

A comparative study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis

V. Mudhale¹, S. Dige¹, U. Ghate¹, B. Kadalge¹, P. Phatak.¹

¹DY Patil Medical College Kolhapur, India

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Abstract

Introduction

Inflammation of the gall bladder is known as acute cholecystitis. Sudden pain in the upper right of the abdomen along with bloating, vomiting, fever, tenderness are symptoms of acute cholecystitis. Laparoscopic cholecystectomy is considered to be the gold standard in treating acute cholecystitis.

Objective

To compare operative and post-operative outcomes like time required for operation, bile ductal injury, postoperative occurrence of pain, total length of stay in hospital, need for conversion to open cholecystectomy between immediate and late LC.

Methodology

Sixty-eight patients aged between 18 to 60 years diagnosed as acute cholecystitis admitted for the intervention of laparoscopic cholecystectomy were considered. Patients were categorized and analyzed based on length of time from presentation to surgery. Operation performed within 3 days of presentation was defined as 'early' laparoscopic cholecystectomy and anywhere after 3 days as 'delayed' laparoscopic cholecystectomy.

Results

The p value obtained for ROFA is 0.042. and that for Pain scale is 0.027. Since the p value is found to be less than 0.05, the null hypothesis is dismissed and we can summarise that there is a significant difference in the means of two groups with respect to these factors. No incidence of conversion to open cholecystectomy was found in both groups.

Conclusion

Both early and delayed laparoscopic cholecystectomy is safe in the management for acute cholecystitis but return to full activity is early and pain scale is less in cases of early cholecystectomy.

Introduction-

Acute cholecystitis (AC) is the inflammation of gallbladder that occurs due to obstruction of the biliary outflow from cystic duct or ineffective emptying of the gallbladder". The most common reason for impaired emptying is stones or biliary sludge. It is found in both genders but has a predisposition for certain populations. [1] The risk of formation of gallstones is high in women, obese patients, pregnant women, and persons ≥ 40 years of age.[3] The overall global prevalence of cholecystitis is estimated to be around 20% with higher incidences in developed nations. In the United States, it is estimated to affect about 20 million people. [4] In 90% of the patients, AC results from gallstones. It is predicted that 20-40% of subjects with gallstones will grow symptoms and 12% will result in AC.[5] Laparoscopic cholecystectomy (LC) is considered as gold standard for the treatment of AC. [6] However, there is disagreement regarding the ideal time of LC in AC patients. There are two categories of LC including early and delayed cholecystectomy. Recent evidence showed that early LC can be performed before 72 hours from the symptomatic presentation, defining a firm 72- hours boundary.[2,7-9] The advantage of early LC including ultimate treatment throughout the same admission, decreases the chances of unsuccessful treatment, empyema, gangrene, and perforation.[2] Moreover, early LC is associated with reduced hospital stay, and expenditure in comparison to delayed LC.[10-12]


This current study was taken up to differentiate the incidence of postoperative complications of early versus delayed laparoscopic cholecystectomy.

Materials and method

The current prospective observational study was performed at Dr. D. Y. Patil hospital and research center, Kolhapur for 2

Correspondence: P. Phatak

E-mail: pallaviphatak238@gmail.com

 <https://orcid.org/0009-0000-7374-9088>

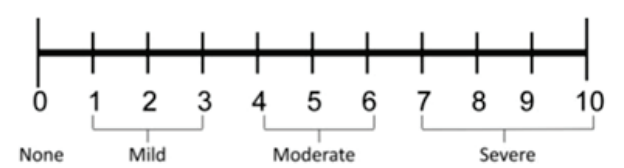
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years after the approval of the institutional ethics committee. Ethical approval for this study was provided by (DYPMCK/408/2021/IEC) the Institutional Ethics Committee, Dr.D.Y. Patil Medical College, Kolhapur, Maharashtra.Pin-416003, Chairperson Professor C.D Lokhande granted approval for the study on 24/03/2021. A total of 68 patients who fulfilled inclusion criteria such as the patients aged between 18 to 60 years and those diagnosed with acute cholecystitis presenting within seven days from the presentation of symptoms were included in the study. Whereas, patients presenting with acute cholecystitis with duration of symptoms more than seven days, having stones in common bile duct or “duct dilatation”, patients with significant medical disease that made them unfit for “laparoscopic surgery”, and patients, who rejected to undertake “laparoscopic surgery”, patients with “coagulative disorders , severe chronic obstructive pulmonary disease, end-stage liver disease, cardiac failure, surgical jaundice”, patients of acute cholecystitis with moderate to severe pancreatitis and pregnant women” were omitted from the study. A total of n=68 patients were included in the study and a detailed medical history was obtained with a specific focus on symptoms such as pain in “right upper quadrant”, vomiting and elevated temperature. Clinical evaluation was done to correspond and for confirmation of the diagnosis and the patient was evaluated for operative intervention. Basic biochemical, radiological and pre-anaesthetic tests were undertaken such as “complete haemogram, blood sugar level, renal function tests, liver function tests, chest X-ray, electrocardiogram, serology for viral markers”, and abdominal ultrasonography were done in all patients. Intraoperative/postoperative pain was assessed by using “numeric pain rating scale”. Patient was requested to make three pain readings equivalent to “present, best and worst pain” experienced immediately after the operation upto 24 hours. The patients 24 hours pain score was calculated using the average of three readings. Patients were instructed to indicate the severity of discomfort on range of “0 (no pain) to 10 (worst pain imaginable)”.

Clinical criteria used to define acute cholecystitis are pain in the Right upper quadrant, tenderness in right hypochondrium (Murphy's sign), and fever (temperature >100 degrees F), whereas sonological findings show Cholelithiasis (presence of stone- single /multiple/ biliary sludge), wall thickening (>3



mm), sonographic Murphy's Sign, peri-cholecystic fluid. Subjects were categorized into two groups as 'early group' and 'delayed group' each with n=34 patients depending on the “length of time from presentation to surgery”. Intervention of cholecystectomy within 3 days of the presentation was defined as “early laparoscopic cholecystectomy (early group)” and anywhere after 3 to 7 days was considered as delayed laparoscopic cholecystectomy (delayed group). Data were collected and entered into a Microsoft excel sheet. Using the SPSS IBM 20 version categorical variables were evaluated in terms of frequency and percentages, and the distribution was illustrated using pie charts. Independent sample T test and Mann Whitney u test were used to find the significant difference between the groups. P value less than 0.05 was taken to be significant.

Results

Age distribution

The mean age of the “early and delayed group” patients was 46.64±12.76 years and 44.76±12.18 years respectively. The patients of both groups were categorized according to age groups such as 18-32, 33-46 years, and 47-60 years. Most of the participants in the “early and delayed groups” were belonging to the 46-60 year's age group (44% and 60% respectively)(table.1)

Table 1. Distribution of subjects according to age categories

Age (years)	Early group		Delayed group	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
18-32	6	18	7	20
32-46	13	38	7	20
46-60	15	44	20	60

Gender distribution

In the early group, females were predominantly present (74% vs 26%) whereas, in the delayed group males were predominantly present (68% vs 32%) (fig 1).

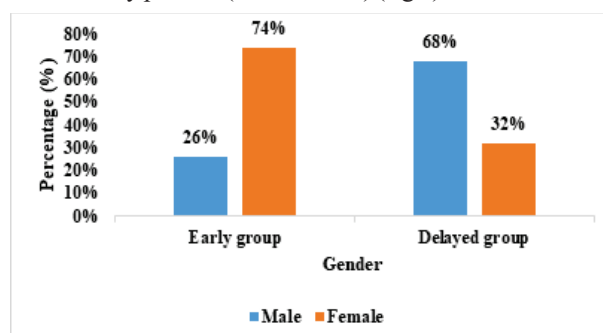


Fig 1. Distribution of subjects according to gender

Duration of surgery (DS)

The mean DS in the “early group and the delayed group” was 66.47 ± 10.19 min and 70.44 ± 15.39 min respectively. There was no statistically significant difference in DS when compared amongst the groups ($P=0.214$) (table 2).

Table 2. Comparison of duration of surgery

Group	Duration of surgery (min)		T value	P value
	Mean	SD		
Early	66.47	10.190	1.254	0.214
Delayed	70.44	15.392		

Duration of hospital stay (DHS)

A significant difference in DHS was observed when compared between the groups (4.78 ± 1.44 days vs 7.44 ± 1.21 days, $P=0.00968$) (table 3).

Table 3. Comparison of duration of hospital stay

Group	Duration of Hospital stay (days)		T value	P value
	Mean	SD		
Early	4.78	1.447	6.210	0.00968
Delayed	7.44	1.211		

Return of full activity (RFA)

In early group patients, the mean duration required for RFA was significantly less compared to delayed group patients (15.82 ± 2.48 days vs 16.97 ± 2.05 days $P=0.042$) (table 4 and fig. 2).

Table 4. Comparison of return of full activity

Group	Return of full activity (days)		T value	P-value
	Mean	SD		
Early	15.82	2.48	2.078	0.042
Delayed	16.97	2.05		

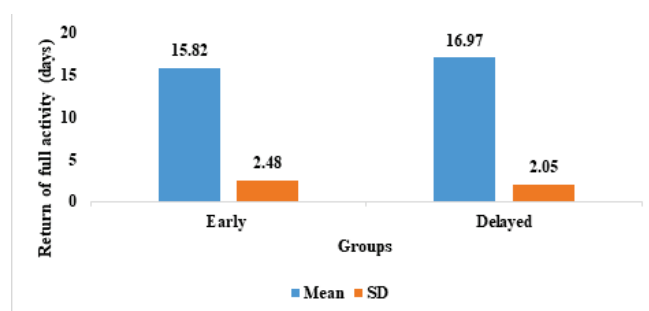


Figure 2. Distribution of return of full activity

The mean pain scale score was significantly more in “delayed group patients” (6.08 ± 0.75) than in “early group patients” (4.823 ± 0.96) ($P=0.027$) (table 5).

No incidence of conversion to open cholecystectomy was found in both the groups.

Table 5. Comparison of pain scale

Group	Pain scale		T value	P value
	Mean	SD		
Early	4.823	0.968	4.106	0.0273
Delayed	6.08	0.753		

Discussion

The study aimed at performing a differentiation between early and delayed laparoscopic cholecystectomy for acute cholecystitis in patients aged between 18 to 60 years. The significant findings of the study were the subjects treated with early laparoscopic cholecystectomy had lower hospital stay ($P=0.00968$) and postoperative pain scores ($P=0.027$) compared to a patient with delayed laparoscopic cholecystectomy. Moreover, in early group subjects, the postoperative RFA was rapid compared to delayed group subjects (15.82 ± 2.48 days vs 16.97 ± 2.05 days $P=0.042$). These findings suggested that early laparoscopic cholecystectomy has fewer postoperative complications compared to delayed laparoscopic cholecystectomy. This suggests that the prevalence of acute cholecystitis is more in subjects ≥ 46 years of age. Moreover, out of 68 patients, 36 were female similarly, Lal S. et al. and Rather ZM also depicted female predominance. [10] The mean DS in early group patients was less (66.47 ± 10.19 min) than in delayed group patients (70.44 ± 15.39) however, the difference was statistically insignificant ($P > 0.05$). The difference in the results may be due to the difference in inclusion criteria, type

of the study, or surgeon-associated factor. In this study no incidence of complications such as bile leak, bile duct injury, and complication associated open procedure in any patients of either group. The strength of the study was the appropriate sample size and uniform application of protocol. The study showed that early intervention was better than delayed surgery in terms of duration of surgery, duration of hospital stay, return of full activity, and pain. The limitations of the study were the investigator was not blinded during data collection, and the study was single centered, all together could have led to some bias. The other important limitation such as operation expenditure was not assessed in this study. Randomization was not performed due to the inadequate sample size. Further, a blind randomized study with an adequate sample size is required to approve the present study discoveries. Moreover, considering the variability in the incidence of complications in literature, we assume that there might be a correlation between the surgeon's experience and the incidence of complications that need to be evaluated.

Conclusion

The time required for surgery In laparoscopic cholecyst ectomy for acute cholecyst is, the duration of surgery was less in the early group than the delayed group. Also, the duration of hospital stay was notably more in the delayed group compared to early group patients. The time required to return to full normal activity was significantly less in early group subjects than in delayed group subjects. The mean pain scale score was significantly more in the delayed group patient. No incidence of postoperative complications was seen in either group. Thus, we can conclude that early laparoscopic cholecystectomy was better than delayed laparoscopic cholecystectomy.

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