

Preliminary Report

Early Laparoscopic Cholecystectomy for Acute Versus Chronic Cholecystitis: A Prospective Comparative Study

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ABSTRACT

Background: It is widely believed that laparoscopic cholecystectomy (LC) for acute cholecystitis (AC) is associated with technical difficulties resulting in higher conversion and complication rates. The aim of this study was to compare the feasibility and outcome of LC in AC as compared to chronic cholecystitis (CC).

Patients and Methods: During an 18-month period (1/1/02 - 30/6/03), 102 consecutive patients with the diagnosis of cholecystitis were operated upon. Twenty-four patients were male (23.5%) and 78 were female (76.5%). There were 19 patients (18.6%) with AC (Group 1) and 83 (81.4%) with CC (Group 2). Patients in the AC groups were operated upon within 72 hours of the onset of symptoms.

Results: LC took an average of 89 ± 21.2 minutes (range 40-180) for AC and 57 ± 33.4 minutes (range 25-165) for CC ($p = <0.05$). A 5th port was used in two patients (7.7%)

from the AC group and only in one patient (1.2%) from the CC group. Adhesions were present in 47.4% (9/19) patients with AC as compared to 28.9% (24/83) in those with CC ($p = <0.05$). There were two conversions to open cholecystectomy; both belonged to the CC group (2.4%, 2/83). No major post-operative complications were encountered in either group. The average hospital stay was 2.4 days in the AC group and 1.89 days in the CC group.

Conclusions: Early laparoscopic cholecystectomy for AC is technically more demanding and takes a longer time to perform; however, it is not associated with a higher conversion rate nor is it associated with a higher complication rate or a significantly longer hospital stay than for CC. To ensure safety and efficacy of LC for AC, it should be performed within 72 hours of the onset of symptoms.

KEY WORDS: acute cholecystitis, chronic cholecystitis, conversion, laparoscopic cholecystectomy, open cholecystectomy

INTRODUCTION

Laparoscopic cholecystectomy (LC) has become the standard method of treatment for patients with chronic cholecystitis (CC). It is associated with a lower morbidity, better cosmetic outcome, lesser hospital stay, and lower cost as compared to the conventional open cholecystectomy (OC)^(1,2). Despite recent reports on the safety and efficacy of LC in treating acute cholecystitis (AC), its role in the management of this condition remained controversial⁽³⁻⁸⁾ because of the potential hazard of severe complications^(9,10) and the high incidence of conversion to open surgery⁽⁵⁻⁷⁾. This conversion may result in loss of all the economic advantages of this minimally invasive procedure.

The present prospective study was conducted to assess the feasibility and outcome of LC in patients with AC (early LC) as compared to those with CC (late LC).

PATIENTS AND METHODS**Setting:**

The present study was conducted at the

Department of Surgery, Ahmadi Hospital, KOC, State of Kuwait.

Selection Criteria:

Between the first of January 2002 and the end of June 2003, 119 consecutive patients with the diagnosis of AC or CC were treated at the surgical department. Patients presenting with jaundice ($n = 6$) or symptoms of more than 72 hours prior to admission ($n = 7$), and those with incidental finding of AC during elective LC ($n = 3$) or an absolute contraindication to surgery ($n = 2$) were excluded from the study. Previous abdominal surgery was not considered a contraindication to LC. The remaining 102 patients constituted the population of the present study. There were 78 women (76.5%) and 24 men (23.5%). The mean age was 38.4 ± 12.3 years (range 19-69 years).

The diagnosis of AC was based on three diagnostic criteria; namely, acute upper abdominal pain with tenderness under the right costal margin, fever above 37.5°C and/or leukocytosis more than $10,000/\text{mm}^3$, and ultrasonographic evidence

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Table 1
Clinical data and laboratory results on admission

	Acute Cholecystitis (Group 1, n = 19)	Chronic Cholecystitis (Group 2, n = 83)	p Value
Age in years: X ± SD (range)	38 ± 9.2 (23-55)	39.1 ± 11.3 (19-69)	NS
Sex: Females: n (%)	14 (73.7%)	64 (77.1%)	NS
Body weight in Kg: X ± SD (range)	81.5 ± 10.7 (56-110)	81.1 ± 13.4 (57-118)	NS
Fever (> 37.5°C): n (%)	19 (100)	2 (2.4)	<0.05
WBC (> 10,000/mm ³): n (%)	17 (89.5)	2 (2.4)	<0.05
Total bilirubin (umol/L): X ± SD	16.1 ± 7.7	17.2 ± 9.6	NS
ALP: (IU/L): X ± SD	99 ± 30.7	91.6 ± 43.7	NS
Urea (mmol/L): X ± SD	5.6 ± 2.3	5.7 ± 2	NS

ALP: Alkaline phosphatase

(thickened or edematous gall bladder wall, presence of gall stones, ultrasonographic Murphy's sign, and pericholecystic fluid collection). In addition, the diagnosis of AC or CC was confirmed by histopathologic examination after surgery.

Study Protocol:

Subjects enrolled in this study (n = 102) were divided into two groups. Patients in Group 1 (n = 19, 14 women and five men) had AC and underwent LC within 72 hours of the onset of symptoms. Patients in Group 2 (n = 83, 19 men and 64 women) had LC for CC.

A single dose of intravenous antibiotics was given with induction of anesthesia. Special modifications to the procedure were adopted when deemed necessary.

The severity of pain during the first two post-operative days was assessed daily using a visual analog scale of zero to 10, and the number of analgesic injections required by the patient during the hospital stay was recorded. Feeding was resumed as soon as tolerated. Patient discharge was based on clinical grounds. All patients were followed-up at the surgical outpatient clinic at one week after discharge and at four weeks thereafter.

Assessment of Feasibility and Outcome:

Patients in both groups were compared regarding feasibility (difficulty of operation) and outcome. Assessment of feasibility was based on the operative findings, the need for special modifications of the operative technique, the operative time, and the rate of conversion to open cholecystectomy. The patient's outcome was evaluated with regard to the developments of complications, post-operative pain, post-operative hospital stay, and total recuperation period (time from initial admission to resumption of normal activities).

Statistical Analysis:

All continuous variables were expressed as mean values and standard deviation (X ± SD), and were compared using the student's t test. The Chi (X²) square test was used to compare differences in percentage between the two groups studied. A probability value of less than 0.5 was considered to be statistically significant.

RESULTS

Demographic and clinical data were similar in both groups. Patients with AC had more significant fever (p<0.01). Biochemical results were comparable except for leukocytosis (>10,000/mm³), which was present in 17 patients (89.5%) with AC as compared to only two patients (2.4%) with CC (p<0.01) (Table 1).

Assessment of Feasibility:

Operative Findings: The gall bladders of patients with AC were more often tensely distended (p<0.01) and filled with turbid bile or pus (p<0.01). Severe adhesions were also seen more frequently among patients with AC (47.4%) than among those with CC (28.9%).

Operative Time and Modifications of Technique: LC took an average of 89 ± 21.2 minutes for AC and 57 ± 33.4 minutes for CC (p<0.05). More significant modifications in operative technique, including gall bladder decompression, and closed suction drainage of the subhepatic space were required in patients with AC (p<0.05). Moreover, an additional cannula was used in 7.7% of patients with AC (2/19) to facilitate retraction of viscera as compared to 1.2% of patients (1/83) with CC.

Conversion Rate: Only two cases of conversion to OC were encountered in the present study; both belonged to the CC group (2.4%, 2/83), yielding an overall conversion rate of 1.9% (2/102). The reason for conversion to OC was difficulty in dissection at the Calot's triangle.

Table 2
Operative findings, modifications and time taken.

	Acute Cholecystitis Group 1, n = 19 (%)	Chronic Cholecystitis Group 2, n = 83 (%)	p Value
Operative Findings:			
Perforated GB	1 (5.26)	0	NS
Tensely distended GB	16 (84.2)	11 (13.3)	< 0.01
Turbid bile/pus in GB	15 (78.9)	7 (8.4)	< 0.01
Severe adhesions	9 (47.4)	24 (28.9)	< 0.05
Modifications of Technique:			
Use of 5 th port	2 (7.7)	1 (1.2)	NS
GB decompression	3 (15.8)	1 (1.2)	< 0.05
Sutures for cystic duct	1 (5.26)	0	NS
Extension of umbilical cannula site	3 (15.8)	12 (14.4)	NS
Closed suction drainage	9 (47.4)	1 (1.2)	< 0.05
Operative Time (Minutes):			
X ± SD	89 ± 21.2	59.1 ± 33.4	<0.05
Range	40-189	25-165	
Conversion Rate	0	2 (2.4)	NS

GB: Gall bladder

Assessment of Outcome: There were no bile duct injuries or other major complications in either group. One patient with AC developed bile leakage after surgery that subsided spontaneously within seven days. On the other hand, one patient with CC developed an umbilical port hernia, and another underwent ERCP post-operatively to remove a retained stone in the common bile duct. There was no significant difference between both groups regarding the post-operative pain score, or analgesic requirement. The total hospital stay was similar between both groups and so was the total recuperation period (Table 3).

DISCUSSION

Until recently, AC was considered a relative contraindication to LC due to higher incidence of complications, including bile duct transection rate^[11]. With improvements in instruments and technique, the number of reports on LC for AC has increased, with conversion rates ranging from 6.5% to 35%^[5-7,12-15].

The results of the current series confirm the view that complication rates of LC for AC or CC are comparable if the procedure is performed early in AC. None of our patients sustained bile duct injury or developed other major complications. The two cases of conversion to OC reported herein belonged to the CC group, which is inconsistent with the reports of other studies^[16,17] that considered AC a risk factor for conversion to open surgery. With experience, patience, careful dissection, and identification of vital structures, the surgeon can

safely complete a LC for AC in almost all cases. The most common reason for conversion to OC is the presence of severe adhesions^[18]. In the early phase of acute inflammation, adhesions are easily separated, and there is usually an edematous plane around the gall bladder that facilitates dissection. In chronic cases, however, the inflammation and edema are replaced by fibrotic adhesions between the gall bladder and the surrounding structures, which occasionally renders laparoscopic dissection extremely difficult. Adoption of an initial conservative approach in patients with AC does not seem to improve the success rate of LC. In fact, the conversion rate for delayed (interval) LC proved to be higher than that for early surgery in AC^[18-23]. This is the rationale behind adopting the early approach in the present study. However, performing LC during the acute phase requires more frequent modifications in operative technique and thus a longer operative time. In some cases, decompression of a tensely distended gall bladder by needle aspiration is necessary. In case of AC, the gall bladder may contain turbid bile or even pus. Thus, the surgeon must take extra precautions, including the use of suction drains, in some cases, to avoid bile collection with its potential risk of infection^[24].

The post-operative pain score and analgesic requirements in patients with AC or CC were comparable. The post-operative hospital stay and total recuperation period were also similar, being significantly shorter than those reported for OC^[22], which emphasizes the socio-economic benefits of the laparoscopic technique.

Table 3
Post-operative course of studied patients

	Acute Cholecystitis (Group 1, n = 19)	Chronic Cholecystitis (Group 2, n = 83)
Pain Score: X ± SD	2.9 ± 0.1	2.7 ± 0.2
No. of analgesics: X (range)	2.6 (1-7)	2 (0-6)
Hospital stay (days): X (range)	2.4 (1-8)	1.89 (1-7)
Recuperation period (days): X ± SD	21.2 ± 4	17.6 ± 3.3
Minor complications: N (%)	1 (5.26%)	2 (2.4%)
Bile leakage	1 (5.26%)	0
Retained CBD stone	0	1 (1.2%)
Umbilical port hernia	0	1 (1.2%)

CBD: Common bile duct

All the differences were not statistically significant

In conclusion, both early LC (for AC) and late LC (for CC) performed by experienced surgeons are safe and effective. Early surgery is technically more demanding and time consuming than late surgery. However, patients enjoy the advantages of less post-operative pain, low morbidity, and short hospital stay. To ensure safety and efficacy of LC for AC, the procedure should be performed by an experienced surgeon as soon as the diagnosis is established, preferably within three days of the onset of symptoms.

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