

ORIGINAL ARTICLE

EARLY VERSUS DELAYED LAPAROSCOPIC CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS

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Background: Laparoscopic cholecystectomy is considered the gold standard for the management of acute cholecystitis but controversy surrounds the timings of the surgery. Studies are available favouring both early and delayed laparoscopic cholecystectomy. The objective of this study was to compare early versus delayed laparoscopic cholecystectomy for acute cholecystitis. **Methods:** This quasi-experimental study included 180 patients irrespective of their age and sex presented at department of Surgery, Lahore General Hospital between January to December 2014 with a diagnosis of acute cholecystitis were assigned randomly to early laparoscopic cholecystectomy within 24 h of admission or to initial conservative treatment followed by delayed laparoscopic cholecystectomy, 6–12 weeks later. **Results:** The mean operating time was 64.32 min vs. 58.24 min in the delayed group, conversion rate (early 15.5% vs. delayed 14.4%). The mean postoperative hospital stay was 1.67 days in the earlier group and 4.38 days in the delayed group. Overall mortality was zero. **Conclusion:** Early laparoscopic cholecystectomy for acute cholecystitis is safe, offering economic benefit of much shorter hospital stay and quick recovery.

Keywords: Acute cholecystitis; Laparoscopic cholecystectomy; Early cholecystectomy

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INTRODUCTION

In the developmental stages of laparoscopic cholecystectomy, acute cholecystitis was considered a contraindication for the procedure. With the increasing experience in laparoscopic surgery, a number of centres have reported the use of laparoscopic cholecystectomy for acute cholecystitis, suggesting that it is technically feasible and safe.^{1–3} Early surgery for acute cholecystitis gained popularity in the late 1980s.⁴ Laparoscopic cholecystectomy is the most common laparoscopic surgery performed in the world. The traditional treatment (initial) of acute cholecystitis includes bowel rest, intravenous hydration, and correction of electrolyte abnormalities, analgesia, and intravenous antibiotics. Following this treatment, patients with uncomplicated disease are managed on outpatient basis and are called for laparoscopic cholecystectomy after a period of 6–8 weeks.⁵

Early open cholecystectomy had been established as the preferred treatment of acute cholecystitis to reduce morbidity, mortality and the total hospital stay.⁶ Although widely discussed in the past, unequivocal evidence exists supporting the superiority of early laparoscopic cholecystectomy within 72 hours over delayed laparoscopic cholecystectomy with respect to outcome and the cost of treatment.⁷ This trend was confirmed in a recently published randomised study in patients managed within 24 hours of admission. Cholecystectomy however, may not always be possible within 24 hours of admission for certain reasons. In such cases, surgery should be performed within 72 hours as recommended in several guidelines. Delayed cholecystectomy

potentially increases the chances of further gallstone related complications during the waiting interval and thus additional hospital admission on recent evaluation has indicated early laparoscopic cholecystectomy to be safe option in acute cholecystitis.^{8–11}

Very few studies demonstrate the feasibility of laparoscopic cholecystectomy for acute cholecystitis. However, most surgeons prefer to delay surgery in acute phase. The aim of this study is to compare early and delayed laparoscopic cholecystectomy in the treatment of acute cholecystitis.

MATERIAL AND METHODS

This quasi experimental study included 180 patients, irrespective of their age and sex, presenting through the surgical emergency and outpatient department of Lahore General Hospital from 1st March to 1st December 2014. Diagnosis of acute cholecystitis was based on the following four diagnostic criteria: acute upper abdominal pain with tenderness under the right costal margin, fever more than 37.5 °C, leucocytosis more than 10,500/mm, and ultra-sonographic evidence of acute cholecystitis (thickened gallbladder wall, oedematous). In the early group laparoscopic cholecystectomy was performed within 72 hours of admission whereas in the delayed group, laparoscopic cholecystectomy was done after 6–8 weeks after the acute episode had subsided. Patients were assigned to two groups. Informed consent was obtained from every patient in writing. Patients with coexisting common bile duct stones, biliary pancreatitis, upper abdominal surgery or significant medical disease rendering unfit for the laparoscopic surgery were excluded.

All the surgeries were performed by a single consultant to reduce the bias related to surgical hand. Laparoscopic cholecystectomy was performed using a standard 4 port technique. Modifications were used in the surgical technique in both groups which varied case to case like using gallbladder decompression, retrieval bag, placement of sub hepatic drain, and use of 5th port. Statistical analysis was performed using paired t-test and the chi square test. SPSS version 17 was used to determine the *p*-value (*p*-value less than 0.05 was considered significant). Chi-square/Fisher's exact test was applied to compare categorical data. Parameters such as conversion rates, average hospital stay, post-operative complications and operation time were assessed.

RESULTS

During the study period, a total of 180 patients were evaluated, 90 patients in the early group and 90 patients in the delayed group. The mean operating time was 64.32 min vs. 58.24 min in the delayed group.

In the early group 14 (15.5%) of the patients underwent conversion to open surgery versus 14.4% in the delayed group. The main reasons for conversion in our study was distorted, unclear obscure Callots triangle, multiple dense adhesions all around the Callots triangle and with the surrounding structures, making dissection difficult and posing risk of bile duct injury in case of delayed cholecystectomy and difficulty in securing haemostasis.

There were no deaths in either group, the overall mortality was zero. The mean duration of post-operative analgesic requirement was 3.1±0.82 days in the earlier group and 4.2±1.24 days in the delayed group (*p*-value=0.0001). The mean postoperative hospital stay was 1.67±0.89 days in the earlier group and 4.38±1.48 days in the delayed group (*p*-value=0.0001)

Table-1. Per-operative comparison of early vs. delayed (n=180)

	Early (n=90)	Delayed (n=90)	<i>p</i> -value
Adhesions	24 (26.6%)	38 (42.2%)	0.028*
Required decompression	40 (44.4%)	9 (10%)	0.000*
Drain placement	30 (33.3%)	38 (42.2%)	0.22
Use of 5 th port	0 (0%)	2 (2.2%)	0.49

* statistically significant at 5% level

Table-2: Operative complications (n=180)

Intraoperative complications	Early (n=90)	Delayed (n=90)	<i>p</i> -value
Bile leak	6 (6.6%)	8 (8.9%)	0.78
CBD injury	0 (0%)	1 (3.3%)	0.43
Conversion rate	14 (15.5%)	13 (14.4%)	1.00
Postoperative complications			
Wound infection	8 (8.8%)	11 (12.2%)	0.62
sub hepatic collection	7 (7.7%)	10 (11.1%)	0.61
Chest infection	2 (2.2%)	1 (1.1%)	0.82
Retained CBD stones	2 (4.4%)	1 (3.3%)	0.73

DISCUSSION

Acute cholecystitis is the most commonly encountered entity in the hepatobiliary system and cholecystectomy is the commonest surgical intervention.⁵ Several randomised clinical trials of comparisons of early laparoscopic cholecystectomy (ELC, performed within 7 days of onset of symptoms) with delayed laparoscopic cholecystectomy (DLC, performed at least 6 weeks after the symptoms occurred) show that ELC could get more benefits in hospital stay and equally the same level of clinical safety, comparing with DLC. Successful laparoscopic cholecystectomy during the period of acute inflammation is associated with an early recovery and shorter hospital stay. With improvement in instrument, technique, expertise, the number of reports on laparoscopic cholecystectomy for acute cholecystitis has increased with the conversion rates ranging from 6.5–35%.^{12–14}

Laparoscopic cholecystectomy (LC) performed within 24 hours of admission was shown to be superior to delayed LC with regard to outcome. The authors concluded that immediate LC should become the treatment of choice for operable patients with acute cholecystitis. Kolla *et al* mentioned several key points that should be considered when performing laparoscopic cholecystectomy, which includes decompression of the gall bladder allowing better grasping and retraction. In our study decompression was required in 44.4% of the earlier group, whereas in the afore mentioned study decompression was required for 80% of the cases.¹⁵

Most surgeons agree that the timing of the procedure is an important factor in determining the outcome. Ideally the surgery should be performed with in the “golden 72 hour” from the onset of symptoms has been suggested. Such early surgery is not always possible because of logistic difficulty in performing surgery for such patients on emergency basis. Surgery for acute cholecystitis could be time critical.^{16–19} According to Zhu *et al*²⁰ Gallbladder inflammation during the first 72 h of onset of symptoms may not involve structures within the triangle of Callot. Surgical dissection within this critical period therefore appears easiest due to the lack of organised adhesions. Cholecystectomy within this timeframe reduces the risk of injury to the structures within the Callots triangle. This can be seen in low rates of complication and conversions. The mean operating time was 64.32 min vs. 58.24 min in the delayed group, the difference in time was statistically significant (*p*-value). Study done by Agarwal²¹ reports mean operating time for early 69.4 min versus 66.4 min for delayed group whereas another prospective randomised trial by Verma²² duration of surgery was 65.78 min vs. 56.83

mins in delayed group. Kolla *et al*¹⁵ showed that, the mean operating time was 104 min in the early group and 93 min in the delayed group.

The overall complication rate in early group was 23.3% vs. 36.7% in the delayed group. This difference was statistically not significant contrary to that reported by Johansson *et al*⁴ (18% vs. 8%) and Kolla *et al* (20% versus 15%). Study by Lai *et al*¹⁸ showed no difference in the complication rate between the two groups (9% versus 8%). However, it is comparable with the other two prospective controlled studies by Lo *et al*⁸ (29%) and Gonzalez-Rodriguez *et al*²³ (17.7%) had shown significantly higher complication in the delayed group than in the early group. There were no major complications. Only one case of bile duct injury in the delayed group which was due to the obscure, unclear Callots triangle anatomy and delay in timely conversion to open cholecystectomy which suggests that early laparoscopic cholecystectomy is a safe procedure.

In our study the conversion rate was seen to be 15.5% in early vs. 14.4% in delayed group which can also be seen in recently published Agrawal *et al* study where the conversion rate was 16% in early, due to dense adhesions all around, unclear and obscured callots triangle anatomy. The conversion rates in most of the studies lie in acceptable range and are comparable to our study. Waiting for the inflamed gallbladder to cool down allows maturation of the surrounding inflammation and results in the organisation of the adhesions, leading to scarring and contraction which makes the dissection more difficult.

There was significant difference in hospital stay between both the groups. The total hospital stay was significantly less for the early group than the delayed group in our study which is consistent with other studies, which has also been reported by many other studies. There is a socioeconomic advantage as well as prevention of recurrent attacks and the complications during the waiting period. The postoperative pain scores and analgesia requirements were similar in the two groups.

The strengths of our study are that quality of data collected was good owing to rigours applied to it. The weaknesses are a non-randomized design and lack of collection of data on many independent variables. However, the outcome results may be useful.

CONCLUSION

In conclusion, early laparoscopic cholecystectomy is safe and feasible for acute cholecystitis and is associated with fewer intraoperative and postoperative complications much shorter hospital stay, quick recovery (earlier return to work), which offers a major economic benefit to the health care system especially in our country by significant

reduction of postoperative hospitalization and treatment cost. We therefore suggest that laparoscopic cholecystectomy be performed within 72 hours of admission.

AUTHORS' CONTRIBUTION

SK: Ethics submission, conception of the study, analysing, integrating and interpretation of results, writing the paper. ZI: Critical view of the manuscript. AAB: Conception of the study

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