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Original Research Article

Comparative study of early versus delayed laparoscopic cholecystectomy in acute cholecystitis and its associated complications

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ABSTRACT

Background: Acute cholecystitis is a common surgical problem and was usually treated with conservative management followed by surgery after an interval of 6/8 weeks. The aim of the study was to compare the efficacy of immediate with delayed laparoscopic cholecystectomy.
Methods: Randomized controlled trial in RRMCH from January 2019 to June 2019 was conducted on patients diagnosed to have acute cholecystitis. The 25 patients underwent immediate laparoscopic cholecystectomy within 24-72 hours of admission and 25 patients underwent DLC.
Results: In the early surgery group intraoperative complications noted were adhesions, bleeding, GB perforation and bile duct injury. Although the percentage of complications was high in delayed group no statistical significance could be derived between the groups
Conclusions: Early laparoscopic cholecystectomy (ELC) surgery had similar intra and postoperative complications compared to delayed surgery in acute cholecystitis but was associated with a shorter surgery and lesser stay in hospital.

Keywords: ELC, DLC, Acute cholecystitis

INTRODUCTION

Acute cholecystitis is a common general surgical emergency seen in various setting from district hospital to specialized tertiary level institutions.[1]
Acute cholecystitis is due to gallstones in up to 90% of patients.[2]

Laparoscopic cholecystectomy for acute cholecystitis are mainly performed after acute episode occurs while conservative therapy, usually antibiotics, and DLC are still common in many centres.3 Laparoscopic cholecystectomy is currently gold standard treatment.[4]

However, the timing of laparoscopic cholecystectomy still remains controversial regarding the inflammation, edema, and adhesions during the acute course of the disease.

Hence, the proposed study to compare benefits and complications in cases of early vs. DLC in acute cholecystitis has been carried out in our institution.

Aims and objectives

Aim and objectives were to assess the benefits and complications associated with early laparoscopic cholecystectomy (ELC) compared with DLC in patients with acute cholecystitis.

METHODS

Source of data and duration of study

All patients presenting with acute cholecystitis to Rajarajeswari medical college and hospital between November 2019 to November 2021.

Inclusion criteria

All patients above 18 years were chosen for the study who presented with features of acute cholecystitis and were then diagnosed with acute cholecystitis based on clinical and relevant investigations were included in the study.

Exclusion criteria

Patients also diagnosed to have acute pancreatitis, cholangitis, choledocholithiasis were excluded.

Study type

This was a randomized control study and the randomization was done by odd-even method after obtaining ethical committee clearance.

Sample size of the study was 50 patients

Patients fulfilling the inclusion criteria were invited to participate in the study and informed consent was taken.

All selected patients were randomized into two groups- one group underwent ELC (ELC 24-72 hours) and the second group underwent delayed or late laparoscopic cholecystectomy (LLC 6-8 weeks).

Statistical analysis

Descriptive statistical analysis was performed using SPSS-16. The demographic variables were represented in percentage and continuous variables were represented using Mean and standard deviation. Possible associations were found out using chi-square test/ Fisher exact test. The benefits and complications were compared using independent t-test.

RESULTS

Gender and type of surgery

Distribution of subjects according to sex between 2 groups (ELC and LLC).

The 48% of the subjects were female and 52% of them were male. Male and female had equal distribution in both types of surgery. There was no statistical significant difference found between distribution of subjects according to sex between 2 groups (ELC and LLC).

Age distribution

Mean age in ELC was 40.16±10.14 years and Mean age in LLC was 36.92±8.49 years. There was no statistically significant difference found between the mean ages between 2 groups (ELC and LLC).

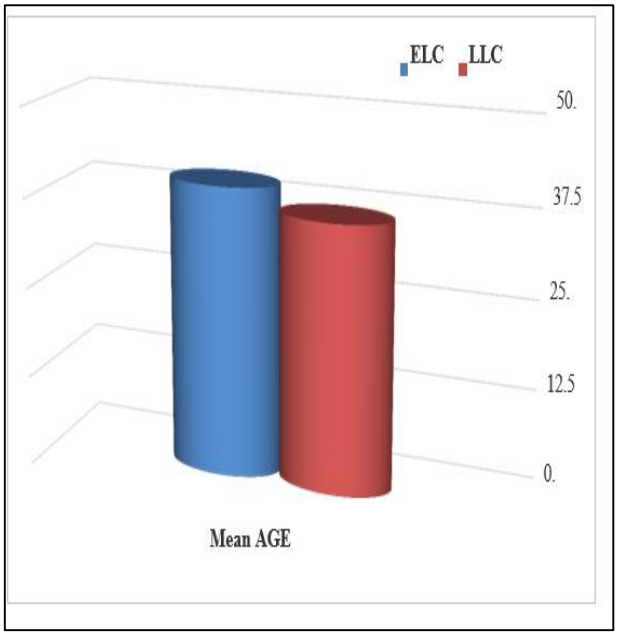

Figure 1: Comparison of mean age between 2 groups (ELC and LLC).

Clinical features

Fever

Table 1: Distribution of subjects according to fever between 2 groups (ELC and LLC).

Fever	Surgery		Total	P value
	ELC	LLC		
No	13	12	25	0.77
	52.0%	48.0%	50.0%	
Yes	12	13	25	
	48.0%	52.0%	50.0%	
Total	25	25	50	
	100.0%	100.0%	100.0%	

The 12 patients (48%) in ELC group and 13 patients (52%) in LLC group presented with history of fever. There was no statistically significant difference found between fever between 2 groups (ELC and LLC).

Pain abdomen

Distribution of subjects according to pain abdomen between 2 groups. All the patients in the study presented with complaints of pain abdomen (100%).

Vomiting

The twenlve patients (48%) in ELC group and seven patients (28%) in LLC group presented with complaints of vomiting. There was no statistical significant difference found between vomiting between two groups (ELC and LLC).

Table 2: Distribution of subjects according to vomiting between 2 groups (ELC and LLC).

Vomiting	Surgery		Total	P vaue
	ELC	LLC		
No	13	18	31	0.260
	52.0%	72.0%	62.0%	
Yes	12	7	19	
	48.0%	28.0%	38.0%	
Total	25	25	50	
	100.0%	100.0%	100.0%	

Jaundice

Two patients (8%) in ELC group and 1 patients (4%) in LLC group presented with history suggestive of jaundice. There was no statistical significant difference found between jaundice between 2 groups (ELC and LLC).

Table 3: Distribution of subjects according to jaundice between 2 groups (ELC and LLC).

Jaundice	Surgery		Total	P value
	ELC	LLC		
No	23	24	47	0.552
	92.0%	96.0%	94.0%	
Yes	2	1	3	
	8.0%	4.0%	6.0%	
Total	25	25	50	
	100.0%	100%	100.0%	

Temperature

The 12 patients (48%) in ELC group and 13 patients (52%) in LLC group were febrile There was no statistical significant difference found between temperature between 2 groups (ELC and LLC).

Table 4: Distribution of subjects according to temperature between 2 groups (ELC and LLC).

Temperature	Surgery		Total	P value
	ELC	LLC		
Afebrile	13	12	25	0.777
	52%	48%	50%	
Febrile	12	13	25	
	48%	52%	50%	
Total	25	25	50	
	100%	100%	100%	

Gallbladder calculi

The 22 (88%) patients and 3 patients (12%) in ELC group had multiple and single gallbladder calculi respectively whereas 21 (84%) patients and 4 patients (16%) in LLC group had multiple and single gallbladder calculi respectively There was no statistical significant difference found between gallbladder calculi and type of surgery.

Table 5: Distribution of subjects according to gallbladder calculi between 2 groups.

Gall bladder calculi	Surgery		Total	P value
	ELC	LLC		
Multiple	22	21	43	0.684
	88.0%	84.0%	86.0%	
Single	3	4	7	
	12.0%	16.0%	14.0%	
Total	25	25	50	
	100%	100%	100%	

Peri cystic fluid collection

The 12 (48%) patients in ELC and 17(68%) patients in LLC were found to have peri-cystic fluid collection. There was no statistical significant difference found between peri- cystic fluid collection between 2 groups (ELC and LLC).

Table 6: Distribution of subjects according to peri cystic fluid collection between 2 groups (ELC and LLC).

Peri cystic fluid collection	Surgery		Total	P value
	ELC	LLC		
No	13	8	21	0.176
	52.0%	32.0%	42.0%	
Yes	12	17	29	
	48.0%	68.0%	58.0%	
Total	25	25	50	
	100.0%	100.0%	100.0%	

Gall bladder wall thickening

Distribution of subjects according to wall thickening between 2 groups (ELC and LLC).

The 19 (76%) patients in ELC and 19 (76%) patients in LLC were found to have gallbladder wall thickening. There was no statistical significant difference found between gallbladder wall thickening between the 2 groups (ELC and LLC).

Conversion

Distribution of subjects according to conversion to open between 2 groups (ELC and LLC).

LLC had more conversions to open surgery when compared with ELC. 32% of subjects in LLC had conversion to open where as in ELC only 20% had conversion to open. However, there was no statistical significant difference found between conversion to open between 2 groups (ELC and LLC).

Adhesions

Distribution of subjects according to adhesions between 2 groups (ELC and LLC).

LLC cases had more adhesions when compared with ELC. 36% of subject in LLC were found to have adhesions where as in ELC only 12% had adhesions. There was a statistical significant difference found between adhesions in the 2 groups (ELC and LLC).

Bleeding

Distribution of subjects according to bleeding between 2 groups (ELC and LLC).

LLC had more intraoperative bleeding when compared with ELC, 40% of subjects in LLC had more intraoperative bleeding where as in ELC only 12%. There was a statistical significant difference found between bleeding between 2 groups (ELC and LLC).

Gallbladder perforation

LLC had more incidence of gallbladder perforation when compared with ELC. 12% of subjects in LLC had gallbladder perforation during surgery compared to 8% in ELC group. But there was no statistical significant difference in incidence of gallbladder perforation between 2 groups (ELC and LLC).

Table 7: Distribution of subjects according to gallbladder perforation between 2 groups (ELC and LLC).

Gall bladder perforation	Surgery		Total	P value
	ELC	LLC		
No	23	22	45	0.637
	92.0%	88.0%	90.0%	
Yes	2	3	5	
	8.0%	12.0%	10.0%	
Total	25	25	50	
	100%	100%	100%	

Bile duct injury

Table 8: Distribution of subjects according to bile duct injury between 2 groups (ELC and LLC).

Bile duct injury	Surgery		Total	P value
	ELC	LLC		
No	24	22	46	0.297
	96.0%	88.0%	92.0%	
Yes	1	3	4	
	4.0%	12.0%	8.0%	
Total	25	25	50	
	100%	100%	100%	

LLC had more incidence of bile duct injury when compared with ELC. The 12% of subject in LLC had bile duct injury where as in ELC only 4% had bile duct injury. There was no statistical significant difference found between bile duct injury and type of surgery.

Postoperative wound infection

LLC had more wound infections when compared with ELC, 20% of subjects in LLC developed wound infection where as in ELC only 8% had wound infection. There was no statistical significant difference found between wound infection and type of surgery.

Bile leak

Distribution of subjects according to bile leak between the 2 groups (ELC and LLC).

LLC had more incidence of bile leak when compared with ELC, 6% of subject in LLC had a postoperative bile leak whereas in ELC, only 4% had bile leak. There was no statistical significant difference found between bile leak and type of surgery.

Postoperative jaundice

LLC had more incidence of postoperative jaundice when compared with ELC. 12% of subject in LLC developed postoperative jaundice where as in ELC only 4% had postoperative jaundice. There was no statistical significant difference found between postoperative jaundice and type of surgery.

Duration of surgery

Mean duration of surgery was more in LLC when compared with ELC. There was a statistical significant difference found between duration of surgery and the 2 groups.

Table 9: Comparison of mean duration of surgery between the 2 groups (ELC and LLC).

Variables	Surgery	Mean	SD	P value
Duration of surgery (Min)	ELC	76.16	23.38	<0.001
Total	LLC	116.48	23.141	

Hospital stays

Comparison of mean hospital stay between the 2 groups (ELC and LLC).

Mean hospital stay was more in LLC when compared with ELC (6.48 days vs 3.84 days). There was a

statistical significant difference found between hospital stay and type of surgery.

DISCUSSION

In our study, the mean age of patients undergoing ELC and mean age in late laparoscopic cholecystectomy group was a statistically comparable similar to study by Lee et al.[5]

Among the selected patients, mean duration of symptoms in patients undergoing surgery in <72 hours and those operated after 72 hours was compared. and it was seen that both groups had complaints of pain abdomen in all patients.

However, fever was noted in 48%, vomiting in 12% and jaundice in 2% in those who underwent early surgery while 52% patients had fever, vomiting in 7% and jaundice in only 3% in the other group. Although not statistically significant the number of patients operated after 72 hours had increased incidence of fever, which may be because of longer duration of symptoms.

On comparing the ultrasound findings between the 2 groups in our study, it was noted that gallbladder calculi were observed in all the patients included in the study, pericholecystic fluid collection was noted in 12 patients in both group and gall bladder wall thickening was noted in 6 patients of both groups. signifying no statistical difference between 2 groups. Ozkerdes et al too had similar observations in his study.[6]

In ELC, (3 patients) underwent laparoscopy converted to open cholecystectomy due to dense adhesions and excessive intraoperative bleeding, while in LLC (7 patients) were converted to open cholecystectomy.

Although a higher number of patients required conversion in LLC, the results were not significant.

Similar findings were documented by other authors.[9,10] A study conducted by Menahen found that the rate of conversion was not significantly different after ELC than after DLC.[7]

In the ELC group, intraoperative complications noted were adhesions (16%), bleeding (16%), GB perforation (8%) and bile duct injury (4%). In LLC, complications that were noted were adhesions (68%), bleeding (40%), GB perforation (12%), bile duct (12%) injury.

Although the percentage of complications was high in the delayed surgery group patients, no statistical significance could be derived between the two groups. Most common complication in both groups was adhesions followed by bleeding from GB fossa or cystic artery.

Postoperatively, complications seen in early surgery were bile leak (4%), postoperative jaundice (4%) which included SSI for 2 patients. In late surgery, post-operative complications seen were bile leak (16%) and jaundice (12%).

Duration of surgery in ELC patients was 76.16± 23.38 minutes while that in LLC group was 116.48±23.14 minutes. There was a statistical difference between duration of surgery.

A study by Ozkerdes et al found that the total hospital stay was longer in the DLC group than in the ELC group.[8]

In our study, too, mean hospital stay was more in LLC when compared with ELC (6.48 days vs 3.84 days) and there was a statistical significant difference found between hospital stay and type of surgery.

Early LC for acute cholecystitis with cholelithiasis is safe and feasible, offering the additional benefit of shorter hospital stay. It should be offered to the patients with acute cholecystitis, provided that the surgery is performed within 72 hours of acute symptoms by an experienced surgeon.

Limitation

Small sample size, short duration of study were limitations of the study.

CONCLUSION

DLC is associated with a longer total hospital stay but equivalent morbidity as compared to ELC for patients presenting with acute cholecystitis. ELC would appear to be the treatment of choice for patients presenting with acute cholecystitis. By a study of the various above-mentioned literature in the topic and by comparison of their documented findings, it is clear that our study has findings that are in accordance to most of them.

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