

A comparison of the outcome between acute open and acute laparoscopic cholecystectomy

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Abstract

Background: Laparoscopic cholecystectomy (LC) is now used in the management of acute cholecystitis, but still at the expense of a high conversion rate. The aim of this study was to evaluate the role of LC in acute cholecystitis and compare it to acute open cholecystectomy (OC) in terms of complications, conversion rate, hospital stay and operation time.

Methods: 94 patients with acute cystitis were admitted to the Emergency Department and non-randomly were divided into acute LC (n=46) and OC (n=48).

Results: The mean of hospital stay was 3.4 and 5.4 days in acute LC and OC groups, respectively. There was a statistically significant difference between acute LC and OC in terms of hospital stay. The operation time mean was 58.8 and 53.2 minutes in acute LC and OC, respectively. Conversion occurred in 7 patients (15.2%) in the acute LC group. Major complications occurred in two patients (5.1%) in acute LC and five patients (10.4%) in OC.

Conclusion: In patients with acute LC, there was a decreased hospital and post-operative stay and major complications compared with OC. Laparoscopy appears to be a good approach and the first choice for emergency cholecystectomy in patients with acute cholecystitis.

Keywords: Acute cholecystitis; Open cholecystectomy; Laparoscopic cholecystectomy

Introduction

Laparoscopic cholecystectomy (LC) is now the procedure of choice for elective treatment of cholelithiasis. The benefits of open cholecystectomy (OC) have been substantiated in a number of prospective, randomized clinical trials, showing that the early-operation strategy is associated with a shorter hospital stay without added morbidity compared to delayed elective cholecystectomy for acute cholecystitis.^{1,2} Originally, LC for acute cholecystitis reported with high complication rates was mainly the result of distorted anatomy caused by the acute inflammation, edema and adhesions. Also LC was considered to pose certain technical challenges for the

surgeon and potential risks to the patient, and was, therefore, considered contraindicated.³⁻⁵ However, with growing experience and greater technical skills, surgeons realized that these obstacles could be properly managed.^{6,7} LC for acute cholecystitis is successful, safe and cost effective.⁸⁻¹⁰ Consequently, an expanding number of reports became available demonstrating the feasibility of the laparoscopic approach for acute cholecystitis with an acceptable morbidity but still at the expense of a high conversion rate.^{4,5,8,10-12} We believe that LC should be compared with OC in acute cholecystitis. The aims of this study were to compare the morbidity, mortality, operation time and hospital stay of acute LC and OC in patients with acute cystitis.

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Materials and Methods

This study was carried out between October 2003 and June 2006, and included 94 patients. These patients

with acute cholecystitis were admitted to the Emergency Department of Shafieeh Hospital affiliated to Zanjan University of Medical Sciences with a diagnosis of acute cholecystitis. The diagnosis was based on the findings of acute right upper quadrant tenderness, fever and/or leukocytosis and ultrasound evidence of acute cholecystitis. Patients were excluded if they had bilirubin greater than 3.5 mg/dl or alkaline phosphates greater than 250 (UL); if they suffered from choledocholithiasis, biliary pancreatitis; if they could not understand the information regarding the study; if they were elderly (>90 years) or if they had symptoms for more than 1 week. Written informed consent was obtained from all patients prior to their enrollment in the trial. The study protocol was approved by the Ethics Committee at the Medical Faculty of Zanjan University of Medical Sciences. Patients with acute cholecystitis were non-randomly categorized into two groups. One group was managed with OC (n=48) and the other with acute LC (n=46) within 72 hours after admission but not later than 7 days after the onset of symptoms. The two groups received anti-analgesic (acetaminophen, pethidine) drugs, intravenous fluids and cephazolin (1 g/IV, every 6 hours). The operations were performed, using standard 4-puncture technique for acute LC group. Port incision was enlarged to extract the specimen. Closed suction drains were placed in the sub-hepatic space for most patients whenever considered necessary. Resected gallbladders were sent for pathologic examination. The procedures were carried out by one surgeon.

Data were collected prospectively and included patients' demographics, medical history (cardiovascular and respiratory diseases, chronic renal failure and diabetes), laboratory results, operative findings, reasons for conversion, intraoperative complications, bile duct injury, hemorrhages, operating time (operation time was calculated in minutes from the time of incising the abdomen to the end of the last suture), postoperative complications, surgical infections (wound infection, prolonged fever, subphrenic or subhepatic abscess), respiratory infections, etc. The length of hospital stay was calculated as postoperative number of nights spent in the hospital. Significant differences were found, using the unpaired student t, Chi Square and Mann-Whitney U tests. P values less than 0.05 were considered significant. All analyses were performed using SPSS software (Version 11.5, IL, Chicago, USA).

Results

In this study, 94 patients underwent cholecystectomy. There were 77 females and 17 males (18.1%). The age range was 21-85 years with the average of 56.5 ± 15.9 . 46 patients (38 females, 8 males) were enrolled in acute LC group and 48 (39 female, 9 male) were enrolled in the OC group. No statistically significant difference was found between acute LC and OC in terms of age, sex, temperature, WBC count, and ultrasound finding. Conversion occurred in 7 patients (15.2%) in acute LC group. In patients with acute LC, four females (10.5%) out of 38 and three males (37.5%) out of 8 patients underwent conversion ($P < 0.054$). The causes of conversion to open cholecystectomy were cancer in 2 patients, suspect duodenal injury in 3 patients and difficult dissection in 2 patients. The mean of hospital stay was 3.4 and 5.4 days (median 3 vs. 5) in acute LC and OC, respectively ($p = 0.002$). The mean of post-operative stay was 1.9 and 3.3 days (median 1 vs. 3), respectively ($p = 0.022$). The results after excluding the converted cases are displayed in Table 1. There was no significant difference regarding associated disease and American Society of Anesthesiologists class (ASA class) III and IV in the two groups ($p = 0.66$) (Table 1). However, after excluding associated disease, hospital stay (in patients without associated disease, Table 2) reduced to 2.4 ± 1.1 and 4.9 ± 2.2 in patients with acute LC and OC, respectively ($p = 0.0005$). The mean time between admission and laparoscopy procedure in patients with acute LC was 1.6 ± 1.04 days.

The mean operation time was 58.8 and 53.2 minutes in ALC and OC, respectively ($p = 0.19$). The mean operation time after excluding converted cases was less than above (Table 1). The intra- and post-operative complications were presented in Table 3. Complications which needed longer post-operative stay or readmission for intervention (major complications) were observed in 2 patients in the acute LC group (5.1%) and in 5 (10.4%) in the OC group (severe wound infection in one patient) (Table 3). The complication in patients converting to open cholecystectomy was one case with hematoma.

Discussion

LC was first introduced for elective treatment of cholelithiasis. LC in patients with acute cholecystitis is technically demanding, but in the experienced

Table 1: Results of treatment after exclusion of the converted case.

Variables	ALC (n=39)	OC (n=48)	P-Value
Sex			
female	34	39	0.36
male	5	9	
Age (range)	54.6 (21 – 84)	59.9 (27-85)	0.38
Hospital stay (Mean, day)	2.84 (1-8)	5.39 (2 - 18)	0.005
Postoperative stay(day)	1.2 (0.29-6)	3.3 (1-11)	0.005
Operative time (minute)	49.85	53.2	0.21
ASA class I & II	30 (77%)	35 (73%)	
ASA class III & IV	9 (23%)	13 (27%)	0.66
Use of drain	33 (84.6%)	30 (62.5%)	0.022
Hydrops	2	2	-
Gangrenous cholecystitis	2	3	-
Mortality	0	1	-

n=Number, ALC=Acute laparoscopic cholecystectomy, OC=Open cholecystectomy, ASA=American Society of Anesthesiologists Class

Table 2: Associate disease in two groups (After excluded converted cases).

Variable	ALC (n=39)	OC (n=48)
Heart disease	4 (10.2%)	8 (16.6%)
Diabetic	2 (5.1%)	3 (6.2%)
Chronic renal failure	1 (2.5%)	-
COPD	2 (5.1%)	2 (4.1%)
Total	9 (23%)	13 (27%)

n=Number, ALC=Acute laparoscopic cholecystectomy, OC=Open cholecystectomy.

Table 3: Intra and post operative complications (After excluded converted cases).

Variable	ALC (n=39)	OC (n=48)
IOC:		
Hemorrhage	1	1
Liver damage	-	1
Cystic artery rupture	2	2
Gallbladder tearing	8	6
Colon tearing*	-	
bile duct transaction*	-	
POC:		
Wound infection*	-	3
Umbilical Wound Infection	2	-
Epigastric Wound Infection	4	-
Bile collection*	-	1
Missed stone*	1	-
Hematoma*	1	1
Epigastric trocar Pain	4	-
Umbilical trocar Pain	1	-
Shoulder pain	5	-
Incisional pain (OC)	-	9

IOC= Intra operative complications, POC= Post operative complications n= Number, ALC= Acute laparoscopic cholecystectomy, OC =Open cholecystectomy, *= major complications

hands it is a safe and an effective treatment. The results of this non-randomized, clinical study showed

that laparoscopic cholecystectomy could be performed successfully in most patients with acute

cholecystitis. Hospital and post-operation stay and major complication rates in acute LC were lower than OC with no increase in operation time. Hospital stay ($p=0.002$) and post-operation stay ($p=0.022$) in ALC were lower than in OC. After the exclusion of converted cases, the mean hospital and post-operation stay reduced in acute LC (Table 1). Kiviluoto et al. reported that the median of hospital stay was 4 days in acute LC and 6 days in OC.¹³ Eldar et al. reported that the median of post-operation stay was 3 days in acute LC.³ Gharaibeh et al. reported that the mean post-operation stay was 1.9 days in patients with acute LC.¹⁴ The associated disease and ASA class III or IV necessitated longer hospital stay because these patients required other treatments.

The mean time between admission and laparoscopy procedure in patients with acute LC was 1.6 ± 1.04 days. Tissue edema and hyperemia were the main problems in acute LC group. Basic et al. suggested that laparoscopic cholecystectomy should be carried out in the first 72 hours after the onset of symptoms.¹⁵ Early LC in relation to the onset of the gallbladder inflammation may reduce the conversion rate, complication rate, hospital stay and operation time.^{3,6} The mean operation time between acute LC and OC was not different significantly ($p=0.19$). Moreover, after excluding the converted patients in acute LC, the mean operation time between acute LC and OC was not different significantly ($p=0.21$). Eldar et al. reported the mean operation time in patients with acute LC was 60 minutes.³ Gharaibeh et al. reported the mean operation time in patients with acute LC was 74 minutes.¹⁴ Kiviluoto et al reported that the mean operation time was 108.2 minutes in the LC group and 99.8 minutes in the OC group.¹³ However, the operation time remained significantly longer for these procedures than for those performed with

the traditional method.¹⁶ However, in this study the mean operation time in patients with acute LC and OC was not different between the two groups.

Conversion occurred in 7 patients in acute LC group (15.2%). In other studies, it ranged from 6 to 35%.^{16,17} One study demonstrated 38.6% conversion rate for acute cholecystectomy which was significant for cornice cholecystitis (9.6%).¹⁷ Arnalson et al. reported that the conversion rate was 3.1% and 12.2% for elective LC and acute LC, respectively.¹⁰ The most common cause of conversion rate in patients with acute LC was difficult dissection of Calot's triangle which has been previously described.^{12,13,18} Conversion rate for males was higher than that for females, being similar to those in previous reports.^{14,19} Major complication rates were higher in patients with OC. Kiviluoto et al. reported that the morbidity rate in acute LC was lower than that in OC, showing the fact that LC was safe.¹³ Previous studies reported similar results.^{14,15} Mortality in this study was one patient in OC. Zackes et al. showed that the crude risk ratio comparing death risk in open cholecystectomy to that in LC was 5.00.²⁰ Shikata et al. reported that the combined risk difference of morbidity showed no differences between the open and laparoscopy procedures in acute cholecystitis.²¹ This study was a non-randomized clinical trial. So we recommend a randomized clinical study to perform LC for acute cholecystitis with more patients in multi-centers. The results of this study indicated that LC can decrease hospital and post-operation stay and major complications. Therefore, LC reduces the total cost of hospitalization and increases the patients' satisfaction. Laparoscopy appears to be a good approach and the first choice for emergency cholecystectomy in patients with acute cholecystitis.

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