



Acute Biliary Pancreatitis - Optimal Time for Cholecystectomy: A Prospective Randomized Study

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Abstract

Background: Cholecystectomy can prevent recurrent attacks of mild Acute Biliary Pancreatitis (ABP). However, the optimal timing of cholecystectomy remains controversial. The aim of this prospective randomized study is to compare the outcomes of Early Laparoscopic Cholecystectomy (ELC) vs. Delayed Laparoscopic Cholecystectomy (DLC) for patients with mild ABP.

Methods: From June 2014 to December 2017, 131 patients with mild ABP were prospectively randomized to either an ELC group (70 patients) or control DLC group (61 patients). The primary outcomes were gallstone-related morbidity and mortality while the secondary outcomes were success and failure rate, the difficulty of cholecystectomy, operative time, cholecystectomy related complications, readmission for gallstone-related complications, hospital stay, ICU admission and additional procedure. The study was registered in the *ClinicalTrials.gov* PRS register with identification number NCT03085407.

Results: There were statistically significant differences in the incidence and number of readmission for gallstone-related complications (5.7% vs. 62.35, $P < 0.001$ & 4.3% vs. 21.3%, $P < 0.001$), and the total length of hospital stay (4.4 ± 1 vs. 6.9 ± 2.6 , $p = 0.03$). There were no statistically significant differences in the other parameters of evaluation between both groups.

Conclusion: In mild ABP, ELC can be done safely and efficaciously with a significant reduction in the recurrent biliary events, the total length of hospital stay and frequency of readmission compared with DLC.

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Keywords: Acute biliary pancreatitis; Cholecystectomy; Optimal time

Introduction

Acute biliary pancreatitis (ABP) caused by gallstones and biliary sludge [1] is the most important cause of Acute Pancreatitis (AP), accounting for up to 75% of cases [2-4]. Although most cases of ABP are mild and self-limiting, a small group (20%) of patients may develop severe pancreatitis, which is associated with high morbidity and mortality [5,6]. Commonly, after resolution of the initial attack of APB, patients may experience a recurrent attack (40% to 60%) within 2 weeks or other gallstone-related complications such as biliary colics, acute cholecystitis, acute cholangitis or common bile duct (CBD) obstruction [7,8].

Cholecystectomy or endoscopic biliary tree clearance of stones is indicated to reduce the risk of these recurrent biliary complications [9,10] and failure to provide definitive treatment exposes the patient to risks of dangerous biliary events [11]. However, there is a clear consensus that patients who present with ABP should undergo cholecystectomy to prevent further attacks; the optimal timing of surgery remains controversial [6,12].

There is an acceptance that cholecystectomy is delayed for patients with the severe attack until local complications as pancreatic necrosis and organ failure have resolved, typically after 6 weeks [4,10,13-15]. Whereas for patients with mild ABP, the precise moment for a cholecystectomy remains unclear [6,12]. It is recently recommended that early cholecystectomy should be performed, on the basis of prevention of the frequent recurrent attacks and readmission with biliary complications [10,16,17] with evidence that there is no difference in pre-operative morbi-mortality compared to patients subjected to delayed cholecystectomy [12,17-19].

Still, the actual timing of "early cholecystectomy" is unsettled between the guidelines from the index hospital admission up to 4 weeks [2,7,8,10]. These variations may be attributed to the lack of

evidence from prospective randomized controlled trials addressing the timing and safety of this maneuver [20]. Recently and despite the revised guidelines [9,10], early cholecystectomy during the same hospital admission is not commonly practiced [18] and the majority of surgeons prefer interval or delayed cholecystectomy with doubt regarding the efficacy and safety of early cholecystectomy [21-24]. The drawback of this strategy increased the risk of recurrent gallstone-related complications with repeated admission and higher costs [20].

Endoscopic retrograde cholangiopancreatography (ERCP) with Endoscopic Sphincterotomy (ES) may be an alternative measure for reduction of recurrent attacks of ABP but may result in higher rates of post-procedure complications when compared with Laparoscopic Cholecystectomy (LC) [25,26]. It can be used as an accepted definitive treatment in patients who have multiple co-morbidities and are not fit for surgery [14,15,20]. In this study, we compare the outcomes of patients with Early Laparoscopic Cholecystectomy (ELC) vs. delayed laparoscopic cholecystectomy (DLC) for patients with mild acute biliary pancreatitis.

Patients and Methods

Study design and setting

This is an open-label, prospective randomized controlled study including all patients have mild ABP who met the inclusion criteria. The study was performed at Qena and Sohag University hospitals, Egypt. They are two tertiary centers and serves a population over 10 million people in Upper Egypt, over a period of 3.5 years.

Hypothesis

We hypothesize that ELC (regardless of whether or not abdominal symptoms were still present and laboratory parameters had normalized) can be done safely and efficaciously with reduced recurrent attacks and hospital stay as compared with DLC (after resolution of abdominal symptoms and normalization of laboratory parameters) in patients with mild ABP.

Inclusion criteria

The study included all patient diagnosed with (1) the first attack of mild ABP, (2) onset <72 hrs, (3) age \geq 18 years, and (4) American Society of Anesthesiologists (ASA) grade \leq III. Acute pancreatitis was diagnosed by the presence of 2 of the 3 following evidence: (1) clinical evidence of pancreatitis (epigastric pain, acute onset, persistent, severe, often radiating to the back); (2) biochemical evidence of pancreatitis (serum amylase or lipase levels at least 3 times the upper limit of normal); and/or (3) radiographic evidence of pancreatitis (characteristic findings on contrast-enhanced computed tomography or magnetic resonance imaging) [27]. Biliary pancreatitis was diagnosed by (1) imaging confirmation of gallstones, sludge and/or CBD dilatation; and (2) no alcohol abuse [27]. Mild pancreatitis was defined by absence of (1) local complications such as peri-pancreatic fluid collections, acute necrotic collection and/or walled off pancreatic necrosis; (2) persistent organ failure (>48 hrs); (3) intensive care unit (ICU) admission; and (4) associated acute cholangitis [27]. The onset of AP is defined as the time of onset of abdominal pain not the time of admission to the hospital. The time interval between the onset and the hospital admission was noted. ICU admission was advised with aggressive fluid resuscitation requirement or associated acute cholangitis [6].

Exclusion criteria

Patients were excluded if they have any of the following: (1) severe

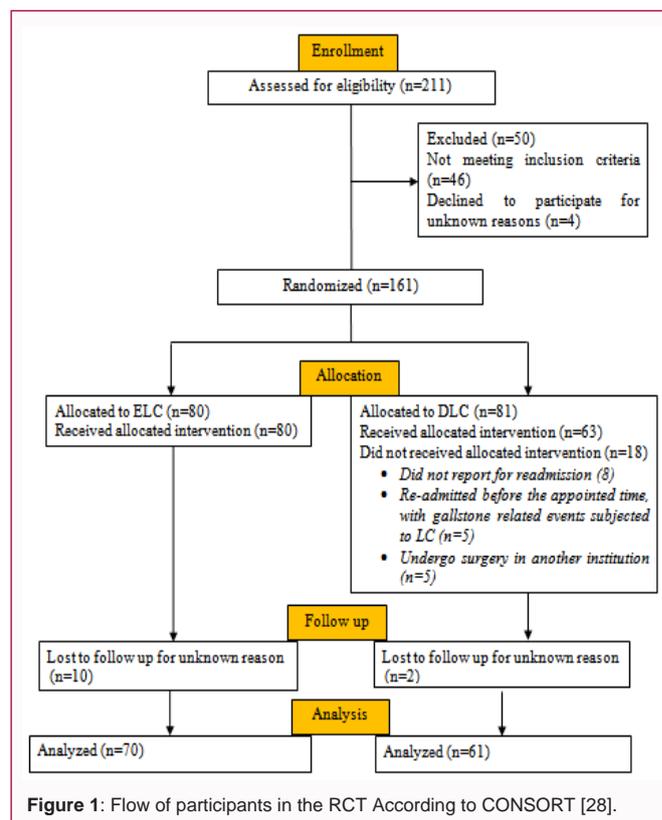


Figure 1: Flow of participants in the RCT According to CONSORT [28].

or chronic pancreatitis; (2) acute cholangitis; (3) alcohol abuse; (4) pregnancy; (5) severe medical conditions contraindicating operation; (6) previous cholecystectomy; or (7) refusal of participation.

Sample size calculation and randomization

The number of patients needed was calculated on the basis of the reduction of the recurrent biliary event. Considering a power of 80% and reliability of 0.05 to demonstrate, we found that 53 patients should be present in each group. With an estimated 10% loss to follow up, 58 patients will have to be included in each group.

The study was started with a target of 211 patients for the possible loss of patients and data during the study. Eligible patients (161 patients) were randomly divided immediately after admission into two equal groups (A & B) according to a computer-generated random number and CONSORT guidelines (Figure 1) [28]. Group (A) received ELC while group (B) received DLC. ELC was defined as laparoscopic cholecystectomy within 72 hrs after the onset of AP to allow the diagnosis and organize the operation by surgeons. DLC was defined as laparoscopic cholecystectomy performed electively (\geq 6 weeks) after the onset of AP [29]. ES has a protective effect on the recurrence of biliary pancreatitis and CBD obstruction [30], so randomization was balanced for ES. This allows for subgroup analysis with or without ES.

Ethical consideration

The study protocol was approved by the local research ethics committee of our hospital (No: SVU 148). Also, a written informed consent was obtained from all patients' prior recruitment to study. All patient data were kept private throughout the study. The study was registered in the *ClinicalTrials.gov* PRS register with identification number NCT03085407.

The procedure

ERCP+ES was done during the first 48 hours of admission in patients with elevated liver function test and/or imaging confirmation of biliary dilatation or CBD stones (US, CT, MRI and or MRCP). In the DLC group, patients were discharged after successful conservative treatment and scheduled for re-admission and cholecystectomy at the appointed time (≥ 6 weeks).

All cholecystectomies were done laparoscopically by expert surgeon. LC was carried out with three ports technique [31]. An additional fourth port was used when required. All dissections were performed with the harmonic scalpel. No Intra Operative Cholangiogram (IOC) was done for any patient of both groups with the strategy of preoperative endoscopic stone extraction with excellent and great endoscopic experiences of all participant surgeons. The abdominal drain was used only in doubtful patients with difficult dissection.

Postoperatively, all patients were closely monitored in the inpatient department. They started oral fluid 6 hours after the operation and subsequently advanced to a regular diet. Patients were discharged on the second postoperative day if they were able to tolerate regular diet with no pain with oral medication, and they had no other indications for continued hospitalization.

Outcomes

The primary endpoint:

Gallstone related morbidity and mortality occurring within 6 months after the onset of ABP, before or after cholecystectomy. Gallstone related complications include severe biliary colic, recurrent ABP, acute cholecystitis, and symptomatic choledocholithiasis (acute cholangitis and/or obstructive jaundice needing ERCP) requiring readmission [32].

The secondary endpoints:

1. Length of hospital stays of index admission.
2. Patients reporting mild biliary colic treated without readmission.
3. Success and failure (conversion to open cholecystectomy) rate of LC.
4. The difficulty of cholecystectomy as measured on a visual analogue scale (0-10).
5. Operative time.
6. Cholecystectomy related complications (intra-operative and post-operative).
7. The total length of hospital stays (LOS): (index admission plus readmission for recurrences and for cholecystectomy).
8. ICU admission (number of patient and total length of stay).
9. Postoperative ERCP.

Follow up

Patients who were discharged after randomization for DLC were followed up in the outpatient clinic weekly until readmission and operation at the appointed time with instruction to record all episodes of biliary colic (*i.e.*, irrespective of readmission). Postoperatively, patients in both groups were followed up in the outpatient clinic with a monthly visit over at least 6 months and were stopped follow up if

they remained completely asymptomatic.

Data collection and analysis

Patient data were prospectively collected during hospital admission for all patients using a case record form. Data entry was performed using the SPSS software version 16.0 (Chicago, IL, United States of America). The computer-assisted analysis was carried out at the end of the study. Results were expressed as means \pm standard deviation (SD) or medians with inter-quartile ranges (IQRs) for continuous variables and Mann Whitney U tests were performed to assess for significant differences in continuous data between two groups. Frequencies were presented for categorical variables and Fischer's exact test or chi-square tests were used as appropriate. Statistical significance will be achieved if P-value is less than 0.05. Subgroup analyses were done based on ES (yes vs. no) before randomization to assess its potential protective effect on the occurrence of gallstone-related complications.

Results

A total of 161 patients who had fulfilled the inclusion criteria of the study from June 2014 to December 2017 were recruited. The patients were randomized into two equal groups as previously mentioned (ELC=80, DLC=81). In the ELC group, 10 patients subsequently withdrawn from the study due to lost to follow up after the operation. In the DLC group, 20 patients subsequently excluded due to did not report for re-admission at the appointed time for operation (8 patients), re-admitted before the appointed time, with recurrent biliary events (3 patients with obstructive jaundice and 2 patients with ABP) and they all subjected to successful LC during the re-admission time, undergo surgery in another institution (5 patients), or lost follow up after cholecystectomy (2 patients). The remaining 131 patients were enrolled in the final analysis of this study where the ELC group includes 70 patients and the DLC group includes 61 patients (Figure 1).

Pre-cholecystectomy ERCP/ES was performed for 33 patients in the ELC group and 28 patients in the DLC group due to CBD stones, based on laboratory and imaging findings. Stones were found in the CBD during ERCP in all patients. ES was done a median of 1 day (IQR 1-2 days in ELC group and 1-4 days in DLC group) after the onset of ABP (Table 1). The only reported post ERCP complication was minor bleeding in one patient (1.4%) in ELC group A, vs. 2 patients (3.3%) in DLC group ($P=0.89$). All cases were successfully treated with endoscopic technique for achieving hemostasis. There were no significant differences with respect to age, sex, ASA score, pre-cholecystectomy ERCP between both groups (Table 1). The median interval time from onset of ABP to cholecystectomy was statistically greater among DLC group than among ELC group [56 days (IQR 46-121 days) vs. 3 days (IQR 3-3 days), respectively, $p<0.000$] (Table 1). In the DLC group, 28 (45.9%) underwent LC within 6 to 7 weeks.

Gallstone related complications occurred in 3 patients (4.2%) in the ELC group, as compared with 11 patients (18.1%) in the DLC group. In the ELC group, there were no gallstone-related complications in the short interval between the onset of pancreatitis and cholecystectomy, and all complications (100%) occurred after the operation with a median of 50 days (IQR 22-60). In the DLC group, 91% (10 patients) of gallstone-related complications occurred before LC, with a median of 41 days (IQR 20-70), and 9% (1 patient) occurred after LC with a median of 115 days (IQR 70-160). The overall difference between the two groups was statistically significant ($p<0.001$) (Table 2). Three

Table 1: Patients data.

Patients parameters	ELC (n=70)	DLC (n=61)	P value
Age (years), mean \pm SD	34.63 \pm 6.129	32.22 \pm 7.59	0.89
Sex (Male/Female), n	29/41	26/35	0.87
ASA score, mean \pm SD	1.89 \pm 0.81	2 \pm 0.76	0.57
Preoperative ERCP, n (%)	33 (47.1%)	28 (45.9%)	0.91
Interval time between onset and operation (days), median (IQR)	3 (3-3)	56 (46-121)	0

ELC: Early Laparoscopic Cholecystectomy; DLC: Delayed Laparoscopic Cholecystectomy; SD: Standard Deviation; ASA: American Society of Anesthesiologists; ERCP: Endoscopic Retrograde Cholangio Pancreatography; IQR: Inter-Quartile Range

Table 2: Primary endpoints.

Parameters	ELC (n=70)	DLC (n=61)	P value
Gallstone related complications, n (%)	3 (4.2%)	11 (18.1%)	0.001
Sever biliary colic	1 (1.4%)	2 (3.3%)	0.54
Recurrent ABP	1 (1.4%)	5 (8.2%)	0.02
Acute cholecystitis	0 (0%)	2 (3.3%)	0.08
Symptomatic choledocholithiasis	1 (1.4%)	2 (3.3%)	0.12
Mortality, n	0	0	0

ELC: Early Laparoscopic Cholecystectomy; DLC: Delayed Laparoscopic Cholecystectomy; ABP: Acute Biliary Pancreatitis

Table 3: Secondary endpoints.

Parameters	ELC (n=70)	DLC (n=61)	P value
Mild biliary colic, n (%)	1 (1.4%)	27 (44.3%)	0.0001
Success rate, n (%)	68 (97.1%)	60 (98.4%)	0.89
Failure rate, n (%)	2 (2.8%)	1 (1.6%)	0.71
Difficulty of cholecystectomy - VAS (1-10), mean \pm SD	5.3 \pm 1.4	4.9 \pm 1.1	0.74
Operative time (min), mean \pm SD	58.9 \pm 18.6	54 \pm 17.6	0.84
Cholecystectomy related complications, n (%)	5 (7.1%)	3 (4.9%)	0.67
Liver injury	1 (1.4%)	0	
Blood oozing from gall bladder bed	2 (2.8%)	1 (1.6%)	
Rupture gall bladder	0	1 (1.6%)	
Wound infection	2 (2.8%)	1 (1.6%)	
Length of hospital stay (days), mean \pm SD			
Index admission	4.2 \pm 0.6	3.7 \pm 0.5	0.21
Total length	4.4 \pm 1	6.9 \pm 2.6	0.01
ICU admission			
Number of patient, n (%)	0	2 (3.3%)	0.51
Total length of admission (days), median (IQR)	0	5 (4-6)	0.23
Postoperative ERCP, n (%)	2 (2.8%)	2 (3.3%)	0.21

ELC: Early Laparoscopic Cholecystectomy; DLC: Delayed Laparoscopic Cholecystectomy; SD: Standard Deviation; ICU: Intensive Care Unit; IQR: Inter-Quartile Range; ERCP: Endoscopic Retrograde Cholangio Pancreatography

patients readmitted with severe biliary colics (ELC=1, DLC=2), and treated conservatively. Recurrent biliary pancreatitis occurred in 1 patient (1.4%) in the ELC group, as compared with 5 patients (8.2%) in the DLC group, 2 patients in the DLC group presented with a severe pancreatitis with pancreatic necrosis required ICU admission for a median of 5 days (IQR 4-6). Two patients presented with acute cholecystitis in the DLC group, with a median of 99 days (IQR 50-148) and treated successfully with conservative treatment. Three patients presented with the manifestation of calculi obstructive jaundice (ELC=1, DLC=2) at a median of (54 & 55 days) and IQR of (54-54 & 17-93) respectively. They were treated successfully with ERCP and stone extraction without any post ERCP complications. No mortality occurred in both groups (Table 2).

In the ELC group, one patient reported postoperative mild biliary colic, compared with 27 patients in the DLC group (1.4% vs. 44.3%, $p < 0.0001$). LC was scheduled for all patients in both groups. In ELC group, it was completed successfully in 68 patients and 2 operations were converted to open surgery due to severe adhesions and difficult visualization of Calot's triangle and uncontrolled bleeding from an aberrant artery. In DLC group, it was completed successfully in 60 patients and 1 patient was converted to open surgery due to severe adhesions and difficult dissection of Calot's triangle. The mean difficulty of cholecystectomy scale was 5.3 and 4.9 in patients who underwent ELC and DLC respectively. However it was higher in the early group, it was statistically insignificant ($p = 0.74$). The operative time was statistically insignificant ($p = 0.84$) as the mean operative

time was 58.9 ± 18.6 min in the ELC group versus 54 ± 17.6 min in the DLC group. There was no statistically significant difference in the cholecystectomy related complication rates between the two groups (7.1 vs. 5%, $p=0.67$). There was no difference between the two groups in the length of index admission (mean of 4.2 days in the early group and 3.7 days in the delayed group, $p=0.21$), but the total length of hospital stay is statistically longer in the DLC group compared with the ELC group (6.9 ± 2.6 vs. 4.4 ± 1 days; $p=0.01$). In DLC group, the mean of index admission length was 3.7 ± 0.5 days, the mean of readmissions length due to pre-cholecystectomy gallstone related events was 1.9 ± 0.4 days, and the mean for cholecystectomy was 2.3 ± 0.4 days. There was no difference regarding ICU admission between both groups. Postoperative ERCP was required for 4 patients in both groups (ELC=2, DLC=2). In the ELC group, it was done for one patient with recurrent biliary pancreatitis and another with calculous obstructive jaundice. In the DLC group, it was done for 2 patients with calculous obstructive jaundice (Table 3).

In the subgroup analysis, the risk of recurrent biliary events was reduced in patients who underwent ES before cholecystectomy as compared to patients who did not undergo ES before cholecystectomy ($p=0.08$). The recurrent biliary events occurred in one (3%) patient in the ELC group, compared with 4 (14.3%) patients in the DLC group. In the DLC group, one patient developed recurrent ABP, two patients developed acute cholecystitis, and one was readmitted for severe biliary colic. One patient in the ELC group was readmitted for severe biliary colic.

Discussion

This study demonstrates that ELC done within 72 hrs of onset of mild ABP regardless of normalization of laboratory values or clinical stabilization, decrease the risk of recurrent biliary complications and the total LOS compared with DLC after normalization of laboratory values and clinical condition. In addition, the cholecystectomy can be done safely and efficaciously with a very low incidence of cholecystectomy related complications.

The timing of cholecystectomy in patients with ABP remains a subject of ongoing debate. It is advisable that cholecystectomy is delayed for patients with severe ABP until local complications have resolved [12-15]. Regarding mild ABP, The early data recommended delayed cholecystectomy (6-8 weeks) with the low incidence of morbidity and mortality [3,33-35]. This was supported by Kelly and Wagner who showed that early cholecystectomy within 72 hrs will be associated with difficult dissection and more surgical complications and conversion to open surgery [36]. Moreover, patients during this phase can still develop pancreatic necrosis and/or organ failure which both considered as contraindications for early surgery [36,37]. The recently published studies and guidelines refute this data with confirmed comparable outcomes of early and delayed LC for patients with mild ABP. They recommended ELC index admission as the procedure of choice for patients with mild ABP [5,6,8-17].

Also, the role and timing of ERCP for ABP is a matter of debate. Moretti *et al.* [38] showed that early ERCP in patients with severe ABP is beneficial with decreased pancreatitis related complication while it has no advantage in patients with mild ABP compared with conservative management. Bignell *et al.* [39] showed that ERCP and ES alone for the patient with ABP will reduce the incidence of recurrent pancreatitis but they will increase the incidence of gallstone-related complications. Chang *et al.* [40] demonstrated that there was

no difference in pancreatitis related complication rate in patients with mild ABP underwent ERCP either pre or postoperatively. Early studies suggested that ERCP with ES alone, can serve as an acceptable alternative to, and thus can abolish the need for, cholecystectomy in patients with mild gallstone pancreatitis [41-43]. However, more recent evidence and guidelines have refuted this suggestion and conversely recommended early ERCP/ES within 24 hrs to 48 hrs in patients with mild APB only with clear evidence of CBD stone or cholangitis followed by ELC as a definitive treatment for these patients [7,8,10,14,15,44,45].

In our study, we follow the previous international guidelines recommendations regarding preoperative ERCP [8,10,14,15] with no significant difference between both groups. Our results showed that the risk of overall recurrent biliary events was reduced in patients who underwent ES before cholecystectomy as compared to patients who did not undergo ES before cholecystectomy ($p=0.08$). This finding differs from the results of many studies showed that ES might mitigate only the risk of recurrent pancreatitis, but it does not affect the risk of other recurrent complications such as acute cholecystitis, biliary obstruction and or biliary colic [4,44-47]. Our study revealed a statistically significant reduction in the recurrent biliary pancreatitis and biliary obstruction and statistically insignificant difference regarding recurrent biliary colic and acute cholecystitis between patients who did and did not undergo ES before cholecystectomy.

Several studies showed that there is a possible risk of gallstone-related complications (9%-60%) after index admission for mild ABP and before delayed cholecystectomy [4,15,17,18,34,41]. This risk is high (up to 35%) even when the DC will be scheduled within 2 weeks after the index admission [4,17,18]. Our study revealed statistically reduced the risk of gallstone-related complications following ELC as compared with DLC. This was comparable with many studies [41] and support a shift towards ELC for these patients [48,49]. Recurrent ABP was the only statistically significant one of gallstone-related complications between both groups and this was comparable with Da Costa *et al.* [47]. Jee *et al.* [20] showed that although post-cholecystectomy recurrent pancreatitis is very low it can occur as a result of retained CBD stones or sludge. In the same line, our study revealed three patients who had post-cholecystectomy recurrent pancreatitis due to retained CBD stone (ELC=1, DLC=2). Our low incidence of recurrent biliary events with ELC was reflected on the low incidence of readmissions and this was comparable with many studies [6,23,50] concluded that the strategy of early cholecystectomy results in significant reduction in the number of readmissions. This is because full treatment will be done during the index admission for patients scheduled for early cholecystectomy, whereas delayed cholecystectomy requires two admissions at least, one for initial conservative treatment of acute pancreatitis and another for delayed operation. This result will support several previous cost-effectiveness studies showed that the high cost of ELC was offset by the reduction gallstone-related complications and readmissions associated with DLC [51,52].

Our study revealed highly statistically significant difference between both groups (1.4% vs. 44.3%, $p<0.0001$) regarding mild biliary colic which was treated without readmission. This was comparable with Da Costa *et al.* [47] who showed the same high statistically significant difference (3% vs. 51%, $p<0.0001$).

The success and failure rate showed no statistically significant differences between both groups with a comparable result to other

series [6,47,53]. On the contrary, several studies showed a higher conversion rate with ELC. Jee *et al.* [20] showed a conversion rate of (10.53% vs. 11.76%; $p=1.000$), and he attributed these higher incidences to the chronicity of cholecystitis with high frequency of adhesions in their population, while Tang *et al.* too, showed a higher conversion rate of 67% with ELC and 18% with DLC [53].

The old concept of delayed cholecystectomy was based on the concept of difficult intervention during the acute stage with difficult anatomical assessment and dangerous dissection [33,36]. However, our result was exactly the opposite. There was no statistically significant difference regarding the difficulty of cholecystectomy in both groups. And this result was comparable with the recently published studies [47,54]. Interestingly in contrast to this old concept, recently a number of studies concluded that delayed cholecystectomy was significantly more difficult than early cholecystectomy. They have suggested that soft fibrinous omental adhesions during the acute stage will allow easy dissection and easier cholecystectomy. On the contrary, fibrous dense adhesions during the late stage will make the dissection more difficult with complicated cholecystectomy [54,55].

Our study revealed nearly equal operative time (58.9 vs. 54 mins) between both groups and this was consistent with literature that demonstrated no significant difference regarding operative time in patients who underwent EC and DC [20,49,50,54]. Also, Our study demonstrated no significant difference regarding cholecystectomy related complications between both groups and this rate was comparable to that reported in the literature [6,12,20,54]. The low incidence of these complications supports the accepted hypothesis of safety and efficacy of early cholecystectomy after mild ABP [13,47]. Also, this hypothesis is confirmed by previous equal results of surgical difficulty obtained between both groups [47,54].

Although, our study demonstrated no significant difference regarding the length of index admission between both groups; the strategy of early cholecystectomy with a reduced number of readmission was reflected a statistically insignificant reduction in the total length of hospital stay in ELC group compared with DLC group. Similar conclusions have been shown in a number of other studies [6,12,23,55,56].

Conclusion

In conclusion, ELC during the index admission for patients with mild ABP can be done safely and efficaciously with reduced recurrent biliary events and its subsequent total length of hospital stay and frequency of readmission compared with DLC. In addition, there is no difference in the success and failure rate, difficulty of cholecystectomy, operative time, or complication rate between early or delayed LC. Furthermore, it prevents disabling colics that occurred within about half of those patients awaiting DLC. Therefore, we recommend ELC in patients with mild ABP and although we know the difficulty to change the behavior of many surgeons we hope our results to be a point of attraction and persuasion in favor of early surgery.

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