

Outcome of early vs delayed laparoscopic cholecystectomy in patients with acute cholecystitis

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Abstract

Background Laparoscopic cholecystectomy, a common surgical procedure for treatment of acute cholecystitis But the time at which the procedure laparoscopic cholecystectomy, is suppose to be done, that is within a week (early) or after 6 weeks (delayed) remains a controversy. Thus this study was planned to assess the outcome of early vs delayed laparoscopic cholecystectomy among patients with acute cholecystitis. **Methods:** A comparative cross sectional study was conducted from June 2014 to May 2015 in Department of Surgery, Siddhartha Medical Collage. Patients who underwent early laparoscopic cholecystectomy (n=39) and delayed laparoscopic cholecystectomy (n=41) were included in group A and group B, respectively. Outcome measures included were post operative pain score, conversion rate and duration of hospital stay. Data was analyzed using SPSS 17 and independent sample t test and Z test were used. p values of <0.05 was considered as significant. **Results:** Majority of participants (40%) belongs to fourth decade of life and 82.5% were females. Gall stones were common in both groups. Conversion rate was 10.3% and 4.9% in group A and group B, respectively. There was no difference in post operative pain score between both the groups. Duration of hospital stay in group A and group B was 3.81 ± 1.8 and 5.53 ± 2.71 with significant p value (0.0031). **Conclusion** Both early and delayed laparoscopic cholecystectomy is safe in the treatment of acute cholecystitis and there is no difference in the pain score but duration of hospital stay was less in early laparoscopic cholecystectomy group.

Key Word: Early, delayed, Laparoscopic cholecystectomy, Acute cholecystitis

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INTRODUCTION

Digestive tract disorders are common illnesses encountered in medical practice. Among that Biliary diseases constitute a major portion. Cholelithiasis, a prominent biliary tract disorder, causes general ill health and usually requires surgical intervention for complete cure¹. Gallstone disease is three times more common in

women than men. Also with increasing age, prevalence increases from 4% in the third decade of life to 27% in the seventh decade of life². Approximately 20% of patients with gallstones are symptomatic³. Of the asymptomatic cases, 1-2% of cases develop biliary symptoms and cholecystitis every year and once symptomatic these individuals have a 50% chance of having their next attack within one year⁴. One of the major complications of gall stones is acute cholecystitis. For the treatment of acute cholecytitis, non operative methods are inadequate for a large proportion of gallstone patients and cannot promise a permanent cure from gallstone disease⁵. Hence, cholecystectomy remains the standard treatment of choice for gallstone disease. Though, open cholecystectomy remains the gold standard for symptomatic cholelithiasis for over a century, the introduction of laparoscopic technique to perform cholecystectomy has revolutionized this procedure⁶. The first laparoscopic cholecystectomy was

performed in 1985 by Muhe^{5,7}. Laparoscopic cholecystectomy was thus performed as an elective procedure with advantages of shorter recovery time, decreased expense, less postoperative pain, and improved cosmesis⁷. Laparoscopic cholecystectomy for acute cholecystitis has still not become routine because the timing of the surgical management in patients with acute cholecystitis is still a matter of controversy⁸. Early cholecystectomy is the optimal treatment for acute cholecystitis using established optimal surgical treatment for each grade of severity. Several studies have shown that early laparoscopic cholecystectomy conducted within one week, after the onset of symptoms is usually associated with advantages such as reduced hospital stay, sick leave, and health care expenditures and no disadvantages with regard to mortality and morbidity⁹. Early diagnosis and treatment of patients with acute cholecystitis reduce both mortality and morbidity and the accurate diagnosis requires specific diagnostic criteria of clinical data and imaging studies¹⁰. The typical ultrasound image of acute cholecystitis demonstrates gallbladder swelling, wall thickening with sonolucent layers, massive debris, and the stone impaction in the cystic duct¹¹. Also several studies have concluded that cholecystectomy for acute cholecystitis should be carried out within one week of onset of symptoms^{12,13} with an advantage to decrease the morbidity and mortality of patients due to complications who would otherwise need repeated admissions for recurrent symptoms. This prospective randomized study was undertaken to evaluate the operative findings, post operative pain, complications and duration of hospital stay of laparoscopic cholecystectomy for acute cholecystitis and compare the results with those of delayed cholecystectomy.

MATERIALS AND METHODS

A hospital based cross sectional comparative study was done among patients diagnosed with acute cholecystitis, requiring laparoscopic cholecystectomy, in department of Surgery in Siddhartha Medical College, Tumkur. The study was conducted during June 2014 to May 2015. This study was approved by Institutional Ethics Committee. Written informed consent was obtained from the study participants before conducting the study. Participants who underwent early laparoscopic cholecystectomy were included in group A (n=39) and delayed laparoscopic cholecystectomy were included in group B (n=41). Comparison of operative findings, pain scores and complications during post operative period and duration of hospital stay in both group A and group B, were considered as the outcome measures. Diagnosis of acute cholecystitis¹⁴ was made based on acute upper

abdominal pain with tenderness under the right costal margin; fever more than 37.5 C, leukocytosis more than 10 X 10⁹/L, or both; and ultrasonographic evidence (thickened gallbladder wall, edematous gallbladder wall, presence of gallstones, ultrasonographic Murphy's sign, and pericholecystic fluid collection). Patients with acute cholecystitis, who underwent laparoscopic cholecystectomy within one week of onset of symptoms, were included in group A (early) and patients with acute cholecystitis, who underwent cholecystectomy after six weeks of onset of symptoms were included in group B (delayed). Postoperative pain measured by Visual Analog Scale (VAS) was used for assessing the pain. Other outcome measures included in this study were operative findings, postoperative complications and hospital stay duration.

Exclusion criteria

Patients with previous history of upper abdominal surgeries, pregnancy, peritonitis, patients not willing to participate in the study and patients with other systemic diseases were excluded from the study.

Statistical analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS 16). All descriptive data were described in frequency, percentage, mean and standard deviation. The significant difference in proportion and mean between the two groups was tested using Z test and independent sample t test, respectively. Statistical testing was undertaken considering p values <0.05, as significant.

OBSERVATIONS AND RESULTS

In this study a total of 80 patients who underwent laparoscopic cholecystectomy were included. Among them 39 patients were treated with early laproscopic cholecystectomy (Group A) and 41 patients underwent delayed laparoscopic cholecystectomy (Group B). Among them majority of them (40%) were in the age group of 41-50 years of age followed by 31.2%, 15% and 13.8% of patients belongs to age group 31-40 years, 51-60 years and ≤ 30 years, respectively. Group wise distribution of patient's age is shown in the table 1. Mean age of the study participants was 41.46±9.78 years with 40.23±9.31 years in group A and 42.7±10.25 years in group B. Majority of the patients were females in this study (82.5%) with 79.5% and 85.4% in group A and group B, respectively, whereas 17.5% were males with 20.5% and 14.6% in group A and group B, respectively.

Table 1: Group wise distribution of age and sex of the patients

Variable	Group A (N=39)	Group B (N=41)
Age group		
≤ 30 years	6 (15.4)	5 (12.2)
31-40 years	11 (28.2)	14 (34.1)
41-50 years	17 (43.6)	15 (36.6)
51-60 years	5 (12.8)	7 (17.1)
Mean Age ± SD	40.23±9.31	42.7±10.25
Sex		
Female	31 (79.5)	35 (85.4)
Male	8 (20.5)	6 (14.6)

Most common operative finding reported in this study was presence of gall stone in 97.4% and 97.6% of cases in group A and group B respectively. Severe adhesions were reported in 28.25 and 56.1% of cases in group A and group B, respectively. Tensely distended gall bladder was seen in 84.6% and 41.5% of cases in group A and group B, respectively and whereas contracted gall bladder was seen only in group B, in 22% of cases. Perforated gall bladder and pus in gall bladder was reported in 5.1% and 71.8% of cases in group A, respectively and similarly in 2.4% and 36.6% of cases in group B, respectively. The proportion of cases with the operative findings like severe adhesions, tensely distended gall bladder and pus or turbid fluid collection in gall bladder, in both the group A and group B were found to be statistically significant. (Table 2)

Table 2: Proportion of operative findings in both groups

Operative findings	Group A (N=39)	Group B (N=41)	P value
Severe adhesions	11 (28.2)	23 (56.1)	0.0122*
Tensely distended Gall bladder	33 (84.6)	17 (41.5)	0.0001*
Contracted gall bladder	0	9 (22)	-
Perforated gall bladder	2 (5.1)	1 (2.4)	0.526
Pus/Turbid bile in gall bladder	28 (71.8)	15 (36.6)	0.0017*
Presence of gall stones	38 (97.4)	40 (97.6)	0.9546

*Significant

Among 80 cases, in six cases the laparoscopic cholecystectomy was converted into open cholecystectomy, during the surgery. The reasons for conversion of laparoscopic cholecystectomy into open cholecystectomy were common bile duct injury, excessive bleeding and frozen calot's triangle in 3.8%, 1.3% and 2.5% of cases, respectively. Overall conversion rate was reported as 7.5% with 10.3% in group A and 4.9% in group B. Group wise distribution of cases with reasons for conversion is given in the Figure 1.

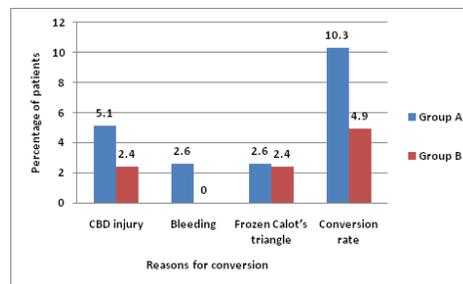


Figure 1: Reasons for conversion from laparoscopic to open cholecystectomy

Pain score was assessed during the post operative period at 6, 12, 24 and 48 hours in both groups and it was reported as 7.51±1.53, 6.28±1.61, 4.34±1.26 and 2.42±0.87, respectively in group A and similarly in group B it was reported as 7.28±1.31, 6.1±1.23, 3.96±1.11 and 2.33±0.94, respectively. Also the number of injection tramadol doses given to group A cases and group B cases was reported as 3.21±1.16 and 3.53±1.04, respectively. There was no statistical significance between pain scores in group A and group B, shown in table 3.

Table 3: Post operative pain scores in both groups

Pain score at	Group A (N=39)	Group B (N=41)	P value
6 hrs	7.51±1.53	7.28±1.31	0.4716
12 hrs	6.28±1.61	6.1±1.23	0.5746
24 hrs	4.34±1.26	3.96±1.11	0.1558
48 hrs	2.42±0.87	2.33±0.94	0.651
Tramadol injection (No. of doses)	3.21±1.16	3.53±1.04	0.1973

Overall post operative complication was found to be 7.7% and 7.3% in group A and group B, respectively. Among the post operative complications, wound infection was common in 3.8% of cases with 2.6% in group A and 4.9% in group B, followed by cholangitis, bile leak and ileus which contribute 1.3% of complications, each. In group A, cholangitis and bile leak was reported by one patient each where as ileus was reported by one case in group B. In this study, 30% of the patients stayed in the hospital for 5-6 days followed by 25%, 23.8% and 21.2% of patients stays in the hospital for 3-4 days, 1-2 days and >6 days, respectively. Group wise distribution of duration of hospital stay is shown in the table 4. Mean duration of hospital stay was reported as 4.67±2.26 days and in group A and group B was reported as 3.81±1.8 days and 5.53±2.71 days, respectively, which is also found to be statistically significant (p value 0.0031).

Table 4: Duration of hospital stay in both groups

Hospital stay (days)	Group A (N=39)	Group B (N=41)	P value
1-2 days	15 (38.5)	4 (9.8)	-
3-4 days	11 (28.2)	9 (22)	-
5-6 days	7 (17.9)	17 (41.5)	-
> 6 days	6 (15.4)	11 (26.8)	-
Mean \pm SD	3.81 \pm 1.8	5.53 \pm 2.71	0.0031*

*Significant

DISCUSSION

In our study, there were 17.5% males and 82.5% females, which are slightly more in females as compared to the study done by Holzbach *et al*¹⁵, which showed gallstones to be twice more common in females than males. The rate is higher in our study possibly due to consumption of diet high in fat content, sedentary life style and prevalence of the disease in our country in addition to other factors.

Pain score

In this study, pain score was assessed during the post operative period at 6, 12, 24 and 48 hours in both groups and it was reported as 7.51 \pm 1.53, 6.28 \pm 1.61, 4.34 \pm 1.26 and 2.42 \pm 0.87, respectively in group A and similarly in group B it was reported as 7.28 \pm 1.31, 6.1 \pm 1.23, 3.96 \pm 1.11 and 2.33 \pm 0.94, respectively. Also there was no statistical significance between pain scores in group A and group B. (p=0.4716, p=0.5746, p=0.1558, p=0.651, p=0.1973). This is comparable with the study done by, Yadav *et al*¹⁶ reported that statistical analysis showed that there were no difference in severity of pain between the early successful group and delayed successful group of patients at 6 hrs, 12hrs, 24hrs, 48hrs and injection tramadol. (p=0.695, p=0.890, p=0.373, p=0.857, and p= 0.431).

Conversion Rate

Overall conversion rate of laparoscopic cholecystectomy into open cholecystectomy was reported as 7.5% with 10.3% in group A and 4.9% in group B, in this study. In various other studies, the conversion rate among patients undergoing laparoscopic cholecystectomy for acute cholecystitis ranged from 6% to 35%¹⁷⁻¹⁹. Most surgeons agree that the timing of the procedure is an important factor in determining the outcome^{17,19}. In a study conducted in Hong Kong, it was reported that the overall conversion rate was reported as 13.5%. Two patients in the early group and five in the delayed group required conversion to open surgery (7.4% vs. 20.0%; p > 0.1). Also they reported that the most common reason for conversion was difficulty in exposing the gallbladder and dissection because of severe adhesions, cholecystoduodenal fistula and bile leakage from accessory cystic duct¹⁷.

Operative findings

Proportion of cases with severe adhesions, contracted gall bladder and presence of gall stones were comparatively high in delayed laparoscopic cholecystectomy group. Whereas the proportion of cases with tensely distended gall bladder, perforated gall bladder and gall bladder with pus or turbid fluid was comparably high in early laparoscopic cholecystectomy group. The operative findings like severe adhesions (p=0.0122), tensely distended gall bladder (p=0.0001) and pus or turbid fluid collection in gall bladder (p=0.0017) were found to be statistically significant. This is comparable with the study done by Chung Mau Lo *et al*, reported in the early group, the gallbladders were more often tensely distended (p <0.001) and filled with turbid bile or pus (p < 0.001)¹⁷.

Post operative complications

Overall post operative complication was found to be 7.7% and 7.3% in group A and group B, respectively. Among that wound infection was the most common complication followed by cholangitis, bile leak and ileus. This is comparable with the study done by Jamil *et al*²⁰ reported that in their study post-operative complications were 9.43% in early and 8% in delayed group (p=0.09). Cholangitis, hematoma and bile leak were more common in early and ileus in delayed group.

Hospital stay

In this study, mean duration of hospital stay was reported as 4.67 \pm 2.26 days and in group A and group B was reported as 3.81 \pm 1.8 days and 5.53 \pm 2.71 days, respectively, which is also found to be statistically significant. (p value 0.0031). Whereas in a study done by Heikki *et al*²¹ reported mean duration of stay in early laparoscopic cholecystectomy group and delayed laparoscopic cholecystectomy group as 10.7 \pm 4.9 and 18.2 \pm 8.6, respectively, with a significant p value (<0.001). In another study, it was reported that hospital stay was 3.47 \pm 1.40 days in early and 6.2 \pm 1.36 in delayed group, significantly higher in delayed group (p=0.01)²¹.

CONCLUSION

Both early laparoscopic cholecystectomy and delayed laparoscopic cholecystectomy is safe in the treatment of acute cholecystitis and there is no difference in the post operative pain score and complications in both the groups. In early laparoscopic cholecystectomy though the proportion of cases with distended gall bladder and pus or turbid fluid filled gall bladder are comparatively higher than delayed laparoscopic cholecystectomy cases, the early laparoscopic cholecystectomy offers comparatively lesser duration of hospital stay than delayed laparoscopic cholecystectomy. Thus this

reduction in hospital stay may be a major economic benefit to the patients of a low socio economic status.

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