

# Early and delayed laparoscopic cholecystectomy in patients with acute cholecystitis

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## Summary:

**Background:** laparoscopic cholecystectomy (LC) gained a wide acceptance as treatment of choice for acute cholecystitis (AC) as early in 72 hours of admission or after interval of 8-12 weeks after the patient treated by medical treatment.

**Patients and Methods:** a prospective study done between 1<sup>st</sup> Jan 2007-1<sup>st</sup> Jan 2010 in the first surgical unit in Baghdad teaching hospital at ( Medical city).The study included 110 patients admitted with AC to undergo LC. They are classified in to two groups; early group who had LC done within 72 hours of admission and delayed group that LC done after interval of 8-12 weeks after initial medical treatment. The diagnosis of AC was based on clinical, laboratory, ultrasonographic, operative finding, and histological examination.

**Results:** The early group required modifications in operative technique (decompression of gall bladder and enlarging incision of epigastric port) more frequently ( $p < 0.001$ ). The conversion rate in early group was 7.3% vs. in delayed group was 12% and complication rate (early 14.5% vs. delayed 20%) were comparable. Successful early LC required a longer operative time than delayed LC (early 75(95-155) minutes vs. delayed 55 (32-110)minutes;  $p < 0.001$ ) but reduced total hospital stay (early 6 (2-15)days vs. delayed 11 (5-25) days;  $p < 0.001$ ).

**Conclusion:** Early LC for treatment of AC has no adverse effect on complication and conversion rates. Although it is technically demanding and time consuming, this procedure provides a marked reduced total hospital stay.

**Key words:** acute cholecystitis, laparoscopic cholecystectomy, early-delayed, conversion.

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## Introduction:

LC first performed by Muhe in 1985(1). It has rapidly become the standard treatment for symptomatic gall bladder stones (2)(3). Advantages of LC over conventional techniques include less postoperative pain, less impairment of vital functions, shorter hospital stay, rapid return to normal activity, fewer complications, better cosmesis and lower cost (4)(5)(6). Initial AC was considered a contraindication to LC, this is due to the belief that inflammation, edema, and sometimes necrosis associated with AC distort the anatomy, making identification, dissection of the ductal and vascular structure difficult and thereby increasing the incidence of complications(7). Approximately 20% of patients requiring cholecystectomy presents with AC and therefore may not offered LC (8)(9). However, with increased experience and refinement of the instruments more surgeons are performing LC in patients with AC (10)(11)(12). The potential hazard of severe complications and the high conversion rate of LC in phase of acute inflammation is a major concern (13) (14). Although recent studies have reported that LC is a safe and effective treatment for acute cholecystitis, the optimal timing for procedure remains unknown (15). Theoretically, conservative treatment with antibiotics followed by interval elective operation several weeks after the acute inflammation subsides may results in a safer operation with

a lower conversion rate. These authors suggested that there was a role for delayed interval elective LC particularly for patients who had symptoms for more than 72 hours (16) (17).

## Patients and methods:

this prospective study was conducted at 1<sup>st</sup> surgical unit in Baghdad teaching hospital at Medical city from 1st Jan 2007- 1st Jan 2010; involve 105 patients, who patients were divided patients in to two groups: early group who underwent LC after admission and the delayed group who underwent LC after interval 8-12 weeks after period of conservative treatment. The diagnosis was based on more than one of the following criteria; acute upper abdominal pain with tenderness under right costal margin, guarding, fever, leukocytosis and ultrasonic findings showing thickened, edematous gall bladder wall, presence of gall stones, ultrasonographic Murphy's sign and pericholecystic fluid collection. The initial supportive treatment during the acute phase was the same for both groups, all patients received intravenous fluids infusion and intravenous cefotaxime 1 gram every 8 hours, and nasogastric tube suction and urinary catheter were inserted when it was clinically indicated. For patients assigned to early group, LC was performed as soon as possible within 72 hours. Patients assigned to delayed group was treated conservatively and discharged

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as soon as the acute attack subsided to be readmitted for elective LC 8-12 weeks later. All patients subjected LC with the usual four ports; occasional modifications are used to overcome technical difficulties. A closed technique was used in all cases to create pneumoperitonium and introduce by using the sub umbilical Veres needle. In patient with previous abdominal surgery the epigastric port was used as initial insufflations site when necessary. A side viewing laparoscope (30) degree was used in all cases. Aspiration of distended gall bladder to allow easier grasping was routine. The gall bladder was freed from adhesions using blunt and sharp dissection. The structures at Calot's triangle were clearly identified. The cystic duct usually thickened, was controlled with titanium clips in most cases or a pre-tied laparoscopic loop (endoloop) if required.

Extra care was taken during dissection of the Calot's triangle with minimal use of electro diathermy in that area. Intraoperative cholangiogram was not done. Pre and post operative ERCP was performed selectively in patients with clinical picture suggestive of common bile duct stones (three patients in early group and 4 patients in delayed group preoperatively and one patient only in early group postoperatively). The gall bladder dissected from the liver bed using monopolar electrocautery. A subhepatic drain was inserted when necessary.

Outcome parameters: the following parameters were recorded. Operative findings and time taken for each operation were recorded. The operative time was noted from making skin incision to skin closure. The use of postoperative analgesics and antibiotics, dates of discharge as well as complications during hospital stay were recorded.

Statistical methods: continuous data variables were compared between groups using student's t-test of the mean. Discontinuous variables and proportions were compared using Chi-square test. A p-value of less than 0.05 was considered to be statistically significant.

**Results:**

This study was conducted in the 1<sup>st</sup> surgical unit in Baghdad teaching hospital at Medical city from 1<sup>st</sup> of Jan 2007- 1<sup>st</sup> Jan 2010, LC was attempted in 350 patients, 105 (30 %) patients had AC and these patients were suitable for the study. Fifty five patients (52.4%) was included in early group (LC done within 72 hours), 50 patients (47.6%) in delayed group (LC done after 8-12 weeks after conservative treatment), there were 22 male (21 %) and 83 female (79%) with a mean age of 46 years (range 20-65) years. The median time interval between the onset of symptoms and admission to the hospital was 3 days (range 1-7 days). The clinical data and laboratory results on admission were comparable between two groups. (Table 1).

**Table1 Clinical and laboratory data in both groups**

	Early group (n=55)	Delayed group (n=50)
Age(year)	45(22-63)	47(25-68)
Sex(M:F)	10:38	12:45
Previous lower abdominal surgery	6	9
Previous biliary colic	8	11
Duration of acute symptom(day)	3 (1-7) days	3 (1-7) days
Temperature(C)	38.3(36.5-39.7)	38.2(36.1-39.2)
WBC \ ml	14(6-18)	12(5-19)
Urea mmole\L	5.2(2.1-11)	4.4(2.1-9.3)
Total serum bilirubin mmole\L	17(5-90)	14(5-60)
Alkaline phosphatase I.U\L	80(20-155)	84(24-160)
Aspartate aminotransferaseIUL	20(11-98)	18(6-84)
Alanine aminotransferaseIUL	18(15-86)	16(10-99)

LC for the early group was performed with in a median time of 36 hours (range 12-72 hours) after admission. Five of 50 patients (10%) of delayed group failed to respond to conservative treatment and underwent urgent LC at 4th or 5th day after admission. Indications of early operative intervention were spreading peritonitis in 3 patients and persistent fever in 2 patients. The remaining patients were scheduled for elective surgery. At operation turbid bile or pus was found in the gall bladder in 51 patients (92.7%) in early group and 22 patients (44%) in the delayed group .There were gall bladder perforation in 2 patients (3.6%) of early group and no patient in the delayed group. Severe adhesion was found in 15 patients (27.2%) in early group and 22 patients (44%) in delayed group while contracted gall bladder was present only in the delayed group(8 patients) (16%). Histopathological examination of gall bladder confirmed the presence of AC in all patients undergoing LC during acute phase. In the delayed group there were 32 patients (64%) had chronic cholecystitis. Two patients (4%) showed features of acute cholecystitis due to probably they had acute attack during the interval time. In 5 patients who did not respond to conservative treatment all show evidence features of AC. (Table 2).

**Table2: operative and Histopathological features.**

Operative finding	Early group n=55		Delayed group n=50	
	N	%	N	%
Severe adhesion	15	27.2%	22	44%
Tensely distended GB	40	72.7%	20	40%
Contracted GB	0	0%	8	16%
Perforated GB	2	3.6%	0	0%
Turbid pus	51	92.7%	22	44%
<b>Histopathological features</b>				
Acute gangrenous	5	90%	0	0%
Acute cholecystitis	39	70.9%	2	4%
Acute on chronic	11	20%	16	32%
Chronic cholecystitis	0	0%	32	64%

More modifications in operative techniques and longer operative time were required in early group than in delayed group as shown in table 3. The operative time was the longest in patients who required urgent operation after failure of conservative treatment median operative time 127 minutes ( range 105-180 minutes), when compared to those of early group median time was 75 minutes (range 95-155 minutes) or delayed group median time of 55 minutes(range 32-110 minutes) (P< 0.001). Forty patients (72.7%) in the early group need decompression of the gall bladder while no patient require that in the delayed group(P< 0.001 ). Enlarging of the epigastric port incision (for extraction of stone and delivery of gall bladder) was needed in 30 patients (54.5%) in early group and 12 patients (24%) in the delayed group( P< 0.001). All patients in the early group needed a closed tube drain while 46 patients (92%) needed that in the delayed group. (Table3).

**Table 3: Intraoperative surgical modifications in acute cholecystitis**

	Early group n=55		Delayed group n=50		P-value
	N	%	N	%	
Decompression GB	40	72.7%	0	0%	P<0.001
Enlarge incision	30	54.5%	12	24%	P<0.001
Use drain	55	100%	46	92%	0.008
Operative time	75(95-155)		55(32-110)		P<0.001

Four patients (7.3%) in the early group and 6 patients (12%) in the delayed group were converted to open surgery, the reason for conversions were difficulty in gall bladder exposure (early group 1 patient, delayed group 3 patients)

and difficulty in dissection at Calot's triangle (early group 3 patients, delayed group 3 patients). There was no statistical significance regarding the rate of conversion between two groups although patients converted to open surgery in delayed group was higher than that in early group. No patient required conversion due to Intraoperative complication. Preoperative ERCP was performed for 3 patients in the early group and 4 patients in the delayed group and common bile duct stones were detected and removed endoscopically in these patients.

Complications developed in 8 patients (14.5%) in early group and in 10 patients (20%) in the delayed group as shown in table 4. Two patients (4%) in the delayed group developed bile leakage which was subsided spontaneously within 7 days. Two other patients (4%) had fever and intra-abdominal collection; one was treated by aspiration under ultrasound guide and the other respond to antibiotics treatment. One patient (2%) in the delayed group was on anticoagulant therapy developed intra abdominal bleeding who resuscitated by blood transfusion. There was no reoperation or hospital mortality. One patient (1.8%) developed jaundice postoperatively in early group; ERCP was performed and revealed a retained stone in common bile duct which was removed. There was no statistical significance in the rate of complications between two groups.

**Table 4:**

(Table 4) postoperative complications.	Early group		Delayed group	
	N	%	N	%
Wound infection	3	5.4%	2	4%
Bile leakage	0	0%	2	4%
Intraabd. collection	0	0%	2	4%
Chest infection	1	1.8%	1	2%
UTI	2	3.6%	1	2%
Intraabd.bleeding	0		1	2%
Retained duct stone	1	1.8	0	0%
ileus	1	1.8%	1	2%
<b>total</b>	<b>8</b>	<b>14.5%</b>	<b>10</b>	<b>20%</b>

There was no difference in postoperative pain score although patients in the early group required fewer analgesics than those in the delayed group and the total hospital stay of the early group was 5 days less than that of the delayed group ( p<0.001). (Table 5).

**Table 5: postoperative pain, dose of analgesia and hospital stay.**

	Early group	Delayed group	P value
Postoperative pain score	2.4 (0-7.4)	2.8 (0-7.9)	0.017
Doses of analgesia	1 (0-12)	2 (0-15)	0.318
Total hospital stay(days)	6 (2-15)	11 (5-25)	P<0.001

**Discussion:**

AC is present in approximately 20% of patients undergoing cholecystectomy (8) (9) and LC for AC constitutes a challenge procedure for many surgeons. The conversion rate among patients undergoing LC ranged from 6%- 35% in different studies (18)(19) and this comparable to our study that conversion rate was 9.5% (10 patients) in both early and delayed groups and this due to difficulty in gall bladder exposure and difficulty in dissection in Calot's triangle. The chronicity of the gall bladder diseases that leads to fibrous adhesion may be more important than the acute inflammation reaction in determining conversion to open surgery (20). Lo CM et al considered a numbers of risk factors for conversion with AC such as old ages, presence of large stones, a history of previous biliary disease, repeated inflammation, these will result in fibrosed gall bladder that render a cholecystectomy is more difficult with a high conversion rate (21), so in presence of dense fibrous tissue in delayed group this makes LC unsafe so the interval for delayed group cannot reduce the conversion rate. In our study complications rate for delayed group was (20%) is higher than early group (14.6%) and major complication following elective surgery was reported as (0.9%-1.6%) (4)(22). In this study major complications that occurred in early group were minimal as one patient developed retained stone in common bile duct while in delayed group there were intraabdominal collection and bile leak and but was no significant statistical difference in rate of complication between both groups. In this study the median operating time for early group was 75 minutes (range 95-155) while in delayed group was 55 minutes (range 32-110) and this difference is statistically significant and this result was similar to many studies that the reported range of operating time of ( 70-153 )minutes for early LC and (40-165) minutes for delayed LC(23)(24)(25). there was technical difficulties during LC for early group as presence of distended, edematous gall bladder containing pus or infected bile rendering grasping difficult so some modification should be done to overcome this situation which made the operation longer than delayed group and this was agreed by many studies as the operation is longer but safer in outcomes (19)(20)(21). Bile leak is the most common technical complication of LC occurring in 0.2-2%

of patients (26) (27), in our study it was recognized in 4% of patients in the delayed group and in no patient in early group and treated conservatively. Of great importance was the lack of serious complications, in particular, bile duct injury in this study. Also no deaths occurred and no delayed complications. There are logistic difficulties in accommodating emergency patients on routine operating list, particularly when the operation is time consuming.

*References:*

1. Muhe E.»Die erste cholecystektomie durch das laparoskop» *langenbecks Arch Klin Chir* 1986;369:804.
2. Al-mulhim AA, Al-Ali AA, Bahnassy AA, Abdelhadi M, Wosornu L, et al "increased rate of cholecystectomy after introduction of laparoscopic cholecystectomy in Saudi Arabia" *World J Surg* 1999;23:458-62.
3. Bittner R. "Laparoscopic surgery: 15 years after clinical introduction." *World J Surg* 2006; 30:1190-1203.
4. Cuschieri A, Dubois F, Mouie J, Mouret P, et al. "The European experience with laparoscopic cholecystectomy." *Am J Surg* 1991; 161:385-7.
5. NIH Consensus conference. "Gall stones and laparoscopic cholecystectomy." *JAMA*.1993; 269:1018-24.
6. Barkun JS, Barkun AN, Meakins JL. "Laparoscopic versus open cholecystectomy: the Canadian experience The Mc Gill Gall stone treatment group " *Am J Surg* 1993; 165:455-8.
7. Cameron JC, Gadacz TR. "Laparoscopic cholecystectomy (editorial)." *Ann Surg*. 1991; 214:251.
8. Sharp KW. "Acute cholecystitis" *Surg Cli North Am*. 1988; 68:269-79.
9. Hermann RE. "The spectrum of biliary stone disease." *Am J Surg*. 1989; 158:171-3.
10. Wilson RG, Macintyre IMC, Nixon SJ et al. "laparoscopic cholecystectomy as a safe and effective treatment for severe acute cholecystitis" *BMJ*. 1992; 305:394-6.
11. Rattner DW, Ferguson C, Warshaw A. " Factors associated with successful laparoscopic cholecystectomy for acute cholecystitis" *Ann Surg* 1993; 217:233-6.
12. Wiesen SM, Unger SW, Barkin JS, et al. "Laparoscopic cholecystectomy: the procedure of choice for acute cholecystitis" *Am J Gastroenterol*. 1993; 88:334-7.
13. Kum CK, Eypasch E, Lefering R. "Laparoscopic cholecystectomy for acute cholecystitis: is it really safe" *World J Surg* 1996; 20:43-49.
14. Kum CK, Goh PMY, Issac JR. "Laparoscopic cholecystectomy for acute cholecystitis" *Br Surg* 1994; 81:1651-1654.
15. Chung-Mua LO, Chi-Leung "Prospective randomized study of early vs. delayed laparoscopic cholecystectomy for acute cholecystitis" *Ann Surg* 1998; 227:461-467.
16. Koo KP, Thirlby RC "Laparoscopic cholecystectomy in acute cholecystitis: what is the optimal time for operation?" *Arch Surg* 1996; 131:540-545.