Early Laparoscopic Versus Open Cholecystectomy for Acute Cholecystitis

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Abstract

Background: Acute cholecystitis is common surgical problem, which was treated previously by conservative treatment .Later early open has been introduced as an alternative to interval for treatment of acute cholecystitis. Early open was found to be a safe, successful with comparable postoperative complication rate. With the advent of laparoscopy laparoscopic have been used for chronic cholecystitis and became the first line of treatment. New reports have shown that laparoscopic can be used as an alternative to open for surgical treatment of acute cholecystitis.

Objectives: to compare the success, safety of early laparoscopic versus early open as a primary treatment of acute cholecystitis.

Methods: out of 68 patients were treated for clinical acute cholecystitis between January 2002 and February 2004 in the department of surgery, at Al – Kindy teaching hospital. A total of 62 patients underwent early for acute cholecystitis as soon as possible after diagnosis. The preferred preoperative imaging technique was ultrasound. 30 (48.3%) of the operations were attempted laparoscopically, whereas the remaining 32 patients (51.7%) underwent initial open .

Results: The mean operative time for the open cases was 75 minutes versus 60 minutes for the laparoscopic group. There was no perioperative mortality in either group. The incidence of conversion to open was 10% (3 patients). Surgical complications related to laparoscopic and open occurred in 2 (6.6%) and 3 (9.3%) cases, respectively. There was no difference between the open and laparoscopic groups in regard to the major postoperative complications.

Conclusion: The current study shows that early (whether performed by open or laparoscopically) is a safe and effective treatment for acute cholecystitis. Low conversion rates can be maintained with strict guidelines for appropriate patient selection, adequate experience, and proper laparoscopic technique.

Key Words: Acute cholecystitis– Conversion rate – Laparoscopic .

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Introduction

Acute cholecystitis is most often associated with gallstones (about 90 – 95% of patients with acute cholecystitis have gallstones). Gallstones are one of the most common disorders of the gastrointestinal tract, affecting about 30% of women over 60 years of age in western society. In 1992, it was estimated that 10 – 15% of the adult population in the USA had gallstones (20 million people); however, the vast majority of subjects (more than 85%) are a symptomatic, and when such patients are followed between 1% and 4% per year will develop biliary symptoms [1]. In several large series of asymptomatic patient with gallstones who were followed without surgical treatment, symptoms developed in 50 percent, and serious complications occurred in 20 percent [2].

In 95 percent of patients with acute cholecystitis a gallstone is found impacted in Hartman's pouch or obstructing the cystic duct. Acute cholecystitis can occur in the absence of gallstones (acute acalculus cholecystitis), which accounts for 2 – 8% of patients with acute cholecystitis. it is usually encountered in critically ill, elderly patients, in patients with multiple trauma, extensive burns, severe sepsis and drug over dosage [1, 2, 3].

At least three factors contribute to the development of acute cholecystitis: infection, obstruction, and ischemia. Stones impacted in Hartmann's pouch cause obstruction of the neck of gallbladder or cystic duct. Direct pressure of the calculus on the mucosa results in ischemia, necrosis, and ulceration with swelling, edema, and impairment of venous return. These processes cause an inflammatory process to start, this results in acute cholecystitis. If the inflammation persists it may cause perforation or gangrene of the gallbladder [3, 4, and 5].

Diagnosis of acute cholecystitis is made on the basis of history, clinical features and examination, and is supported by ultrasound scanning. Radiographs of the chest and abdomen are performed to rule out pneumonia, although, a radiopaque calculus is noted in less than 20% of cases [4].

The objective of the management of the patient with acute cholecystitis is to prepare the patient for . for acute cholecystitis is the preferred treatment if contraindications to operation are not present. There has been considerable controversy in regard to the timing of operation in patients with acute cholecystitis.

For the purpose of discussion, *early operation* is defined as one performed within 72 hour after the onset of symptoms; *intermediate operation* is one carried out between 72 hour and the cessation of clinical manifestations; interval is scheduled elective surgery performed 6 to 12 weeks after the acute attack when the inflammatory process has been subsided [2].

Opinions still differ regarding the treatment of acute cholecystitis. Following the initial conservative treatment two options are available:

1) Interval (delayed) ;
2) Early .

The interval approach is the traditional one and entails conservative management of the acute episode with discharge of the patient after complete resolution of the attack. Subsequently, the patient is admitted some 2 – 3 months later for an elective [6, 7, and 8].

Early is being increasingly performed in the management of acute cholecystitis. It must be distinguished from emergency . Following initial conservative management and confirmation of the diagnosis, the patient is operated on within 72 hours of the onset of the acute attack. The results of several prospective clinical trials comparing early versus interval have shown a clear benefit from early performed during the same hospital admission. These include less time spent in hospital and lower cost of treatment. The early approach is not attended by any increase in the morbidity (including iatrogenic bile duct injury and missed stones) and mortality than interval [7, 8].

In recent years, increasing numbers of surgeons have favored a policy of early surgery, provided there are no specific contraindications to surgery, the patient is prepared for early surgery within 48 – 72 hours of admission to hospital. Early is a safe and feasible in patients with acute cholecystitis. If early intervention can be achieved "edema planes" present and allow the gallbladder to be dissected more easily [9].

Over the past decade, laparoscopic (LC) has evolved rapidly to become the present gold standard for the elective treatment of symptomatic gallstone disease. Recently the laparoscopic approach has been applied to the treatment of acute cholecystitis. Inflammatory gallstone disease no longer maintains its previous status of contraindication as it did in the beginning of the laparoscopic technique [10].

Approximately 20% of patients with gallstones will present with acute cholecystitis; therefore, the safety and effectiveness of the laparoscopic approach have inevitably become the focus of several recent studies. To date, several relatively small series with varied results have been published. Conversion rates from laparoscopy to an open procedure have been reported to be between 5% and 30% in the acute setting [8, 11, and 12].

The aim of this prospective study is to determine the safety and success of early in acute cholecystitis, the efficacy of early laparoscopic for acute cholecystitis, and to evaluate the results of open versus laparoscopic in acute cholecystitis.

Methods

Between January 2002 and February 2004, 68 patients aged 28 to 67 years (mean 42.2 ±11) were treated for clinical acute cholecystitis in the department of surgery, at Al – Kindy teaching hospital. Data sheets containing demographic preoperative and operative information were prospectively generated. The preoperative notes included history of gallstones, duration of gallbladder complaints (as indication of the onset of the disease); the presence of associated disease especially diabetes mellitus, cardiac ischemia, hypertension, and cerebrovascular accident; finding of a palpable gallbladder; temperature; and laboratory results of WBC count, serum bilirubin, SGPT, and serum alkaline phosphatase.

A total of 62 patients underwent early as primary treatment; 30 (48.3%) of the operations were attempted laparoscopically, whereas the remaining 32 patients (51.7%) underwent initial open . Six patients were excluded from the study for various reasons ,two cases were unfit for anesthesia, one case due to pregnancy, two cases are due to common bile duct stones and one case due to cholecystostomy . In 28 cases (45.1%) the signs and symptoms of acute cholecystitis was for the first time, while 34 cases (54.8%) had previous history suggestive of chronic cholecystitis but presented with an acute attack of the disease.

The diagnosis of acute cholecystitis was made on the clinical signs of acute cholecystitis (right upper quadrant abdominal pain, fever, & leukocytosis), and preoperative abdominal ultrasound. It was proved by operative findings of acute inflammation of the gallbladder and postoperative histopathological findings.

In all cases, when the diagnosis of acute cholecystitis was suspected, the patients were admitted to the surgical ward and immediate measures were initiated including: -

1) Nothing per oral, with nasogastric tube;
2) Administration of intravenous fluids to rehydrate the patients;
3) Administration of parenteral antibiotics (cefotaxime 1gm every 8 hours);
4) Administration of analgesia (diclofenac 75 mg I.M) if no contraindications to non-steroidal anti-inflammatory drugs.

Then after, the following investigations were performed to further confirm the diagnosis of acute cholecystitis and as a part of the preoperative preparations of the patients: -

1. Blood tests: Hb%, ESR, WBC count, blood urea, s.creatinine, random blood sugar (RBS), total serum bilirubin (TSB, direct & indirect), serum alkaline phosphatase, SGPT, SGOT and prothrombin time.
2. Chest X- ray and ECG for patients above 40 years.

As soon as the diagnosis of acute cholecystitis was confirmed, the patients were managed surgically

according to their findings. The patients were divided into two groups:

Group A: (*open group*) – in which patients underwent early for acute cholecystitis by the traditional open method.

Group B: (*laparoscopic group*) – in which early laparoscopic was performed for the patients with acute cholecystitis.

In the open group, early was performed for 32 patients (51.7%). In all of the patients standard was performed. In ten cases it was necessary to aspirate the severely distended gallbladder before commencement of dissection. In all cases sub hepatic closed system drainage was applied.

In the laparoscopic group, which included 30 (48.3%) patients, laparoscopic was performed for them within 48 – 72 hours from onset of acute symptoms. The standard four – trocar technique was used. In twenty five cases, it was necessary to aspirate the distended gallbladder before dissection. The surgical technique includes:

Standard 4-trocar technique, closed technique for umbilical port placement, decompression of gallbladder ,use of monopolar electrocautery, use of clips for cystic duct, cystic artery and use of sub hepatic closed system drainage

Postoperatively the patients were followed up and managed with: -

a. Nasogastric tube with nothing per oral. Usually in the laparoscopic group the nasogastric tube was removed in the same day of operation, while it was removed in the first postoperative day in the open group.

b. Intravenous fluids until oral intake can be resumed (for average about 6 hours in the laparoscopic group and 18 hours for the open group).

c. Parenteral antibiotics (cefotaxime 1gm 3 times daily) for an average of 48 hours postoperatively.

Operative data of concern were macroscopic intraoperative finding of acute or gangrenous cholecystitis, hydrops, or empyema of the gallbladder and the duration of surgery. While postoperative data included duration of hospital stay, postoperative complications, and information about histopathology of the gallbladder.

Results

Out of the 62 patients underwent surgery at our department for acute cholecystitis, open was performed for 32 (51.7%) of the patients, while laparoscopic was done for the remainder 30 (48.3%) patients.

There was no predominant difference between the laparoscopic group and open group in reference to age, sex, and weight **(Table- 1).**

The majority of the patients admitted with acute cholecystitis felt sick less than 72 hours before hospitalization (an average, 36 hours). Their preoperative signs and symptoms are presented in **(Table -2.)** There was a history of previous gallstone disease in 34 (54.8%) patients; while in 28 cases (45.1%) the signs and symptoms of acute cholecystitis was for the first time.

The preferred preoperative imaging technique was ultrasound. Double check ultrasound was performed on all of the patients included in this study to ascertain the accuracy of diagnosis.

The common intraoperative findings in the open and laparoscopic groups are shown in **(Table 3).** There was a significantly higher incidence of pericholecystic and sub hepatic adhesions in the open group as compared to the laparoscopic group.

Intraoperative complications were low in both groups, with a significantly higher incidence of iatrogenic perforation of the gallbladder in the laparoscopic group 10 cases (33.3%) versus 4 cases (12.5%) in the open group because of friability of gall bladder wall. Intraoperative bleeding that required conversion occurred in a single case (3.3%) in the laparoscopic group. There was only one case (3.3%) of common hepatic duct injury that occurred in the laparoscopic group. Injury to the liver occurred in 5 patients (15.6%) in the open group and in 2 patients (6.6%) in the laparoscopic group. The mean operative time for the open cases was 75 minutes versus 60 minutes for the laparoscopic group **(Table-4).**

Early: Intraoperative complications and duration of surgery.

The incidence of conversion to open in the 30 patients with acute cholecystitis in which laparoscopic was attempted on them was 10% (3 patients). The reasons for conversion were: intraoperative bleeding from cystic artery (one case), distortion of the biliary anatomy due to severe inflammation (one case), injury to common hepatic duct in third one.

Histopathological examination of the excised gallbladders of the patients who underwent early revealed various levels of acute inflammation in all the cases: simple acute cholecystitis in 27 patients, acute on chronic cholecystitis in 17 cases, cholecystitis with necrosis in 5 cases, empyema of the gallbladder in 12 cases, carcinoma of the gallbladder in a single female patient operated upon laparoscopically **(Table-5).**

The above mentioned intraoperative complications were treated as follows: the common hepatic duct injury. The patient underwent immediate laparotomy and suturing of the injury with T – tube drainage of the common bile duct which was left for more than two months, then removed uneventfully. The postoperative bile leak (a single incident in the open group) resolved spontaneously by the 6th

postoperative day. The three cases of retained choledochal stones were referred to a specialized center and they were treated endoscopically two weeks to three months after surgery without further complications.

Major post operative complications occurred in 3 cases (9.3%) treated by early open and in 2 cases (6.6%) treated by early laparoscopic. While minor postoperative complications were occurred in 8 (25%) patients in the open group versus 3 (10%) patients in the laparoscopic group. Retained ductal stones occurred in two cases in the open group versus single case in the laparoscopic group **(Table-6).** A minor complication includes incisional hernia in both groups which were followed up for one year which were treated surgically thereafter.

There was no mortality in either group. The mean postoperative hospitalization was 3.5(±2) days (range, 2 – 7 days) in the open group; versus 1.5 (±1) days (range, 1 – 4) in the laparoscopic group.

Table8. *Morbidity after early (n= 62).*

Discussion

There was a longstanding controversy existed on the timing of in cases with acute inflammation. Prospective randomized studies demonstrated that an early was superior to delayed surgery because of the shorter hospitalization and recovery period [1, 2, and 3].

It is now beyond dispute that early can be safely performed in the majority of acute cholecystitis cases, when uneventfully completed, the advantages may be similar, or sometimes may be superior to the delayed interval . This was discussed by Norby S. et al. who noted a shorter postoperative hospital stay, approximately similar postoperative complication rate and a shorter sick leave period in the group with early as opposed to the group with interval [6].

This result was also strongly supported by Jarvinen and Hastbacka in which they demonstrated in a controlled randomized trial that the management of patients with acute cholecystitis was changed from delayed to early. The results obtained in 125 consecutive patients in a retrospective study and in 144 consecutive patients in a prospective study were compared. The comparison confirmed that early reduces morbidity and early is strongly recommended [7].

Laparoscopic is established as the treatment of choice for cholecystolithiasis, and it is accepted widely as the treatment of choice in the elective management of symptomatic gallstone disease. However, it is now being proposed for the treatment of acute cholecystitis as well, technical difficulties may occur in the presence of inflammatory conditions and conversion to open may be inevitable. In our study the mean operative time was 60 minutes for laparoscopic group while it was 75 minutes for open Cholecystectomy group. It was shorter than that of kamal.A. Gharaibeh, Fouad Ammari,Hussein Al-Heiss et al (13) . The conversion rate was 10% which was comparable studies of kamal I.A. Gharaibeh, Fouad Ammari, Hussein Al-Heiss et al which was 11.8% (13) .it was higher than the conversion rate of Samuel et al which was 5.3% [8] it was lower than the results of Eldar et al who reported a conversion rate of 23% and of that Chandler *et al* which was 24% (14) .

Major bile duct injury in the laparoscopic group was reported in 1 out of 30 cases (3.3%) of cases in our study while no major bile duct injury was reported in the study of Lai et al (15) mainly due to repeated attacks of acute on chronic infection with difficult dissection due to fibrous adhesions .

The post operative bile leakage was higher in the open 3.1% while no case was reported in the laparoscopic group this was lower than the incidence of postoperative bile leakage in other studies which was 0.5% in the study of kamal I.A. Gharaibeh, Fouad Ammari,Hussein Al-Heiss et al (13) as we feel that acute cholecystitis offer protection from diathermy injury due to the associated swelling, as it decrease the conduction of diathermy to the duct system .

Paralytic ileus was higher in the open group 6.3% while no case was reported in the laparoscopic group which was comparable with other studies (13, 14), (15) .

We agree with Russel et al. who noted in a study of the impact of gender on the severity and complications of symptomatic cholelithiasis that men are more likely to have severe disease and, independent of clinical presentation, men are more likely to have an increased risk of conversion to an open [12]. In our study conversion occurred in three patients and two of them were males. It is our impression, however, those men in this country present at a more advanced stage of their disease, often ignoring mild recurrent bouts of biliary colic or inflammation and may be due to delayed diagnosis by medical staff as the disease is less common in male.

Atelactasis and chest infection was higher in the open group 6.2%, 6.2% while no reported case of atelactasis was reported in the laparoscopic group and 1 out of 30 cases (3.3%) develop chest infection this was due to severe post operative pain which hinder the respiratory movement and higher dose of narcotic analgesia in the open group.

Initial aspiration of distended gallbladder facilitates retraction and handling while minimizing bile leakage and spillage of stones. The key to success for safe dissection of inflamed or dense fibrotic

tissue is to identify structures confidently and to avoid their injury.

Conclusion

In conclusion, this study elucidates that early, whether performed laparoscopically or by the traditional open method, is a safe and effective treatment for acute cholecystitis.

we recommend early laparoscopic as primary treatment of acute cholecystitis as it is successful, less time consuming ,cost effective and has low morbidity than early open .

(Table-1)

Demography of the patients (n= 62)

	Open group (n= 32)	**Laparoscopic group (n= 30)**
• Age range (years)	33 – 65	28 – 55
Mean	42(±3)	38(±4)
• Sex : female/ male	24 / 8	21/ 9
• Weight (kg)	45 – 98	47 – 88
Mean	61(±4)	64(±3)

(Table-2) Early for acute cholecystitis: Patient presentation

	Open group (No. = 32)	**Laparoscopic group (No. = 30)**
§ randomized admission	32	30
Right upper quadrant pain	28	25
§ Epigastric pain	4	5
Palpable gallbladder	12	14
§ Fever > 38 ^{o}c	23	16
§ Range of WBC X1000 (/cc^{3})	5.8 – 17.6	5.6 – 15.5
§ Range of bilirubin (mg/dl)	0.8 – 2.2	0.8 – 1.8
§ Range of Alk. Phosph. (U/L)	35 – 120	35 – 105

(Table3) Early : intraoperative findings

	open (no = 32)*	**Laparoscopic (no = 30)***
• Tensely distended gallbladder	20	18
• Pericystic /sub hepatic adhesions	18	13
• Hydrops	3	1
• Empyema	9	5
• Gangrene	1	0
• necrosis	5	2
• Perforated gallbladder	2	0
• Pericystic abscess	3	1

(Table4) Early : Intraoperative complications and duration of surgery.

	open group (n = 32)	Laparoscopic group (n=30)
• Common hepatic duct injury	0	1
• Bleeding		
-From liver	5	2
-From cystic artery	0	1
• Iatrogenic perforation of gallbladder	4	10
• Spillage of gallstones	2	5
• Duration of surgery (minutes)	60 – 105	45 – 95
• Mean (minutes)	75	60

(Table-5) Early : Histopathological Results.

	Open (n = 32)		Laparoscopic (n = 30)	
	No.	%	No.	%
• Acute cholecystitis	14	43.8	13	43.3
Acute on chronic cholecystitis	8	25	9	30
• Empyema of the gallbladder	7	21.8	5	16.7
• Necrosis of the gallbladder	3	9.4	2	6.7
• Carcinoma of the gallbladder	0	0	1	3.3

(Table-6) Morbidity after early (n= 62)

	Open group (No. =32)*	Laparoscopic group (No. =30)*
Major complications:		
• Common hepatic duct injury	0	1
• Postoperative bile leak	1	0
• Retained ductal stone	2	1
Minor Complications:		3
• Wound infection	5	0
Paralytic ileus	2	1
Incisional hernia	3	0
Atelactasis	2	1
• Chest infection	2	

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