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Early Laparoscopic Cholecystectomy in Acute Cholecystitis at Al-Kadhimiya Teaching Hospital

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Abstract

Background Despite the well-accepted success of laparoscopic cholecystectomy (LC) in the elective treatment of symptomatic gallstone, the safety and the efficacy of this technique has been subjected to some debate in the setting of acute cholecystitis (AC).

Objective To evaluate our institution's experience with early LC and to evaluate the safety and effectiveness of LC in the treatment of AC.

Methods Eighty nine patients were diagnosed as having AC based on the clinical, laboratory and ultrasound findings; 80 patients were divided randomly into two equal groups. Group 1 included 40 patients who had early LC for AC within one week from onset of the symptoms and group 2 included 40 patients who had late LC around 6 weeks from onset of symptoms as interval LC after conservative treatment.

Results No significant difference in the conversion rate (in early group 8 patients (20%) versus delayed group 6 patients (15%). Complication rate was insignificant (in early group 4 patients (10%) versus delayed group 3 patients (7.5%). The delayed group had a significantly shorter operative time (early group = 128±53.5 min versus delayed group = 107±50.1 min) and significantly shorter postoperative stay (early = 2.4±3.2 days versus delay = 1.4±1.4 days). The early group had a significantly shorter total hospital stay (early = 5.5±3.1 days versus delay = 8.5±4.5 days). The male gender had a significant higher conversion rate in both groups.

Conclusion Early LC can be performed safely in most patients with AC and it is considered as effective treatment, allows significantly shorter total hospital stay with no significant differences in conversion rate or complications compared with delayed LC, in the hands of a safe and well trained surgeon.

Keywords Early laparoscopic cholecystectomy, acute cholecystitis.

List of abbreviation: LC = laproscopic cholecystectomy, AC = acute cholecystitis, ACC = acute calculus cholecystitis, GB = gall bladder, BMI, body mass index

Introduction

Laparoscopic cholecystectomy (LC) became the gold standard treatment for symptomatic cholecystolithiasis, but the appropriate timing for LC in acute cholecystitis (AC) remains controversial [1,2]. Although a wide range of surgeons prefers the delayed policy of operation, however a considerable number of reports and randomized trials on the role of early LC in AC (within one week of onset of symptoms), have shown that it is a feasible and safe procedure, with shorter total hospital stay [3-5].

In spite of distorted biliary anatomy, inflammatory edema [6], adhesions and difficult dissection accompanying AC, which may increase complications and conversion rate, and led to consider AC as a relative or absolute contraindication to early LC [7], but with better experience, training and new technologies have

widened the range of AC management to include LC [8-11].

It was found in many studies that LC within 24, 48, and 72 hours from onset of AC, was associated with reduction in total hospital stay and operative time, without change in complications or conversion rate in comparison with delay LC, and avoid the risk of failed conservative treatment [12-14].

Many published studies showed that about (35-58%) of patients with acute calculus cholecystitis (ACC) were readmitted as emergencies, some with biliary pancreatitis, necessitating laboratory, X-ray investigation and high costs, in the conservative treatment period [15,16]. In addition to "patients suffering, loss of work hours and income, and the effect on the community as a whole". This philosophy of delayed treatment denies those patients presenting with AC from the advantages of early laparoscopic approach.

The aim of this study is to demonstrate the safety and efficacy of early LC in ACC at Al-Kadhimyia Teaching Hospital.

Methods

A prospective randomized clinical trial was conducted at the department of surgery at Al-Kadhimiya Teaching Hospital, Baghdad-Iraq, between January 2010 and February 2012. Eighty nine patients diagnosed as an acute cholecystitis were enrolled in this study.

The diagnosis of AC was based on the following diagnostic criteria. Right upper quadrant or epigastric acute abdominal pain, with tenderness under the right costal margin and localized peritoneal signs with or without fever (≥ 37.5 °C) and/or leukocytosis more than 10,000/mm³, ultrasonographic features suggestive of inflammation demonstrating gallstones, gallbladder (GB) wall thickness > 5 mm, edematous wall, GB distension, pericholecystic fluid collection and positive ultrasonographic Murphy's sign. The diagnosis of AC was finally confirmed by histopathological examination of the excised GB. These were inclusion criteria for our study.

Exclusion criteria were, age older than 70 year, no documented gallstones, those who had obstructive jaundice, biliary pancreatitis and those with comorbid diseases, which may need intensive care unit after the operation. By these criteria, 9 patients were excluded.

The remaining 80 patients were divided into two groups based on the length of time from onset of acute symptoms to surgical intervention. Forty patients had "Early" LC (group 1) within one week from onset of symptoms and 40 patients underwent "interval" LC (group 2) performed around 6 weeks from onset of symptoms.

Informed consent was obtained, and both groups admitted to the surgical ward were initially treated conservatively with medical treatment which included nil by mouth, intravenous fluid, parenteral third-generation cephalosporines and metronidazole, these agents were continued for at least 24 hours postoperatively in group 1. While in group 2, patients were discharged after improvement to arrange for interval LC after around 6 weeks. Postoperatively in both groups, the patients were advised to come for follow up after 7 days, 1 month and 3 months after discharge.

Standard four-trocar technique was employed for LC in both groups. Dissection of the related structures to the GB went smoothly in some cases because of tissue edema. In others, difficulties were encountered in the form of adhesions between omentum and GB, duodenum and GB, dissection of cystic duct and artery in Callot's triangle or the bed of GB. For that reason; modifications were used in some operations of early group to make exposure and dissection of GB easier, as aspiration of GB contents and the use of sharp grasper to retract the thick GB wall.

Statistical Analysis

Variables were compared using Student's *t* test and data were presented as mean ± standard deviation. Statistical analysis was performed using chi-square test, and Fisher's exact test

using SPSS version 10. Significant results were considered when the p value was less than 0.05.

Results

Eighty patients were enrolled in the present study. These patients were divided into two groups; Group 1 included 40 patients diagnosed as having ACC underwent early LC within 1 week from onset of symptoms. Group 2 included 40 patients underwent delayed LC around 6 week from onset of symptoms.

The demographics features of both groups were matched statistically in terms of age, gender and body mass index (BMI). Of the patients, 60 were females (75%) and 20 were males (25%) as shown in table 1.

Table 1. Demographic Features

Characteristics	LC within 1 week N = 40 mean ± SD	LC after 6 week N = 40 mean ± SD	*P Value*
Age (years)	44 ± 16	42 ± 14	0.78
Gender (F:M)	2.3 : 1	4: 1	0.13
BMI	27.9 ± 4.6	28.2 ± 6.9	0.85

LC = laparoscopic cholecystectomy, BMI =body mass index

A statistically significant difference was found between the two groups at the time prior to surgery ($P < 0.05$). Pain, temperature, and the WBC were more in group 1. Moreover the GB wall thickness, and pericholecystic fluid were prominent in group 1 (Table 2).

Table 2. Clinical features and US findings prior to surgery

Parameters		LC within 1 week (N = 40)		LC after 6 week (N = 40)		*P Value*
		No.	%	No.	%	
Upper abdominal pain		40	100	12	30	< 0.05
Fever (37.5 °C)		30	75	4	10	< 0.05
Murphy's sign		25	62.5	5	12.5	< 0.05
WBC > 10×10^9/L		31	77.5	11	27.5	< 0.05
Ultrasound results	Gallstones	40	100	40	100	0
	Thick-wall gallbladder	36	90	20	50	0.01
	Pericholecystic fluid	8	20	2	5	0.01
	Ultrasound Murphy's	25	62.5	5	12.5	< 0.05
History of DM		3	7.5	6	15	0.08
Prior abdominal surgery		16	40	14	35	0.53

LC = laparoscopic cholecystectomy, WBC = White blood cells, DM= diabetes mellitus

Sixty six (82.5%) out of 80 patients underwent LC while open cholecystectomy was done for the rest fourteen patients (17.5%) (8 of them in group 1 and 6 in group 2) without significant difference between the two groups. The mean operative time, including conversions, was 128 ± 53.5 minutes in group 1 and 107 ± 50.1 minutes in group 2 ($P = 0.008$). The mean postoperative stay was 2.4 ± 3.2 days in group 1 and 1.4 ± 1.4 days in group 2 ($P = 0.02$). The mean total hospital stay in group 1 was 5.5 ± 3.1

days compared with 9.5 ± 5.3 days in group 2 (*P* = 0.01) as shown in table 3.

Table 3. Outcome of laparoscopic cholecystectomy

Outcomes	LC within 1 week (N = 40) mean ± SD	LC after 6 week (N = 40) mean ± SD	*P Value*
Patients with complications (No., %)	4 (10%)	3 (7.5%)	0.25
Postoperative stay (days)	2.4 ± 3.2	1.4 ± 1.4	0.02
Total hospital stay (days)	5.5 ± 3.1	9.5 ± 5.3	0.01
Operative time (minutes)	128 ± 53.5	107 ± 50.1	0.008
Conversions (No., %)	8 (20%)	6 (15%)	0.29

LC = laparoscopic cholecystectomy

Adhesions were the commonest cause in group 2, while difficulty in verifying anatomy was the main cause in group 1 as a reason for conversion of the type of operation (Table 4).

Table 4. Reasons of conversion from laparoscopic cholecystectomy to open cholecystectomy

Reasons of conversion	LC within 1 week (N = 40)	LC after 6 week (N = 40)
Adhesion and chronic inflammation	0	6
Difficult anatomy	5	0
Necrotic gallbladder wall	2	0
Bleeding	1	0
Total	8	6

LC = laparoscopic cholecystectomy

Male gender significantly affects the conversion rate of the type of operation (42% in group 1 and 37.5% in group 2 ($P < 0.05$) as shown in table 5.

Table 5. Conversion rate: male versus female

Outcomes	LC within 1 week (N = 40) mean ± SD	LC after 6 week (N = 40) mean ± SD	*P Value*
Male	5 of 12 (42%)	3 of 8 (37.5%)	< 0.05
Female	3 of 28 (10.5%)	3 of 32 (9.5%)	< 0.05

LC = laparoscopic cholecystectomy

Four patients in group 1 and 3 patients in group 2 developed postoperative complication without significant difference between the two groups regarding complications. The complications were 2 cases with respiratory infection (one in each group) and 2 cases of wound infection in group 2, one case of retained common bile duct stone in group 2, one case of subhepatic collection in group 2, one case of liver bleeding in group 1. There was no mortality in this study (Table 6).

Table 6. Complications

Complication	LC within 1 week N = 40	LC after 6week N = 40
Wound infections	2	0
Chest infections	1	1
Retained CBD stone	0	1
Subhepatic collection	0	1
Liver bleeding	1	0
Total	4	3

LC = laparoscopic cholecystectomy, CBD = common bile duct

Discussion

Whether to do open or LC for AC was controversial and a debatable decision between surgeons. However with better training, experience and advanced technology LC rendered a common and preferred policy in the setting of AC [3,4,6-11].

This study aimed to evaluate early vs. late LC for AC, regarding conversion rate, operative time, complications, and total hospital stay. Patients in group 1 were operated within 7 days from the beginning of the attack, we found out that early LC in AC was associated with less total hospital stay, longer operative time, with no significant difference in morbidity or conversion rate, compared to delay LC in AC. There was no mortality in this study.

Al-Mulhim [12] and Madan et al [7] concluded that early LC (within 72 and 48 Hrs) respectively is a safe procedure in most patients, with short total hospital stay (5 days) similar to our result (5.5 days), although their conversion rate was (2.4%), complications (0%) and operative time (105 min), were better than ours (20%, 10%, 128 m) respectively, due to the fact that their operations were done within 72 Hr from onset of symptoms while in our study it was within 7 days. Delay patient presentation, busy elective laparoscopic operating room (as we don't have emergency laparoscopic theater), preoperative anesthetic assessment and other logistic facilities, all were preventing factors for us to perform LC in less than 72 hrs from the time of onset of the attack, which affected our results of LC in AC.

Stevens and colleagues [13], had even better results in total hospital stay (2 day), mean operative time (92 min), without increase in conversion rate (9%) as they operated only during the first 24 Hrs. However, Kolla et al [6] and Lau et al [14], had much higher conversion rate and complications than our study, even though their hospital stay and operative time were less, as shown in table 7.

Table 7. Comparison of our results with other studies

Study	Conversion rate		Mean operative time (min)		Morbidity		Mean hospital stay (days)	
	Early	Delayed	Early	Delayed	Early	Delayed	Early	Delayed
Al-Mulhim [12]	2(2.4%)	8(7%)	105	126	0	7(6%)	5	12.2
Stevens et al [13]	12(9%)	7(6%)	92	95	9(7%)	11(9%)	2	3
Madan et al [7]	0	29%	73	96	0	3	2.1	5.4
Kolla et al [6]	25%	25%	104	93	15%	20%	4.1	10.1
Our study	8(20%)	6(15%)	128	107	4(10%)	3(7.5%)	5.5	8.5

Overall, there was no significant difference in complications and conversion rate between the early and late group LC. Total hospital stay was reduced, despite longer single hospital stay in group 1, which confers socioeconomic and administrative advantages [17,18].

In the United States, the professional consensus is toward early LC. Failure of conservative treatment, recurrent symptoms, longer hospital stay, and greater overall cost, led to attend this policy [7,13]. This approach is also supported by an international consensus published as Tokyo Guideline [19,20], and preferred by a wide range of surgeons [7,9,20,21] except in United Kingdom, where 88% of surgeons still adopting the delay LC policy [22,23].

Moreover, several studies revealed that delay LC is associated with recurrent episodes in 36-58% of cases [24], multiple visits to emergency room, increase total hospital costs [15,16], with increase productive work time losses [25-28].

In conclusion, the outcome of this study showed that early LC is safe and effective treatment for acute calculus cholecystitis and is superior to delay LC in term of reduction in total hospital stay. The patients can undergo LC safely during initial admission without added risk of conversion or complications, but with longer operative time.

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Author Contribution

The authors share the responsibility in preparing and completing this work.

Conflict of Interest

The authors declare no conflict of interest and any competitive intentions.

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