

## Variables affecting outcome of laparoscopic cholecystectomy in acute cholecystitis

Ahmed M. Abozied, Nabila M. Shams, Yehia H. Zayed, Sahar B. Alfeki, and Sayed A. Mostafa

Surgical department Azhar Faculty of Medicine for Girls

### Abstract

The use of laparoscopic cholecystectomy (LC) for treatment of acute cholecystectomy (Ac) and timing of this technique are a subject of debate. This study was undertaken to evaluate our experience with early LC as a safe and effective treatment of these cases.

Charts for all patients who had undergone LC for the diagnosis of AC were done. They were divided into 2 groups based on the length of time from onset of symptoms to surgical intervention, group 1 “early” less than 72h (number of patients (n)=12) and group 2 “delayed” more than 72h (n=22).

Comparing both groups, the conversion rate to an open cholecystectomy (OC) was significantly less in early group than delayed group (8.3% & 41%) respectively. Furthermore, operative time was (76 minutes versus 93m), postoperative hospital stay was (1.3 versus 3 days) and total hospitalization was (2.2 versus 4.5 days) respectively.

In conclusion LC is safe and effective technique for treatment of AC. Patients treated within 72h of onset of symptoms has a lower conversion rate to OC, shorter operative time and reduced total time of hospitalization.

### Introduction

At the beginning of LC it was introduced for cholecystitis as it provides the advantages of decrease pain and disability as well as improved cosmesis. However the role of LC in the settings of AC has been a subject of some debate. Earlier, AC was considered a contra indication to LC.<sup>(1, 2,3)</sup> Many clinics felt that the inflammation, edema and adhesions associated this process made laparoscopic surgery unsafe. As more experience was gained in the field of laparoscopy in general, many patients with AC have been successfully managed using LC technique<sup>(4,5,6,7)</sup>.

The failure rate of LC for AC and conversion to OC in the deferent literatures varies markedly from 7% up to 30%.

Studies attempting to identify risk factors contribute to conversion, have largely analyzed variables such as patient characteristics and radiographic findings. Although these studies may identify patient who have more technically challenging cholecystectomies, they offer little in the way of improving outcome in any given patient after presentation. And in a trial to improve the success rate of LC for treatment of AC, they ignore the patient variables as it is not under their control. But as they said, we can modify variables under our control, for example an operating surgeon's experience with LC for AC, time from emergency admission to LC, and equipment availability and familiarity have been retrospectively identified as variables

that may affect conversion rates from LC to OC in patients with AC.<sup>(9,10,11)</sup>

**Aim of the work:** is to evaluate laparoscopic cholecystectomy, is it safe, effective, and has a place in treatment of acute cholecystitis. What is the rate of conversion to open cholecystectomy and the important variables affect this conversion specially early presentation after the attack ?

**Material and methods:** Between Jan.1997, and Dec. 1999 we conducted a study of 34 patients with AC underwent LC. The diagnosis of AC was established in patients who presented with upper right quadrant or epigastria acute pain of more than two hours duration, had upper right quadrant tenderness and localized peritoneal signs, and had a confirmatory sonographic radiological study demonstrating gall stones and evidence of AC such as gall bladder wall thickening, pericholecystic fluid or oedema, and ultrasound induced Murphy's sign. Also the diagnosis was confirmed by intraoperative findings. All patients with simple biliary colic, choledocholithiasis, biliary pancreatitis, or acalculus cholecystitis were excluded. The patients were divided into two groups based on the duration of acute symptoms to surgical intervention. "Early" intervention was defined as cholecystectomy performed within 72 hours from the onset of symptoms and "Delayed" intervention as surgery after 72h up to 7 days from the onset of symptoms. Informations regarding the age, sex, duration of symptoms, previous operations or other biliary problems were recorded. Routine investigations done to all patients, liver and kidney functions, CBC, electrolytes abdominal US and sometimes CT scan were done. Outcome variables including time from admission to operating room, operative time, post operative length of

stay and total hospital stay were recorded and analyzed. Documentation of type of cholecystectomy LC or converted to OC were also recorded. Lastly all procedures were done in the presence of proper facilities. Lastly all procedures were done in presence of proper facilities such as well trained surgical and anaesthetic staff as well as appropriate equipment.

## Results

Thirty four patients diagnosed as acute cholecystitis during the period from Jan 1997 to the end of 1999 were submitted for LC. Twelve patients of them underwent definitive procedure within 72h from the onset of their acute symptoms "early group" and 22 patients underwent LC more than 72h up to 7 days "delayed group" the average age was 43 years in the early treated group and 46 years in the delayed group. Two patients (16.7%) of the early group had undergone previous abdominal surgery as had 6 patients (27%) of the delayed group. Six patients (50%) of the early group and 15 patients (68%) of delayed group had experienced previous biliary symptoms. There was no significant difference in fever or leukocytosis between both groups at the time of presentation. The average duration of symptoms was 42h for early group and more than 5 days for the delayed group table (1) .

The average operative time for the early intervention patients was 76 minutes and 93 m. for delayed group. All procedures in early group were completed laparoscopically except one case (8.3%), whereas 9 patients (41%) of the delayed group required conversion to open technique. The postoperative hospital stay and total hospital stay were shorter in the early group (1.3 and 2.2 days) compared with the delayed group (3 and 4.5 days). There

was only one case of complication among early group in which bile leakage occurred and jaundice, and it is proved that it was due to missed stone in the CBD, causing its obstruction and rupture of the cystic duct stump. The condition was managed by sphincterotomy and extraction of the

stone through ERCP. There were two cases of wound infection in the delayed group of patients table (2). Even when excluding patients who had conversion to OC, the operative time, postoperative stay and total hospital stay were still significantly lower in the early when compared with the delayed group.

**Table (1)** :- Prehospitalization data of patients.

	Early group n=12	Delayed group n=22
Mean age	43 years	46 years
History of Biliary symptoms	6 cases = 50%	15 cases = 68%
Previous abdominal operation	2 cases = 16.7%	6 cases = 27%
Duration of acute symptoms	42 hours	More than 5 days

**Table (2)**:- Hospital data of patients (Excluding converted patients).

	Early group n=12 < 72h	Delayed group n=22 > 72h
Operative time	76 minutes	93 minutes
Conversion rate	One case = 8.3 %	9 cases = 41%
Postoperative stay	1.3 days	3 days.
Total hospitalization	2.2 days	4.5 days.
Complications:- missed stone infection	One case ----	---- 2cases

Values expressed as median (range)

## Discussion

In patients with AC, should one operate by open surgery or late them “cool off” and delay them for 8 weeks? The answer from several trials is clear: Get it while it’s hot. Laparoscopic cholecystectomy is more likely to be successful and complication free if it is performed within 72 hours of presentation. Not surprisingly, similar findings guided surgeons towards early surgery for AC before the laparoscopic era.<sup>(6)</sup>

A “tough” gall bladder is a “tough” gall bladder whether one uses a Kocher’s incision or uses 4 trocars and titanium clips. The acute inflammation associated with AC creates an oedematous

plane in the submucosa of the gall bladder (GB) which facilitates its dissection from the liver bed. The oedema may spread into triangle of Calot or it may stop at the fundus of gall bladder, leaving Calot’s triangle reasonably free of inflammation. When acute inflammation matures to chronic one, neovascularity, fibrosis and contraction make LC substantially, more difficult and potentially more hazardous. The technical difficulty of LC is related to the operative finding. During early surgery, a distended, edematous gall bladder containing infected bile is frequently encountered, but this can be overcome by

modifications in operative technique such as, use of 5<sup>th</sup> cannula, GB decompression, use of sutures to control cystic duct, use of endoscopic pouches to retrieve specimen, or enlargement of umbilical incision<sup>(12)</sup>. Despite a longer operative time; the surgeon can often complete the cholecystectomy safely under the laparoscope. On the other hand, the chronicity of the GB disease may be more important than the acute inflammatory reaction in determining conversion to OC<sup>(13)</sup>. A number of risk factors for conversion with AC, such as old age<sup>(13,14)</sup>, large stones<sup>(13)</sup>, history of previous biliary diseases, and non palpable GB<sup>(14)</sup>, are associated with repeated inflammation, which result in a scared and fibrosed GB. It is the presence of dense fibrotic adhesions-more common in the delayed surgery-that render laparoscopic dissection impossible, and sometimes unsafe. Thus an initial conservative approach followed by interval elective operation cannot reduce the conversion rate and this holds true even for patients with acute symptoms for 72h or more before admission<sup>(12)</sup>.

Hunter in 1998,<sup>(9)</sup> reported that , as a general rule, with patients who have acute cholecystitis, perform LC as soon as convenient within the first 72h . There is no benefit to attempting to “cool off” the GB before proceeding to the operating room. Laparoscope or no laparoscope the message remains the same, for AC “get it while it’s hot”.

On the other hand, the delay from admission to surgery is surgeon-driven

and is the key element of interest with regard to the optimal timing of surgery. If the operation is to be performed during the acute phase, it should be as soon after admission as possible<sup>(15)</sup>.

Greenwold and others in 2000,<sup>(8)</sup> in a trial to seek ways to improve LC outcome for AC, they stressed that : safty of LC for AC is for the most part related to the surgeon’s technical competency and sound clinical judgment to convert to an open procedure should adequate, exposure not be obtained through the laparoscopic technique. They initiate a protocol for treatment of AC which is(when, where, and who) will treat the patient, to determinate outcome of the procedure. The “when” is as soon as possible after admission. The “where” is at specially equipped laparoscopic surgery unit. And the “who” is the house staff supervised by surgeons with special interest in therapeutic laparoscopy<sup>(8)</sup>.

Findings of several publications concentrating on some points compare - ing early versus late LC for AC as well as our findings are summarized in table (3).

From these studies we feel that operation should be performed as early after onset of symptoms as possible. Also delaying surgical intervention for 6 to 8 weeks adds nothing except more hospital stay, and the risk of recurrence of other biliary complications<sup>(16)</sup>.

The rate of conversion from LC to OC in AC in some different studies as well as our results are show in table (4).

**Table (3):-** shows comparison of conversion rate in some different publications and our study.

Auther	n	Important findings
Chandler et al.(17)	43	Early versus late (up to 5D after admission) was associated with reduced operative time, lower conversion rate, lower blood loss, lower hospital stay and charge. No differed in complication,
Lai et al.(18)	104	No difference in conversion rate, Postoperative analgesics, or complication. Early group had longer operative time and shorter hospital stay
Brodsky et al(6)	215	The only controllable factor related to conversion rate was duration of disease. Earlier operation was associated with lower conversion rate.
Eldar et al (7)	130	Early (<96h) surgery had a conversion rate of 23%. Late (> 96h) had 47%
Willsher et al. (18)	152	Conversion less likely in patents having surgery within 2 days of admission.
Lo et al. (19)	99	Early operation (<72h from admission) was associated with a lower conversion rate and complication rate.
Our study	34	Early intervention (<72h) was associated with a lower conversion rate, lower hospital stay.

Table (4) shows the results of conversion rate in early and delayed groups of patients in the different literatures and our study.

Auther	n	Early group	Delayed group
Greenwald et al, <sup>(8)</sup>	88	8%	74%
Eldar et al, <sup>(7)</sup>	130	23%	47%
Eldar et al, <sup>(19)</sup>	348	1435	39%
LO et al, <sup>(12)</sup>	99	11%	23%
Lujan et al, <sup>(20)</sup>	114	15%as a general conversion rate comparing LC and OC	
Our study	34	8.3%	41%

n= number of patients

**Summery:-** despite the well accepted success of LC in the elective treatment of symptomatic cholelithiasis, the efficacy and timing of this technique has been subject to some debate in the setting of AC. This study was undertaken to evaluate early LC as a safe, effective procedure for AC and the important variables that may play a major role in success rate of complition of LC.

In this study 34 patients with AC were divided into two groups according to the duration of patient's symptoms before presentation (<72 hours) 12 patients and (>72 h) 22 patients.

- 1.The operative time was 76 minutes for early patients and 93 min for delayed patients.
- 2.The conversion rate was 8.3% in early group and 41% in delayed group.
- 3.The postoperative and total length of hospital stay was 1.2 and 2.2 days for early group and 3.0 and 4.5 days for delayed group.
- 4.There is no difference in the complication rate between both groups.

**Conclusion :-**LC is a save and effective technique for treatment of AC. It has definite socioeconomic benefits.

For surgeons, the optimal timing of LC for treatment of AC is as soon after onset of symptoms as possible.

Patients treated within 72 h of onset of symptoms, experience a lower conversion rate to OC, shorter operative time and reduce the postoperative stay, reduce the total hospital stay.

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## التغيرات التي تؤثر على نتائج استخدام منظار البطن لاستئصال المرارة في حالات الالتهاب الحاد

أحمد محمد أحمد أبو زيد، نبيلة م. عبد المنعم شمس، يحيى حسن زايد،  
سحر بدوي الفقي، السيد أحمد مصطفى  
قسم الجراحة كلية طب بنات الأزهر

بالرغم من الثورة التي أحدثها استئصال المرارة بمنظار البطن في الحالات المزمنة إلا أن هناك جدل في استخدامه في الحالات الحادة. وهذا البحث كان محاولة لتقييم استخدام المنظار في استئصال التهاب المرارة الحاد والوصول إلى أهم المتغيرات التي تتحكم في نجاح العملية والتقليل من نسبة التحول إلى استئصالها عن طريق الفتح الجراحي وقد لوحظ أن:

(1) استخدام المنظار لاستئصال المرارة في حالات الالتهاب الحاد عملية آمنة وفعالة وله فوائد اقتصادية كبيرة.

(2) أنسب توقيت لأجراء العملية هو مبكرا بعد حدوث أعراض الالتهاب الحاد وذلك كلما أمكن.

(3) عند إجراء العملية مبكرا (أقل من 72 ساعة) من حدوث الأعراض، تقل نسبة فشل العملية وبالتالي إجراء العملية عن طريق فتح البطن. كذلك تقل مدة إجراء العملية وتقل فترة إقامة المريض في المستشفى بعد العملية وبالتالي تقل تكلفة المريض.