

Early versus Delayed (Interval) Laparoscopic Cholecystectomy For Acute cholecystitis

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Abstract

Background: The surgical management of patients presenting with acute cholecystitis remains controversial.

The aim of this study was to evaluate the safety and feasibility of urgent laparoscopic cholecystectomy during the “index” (acute) admission with acute cholecystitis, and to compare with a policy of delayed (interval) cholecystectomy.

Methods: Between December 2009 and March 2011, 120 patients who had undergone laparoscopic cholecystectomy. Sixty patients underwent surgery during the index admission (group I). Sixty patients were assigned to initial conservative treatment followed by delayed laparoscopic cholecystectomy (group II).

Results: The cholecystectomy for acute group took longer operative time, needed more modification of the procedure used. It had comparable rate of complication, conversion rate and a shorter hospital stay than delayed group.

Conclusions: Laparoscopic cholecystectomy during the index admission with acute cholecystitis can be performed safely and successfully.

المخلص

لازال علاج التهاب المرارة الحاد محل نقاش وهناك عدة طرق لمعالجته . تهدف هذه الدراسة الى بيان امكانية وسلامة استئصال المرارة الطارئة بالناظور خلال فترة دخول المريض كحالة طارئة لعلاج التهاب المرارة الحاد ومقارنته بالطريقة التقليدية لاستئصال المرارة بعد فترة علاج الالتهاب الحاد وشفائه.

خلال الفترة من كانون الأول 2009 الى آذار 2011 أجرينا عملية استئصال المرارة بالناظور الى 120 مريض (72 مريض في مستشفى الكاظمية التعليمي في بغداد و48 مريض في مستشفى الحسين (ع) التعليمي في كربلاء). ستون عملية أجريت لمرضى يشكون من التهاب حاد واجريت لهم العملية خلال فترة رقادهم للعلاج من التهاب المرارة الحاد (المجموعة الأولى) والمجموعة الثانية (ستون مريض) اجريت لهم عملية استئصال المرارة بعد شفائه التام من التهاب المرارة الحاد(بعد6-12 اسبوعا).

كانت نتائج هذه الدراسة تشير الى ان عملية استئصال المرارة للحالات الحادة تأخذ وقت أطول وتحتاج الى تحويلات أكثر أثناء اجراء العملية ولكن لها نفس النسبة من المضاعفات ونفس نسبة التحول من عملية ناظورية الى عملية فتح بطن تقليدية ولكن فترة الرقاد في المستشفى أقل من المجموعة الثانية.

استنتجت هذه الدراسة الى ان إجراء عملية استئصال المرارة بالناظور خلال فترة الالتهاب الحاد يمكن اجرائها بامان ونجاح .

Introduction

Laparoscopic cholecystectomy has increasingly been accepted and considered a gold standard procedure for treatment of symptomatic gallstones and chronic cholecystitis. Gallstone disease first

presents as acute cholecystitis in 15% to 26% of the cases [1, 2, and 3].

For those cases, the role of laparoscopic cholecystectomy is not yet established. During the first years in the development of laparoscopic cholecystectomy, it was feared that a more difficult dissection, related to inflammation and adhesions, would result especially in bile duct injuries

and increased morbidity [4, 5]. The potential hazard of severe complications as a result of distorted anatomy caused by acute inflammation is a major concern [6,7]. Early reports of laparoscopic cholecystectomy for acute cholecystitis frequently showed a higher complication rate, a prolonged operation time [7,8]. Acute cholecystitis was therefore once considered a relative contraindication for early laparoscopic cholecystectomy. In some studies, performing this procedure during the phase of acute inflammation is associated, with a high incidence of conversion to open surgery [7, 8]. This conversion may result in the loss of all of the potential economic advantages of this minimally invasive procedure. Conservative treatment of acute cholecystitis followed by delayed-interval laparoscopic cholecystectomy became a commonly accepted practice in the early 1990s [8, 9].

With the growing experience and improvement in laparoscopic skills, recent studies have demonstrated that laparoscopic cholecystectomy is safe for acute cholecystitis [10, 11, 12]. A number of centers have reported on the use of laparoscopic cholecystectomy for acute cholecystitis [12, 13, 14], suggesting that it is technically feasible and safe. More studies reported successful laparoscopic cholecystectomy during the period of acute inflammation is associated with an early recovery and shorter hospital stay [13, 14]. Several randomized studies in the prelaparoscopic era had shown that early open cholecystectomy for acute cholecystitis was better than delayed open cholecystectomy in terms of shorter hospital stay, but both had similar operative mortality and morbidity [15, 16, 17]. The pendulum has now swung toward early laparoscopic cholecystectomy for the management of acute cholecystitis, as in the era of open cholecystectomy for acute cholecystitis.

Despite studies showing the safety of laparoscopic cholecystectomy for acute cholecystitis [18, 19, 20], some surgeons still

find it too difficult and risky, preferring a conservative treatment followed by interval laparoscopic cholecystectomy a few weeks after resolution of the acute episode. This policy prolongs the overall hospital stay and increases costs. Furthermore, up to 30% of the patients require subsequent surgery or hospital readmission before the scheduled date because of a failed response to conservative treatment, misdiagnosis, or recurrent episodes of acute cholecystitis [21, 22, and 23].

In the current study, we undertook a retrospective randomized trial to review laparoscopic cholecystectomy for patients with gall stones in experienced hands and compare the results of laparoscopic surgery performed for acute cholecystitis with those performed as a delayed or interval cholecystectomy.

The aim of the study

To evaluate the safety and feasibility of urgent laparoscopic cholecystectomy during the "index" (acute) admission with acute cholecystitis, and to compare with a policy of delayed (interval) cholecystectomy.

Patients and Methods

120 patients were the subject of our study from December 2009 to March 2011. Those patients underwent laparoscopic cholecystectomy [(72 patients) in Alkadhimya teaching hospital (Baghdad) and (48 patients) Alhussian teaching hospital (Karbala)]. Retrospective documentation and recording of preoperative, operative, and postoperative data were made on a standard code sheet and stored in a computer data base. 60 patients were admitted with a diagnosis of acute cholecystitis and underwent laparoscopic cholecystectomy within 7 days of onset of symptoms within the same hospital admission based on (1) acute upper

abdominal pain with tenderness under the right costal margin; (2) fever above 37.5 C. and/or leucocytosis greater than 10 X 10⁹/L (normal, <10 X 10⁹/L); and (3) ultrasonographic evidence (thickened gallbladder wall, edematous gallbladder wall, distended gallbladder, presence of gallstones, ultrasonographic Murphy's sign, and pericholecystic fluid collection). All the above criteria had to be satisfied. In addition, to the histological confirmation of acute cholecystitis. While another 60 patients underwent interval laparoscopic cholecystectomy after being treated conservatively for acute cholecystitis, discharged, and readmitted for surgery after an interval of 6 to 12 weeks. Patients with previous upper abdominal surgery, coexisting CBD stone, significant medical disease rendering the patient unfit for laparoscopic surgery were excluded from the study.

All laparoscopic cholecystectomy which were the subject of this study were performed by surgeons who are expert in the field of laparoscopic cholecystectomy (performed at least 50 laparoscopic cholecystectomy per year).

Procedure

Preoperative evaluation : An appropriate history is taken ,the patient fitness for procedure is assessed .This includes investigation of the cardiovascular and respiratory systems, and a full blood count and biochemical profile are performed to exclude anemia or abnormal liver function. Blood coagulation is checked if there is a history of jaundice .The patient is given prophylactic antibiotics. Subcutaneous heparin are prescribed .The patient must sign a consent.

Operative technique: Patient is operated in the supine position with a steep head-up and left tilt. Following induction and maintenance of a general anesthesia, the abdomen is prepared in a standard fashion. Pneumoperitoneum consists of carbon

dioxide instilled into the abdominal cavity at a set pressure with safeguards to prevent pressures above 15-20 mmHg. It is established using an open subumbilical cutdown with direct visualization of the peritoneum to place the initial port. Additional ports are placed in the subxiphoid and right subcostal areas. Once the anatomy is clearly defined and the triangle of Calot's has been wide open, the cystic duct and artery are clipped and divided. The gall bladder is then removed from the gall bladder bed by sharp dissection a closed drain is sometimes placed in the subhepatic space .Recovery after laparoscopic cholecystectomy is rapid, 80% of patients are discharged within 24 hours and the remainder by 2 days.

Study Parameters: The characteristic of patient and outcome of surgery were compared between the 2 groups in terms of operative finding, procedure, time, conversion to open surgery, complications, hospital stay, and post operative pain and analgesia.

Statistical analysis: Statistical analysis was performed using paired *t*-test and chi square test. Statistical significant was set at *p* value of 0.05.

Results

During the study period, a total 120 patients were the subject of the study. 60 patients in the acute group and 60 patients in the delayed group. The 2 groups were well matched in term of age, sex, BMI and the past surgical history on admission were comparable between the two groups (Table 1).

Operative finding:

In the early group, the gallbladders were more often tensely and filled with turbid bile or pus. However, severe adhesions were more frequently encountered among patients in the delayed group (46.7%) than among patients in the early group (8.3%), (Table 2).

Table 1: Clinical data for patients in early and delayed groups at admission

Parameter	Early laparoscopic cholecystectomy (number=60)	Delayed Laparoscopic cholecystectomy (number=60)	P value
Age(years)	38.7 + 11.4	40 + 11.4	0.45
Sex (male: female)	17: 43	19: 41	0.61
Body mass index (BMI) >30 kg/m ²	25 (41.7%)	26 (43.3%)	0.53
Body mass index (BMI) <30 kg/m ²	35 (58.3%)	34 (56.7%)	0.51
Previous lower abdominal surgery	4 (6.7%)	3 (5%)	0.43
Average gallstone size (mm)	14.4	15	0.73

Table 2: Operative findings

Operative finding	Early (n=60)	Delayed(n=60)	P value
Severe adhesions	5 (8.3%)	28 (46.7%)	0.045
Tensely distended gall bladder	40 (66.7%)	7 (11.7%)	0.05
Turbid bile/pus in the gall bladder	40 (66.7%)	21 (35%)	0.45

Procedure modification and time:

Significantly more modifications in operative technique like using suction tube or spatula, higher chance of using a close suction drainage of subhepatic space and a

longer operation time were required in the early group.

The mean operative time was 90 min in acute group, compared with 80 min in the delayed group (Table 3).

Table 3: Operative modifications and time

	Early(n=60)	Delayed (n=60)	P value
Modification of the usual technique	36(60%)	6(10%)	0.045
Use of subhepatic drain	48 (80%)	21(35%)	0.023
Procedure average time in minutes	90	80	0.07

Hospital stay:

The mean total hospital stay was 4 days in the early group and 8 days in the delayed group. However, the mean postoperative hospital stay was 1 days in the early group and in the delayed group (Table 4).

Post operative pain and analgesia:

No significant difference was found in postoperative pain scores in the first day post operatively and analgesic requirements. (Table 4).

Table 4: Hospital stay

Parameters	Early	Delayed	P value
Total hospital stay in days	4	8	0.023
Post operative hospital stay in days	1	1	0.34
Average Pain score day 1 postoperatively(out of 10)	7	6	0.45

Conversion to open surgery:

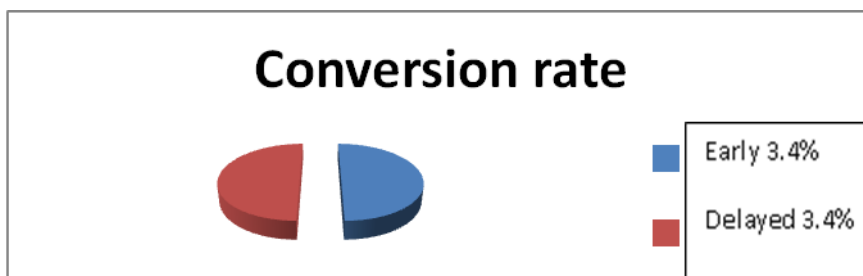
Two patients (3.4 %) in early group and 2 patients (3.4%) in delayed group underwent conversion to open surgery (Graph 1).

The most common reason for conversion was difficulty in exposing the gallbladder and dissection because of severe adhesions (two in the delayed group). The remaining two patients in the early acute laparoscopic surgeries converted due to unclear Calot's

triangle anatomy, and transaction of the gall bladder at Hartman's pouch (Table 5).

Table 5: Causes for conversion to open surgery

Reasons for conversion	Acute(n=60)	Delayed (n=60)	P value
Adhesions	0	2	
Unclear Calot's triangle anatomy	1	0	
Transection of the GB at Hartman's pouch	1	0	
Total	2 (3.4%)	2 (3.4%)	0.54



Graph 1: Conversion rate in early and delayed groups

Complications

There were no bile duct injuries or other major complications (Table 6), (Graph 2). Minor complications occurred in 13 of 120 patients (10.8%), 7 patients in the acute

group and 6 in the delayed group. The most common complication was port site infection. There were neither operative deaths nor any need for reoperation (table 6).

Table 6: Operative complications observed

Complication	Acute (n=60)	Delayed (n=60)	P value
Port site infection	6	2	
Chest infection	0	2	
Urinary tract infection	1	2	
Total	7 (11.7%)	6 (10%)	0.54



Graph 2: Complication rate in early and delayed groups

Discussion

In the early years of laparoscopic surgery, acute cholecystitis was considered a relative contraindication to laparoscopic cholecystectomy. Recently, it has been shown that laparoscopic cholecystectomy

is feasible and safe for acute cholecystitis. Various studies have reported high conversion rates, ranging from 6% to 35% [13, 15, 16] for early laparoscopic cholecystectomy used to manage acute cholecystitis. The higher conversion rate obviates the advantages of early

laparoscopic cholecystectomy. It is therefore argued that if delayed laparoscopic cholecystectomy leads to a technically easier surgery with a lower conversion rate, it may be a better treatment option for acute cholecystitis.

The general belief that initial conservative treatment increases the chance of successful laparoscopic cholecystectomy at a later date probably is not true, as borne out by this study. In our study, both the early and delayed groups had similar conversion rates (3.4%). The reasons for conversion, however, were different. In the acute group, the friable and edematous gall bladder tore when grasped. Moreover, there was excessive oozing attributable to acute inflammation. However, in delayed group, the main reason for conversion involved dense adhesions obscuring the anatomy of Calot's triangle. On the other hand, in the delayed cases, the increase in dense adhesions around the gallbladder and portahepatis after initial conservative treatment made laparoscopic dissection more difficult and constituted the main reason for conversion.

Our experience supports the belief that the inflammation associated with acute cholecystitis creates an edematous plane around the gallbladder, thus facilitating its dissection from the surrounding structures. Waiting for the inflamed gallbladder to cool down allows maturation of the surrounding inflammation and results in organization of the adhesions, leading to scarring and contraction, which make the dissection more difficult. Also, although inflammation in early stages may not necessarily involve Calot's triangle, chronic inflammation often scars and distorts Calot's triangle, making dissection in this critical area more difficult. The degree of histological changes and severity of the inflammation of gallbladder's wall are proportional to the duration from the onset of the symptoms to the operation.

The safety of the laparoscopic approach for acute cholecystitis is a major concern. A higher incidence of complications,

including a bile duct transaction rate of 1.5%, has been reported ^[24, 25]. The results of the current study confirms the view that when performed by surgeons experienced in the technique, laparoscopic cholecystectomy for treatment of acute cholecystitis is safe and effective. Laparoscopic surgery for both early and delayed cases has similar results in that concern. None of our patients sustained bile duct injury or developed other major complications, whereas minor complications occurred in 10.8% of these patients. The most common complication encountered is due to port site infection and this can be attributed to the fact that inflamed gall bladder is extracted through the wound may predispose to higher rate of infection in early surgeries compared to delayed ones. With increasing experience and skills, major bile duct injury has become a rare event during early laparoscopic cholecystectomy for acute cholecystitis ^[21, 23, and 26]. On the other hand, in addition to the findings of the current review ^[26] reported a higher incidence of bile duct injury among patients who underwent delayed laparoscopic cholecystectomy because of fibrosis and adhesions.

Many studies showed the impact of the experience of the individual surgeon on the outcome of laparoscopic cholecystectomy in terms of conversion rate, complications and operating time in the treatment of acute cholecystitis. The surgeon experienced in laparoscopic surgery had to convert less often and completed the procedure faster than the surgeons who is not experienced in that field ^[26, 27]. Therefore all laparoscopic cholecystectomy which were the subject of this study were performed by laparoscopy oriented surgeon (defined as a surgeon performing at least 50 laparoscopic procedures per year hence referred to as laparoscopic surgeon) ^[27].

Cholecystectomy during the acute phase requires more frequent special modifications in operative technique and thus a longer operative time. To avoid

septic complications, the surgeon must take extra precautions, including the use of closed suction drains (80% in acute compared to 35% of delayed cases) because of the high incidence of turbid bile or even pus in the gallbladder with the potential risk of infection.

Although early surgery may be associated with a longer operating time when compared with delayed cholecystectomy [1,2,6] the benefits to the patients and the health economy are maintained. The current systematic review demonstrated that the chief benefit of early laparoscopic cholecystectomy for acute cholecystitis is a significant reduction in the total length of hospital stay. This finding was consistently demonstrated in all the recruited trials [18, 22, 23, 26]. A reduced length of hospital stay is expected to diminish pharmacologic expenses and hospital costs [26] whereas early return to work and normal activities can confer a positive socioeconomic impact [23].

Randomized studies have demonstrated that early surgery results in a significantly shorter recuperation period [20] and total hospital stay [20, 21]. In our experience, surgery for an actively inflamed gallbladder did not extend postoperative in-hospital recovery period compared with laparoscopic cholecystectomy performed for asymptomatic cases [25] with reduction of the total hospital stay. One of the main advantages of laparoscopic cholecystectomy is the potential for patients to return to work early, but the recuperation periods after surgery for acute and asymptomatic cases were not compared in the current study because of its retrospective nature. It is worth noting, however, that approximately half of the patients who underwent surgery for delayed gall stones had more than one previous acute admission to hospital with acute cholecystitis. The delay in offering definitive surgery for an ill-defined interval following an acute attack may only prolong the patients' sufferings and risk further relapses.

After laparoscopic cholecystectomy, the analgesic requirements for early and delayed surgery are comparable. The postoperative pain scores and analgesia requirements were similar in the two groups.

Most surgeons agree that timing of the procedure is an important factor in determining outcome. Ideally, the surgery should be performed as soon after admission as possible. Although operation within the "golden 72 h" from the onset of symptoms has been suggested [2, 5, 13], such early surgery is not always possible in clinical practice because there are logistic difficulties in performing surgery for such patients on an emergency basis. We performed the surgery for the patients in the early group according to the next available elective operating list.

Conclusion

Early laparoscopic cholecystectomy for acute cholecystitis is feasible and safe. We believe that increasing experience should bring down the complication and conversion rate in the early group.

Delayed laparoscopic cholecystectomy is not associated with a lower complication or conversion rate or less postoperative pain than that associated with early laparoscopic cholecystectomy for acute cholecystitis. Early laparoscopic surgery associated with shorter hospital stay but it required longer operation time and more modification during surgery. Laparoscopic cholecystectomy for acute cases offers definitive treatment at the initial admission and avoids the problems of failed conservative management and recurrent symptoms.

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