Research Article

The benefit and feasibility of early laparoscopic cholecystectomy in the management of acute cholecystitis

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Abstract

Background: Acute cholecystitis is a common disease. The best management in early cases is surgical, but the optimal timing for surgery remains controversial. With advances and increased experience in laparoscopic surgery, laparoscopic cholecystectomy is increasingly being used in the management of acute cholecystitis.

Aims: To determine the best time to operate in acute cholecytitis (early vs. delayed) and to compare the results of laparoscopic approach with those of open surgery in the treatment of acute cholecystitis .

Patients and Methods: This was a prospective study done at al-Yarmouk teaching hospital, Baghdad from Sep. 1st 2012 to Sep. 2nd 2013. All patients admitted with a proved diagnosis of acute cholecystitis were included. The patients were divided into two groups, the first group had early cholecystectomy, laparoscopic (LC) or open (OC). The second group was treated conservatively and delayed cholecystectomy was done. Detailed clinical, investigative and imaging data were recorded. The details of the operative findings, procedures and early post-operative complications, were documented.

Results: There were 146 patients, 82.2% female and 17.8% male. The mean age was 40±2 years. Early surgery was done for 32.8% of patients, 58.4% as a laparoscopic procedure, and 41.6% as an open procedure. Delayed cholecystectomy was done in 67.2% of cases. In the early group,the difficulty was minimal in 27.2%, moderate in 39.5%, marked in 25 % and very difficult with conversion done in 8.3%. Early complications were noticed in 4.2% in the early LC group, and 8.3% in the early OC. For delayed LC, 8.1% had early complications vs. 6.1% for delayed OC.

Conclusions: Early laparoscopic cholecystectomy is a safe and feasible approach to the management of acute cholecystitis.

Keywords: Acute cholecystitis, Laparoscopic cholecystectomy

INTRODUCTION

Gallstones are present in about (10% -15%) of the adult western population. Between (1% -4%) of these adults become symptomatic in a year (the majority due to biliary colic but a significant proportion due to acute cholecystitis). [1]

Acute cholecystitis is a common disease. The best management is surgical, but the optimal timing for surgery

remains controversial. Surgery can be done early, shortly after hospital admission, or it can be delayed and done as an elective procedure after conservative treatment with antibiotics. This is better described as interval or delayed cholecystectomy and can be don e 6-8 weeks later. If the patient is started on conservative therapy with antibiotics and there was no response, cholecystectomy can be done and it is called late cholecystectomy. [2]

Laparoscopic surgery is now the standard of care worldwide. [2] It can be performed after the acute cholecytitis episode settles because of the fear of higher morbidity and of need for conversion from laparoscopic to open cholecystectomy. [1] Inflammation, edema and necrosis in patients with LC make dissection more difficult, which can therefore, increase the rate of complications. However, delaying surgery exposes the patients to gallstones-related complications.

In the developmental stages of laparoscopic cholecystectomy (LC), acute cholecystitis (AC) was considered a contraindication for the procedure. With increasing experience in LC, the procedure became technically feasible and safe. [3] Successful LC during the period of acute inflammation is associated with an early recovery and shorter hospital stay. Theoretically, initial conservative treatment with antibiotics followed by interval cholecystectomy 6 to 8 weeks later, after acute inflammation has subsided, may result in a safer operation with less conversion rates. [3] The choice between the two methods of treatment may be difficult because the data prospectively comparing them differ in various studies. [3]

Regarding the timing of surgical intervention, in classic open surgery the best moment to operate on AC is the earliest one. In LC the optimal timing of the surgical treatment of AC still remains under debate, although most recent reports suggest the advantages of the early approach. [4]

The aim of this study is to determine the best time to operate in AC (early vs. delayed) and to compare the results of LC with those of open surgery in the treatment of AC.

PATIENTS AND METHODS

This is a prospective study. All patients admitted with an initial diagnosis of acute cholecystitis to the General Surgery Department at Al- Yarmuok Teaching hospital, during the period from Sep. the 1st 2012 to Sep. the 1st 2013 were included in the study. AC diagnosis has been established on clinical data, results of ultrasonography, intra-operative findings and confirmed through pathologic examination. The main clinical criteria were pain with local tenderness or rigidity in the right hypochondrium and the presence of fever with leukocytosis over 10 000/cmm. The main sonographic criteria were a gallbladder wall more than 5 mm thick with or without peri-cholecystic fluid. All the patients were followed closely from the time of admission until the full resolution of their problem, whether by conservative therapy, early surgery or delayed surgery. The relevant demographic, clinical (including the onset of symptoms), laboratory, radiological, drugs and surgical data were recorded in detail in a special prepared form. The clinical progress of the patients was followed closely during their stay in hospital and documented. The patients have been divided into 2 groups, the main criteria being the time pased between the onset of symptoms and the operation: group I between 72 hours to 7 days and group II with interval surgery (6-8 weeks). The basis on which the decision to do early surgery, or delaying the surgery was considered. Also, the choice between open and laparoscopic surgery was considered. The surgical findings, the surgical procedures and the difficulties encountered during the operation were recorded. The post-operative course and the outcome of surgery (morbidity) have been analyzed. The post-operative complications, early and late, were studied with special emphasis on the relation of these complications to the early or late approach and also to the laparoscopic or open technique.

RESULT

During the period from Sep. the 1st 2012 to Sep. the 1st 2013, 146 patients with AC were admitted to the surgical units at Al- Yarmouk Teaching hospital. Of those, 120 (82.2%) were female, and 26 (17.8%) were male. Seventy-nine patients were in the 3rd and 4th decades of life(54.1%) while 56 patients were in the 4th and fifth decades (38.3%). The mean age was 40 $\pm$ 2. One hundred-eleven (76.03%) were married and 35 (23.97%) unmarried. Most of the patients (82) were government employees (56.2 %), while 64 (43.8 %) were housewives of female patients.

The chief presenting complaint was upper abdominal pain with nausea, found in all 146 patients (100%). Eighty-eight patients had associated fever (60.2%), 56 (38.8%) had vomiting and 4 patients (2.7 %) had jaundice. Clinical examination revealed right hypochondrial tenderness and a positive Murphy sign in all 146 patients. A mass- like lesion was found in 16 patients (10.9%) and there was

right upper abdominal guarding in 54 patients (36.9%). Eighty-four patients (57.5%) had history of similar attacks,while 76 (52%) had co-morbid conditions (mainly diabetes mellitus and hypertension). Sixteen patients (4.1%) had history of previous abdominal surgery.Ultrasonography was done to all patients and revealed the presence of stone or stones in all 146 patients. There was increased wall thickness in 118 (80.8%), peri-cholecystic fluid in 48 (33.3%) and a mass was confirmed in 9 patients only (6.1%).Forty-eight patients (32.8%) were treated by early cholecystectomy, done within 72 hours to seven days. The procedure was laparoscopic in 28(58.4%) and open in 20 (41.6%). Delayed cholecystectomy (6-8 weeks after the initial attack) was done for 98 patients (67.2%).In the early group, the intra-operative findings were adhesions (to the omentum, duodenum or bowel) in 18 (37.5%), thickened gallbladder wall in 8 (16.6%), peri-cholecystic fluid in 4 (8.3%), mass in 6 (12.5%) and obscured anatomy of Calot triangle in 8 (16.6%).

For the early surgery group, the operative difficulty was documented. The procedure was considered simple when the anatomy of Calot triangle was clear; there were no adhesions or mass. This was the situation in 13 patients (27%). In 19 patients (39.5%), the difficulty was moderate (adhesions, mainly omental and a thickened gallbladder wall). The procedure was difficult in 12 (25%) with more advanced adhesions. The procedure was very difficult in 4 (8.3%), with empyema or thickened wall and obscure anatomy due to marked adhesions.In the last group, conversion to open method was needed, so the rate of conversion was 14.3%.The main length of the surgical intervention was 45 minutes in the early open group, 55 minutes in the early laparoscopic group, 55 minutes in the delayed open group and 75 minutes in the delayed laparoscopic group.The average hospital stay in early LC was $3^{\pm}$ 1 days, in early OC was $4^{\pm}$ 1 days, in delayed LC was $4^{\pm}$ 1 days and in delayed OC was $5^{\pm}$ 2 days. Early post-operative complications were seen in 2 patients (4.2%) in the early laparoscopic group and 4 (8.3%) in the early open group. So, 6 patients in the early group (12.5%) had early complications. In the late surgery group, 14 patients had early complications (14.2%). Of those, 8 patients (8.1%) had LC and 6 (6.1%) had OC.In the early surgery group, the most common complication was bile leak, which was seen in 3 (6.2%).There was bleeding in 2 (4.2%) and respiratory complications in one. In the late surgery group, there was bile leak in 8 (8.1%), bleeding in 4 (4%), DVT with pulmonary embolism in one, wound infection in 2 (2%) and pneumonia in one.

Table 1. Distribution of cases in present study according to demographic DATA

		No. of cases	%
Age	0 - 19	1	0.6%
	20 - 39	79	54.1%
	40 - 59	56	38.3%
	60<	10	6.8 %
Occupation	clerk	82	56.2
	House wife or retired	64	43.8
Marital state	married	111	76.03%
	Not married	35	23.97%

Table 2. Distribution of cases in present study according to clinical DATA

		No . of cases	%
Clinical symptoms	Nausea	146	100
	Fever	88	60.2
	Vomiting	56	38.8
	Jaundice	4	2.7
Findings exam	Rt .hypo .pain	146	100
	Murphy's signe +ve.	146	100
	Rt.hypo .guarding	54	36.9
	mass	16	10.9

Table 3. Distribution of cases in present study according to ultrasound finding

		No. of cases	%
Findings	1. stone	146	100
	2.increase wall thickness	118	80.8
	3. pericystic fluid	48	33.3
	4. mass	9	6.1

Table 4. Distribution of cases in present study according to management

		No . of cases	%
1. early cholecystectomy.		48	32.8
	1- Lap	28	58.4
	2. open	20	41.6
2. Delayed cholecystectomy.		98	67.2

Table 5. Distribution of cases in present study according to intra operative finding

	No . of cases	%
1. Adhesion	18	37.5
2. thick gall bladder wall	8	16.6
3. Peri cystic fluid	4	8.3
4. mass	6	12.5
5. obscured anatomy	8	16.6

Table 6. Distribution of cases in present study according to complication

		No . of cases	%
1. Early group.		6	12.5
	1. early Lap.	2	4.2
	2. early open	4	8.3
2. Late group.		14	14.2
	1. Late lap.	8	8.1
	2. Late open	6	6.1

Table 7. Distribution of cases in present study according to types of Complication

		No . of cases	%
1. early group.	1. bile leak	3	6.2
	2. bleeding	2	4.2
	3. resp. comp.	1	0.6
2. Lata group.	1. bile leak	8	8
	2. bleeding	4	4
	3. DVT	1	0.6
	4. wound inf.	2	2%

DISCUSSION

Laparoscopic cholecystectomy (LC) has clearly displaced open cholecystectomy (OC) in the management of simple gallstone disease. However, the role of LC in the management of acute cholecystitis (AC) is somewhat controversial because some surgeons claim that the inflammation, edema and necrosis present in patients with AC make dissection more difficult, which can, therefore, increase the rate of complications. AC has been considered a relative contraindication for LC because of the technical difficulties and a higher complication rate. With accumulated experience in LC, together with technical advances, LC in the management of AC had been considered a viable alternative therapy. [5] In many counties LC is performed after the acute episode has settled, because of the anticipated increased risk of morbidity and a higher conversion rate from LC to OC. [6]This study was undertaken to address two problems: early versus delayed surgical intervention in AC, and the use of LC versus OC in the early surgical management of AC as the open technique is still widely used in Iraq.

In this study, 48 patients (32.8%) were treated by early surgery for their AC. In the study by Lunca [4],64% had early surgery. Late surgery was performed to patients who did not come to hospital in time, and cases in which physician decisions were the main reasons for choosing a late intervention moment. [4] In the present study, the severity of the initial symptoms and the attending surgeon personal preference played the main part in choosing an early or late approach. Other studies had applied a randomized approach to the problem. [7] This was done by dividing the patients into two groups: early and delayed surgery groups. These randomized studies, as well as other non-randomized studies, have reached the conclusion in favor of early approach, because the dissection is not so difficult, the conversion rate is low if the surgery is laparoscopic, the operating time is shorter and the hospital stay is shorter. [8] If surgery is done early, inflammation is widespread and it is easy to perform dissection of the structures. At a later stage, there is induration, hyper vascularity, and the formation of abscesses and necrosis, factors that make dissection difficult. [8]

In the study by Lunca, the average length of surgical intervention was 30 minutes longer in the delayed group. [4] In the delayed group, it was 98+- 34 minutes and the early group it was 75+-28 minutes. All patients had LC in that study.In the present study, the results are similar. The operative time was generally less in the early group. This underlines the technical difficulties encountered in the patients with delayed LC. In most studies, the main hospital stay was 7-8 days for the early group and 11-12 days for the delayed group. [4,8] In the study by Gurusamy, the total hospital stay was shorter by 4 days in the early group. (6) A meta-analysis of randomized controlled trials showed that the combined total hospital stay was significantly shorter in the early group. [9] In this study, the main stay was in general shorter in the early group. It was 3-4 days in the early group and 4-5 days in the delayed group.In the early group treated by LC in this study, 4 patients needed conversion to the open method because of difficulties encountered during the operation (14.3%). The meta-analysis done by Shikata (9), showed no increased risk of conversion to open surgery in the early group. Another meta- analysis study,showed no significant difference in conversion rates between early and delayed LC. (10)One factor to remember regarding conversion is

that it must never be considered a complication but rather a wise move on the part of the surgeon. Lujan mentioned that a low rate of conversion is directly related to an increase in major complications. [15]

This meta-analysis also showed no significant difference regarding early post-operative complications. [10] In the present study, 4.2% of the early LC group, and 8.3% of the early OC group had early post-operative complications. In the delayed group, 8.1% with LC and 6.1% with OC had complications. In the study by Lunca, the rate of complications in early LC was 15 % and in delayed LC was 30.7%. [4]

In this study, the most common early complication in the early group was biliary leak or biliary fistulae which affected 3 patients (6.2%) and bleeding which affected 2 patients (4.2%). In other published studies, most of the complications are minor but in 2% of the cases injuries of the common bile duct can occur, and this is the most feared complication. [8] Another study [4] showed an almost double presence of common bile duct injury (3.77%). That study was froma developing country, so this may be explained by lack of experience, imperfect selection of patients and recognizing the appropriate moment for conversion.[4] Biliary fistulae are classified by some studies as minor complications and the incidence in the literature was 3.7-4.5% [8]. In another series, the incidence was 5.6%.Of those, most close spontaneously and some needed endoscopic sphincterotomy, especially if the fistula is due to slipping of the cystic duct clip. [4] Some studies showed no significant differences in the incidence of biliary or other major complications, in both early and delayed laparoscopic groups. [11, 12]A meta-analysis doneby Gurusamy, also revealed no significant difference between the two groups in terms of serious complications [1]. Also, there was no significant difference in the proportion of people who developed bile duct injury in the two groups. [1]

In this study, conversion from LC to OC was needed on 4 occasions in the early group (14.3%). The reasons for conversion were mainly the presence of obscured anatomy with difficult dissection or empyema.Other studies show less conversion rates with early LC (8.6%) compared to delayed LC (12.7%). [13]Another study showed no statistical difference in the 2 LC groups (early LC 5.6% and late LC 11.5%;). [14] In the study by Lunca from Hungary, conversion to an open procedure was necessary in 26.38% of patients in the early LC group and 50% in the delayed LC group. [4] The main reasons for conversion were difficulties in recognizing the anatomy of the area due to fibrous adhesions (63.5%), bleeding problems (21%), and suspected injury of the biliary ducts (15%). The average time for conversion was 60 minutes due to lack of progression of the dissection. [4] The conversion rate is related to the selection of the patients as well as the surgeon experience. [15]

There was no mortality in this study. In most studies, the mortality rate for LC is less compared to OC. This mortality seems to be raised for the cases with high risk (advanced age, severe forms of AC) reaching almost 16%. [17] In this study, 41.6% of patients in the early group had open cholecystectomy. This was mainly due to the surgeon preference and experience. The incidence of complications was slightly higher in the open group (8.3% vs. 4.2%). Other series also showed a higher incidence of complications with OC than with LC. [15]If these complications were classified according to severity, mild post-operative complications like phlebitis and a dynamic ileus, were more frequent in patients who underwent OC than in those who underwent LC because the postoperative period was significantly longer for these patients. Conversely, the amount of moderate or severe complications, usually related to surgical technique, was similar in both groups of patients.[15]

Delaying surgery may carry the risk of gallstone –related complications. This was reported in our series. Other trials had not reported any gallstone-related complications during the waiting period. [1] One trial reported 5 such complications, including 2 patients with cholangitis. There were no reports of pancreatitis during the waiting period time. [18] Approximately one-sixth of people belonging to the delayed group had either non-resolution of symptoms or recurrence of symptoms before their planned operation and had to undergo emergency LC. [19]In another study, 21.4% of patients in the delayed group required urgent surgery during the waiting period. [13] The conclusion of most studies is that LC is a safe, valid alternative to OC, in patients with AC. [20] This was also the conclusion we reached in this study. The procedure has a low rate of complications, implies a shorter hospital stay, and offers the patient a more comfortable post-operative period than OC. The threshold for conversion to OC should be low so that the rate of complications is also low. [15] .We also concluded that early cholecystectomy resulted in a significantly reduced length of stay, no major complication, and no significant difference in conversion rates when compared with initial conservative management and interval cholecystectomy. Early cholecystectomy also reduced the risk of readmissions attributable to recurrent acute cholecystitis.

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