 0.05). The rate of conversion was found to be 2% in the early group A as compared to 6% in the delayed cholecystectomy group B. Wound infection, biliary leakage, bile duct injury, and respiratory tract infection were found to be statistically significant between the two groups.

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.

Keywords: Early Cholecystectomy, Laparoscopic Cholecystectomy, Delayed Cholecystectomy

INTRODUCTION

The prevalence of cholesterol gallstones has increased exponentially especially in obese people in both developing and developed countries. The expanded predominance of stones is generally due to super-saturation of bile with cholesterol, due to increased synthesis by the liver and emission into bile. Saturation is additionally increased during weight reduction^{1,2}. LC is the gold standard treatment of choice in the management of calculus gallbladder disease in the general population. The advantages of laparoscopic cholecystectomy over open surgery include

less postoperative pain, early mobilization; less pulmonary function impairment, decreased operative stress, and a shorter hospital stay³. The conventional treatment of acute Cholecystitis is conservative which includes administration of intravenous antibiotics and analgesics to prevent possible complications associated with inflammation followed by elective laparoscopic cholecystectomy after 4-6 weeks. The refreshed Tokyo Guidelines propose that an early laparoscopic cholecystectomy (ELC) is compulsory for patients with mild cholecystitis, whereas delayed laparoscopic cholecystectomy (DLC) can be performed in patients with moderate or severe cholecystitis⁴. Early cholecystectomy has the advantage in terms of quick definitive treatment of the disease on first hospital admission itself and avoids the problems of failed conservative management and recurrent symptoms⁵. Despite these recommendations, laparoscopic cholecystectomy for acute cholecystitis is not being performed regularly because the timing and approach to the surgical management in patients with acute cholecystitis is still a matter of controversy. The ideal timing of cholecystectomy in patients with acute cholecystitis still remains a matter of debate.

MATERIALS AND METHODS

This study involved review of case records of 100 patients with clinical diagnosis of acute cholecystitis, admitted in the surgical wards of Kalpana Chawla Government Medical College and Hospital, Karnal during the period of 1st January 2019 to 15th March 2020 who underwent laparoscopic cholecystectomy on an elective basis.

Following criteria were used to define acute cholecystitis in the present study:

- Clinical: Right upper quadrant pain with tenderness (Murphy's sign)

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- Sonological: Cholelithiasis (GB Calculi, single /multiple/ sludge), thickened GB wall (>3 mm), sonographic Murphy's sign, peri-cholecystic collection

Inclusion criteria

- Age group >15–70 years
- Symptomatic gallstone disease (SGBS)

Variables	Early LC (n=50)	Delayed LC (n=50)	p-Value
Age	31.5±7.52	42.12±13.04	0.006
Sex (%)			
Male	9(18)	10(20)	>0.05
Female	41(82)	40(80)	
Hospital stay	2.6±0.54	2.9±0.80	0.170
Pain duration (h)	1.83±0.350	1.7±0.376	0.6746
Operation time	42.2±8.74	53.37±10.65	0.0001

Table-1:

	Early LC (n=50)	Delayed LC (n=50)
Right Hypochondrial Pain		
Present	50 (100%)	8(15%)
Absent	0(0%)	42(85%)
Fever		
Present	8(15%)	3(5%)
Absent	42(85%)	47(95%)
Vomiting		
Present	30(60%)	0(0%)
Absent	20(40%)	50(100%)
Nausea		
Present	20(40%)	5(10%)
Absent	30(60%)	45(90%)
Jaundice		
Present	0(0%)	0(0%)

Table-2: Complaints

- Biliary colic pain
- Acute cholecystitis

Exclusion criteria

- Age below 15 or above 70 years
- Not willing to participate
- Severe concomitant disease
- Suspected common bile duct stone, Gall stone induced pancreatitis, suspected concomitant acute cholangitis,
- Severe preexisting medical co-morbidity
- Contraindication for laparoscopic cholecystectomy
- Pregnancy
- Previous upper abdominal surgery
- Asymptomatic gall stone disease

The participants were divided in to two groups containing 50 patients each, Group A (early laparoscopic cholecystectomy) and Group B (delayed laparoscopic cholecystectomy). The hospital records of these patients were reviewed, and a detailed analysis of the clinical notes of the resident doctors, consultants and nurses was made. Collection of data was done by using a structured predesigned proforma containing a checklist including variables like patients demographic profile, relevant history (history of jaundice, frequency of attacks of cholecystitis, pancreatitis, diabetes, alcoholic liver disease), clinical findings, biochemical and radiological investigations, operative time, intraoperative details, post-operative complications and duration of total hospital stay. All patients who were operated upon by consultants and underwent standard four port laparoscopic cholecystectomy were included in the study. Detailed evaluation and documentation of the management plan, postoperative progress of the patients and complications during the stay in the hospital was made.

STATISTICAL ANALYSIS

Data collected was entered in the Excel 2007 and data analysis was done using Statistical Package for Social

USG findings	Early LC (n=50)	Delayed LC (n=50)
Gall Bladder Size		
Distended	48(96%)	20 (40%)
Normal	2 (4%)	30(60%)
Gall bladder wall thickness (>3 mm)		
Normal	0 (0%)	8 (15%)
Thickened	50 (100%)	42(85%)
Gall Bladder Stones		
Multiple Stones	46(92%)	40(80%)
Solitary Stone	4 (8%)	10(20%)
CBD		
Normal	50 (100%)	50(100%)
Dilated	0 (0%)	0 (0%)
IHBR		
Dilated	0 (0%)	0 (0%)
Normal	50 (100%)	50 (100%)

Table-3: Showing the USG findings in the early vs the delayed group.

Conversion rate	Early LC (n=50)	Delayed LC (n=50)	p= value
Successful LC	49	46	0.06
Conversion to OC	1	4	
Conversion rate	2%	8%	

Table-4: Showing the conversion rate to open cholecystectomy.

Intraoperative and postoperative complication	Early Laparoscopic (n=50)	Delayed Laparoscopic (n=50)
CBD Injury	0 (0%)	0 (0%)
Visceral Injury	0 (0%)	0 (0%)
Adhesions		
Found	0(0%)	10(20%)
Not Found	0 (0%)	40 (80%)
Complication (Post Operative)		
Biliary Leakage	0 (0%)	0 (0%)
Wound Infection	1(2%)	3 (5%)
Pain		
Yes	0(0%)	7(15%)
No	0 (0%)	43 (85%)
Total Hospital stay	3.625±2.02 days	6.2±3.19 days

Table-5: Showing the postoperative pain, risk of postoperative infections and total duration of hospital stay among the early and delayed groups.

Sciences (SPSS) version 20, IBM, USA. The comparison of quantitative variables between the groups such as mean age, mean duration of surgery, mean hospital stay, and mean days to return to full activity was done using unpaired student's "t" test, whereas comparison of qualitative variables such as gender, complications of surgery and conversion to open surgery was done by using chi-square test or Fisher's exact test. The confidence limit for significance was fixed at 95% level with p-value < 0.05.

RESULTS

Demographic findings

As depicted in Table 1, the study groups, which underwent early or delayed laparoscopic cholecystectomy, showed differences in age distribution and duration of surgery. Initial clinical findings and medical history were dissimilar between groups, with pain, fever, vomiting being more common in group A as compared to group B (TABLE 2). The postoperative complication rate and conversion to early laparoscopic cholecystectomy showed no significant differences between early and late laparoscopic cholecystectomy for the early and delayed LC group (Table 4,5).

The conversion rate observed for early group was 2% as compared to 8% in delayed group. This was found to be statistically insignificant (p value=0.06).

DISCUSSION

Laparoscopic cholecystectomy has become affordable, beneficial and practicable by majority of surgeons. The timing of cholecystectomy in patients with acute cholecystitis has been a contentious issue for a long time. As the experience and confidence of surgeons in laparoscopic cholecystectomy rose up, several clinical trials, though samples were small in size, proved that early laparoscopic cholecystectomy in acute cholecystitis is feasible, safe, cheaper and requires shorter hospitalization and thus decreases the total cost of treatment.

Age incidence: In the present study, the incidence of acute cholecystitis is highest between 31-55 years of age with

an average of 40.2 years which is comparable with other studies. Kolla et al⁶ in a series of 40 patients reported a mean age of 40 years.

Sex incidence

In our study, out of 100 patients 74 were female and 26 were male and the female and male ratio is 5:1 which is comparable with other study. Cameron et al⁷ in their series of 109 patients found that 76 were females and 33 were males.¹³

Clinical presentation

De Camp et al⁸ observed that majority of the patients with acute cholecystitis present with pain abdomen (99.7%); 23% presented with jaundice. In the present study the most common symptoms and clinical findings were pain abdomen (100%), nausea and vomiting (60%), fever (20%) which is comparable with other studies.

Treatment

Somasekar et al, Cameron et al, De Camp et al, advocated early cholecystectomy for acute cholecystitis.^{7,8,9} The reasons for advocating early cholecystectomy are- decreased total 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.

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,^{6,10} In the present series the conversion rate from laparoscopic to open surgery was 1 out of 50 in early group versus 3 out of 50 in the group B which is comparable with the published data and found to be statistically insignificant.

Duration of surgery

Yadav et al¹¹ 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 (57.8 minutes versus 66.7 minutes, $p < 0.05$).¹⁷ In the present series the average duration of surgery was 42.2 ± 8.74 minutes in the early group and 53.37 ± 10.65 minutes for the group B 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 delayed cholecystectomy in acute cholecystitis. Bile duct injury as an intra-operative complication is of major concern in both the groups.

Johansson et al Kolla et al^{6,12} 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 was found to be 2% versus 5% between the two group which is comparable with the other published data and found to be statistically insignificant ($p > 0.05$).

Verma et al and Gul et al^{10,13} reported no significant difference in overall complication rate in either group. Saber et al¹⁴ found that overall complication rate was a little bit higher in the early laparoscopic cholecystectomy group but the distribution was still insignificant. In the present series, the risk of postoperative infections and pain along with duration of hospital stay was higher in the patients of group B than the patients in the group A which is statically significant.

Hospital stays

In the present series the mean total hospital stay was 3.625 ± 2.02 days in the group A and 6.2 ± 3.19 days for the group B. Papi et al¹⁵ 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; $p < 0.0001$). Gurusamy et al¹⁶ said that the total hospital stay was about 4 days shorter in early cholecystectomy group compared with delayed group.

Mortality

There was no mortality in both groups in the present study. It is consistent with Mishra et al, who also observed no mortality in their studies. (6,13,2)

CONCLUSIONS

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. The level of difficulty in technique, peri-operative and post-operative complication and hospital stay are higher in delayed laparoscopic cholecystectomy. 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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