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Comparative Study between Early versus Delayed Laparoscopic Cholecystectomy in Mild Acute Gallstone Pancreatitis

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Abstract

Background: Gallstone pancreatitis accounts for around a quarter of all pancreatitis cases. As a result, cholecystectomy is regarded a definite curative treatment for gallstone pancreatitis since it eliminates the source of stones, preventing further bouts of pancreatitis. Although there is agreement that cholecystectomy is the final treatment, there is still debate over the appropriate time to do the surgery in order to receive the greatest results and avoid complications.

Aim of Study: The goal of the study is to evaluate early and delayed laparoscopic cholecystectomy in patients with mild gallstone pancreatitis in order to establish the best timing for cholecystectomy to prevent pancreatitis recurrence and reduce intra- and post-operative cholecystectomy complications.

Patients and Methods: The data of 40 patients with mild acute gallstone pancreatitis who came for the first time to the Department of General Surgery at Ain Shams University Hospitals in Cairo, Egypt, were gathered between December 2020 and July 2021 for this randomized prospective study. They were split into 2 groups: Group A had an early laparoscopic cholecystectomy within one week of admission, and group B had a delayed cholecystectomy six weeks later.

Results: Four men (20%) and sixteen females (80%) were in the early group, while two males (20%) and sixteen females were in the delayed group. 80%, In terms of age (p=0.109), the index group's mean age SD was 39.70 ±8.82 years, with a range of 27 to 50 years, whereas the delayed group's mean age SD was 46.50±9.05 years, with a range of 32 to 59 years. All of the cases were given a thorough history and a thorough clinical examination. All patients (100%) had abdominal discomfort as their presenting symptom, and all patients in groups A had laparoscopic cholecystectomy (LC) without diversion to open cholecystectomy. In group B, 2 cases were converted to open cholecystectomy, all patient have good perstalisis and started oral fluid at same postoperative day, 0% risk of recurrence of biliary pancreatitis in group A and 50% in group B. There was no significant difference in bleeding between both group. Patients who had late cholecystectomy had a higher rate of postoperative wound infection than those who had an early cholecystectomy, but there was insignificant difference. There was no significant difference in biliary complication (biliary damage) across both groups (biliary leak or missed stone). Post-operative pain is higher in late cholecystectomy patients than in early cholecystectomy patients, although the difference is not significant. Patients who had late cholecystectomy stayed in the hospital longer than those who had an early cholecystectomy. Patients were monitored for one month after surgery, with no mortality or complications.

Conclusion: The current study discovered that early cholecystectomy after mild gallstone pancreatitis is better than doing it late because it is linked to a lower rate of biliary pancreatitis recurrence, fewer pancreatitis complications, fewer perioperative complications (adhesions, blood loss, biliary events, infection, postoperative pain), and a shorter recovery time.

Key Words: *Delayed laparoscopic cholecystectomy – Gallstone pancreatitis.*

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Introduction

GALL bladder illness is one of the most prevalent reasons for adult hospitalisation for acute abdomen & the commonest reason for abdominal surgery in the elderly **[1]**.

Patients with tiny gallstones and a broad cystic duct are more likely to pass stones. Acute Biliary Pancreatitis (ABP) is caused by gallstone migration and blockage of the CBD and pancreatic duct **[2]**.

Acute Pancreatitis (AP) is a pancreatic inflammation with little or no fibrosis that can be followed by restoration of clinical and biological data if the main cause is removed. The severity of AP varies greatly in clinical terms. The majority of individuals have a self-limiting mild version of the disease, while others have a more severe and sometimes lethal attack. The mild form accounts for roughly 80% of cases, with a fatality rate of around 1%, while the severe form accounts for the remaining 20% of cases, with mortality rates ranging from

20% to 50%. Biliary calculi are one of the most common causes of AP, accounting for roughly 50-70 percent of cases of patients suffering this disease [3].

For gallstone pancreatitis, recent guidelines recommend laparoscopic cholecystectomy (LC) to lower the recurrence incidence of biliary tract infection and obstruction [4].

But in severe pancreatitis where local and systemic complications such as pancreatic phlegmon and organ failure, cholecystectomy usually delayed after 6 weeks [5].

However, there is no agreement on when LC should be performed for individuals with moderate biliary pancreatitis. According to international norms, LC should be done as soon as the patient has improved during the same hospitalisation [6].

Early LC within 48 hours, compared to delayed LC, can shorten the hospital stay and decrease biliary related recurrent problems, and it does not raise the difficulty of the operation or the incidence of surgical complications, according to a prospective randomised controlled study published in the United States and cited by many guidelines and reviews [7].

Over the course of a year, a prospective study was undertaken at Indira Gandhi Medical College in Shimla, a tertiary care hospital. Two groups of patients were formed from the total number of patients (I and II). Patients with mild AP who were operated on during the same hospitalisation, i.e. within 8 days after the onset of acute mild pancreatitis, were included in Group I. Other mild AP patients who had a delayed laparoscopic cholecystectomy (LC), i.e. after 4-6 weeks of sickness, were included in Group II. It showed that laparoscopic cholecystectomy is safe, efficacious, and possible in the early stages of acute mild biliary pancreatitis. It reduces the length of stay in the hospital while having no effect on the number of complications or deaths [8].

It has been suggested that laparoscopic cholecystectomy should be performed within two weeks of the admission to decrease overall hospital accommodation, and minimise biliary pancreatitis recurrence as early cholecystectomy is preferable to delayed surgery [9,10].

In real practice, however, surgeons frequently with hold LC until there is evidence that the inflammation has entirely resolved, such as the lack of pain, normal amylase and liver function levels [11].

Because of the uncertainty about the safety and efficacy of early cholecystectomy, the majority of specialists perform late cholecystectomy. This could be due to a lack of evidence from prospective randomized controlled studies. Hospital resources, such as surgeon availability, operating rooms, and intensive unit beds, may also influence in objection with early cholecystectomy guidelines.

Aim of the study:

The goal of the study is to evaluate early versus delayed laparoscopic cholecystectomy in patients suffering from gallstone pancreatitis in order to discover the best timing for cholecystectomy in order to minimise pancreatitis recurrence and reduce intra- and post-operative cholecystectomy complications.

Patients and Methods

Patients with acute gallstone pancreatitis who came for the first time to the Department of General Surgery at Ain Shams University Hospitals with mild acute gall stone pancreatitis from December 2020 to July 2021 were included in this prospective study.

Gallstone pancreatitis was diagnosed based on sever abdominal pain, soreness, amylase, and lipase levels that were more than three times the normal limit, and ultrasonography detection of gallstones, as well as rising gallbladder wall thickness, and abdominal computed tomography (CT).

Age, sex, medical history, vital signs, current disease, laboratory results (CBC, liver function, serum amylase) were all assessed. Patients were given enough fluid resuscitation, as well as analgesics and antibiotics.

In both groups, the severity of AP was assessed by the Modified Atlanta Criteria at the time of admission [12].

When clinical and laboratory improvements in upper abdominal discomfort, nausea, vomiting, and a decrease in the levels of liver enzymes, leukocytes, and amylase levels were noted in both groups, the surgical indication was granted.

Patients were scheduled for LC and The ethical committee approved the study, and each patient signed a written informed consent form.

Patients were categorized into two groups (20 patients in each).

- Group 1: Patients who had an Early Cholecystectomy during their initial pancreatitis attack and

before being discharged from the hospital were included (within 7 days).

- Group 2: Patients who had conservative management during their first episode and then had an elective Late Cholecystectomy after 6-weeks.

Study design and randomization: This is a randomised controlled trial that will be conducted in the future. Patients with mild acute gall stone pancreatitis who met the inclusion criteria and gave their informed agreement to join the trial were randomly allocated in one of two groups: Early or delayed cholecystectomy.

Due to the nature of this study, concealing the allocation for investigators or study participants is impossible due to the fact that study participants must be scheduled for an early or delayed cholecystectomy. After informed consent was obtained, an impartial person randomly assigned participants by drawing a sealed, unlabeled, unordered envelope from a container. Cholecystectomy was performed within the index stay in patients randomised to the early group when they no longer required narcotic analgesics and could tolerate a normal oral diet.

Interval cholecystectomy was conducted on an elective basis in the delayed group, roughly 6 weeks after the pancreatitis episode, after hospital discharge from the original stay. Cholecystectomy was carried out laparoscopic. All of the patients were given the proper antibiotic prophylaxis before surgery.

Sample size calculation: To demonstrate a reduction in recurrent biliary episodes with a power of 80% and a two-sided test of 5%, each group will need to have twenty patients (PS Calculations, version 2.1.3; Ain Shams University, Cairo, Egypt). With a 10% expected drop-out rate, a sample size of twenty in each group is required.

Inclusion criteria: The study comprised all patients aged 18 and above who were admitted to Eldemerdash Hospital with mild Acute gallstone Pancreatitis and gave their agreement to join the study. If a person exhibited the following three symptoms, they were diagnosed with acute pancreatitis: (1) Epigastric pain, vomiting and nausea are clinical indications of pancreatitis; (2) A high level of amylase more than three times the upper limit of normal; and (3) Classic features of gallstone in abdominal imaging such as gallstones and/or sludge.

Exclusion criteria:

Patients were excluded if they had any of the following: Patients with a history of acute non-calcular pancreatitis, pancreatic surgery, or endoscopic retrograde cholangiopancreatography (ERCP), patients with poor performance status or medical condition and ASA grades IV and V, patients under the age of 18 or pregnant, patients with choledocholithiasis, acute cholangitis, or biliary tract obstruction, and patients with moderate or severe pancreatitis.

Pre-operative assessment:

Clinical assessment: Full history taking (including history of previous attacks of acute cholecystitis and history of jaundice), together with full general and local examination.

General: General examination was done for all patients, focusing on: Vital data (Fever), complexion (Jaundice, cardio-vascular fitness and respiratory fitness.

Local: Full abdominal examination was done for all patients focusing on: Right hypochondrial and epigastric tenderness, scars of previous operations (mainly in the upper abdomen) and abdominal wall hernias.

Imaging investigations: Pelvi abdominal ultrasound will be needed for diagnosis, pelvi abdominal computed tomography (CT), MRCP will be used in certain cases and general preoperative imaging as chest X-ray, ECG and echocardiogram (if needed).

Laboratory investigations: Complete blood count, coagulation profile (PT, PTT, INR), kidney function tests (BUN, serum creatinine), liver function tests (ALT, AST), total bilirubin, direct bilirubin, alkaline phosphatase and gamma glutamyltransferase (if needed), C-Reactive Protein (CRP), serum amylase and lipase.

All patients received the following line of treatment on admission: Nothing per mouth (N.P.O) till tolerated. Intra venous fluids (500cm Glucose 5% every 8 hours, 500cm Ringer solution every 12 hours and 500cm Normal Saline every 24 hours) if the patient is nothing per mouth (N.P.O).

Broad spectrum third generation cephalosporins antibiotic injection 1gram every 12 hours for 5 days, proton pump inhibitor every 12 hours.

All patients in both groups received analgesic in the form of paracetamol (perfelgan) every 12 hours with antispasmodic injection for 24 hours and was given narcotic as Pethidine 50mg when needed.

Operative technique:

Preoperatively, all patients received third-generation cephalosporin intravenously within 1 hour of the incision time. In all surgeries, the same laparoscopic surgical techniques were employed, with insufflation of the abdominal cavity at 12 to 15 mmHg then dissection of the medial and lateral salcus, identification of the cystic artery and cystic duct, clipping and dissection of the cystic duct and cystic artery, and dissection of the gall bladder bed.

Intra operative evaluation: Intra operative measures of surgery on both groups of patients will Evaluate operation time (min), conversion rate (%), difficulties during surgery, intraoperative complications as vascular injury, billiary injury, bowel injury.

Post-operative evaluation: The postoperative outcome of the surgery on both groups of patients will evaluate the total hospital stay (days), mortality rate, postoperative complications as bleeding, leakage, and recurrent events during the follow-up. The patient was then followed-up for one month at the outpatient clinic or by the referring surgeon after being discharged.

Ethical consideration: With reference to the evaluation of patients' medical records and reports, approval was received from the Clinical Research Ethics Committee and Medical Research Ethics Committee, Faculty of Medicine, Ain Shams University. It was also acquired from the competent authorities in Eldemrdash Hospital. Throughout the trial, all patient information sheets were kept private. Prior to surgery, informed written consent was obtained.

Data collection: After the project was approved, data gathering began in Eldemerdash and Ain Shams specialised hospitals, as well as Ain Shams University. Each patient in the study had their preoperative, surgical, and postoperative data recorded prospectively.

Statistical analysis: Data were collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) version 23. The quantitative data with non parametric were presented as median with inter-quartile range (IQR). Also qualitative variables were presented as number and percentages. The comparison between groups regarding qualitative data was done by using Chi-square test and/or Fisher exact test when the expected count in any cell found less than 5. The comparison between two independent groups with quantitative data and parametric distribution was done by using Independent *t*-test while with non-parametric distribution was done by using Mann-Whitney test. The comparison between two paired groups with quantitative data and parametric distribution was done by using Paired *t*-test while with non-parametric distribution was done by using Wilcoxon Signed Rank test. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the *p*-value was considered significant at the level of <0.05.

Results

Table (1): Comparison between Group and Group B regarding demographic data.

	Group A No.=20	Group B No.=20	Test value	*p*-value	Sig.
Age:					
Mean ± SD	40.20±8.22	44.80±9.43	–1.644	0.109	NS
Range	27-50	32-59			
Sex:					
Female	16 (80.0%)	16 (80.0%)	0.000	1.000	NS
Male	4 (20.0%)	4 (20.0%)			

p-value >0.05: Non significant (NS). *:Chi-square test.
p-value <0.05: Significant (S). •: Independent *t*-test.
p-value <0.01: highly significant (HS).

The Previous table shows that there was no statistically significant difference found between the two groups regarding Age, and sex. Group A include 20 patients (16 Females, 4 Males). Group B include 20 patients (16 Females, 4 Males).

Table (2): Comparison between Group and Group B regarding associated co morbidities.

	Group A		Group B		Test value*	*p*-value	Sig.
	No.	%	No.	%			
B.asthma:							
Negative	20	100.0	18	90.0	2.105	0.147	NS
Positive	0	0.0	2	10.0			
D.M:							
Negative	16	80.0	18	90.0	0.784	0.376	NS
Positive	4	20.0	2	10.0			
HTN:							
Negative	16	80.0	18	90.0	0.784	0.376	NS
Positive	4	20.0	2	10.0			
R,Stone:							
Negative	20	100.0	18	90.0	2.105	0.147	NS
Positive	0	0.0	2	10.0			
CS:							
Negative	10	50.0	14	70.0	1.667	0.197	NS
Positive	10	50.0	6	30.0			
Appendect:							
Negative	14	70.0	16	80.0	0.533	0.465	NS
Positive	6	30.0	4	20.0			

p-value >0.05: Non significant (NS). *:Chi-square test.
p-value <0.05: Significant (S).
p-value <0.01: highly significant (HS).

There were no significant differences between the two groups regarding other morbidities (Bronchial Athma, DM, HTN, Renal Stones) (Fig. 1).

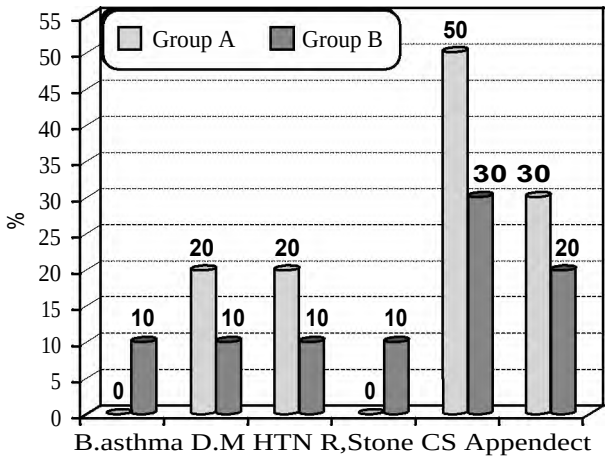

Fig. (1): Comparison between Group and Group B regarding associated co morbidities.

Table (3): Comparison between Group and Group B regarding Laboratory data at time of admission.

	Group A No.=20	Group B No.=20	Test value	*p*-value	Sig.
Amylase:					
Mean ± SD	1298.60±618.79	1103.10±572.41	1.066•	0.293	NS
Range	383-2200	395-2070			
Lipase:					
Median (IQR)	848 (442-1200)	888.5 (628-1200)	–0.271≠	0.787	NS
Range	214-1950	234-1700			
AST:					
Median (IQR)	72.0 (48.5-91.5)	84.5 (67-112)	1.612≠	0.107	NS
Range	22-180	32-180			
ALT:					
Median (IQR)	82.5 (67-112)	65.5 (40-96)	1.571≠	0.116	NS
Range	32-180	21-125			
ALP:					
Mean ± SD	160.50±66.03	184.20±99.86	–0.910•	0.369	NS
Range	40-300	88-390			
CRP:					
Mean ± SD	43.10±13.68	45.20±19.15	–0.410•	0.684	NS
Range	12-60	6-70			
Billirubin:					
Mean ± SD	1.12±0.49	1.14±0.51	–0.131•	0.897	NS
Range	0.5-2	0.5-2.1			
Ca:					
Mean ± SD	9.22±0.59	9.20±0.75	0.096•	0.924	NS
Range	8.5-10.3	8-10.1			

ALT: Alanineaminotransferase.
AST: Aspartate aminotransferase.
CRP: C-reactive protein.
Ca: Calcium.
•: Independent *t*-test.
≠: Mann Whitney test.
p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS)

There is no significant difference between group A and group B regarding laboratory data.

Table (4): Comparison between the two studied groups according to imaging data.

	Group A		Group B		Test value*	*p*-value	Sig.
	No.	%	No.	%			
Gallstone number:							
Single	4	20.0	4	20.0	0.000	1.000	NS
Multiple	16	80.0	16	80.0			
Cystic dilation:							
No	20	100.0	20	100.0	NA	NA	NA
Yes	0	0.0	0	0.0			
IHBRD:							
No	16	80.0	14	70.0	0.533	0.465	NS
Yes	4	20.0	6	30.0			
CBD dilation:							
Normal	16	80.0	14	70.0	0.533	0.465	NS
Dilated	4	20.0	6	30.0			

p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS).
*:Chi-square test.

There was no significant difference between the two studied groups as regard imaging data (Table 6). Group A contain multiple stone in 16 patients (80%), single stone 4 (20%). Group B contain multiple stone in 16 (80%) and single stone 4 (20%). No cystic dilation in group A and only 2 cystic dilation in group B. Normal CBD in group A 16 patients (80%) and dilated CBD 4 patients (20%). Normal CBD in group B 14 patients (70%) and dilated CBD 6 patients (30%). The patients with biliary dilatation and bilirubin elevated were store Passers, So They did not undergo ERCP.

Table (5): Comparison between the two studied groups according to recorded intra operative data surgical data.

	Group A No.=20	Group B No.=20	Test value	*p*-value	Sig.
Adhesion:					
No	8 (40.0%)	10 (50.0%)	0.404*	0.525	NS
Yes	12 (60.0%)	10 (50.0%)			
Callot dissection:					
Easy	12 (60.0%)	12 (60.0%)	0.000*	1.000	NS
Difficult	8 (40.0%)	8 (40.0%)			
Operation time (min):					
Mean ± SD	69.70±21.10	86.80±17.62	–2.858•	0.007	HS
Range	35-95	40-100			
Conversion to open:					
No	20 (100.0%)	18 (90.0%)	2.105*	0.147	NS
Yes	0 (0.0%)	2 (10.0%)			
Organ injury:					
No	20 (100.0%)	20 (100.0%)	NA	NA	NA
Yes	0 (0.0%)	0 (0.0%)			
Bleeding:					
No	12 (60.0%)	12 (60.0%)	0.000*	1.000	NS
Yes	8 (40.0%)	8 (40.0%)			

p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: highly significant (HS).
*:Chi-square test.
•: Independent *t*-test.

There was no significant difference between the two studied groups as regard surgical data (Table 7). Group A adhesion present in 12 patients (8 with

omentum and 4 with duodenum). Group B adhesion present in 10 patients (5 with omentum and 5 with duodenum) (Figs. 2,3). Easy Callot dissection means easy identification of cystic duct and cystic artery. In group A and B, 12 were easy and 8 were difficult. Operation time was more in group B (80.80±17.62). And group A mean time was (69.70 ±21.10). No conversion to open in group A but 2 cases was converted to open in group B due to bleeding. No organic injury in both groups. And equal bleeding results in both groups. (Figs. 4,5).

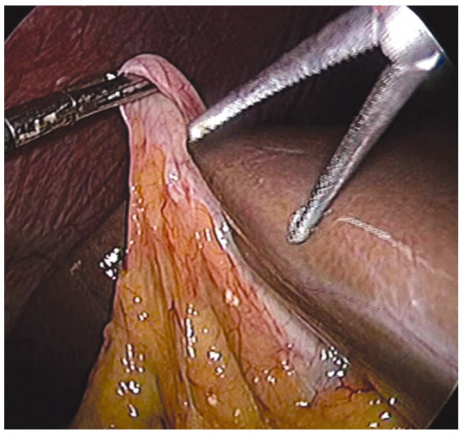

Fig. (2): Omentum adhesions.

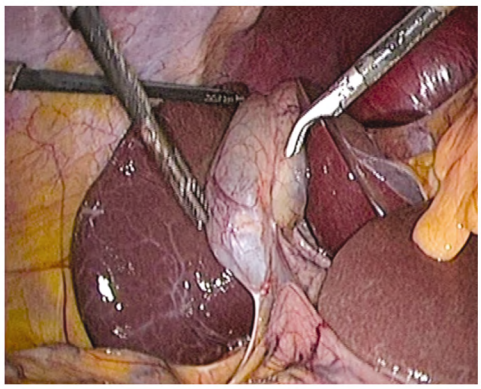

Fig. (3): Adhesions between duodenum and gallbladder.

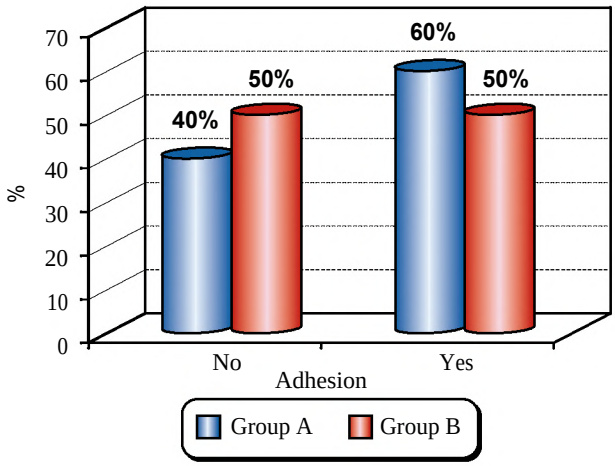

Fig. (4): Comparison between the two studied groups according to adhesion.

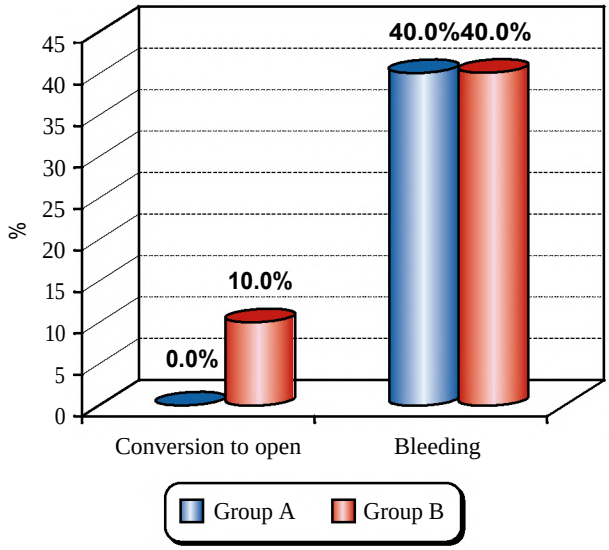

Fig. (5): Comparison between the two studied groups according to conversion to open and bleeding.

Table (6): Complications of pancreatitis and surgery.

	Group A No.=20	Group B No.=20	Test value	*p*-value	Sig.
Hospital stay:					
Mean ± SD	1.40±0.70	3.2±1.23	5.848•	0.000	HS
Range	1-3	2-5			

p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: highly significant (HS).
•: Independent *t*-test.

Hospital stay duration was more in group B mean (2-5 days) than group A with mean (1-3 days). (Fig. 6).

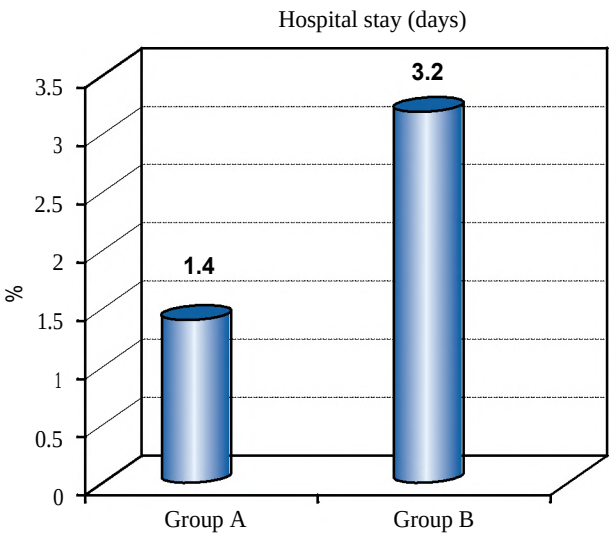

Fig. (6): Comparison between the two studied groups according to hospital stay.

Table (7): Complications of pancreatitis and surgery.

	Group A		Group B		Test value*	*p*-value	Sig.
	No.	%	No.	%			
Bile leak:							
No	16	80.0	16	80.0	0.000	1.000	NS
Yes	4	20.0	4	20.0			
Biliary injury:							
No	20	100.0	20	100.0	–	–	–
Yes	0	0.0	0	0.0			
Missed stone:							
No	18	90.0	16	80.0	0.784	0.376	NS
Yes	2	10.0	4	20.0			
Recurrence:							
No	20	100.0	10	50.0	13.333	0.000	HS
Yes	0	0.0	10	50.0			
Infection:							
No	14	70.0	12	60.0	0.440	0.507	NS
Yes	6	30.0	8	40.0			
Pain severity:							
Mild pain	14	70.0	12	60.0	2.154	0.341	NS
Moderate pain	6	30.0	6	30.0			
Severe pain	0	0.0	2	10.0			
Pancreatic edema:							
No	16	80.0	12	60.0	1.905	0.168	NS
Yes	4	20.0	8	40.0			
Pancreatic ascites:							
No	16	80.0	14	70.0	0.533	0.465	NS
Yes	4	20.0	6	30.0			
Pancreatic pseudocyst:							
No	14	70.0	10	50.0	1.667	0.197	NS
Yes	6	30.0	10	50.0			

p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS).
*:Chi-square test.

There were no significant differences between the two groups regarding complication of pancreatitis. Pancreatic Oedema is more in group (B) than group (A) with, in group (A) oedema was found in four patient with percentage of (20%) compared with 8 patients in group (B) with percentage (30%). Pancreatic Ascites is more in group (B) than group (A) in group (A) pancreatic ascites was found in four patient with percentage of (20%) compared with 6 patients in group (B) with percentage 30%. Pancreatic Pseudocyst is more in group (B) than group (A) as in group (A) Pancreatic Pseudocyst was found in two patients with percentage of (10%) compared with 10 patients in group (B) with percentage (50%) (Fig. 7).

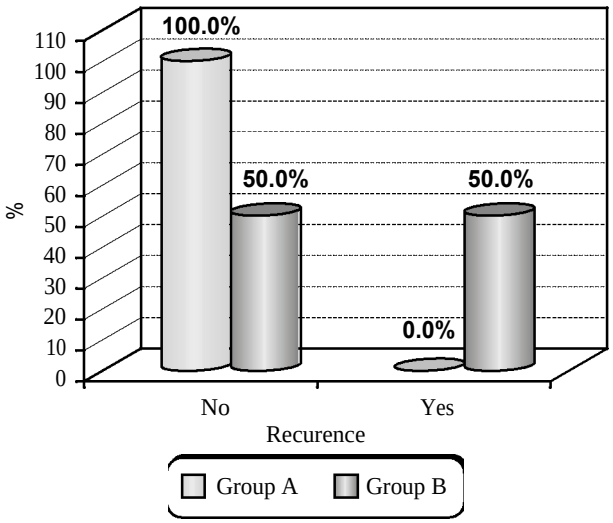

Fig. (7): Recurrence of pancreatitis in both groups.

There were significant differences between the two groups regarding recurrence of pancreatitis. Recurrence of Pancreatitis is significantly more in group (B) than group (A) with (*p*-value=0.01). Group a show no recurrence at all but in group b recurrence occur in 10 patients with 50%. (Fig. 7).

Table (8): Comparison between the two studied groups according to laboratory data one week post-operative.

Post operation	Group A No.=20	Group B No.=20	Test value	*p*-value	Sig.
Amylase:					
Mean ± SD	39.00±8.51	39.20±6.63	–0.085•	0.933	NS
Range	24-54	28-48			
Lipase:					
Median (IQR)	28.5 (26-32)	27.5 (21-33)	–0.705≠	0.481	NS
Range	15-35	12-36			
ALT:					
Median (IQR)	24 (18-27)	26.5 (20-32)	–1.575≠	0.115	NS
Range	10-34	12-40			
AST:					
Median (IQR)	20 (17-26)	24.5 (21-29)	–1.492≠	0.136	NS
Range	9-31	8-37			
ALP:					
Mean ± SD	57.10±18.36	65.00±19.44	–1.358•	0.183	NS
Range	23-85	38-90			
Billirubin:					
Mean ± SD	0.99±0.21	0.88±0.14	1.855•	0.071	NS
Range	0.5-1.5	0.6-1			

ALT: Alanineaminotransferase.
AST: Aspartate aminotransferase.
ALP: Alkaline phosphatase.
•: Independent *t*-test.
≠: Mann Whitney test.
p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS).

There is no significant difference between the two studied groups according to laboratory data one week post-operative.

There was no significant difference between the two studied groups as regard 1 st week follow (Table 9).

Table (9): Comparison between group A according to laboratory data pre and post-operative.

Group A	Pre operation No.=20	Post operation No.=20	Test value	*p*-value	Sig.
Amylase:					
Mean ± SD	1298.60±618.79	39.00±8.51	9.401•	0.000	HS
Range	383-2200	24-54			
Lipase:					
Median	848	28.5	–3.923≠	0.000	HS
(IQR)	(442-1200)	(26-32)			
Range	214-1950	15-35			
ALT:					
Median	72.0	24	–3.826≠	0.000	HS
(IQR)	(48.5-91.5)	(18-27)			
Range	22-180	10-34			
AST:					
Median	82.5	20	–3.923≠	0.000	HS
(IQR)	(67-112)	(17-26)			
Range	32-180	9-31			
ALP:					
Mean ± SD	160.50±66.03	57.10±18.36	8.459•	0.000	HS
Range	40-300	23-85			
Billirubin:					
Mean ± SD	1.12±0.49	0.99±0.21	1.302•	0.208	NS
Range	0.5-2	0.5-1.5			

ALT: Alanineaminotransferase. •: Paired *t*-test.
AST: Aspartate aminotransferase. ≠: Wilcoxon Rank test.
ALP: Alkaline phosphatase.
p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS).

There is significant difference between pre-operative and post-operative regarding to laboratory data except bilirubin.

Table (10): Comparison between group B according to laboratory data pre and post-operative.

Group B	Pre operation No.=20	Post operation No.=20	Test value	*p*-value	Sig.
Amylase:					
Mean ± SD	1103.10±572.41	39.20±6.63	8.618•	0.000	HS
Range	395-2070	28-48			
Lipase:					
Median (IQR)	888.5 (628-1200)	27.5 (21-33)	–3.923≠	0.000	HS
Range	234-1700	12-36			
ALT:					
Median (IQR)	84.5 (67-112)	26.5 (20-32)	–3.923≠	0.000	HS
Range	32-180	12-40			
AST:					
Median (IQR)	65.5 (40-96)	24.5 (21-29)	–3.922≠	0.000	HS
Range	21-125	8-37			
ALP:					
Mean ± SD	184.20±99.86	65.00±19.44	5.734•	0.000	HS
Range	88-390	38-90			
Billirubin:					
Mean ± SD	1.14±0.51	0.88±0.14	2.564•	0.019	S
Range	0.5-2.1	0.6-1			

ALT: Alanineaminotransferase. •: Paired *t*-test.
AST: Aspartate aminotransferase. ≠: Wilcoxon Rank test.
ALP: Alkaline phosphatase.
p-value >0.05: Non significant (NS).
p-value <0.05: Significant (S).
p-value <0.01: Highly significant (HS).

There is significant difference between pre-operative and post-operative regarding to laboratory data.

Discussion

As we mentioned before biliary pancreatitis represent about 25% of pancreatitis. So cholecystectomy is considered a definitive curative treatment for biliary pancreatitis as this remove the source of stones so no more stones pass through biliary channels and prevent further attacks of pancreatitis. Although there is agreement about cholecystectomy as definitive treatment but the argument about the optimum timing of operation is still present to get better results and avoid complication to get best outcome as much as possible.

In this study we did our best to determine the optimum timing of intervention by comparing multiple important points (bleeding, adhesions, biliary complications, infection and pain) to get best benefit to the patients, protecting them from further pancreatitis or its complication or even perioperative complications.

There is no consensus on what constitutes a 'early' laparoscopic cholecystectomy.

Early LC was performed one week after randomization, and delayed LC was performed six weeks after randomization in our study.

Yuan et al., **[13]** Regardless of whether there was Clinical and laboratory improvement, an early laparoscopic cholecystectomy was recommended within 72 hours of the index admission.

Patients were divided into 2 groups in the studies by Aboulian et al., **[7]** and Falor et al., **[14]** based on the timing of the LC. Patients who underwent an early LC (within 48 hours of admission) were compared to patients who underwent late LC (after 48 hours).

Early cholecystectomy was defined in the study by Nebiker et al., **[15]** as cholecystectomy within two weeks of start of symptoms (group A). Initial conservative treatment followed by cholecystectomy after 14 days from first admission was defined as delayed cholecystectomy (group B). Only 8 patients in group A left the hospital before the operation, whereas those in group B usually left after the first attack and were re-admitted later on for cholecystectomy.

Gurusamy et al., **[11]** early LC was defined as any LC performed within three days of the onset of pancreatitis, while 'delayed' laparoscopic chole-

cystectomy was defined as any laparoscopic cholecystectomy performed after three days.

In our study, all patients in the early group completed the study and underwent laparoscopic cholecystectomy without experiencing a 2 nd attack of mild biliary pancreatitis, but group B (10) patients had recurrent attack of biliary pancreatitis.

Van Geenen et al., **[16]** after mild gallstone pancreatitis, researchers deduced that high risk of recurrent bilio-pancreatic events more with late cholecystectomy, Even when the late cholecystectomy occurs within two weeks of discharge from acute pancreatitis, the risk is substantial. To avoid such biliary occurrences, which make patients complaining, hospitalisation, and increased costs, an early cholecystectomy may be recommended.

There was no statistical difference between the two groups in terms of intra-operative events, and there was no difference in terms of intra-operative complications in our study, which is consistent with other studies as well as in Aboulian et al., **[7]**.

In Yuan et al., **[13]** in this study, peri-operative and post-operative significant events such as, vascular injury, bile leak, biliary tree injuries, intra-abdominal infection, fever, and port site infection were similar in the both groups, with no substantial difference between them.

In Falor et al., **[14]** there was no statistical difference regarding biliary complications, recurrence of pancreatitis, infections, and pain postoperatively in both groups in this study. In early group, complications were 4.2 percent and in delayed group 4.8 percent with no statistical difference regarding bleeding.

In Yuan et al., **[13]** in the study, three patients in the early group converted to open cholecystectomy, while two patients in the delayed group did not. The difference was insignificant statistically.

In Nebiker et al., **[15]** study, conversion to open surgery was necessary in 6% in group A and 3% in group B.

In Falor et al., **[14]** study, conversion from LC to open cholecystectomy 2.5% in early group and 7.5% in delayed group.

In our study, early group were completed laparoscopically surgery, and delayed group two cases (10 percent) converted to open due to bleeding.

In the current study we found that recurrence of biliary pancreatitis were significantly more in patients who did late cholecystectomy than patients who did early cholecystectomy. In agreement with the current study. Jee et al., **[17]**; Bouwense et al., **[18]**; Hadi et al., **[19]**; Demir et al., **[20]**; Jan et al., **[21]**; Brett et al., **[22]**; found that recurrence of pancreatitis is more in patients who did late cholecystectomy than early cholecystectomy. This is mostly due to persistence of the cause (gall bladder stones) that leads to recurrence of the pancreatitis and delaying cholecystectomy has no advantage regarding intraoperative complications.

The current study showed that Post-operative wound infection was more in people who did late cholecystectomy than patients who did early cholecystectomy but non significant in agreement with Bouwense et al., **[18]**; Jee et al., **[19]**; Hadi et al., **[20]**; and Methias et al., **[23]**; found that no significant difference between early and late cholecystectomy according to infection, In contrast with Brett et al., **[22]**; Jan et al., **[21]**; who found that infection was more in the late cholecystectomy than early one.

The current study showed that non significant difference in biliary complication (biliary injury, Biliary leak or missed stone). In agreement with the current study Demir et al., **[20]**; Methias et al., **[23]**; found that biliary injury was more in the late cholecystectomy than early one due to difficult adhesion that made dissection extremely difficult which increase possibility of biliary complications. In contrast with current study Bouwense et al., **[18]** and Brett et al., **[22]**; found that inflammatory condition and edema in addition to perioperative morbidity increase biliary injury in early cholecystectomy than late one. Also Jan et al., **[21]**; and Jee et al., **[17]**; found that no difference between late and early cholecystectomy according to biliary injury explaining that this depends on surgeon skills.

The current study showed that Post-operative pain was non significantly between both groups. This is mostly due to irritation of nerves associated with difficult dissection in addition to pain associated with abdomen inflation by laparoscopy.

The current study showed that hospital stay was significantly more in patients who did late cholecystectomy than patients who did early cholecystectomy. In agreement with the current study Jan et al., **[21]**; Hadi et al., **[19]**; Demir et al., **[20]**; Jee et al., **[17]**; Methias et al., **[23]**; Bouwense et al., **[18]**; found that more hospital stay for patients who did late cholecystectomy than early cholecystectomy.

Conclusion:

The current study found that early cholecystectomy after gallstone pancreatitis is more advantageous than late cholecystectomy after gallstone pancreatitis because it is associated with less rate of recurrence of biliary pancreatitis, less complication of pancreatitis, less perioperative complication (adhesions, blood loss, biliary events, infection, postoperative pain) and shorter duration of postoperative hospital stay.

The feasibility and safety of early cholecystectomy in mild gall stone pancreatitis was affirmed. But we need another study with larger sample size and longer duration to get stronger significant results.

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مقارنة بين التدخل الجراحى المبكر والمتأخر لإستئصال المرارة بالمنظار فى حالات إلتهاب البنكرياس المرارى الحصوى الحاد الخفيف

المقدمة: يمثل إلتهاب البنكرياس المرارى حوالى ربع حالات إلتهاب البنكرياس. نتيجة لذلك، يعتبر استئصال المرارة علاجاً محدداً لإلتهاب البنكرياس المرارى لأنه يزيل مصدر الحصوات ويمنع المزيد من نوبات إلتهاب البنكرياس.

على الرغم من وجود اتفاق على أن استئصال المرارة هو العلاج النهائى، إلا أنه لا يزال هناك جدل حول الوقت المناسب لإجراء الجراحة من أجل الحصول على أفضل النتائج وتجنب المضاعفات.

الهدف من الدراسة: الهدف من الدراسة هو تقييم استئصال المرارة بالمنظار المبكر والمتأخر فى المرضى الذين يعانون من إلتهاب البنكرياس الحصوى الخفيف من أجل تحديد أفضل توقيت لاستئصال المرارة لمنع تكرار إلتهاب البنكرياس وتقليل مضاعفات استئصال المرارة أثناء وبعد الجراحة.

المرضى وطرق العلاج: تم جمع ٤٠ بيانات مريضاً يعانون من إلتهاب البنكرياس بالحصوى الحاد الخفيف والذين حضروا لأول مرة إلى قسم الجراحة العامة فى مستشفيات جامعة عين شمس فى القاهرة، مصر، بين ديسمبر ٢٠٢٠ وسبتمبر ٢٠٢١ لهذه الدراسة العشوائية المرتقبة. تم تقسيمهم إلى مجموعتين المجموعة أخضعت لعملية استئصال المرارة بالمنظار فى غضون أسبوع واحد من الحجز فى المستشفى، والمجموعة ب تم تأجيل استئصال المرارة بعد ستة أسابيع.

النتائج: كان رجلان (٢٠٪) وثمانى إناث (٨٠٪) فى المجموعة المبكرة، بينما كان اثنان من الذكور (٢٠٪) وثمانى إناث فى المجموعة المتأخرة. ٨٠٪، من حيث العمر (p=0.109)، كان متوسط العمر SD لمجموعة المؤشر ٣٩.٧ ± ٨.٨٢ سنة، مع مدى من ٢٧ إلى ٥٠ سنة، فى حين كان متوسط عمر المجموعة المتأخرة ٩.٠٥ ± ٤٦.٥ سنة، بمدى من ٣٢ إلى ٥٩ عاماً. تم إعطاء جميع الحالات تاريخ شامل وفحص سريرى شامل. عانى جميع المرضى (١٠٠٪) من عدم ارتياح فى البطن كأعراض، وخضع جميع المرضى فى المجموعة أ لاستئصال المرارة بالمنظار (LC) دون الحاجة إلى الفتح الجراحى لاستئصال المرارة. فى المجموعة ب، تم تحويل حالتين إلى استئصال المرارة بالفتح الجراحى، وكانت حركة الأمعاء فى كل المرضى جيدة وتم بدأ السائل الفموى فى نفس يوم ما بعد الجراحة، وكانت نسبة خطر تكرار إلتهاب البنكرياس الصفراوى فى المجموعة أ ٠٪ و ٥٠٪ فى المجموعة ب، وكان خطر النزيف بين المجموعتين متساوى، والمرضى الذين خضعوا لاستئصال المرارة المتأخر لديهم معدل أعلى من عدوى الجرح بعد الجراحة من أولئك الذين خضعوا لاستئصال المرارة فى وقت مبكر، ولكن كان هناك فرق ضئيل، ولم يكن هناك فرق كبير فى المضاعفات الصفراوية (الضرر الصفراوى) عبر كلا المجموعتين (التسرب الصفراوى أو الحصوات المفقودة). وكان الألم بعد الجراحة أعلى فى مرضى استئصال المرارة المتأخر عنه فى مرضى استئصال المرارة فى وقت مبكر، ولم يكن الاختلاف بين المجموعتين كبيراً. بقى المرضى الذين خضعوا لعملية استئصال المرارة المتأخرة فى المستشفى لفترة أطول من أولئك الذين خضعوا لعملية استئصال المرارة فى وقت مبكر. تمت مراقبة المرضى لمدة شهر واحد بعد الجراحة، دون حدوث وفيات أو مضاعفات تذكر.

الخلاصة: اكتشفت الدراسة الحالية أن استئصال المرارة المبكر بعد إلتهاب البنكرياس الخفيف بالحصوة أفضل من إجرائه فى وقت متأخر لأنه مرتبط بمعدل أقل لتكرار إلتهاب البنكرياس الصفراوى، ومضاعفات أقل من إ لتهاب البنكرياس، ومضاعفات أقل حول الجراحة (الالتصاقات، وفقدان الدم، والأحداث الصفراوية، والعدوى، ألم ما بعد الجراحة)، ووقت شفاء أقصر.