

# Laparoscopic Cholecystectomy in Cases of Acute Cholecystitis

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## ABSTRACT

**Objective:** To evaluate the laparoscopic cholecystectomy procedure in cases of acute cholecystitis.

**Study Design:** Cohort study

**Place and Duration of Study:** Department of Surgery, Surgical Unit-1, SIMS/Services Hospital Lahore from 1<sup>st</sup> January 2021 to 30<sup>th</sup> June 2022.

**Methodology:** One hundred and ninety eight cases which suffered from acute cholecystitis were enrolled. The age of the cases was within 35-60 years. The cases were divided into 3 groups; group A, group B and group C. The group selection was dependent on the interval period (between the onset of acute attack and the time of presentation for treatment). Group A was the one where interval period was <3 days, Group B has 3 to 7 days while it was >7 days in group C. The laparoscopic cholecystectomy was performed and operative outcomes were evaluated.

**Results:** The mean age of the patients was 40.66±1.5 years with more females in each group than males. The cases of gall bladder empyema/mucocele were presented at the highest 68.8%. This was followed by the cases having Gall Bladder phlegmon identified in 24.74% of the cases. The rate of complication was highest in Group B while operation time and post-operative hospital stay was highest in Group A. The conversion rate from Laparoscopic to open cholecystectomy was measured as 3.03%.

**Conclusion:** Laparoscopic cholecystectomy is a procedure which can be successfully achieved in acute cholecystitis cases with reduced conversion rate and complication attained through surgical expertise.

**Keywords:** Laparoscopic cholecystectomy, Acute cholecystitis, Conversion rate

## INTRODUCTION

Cholecystectomy is a procedure involving removal of the gall bladder. It is a symptomatic surgical procedure of the gall stone removal as well as used for other gall bladder related condition requiring removal of the gall bladder. Cholecystectomy has been the eight most common operating procedures a decade before however the cases requiring cholecystectomy continuously escalated within the recent years with many reported in developing countries.<sup>1</sup>

The reported cases of gall stones from USA reach out to 15%<sup>2</sup>, while the prevalence of reported cases from European countries ranges between 9 to 12%.<sup>3</sup> The yearly increase in the incidence of surgical cases of gall stones in Pakistan is reported as 4.2 percent in men and 14.2 percent in women.<sup>4</sup> The most important factors involved with the increased risk of cholecystectomy includes female having obesity and above forty years of age.<sup>5</sup>

Laparoscopic cholecystectomy is considered as a global gold standard procedure for treatment of cholelithiasis.<sup>6</sup> Despite the fact that that this procedure is taken as gold standard there are still controversial theories regarding its acceptance in cases of acute cholelithiasis and acute cholecystitis.<sup>7</sup> Acute cholecystitis is formed when a gall calculus wedges the common biliary duct (CBD). It is accompanied with crucial pain in right-upper abdomen requiring imperative management and treatment [8-9]. The finding of biliary-colic is advanced to acute-calculous cholecystitis in cases where the pain remains unresolved in 6 hours, if no stone is found then the condition is termed as acute calculous cholecystitis.<sup>10</sup>

The present study was designed to evaluate the laparoscopic cholecystectomy procedure in cases of acute cholecystitis. The results of this study assisted in providing evidence-based reasoning for opting the laparoscopic cholecystectomy in cases of acute cholecystitis.

## MATERIALS AND METHODS

It was a cohort study conducted at Department of Surgery, Surgical Unit-1, SIMS/Services Hospital Lahore from 1<sup>st</sup> January 2021 to 30<sup>th</sup> June 2022. A total of 198 cases of acute cholecystitis were enrolled. The sample size was generated through using Australian Bureau of Statistics Sample size calculator where

confidence of interval was taken as 95% and incidence of acute cholecystitis as 0.63/100 cases. The age of the cases was settled within 35-60 years. All cases which suffered from acute cholecystitis were enrolled in the study after their written consent; however those having chronic symptoms as well as acute cholelithiasis were excluded from the study. The cases were diagnosed on the basis of their clinical signs and symptoms as well as Ultrasonography reports and Magnetic resonance cholangiopancreatography (MRCP) scan. The diagnostic clinical presentation and biochemical value included acute right upper-abdominal pain >8 hours, accompanied with tenderness, with/without mild jaundice temperature > 37.5°C, and a TLC count of >109 /L and added by ultrasonographic sign of distended gallbladder having edematous wall and +ve Murphy's sign (+/- pericholecystic phlegmon +/- fluid in Morison's pouch). The cases were then divided into 3 groups as A, B and C. The group selection was dependent on the interval period (between the onset of acute attack and the time of presentation for treatment). Group A was the one where interval period was <3 days, Group B has 3 to 7 days while it was > 7 days in group C. All related information including demographic details, biochemical history, imaging reports was entered in a well structure questionnaire. The laparoscopic cholecystectomy was performed post induction of anesthesia and intubation. The initial abdominal insufflation was achieved through 15 mmHg using carbon dioxide. A 4 small size incision were made in abdomen for trocar-placement (supraumbilical x1, subxiphoid x1, and right subcostal x2). A laparoscope and long instrumentation was used for retraction of gall bladder over liver. Critical view was carried out through careful dissection. Isolation of the cystic duct and cystic artery was conducted. Both structures were carefully clipped and also transected. Gall bladder was separated through electrocautery or harmonic scalpel application from liver bed entirely. Hemostasis was achieved post abdomen allowance to deflate to 8 mmHg within 2 minutes. The gallbladder was detached from abdomen in specimen pouch. All trocars were removed. Port sites Closure was performed and fascial-closure of trocar-sites > 5 mm was done to prevent incisional hernias. Data was analyzed using SPSS version 26.0 where chi-square test was used for analysis having a p value <0.05 as representing significance.

**RESULTS**

The mean age of the patients was 40.66±1.5 years. In Group A there were 13% of the cases with 61.53% being females, while in group B and Group C there were 64% and 22% of the cases respectively with 64.06% and 75% females correspondingly (Table 1).

The cases of gall bladder empyema/mucocele were presented at the highest 68.8%. This was followed by the cases having Gall Bladder phlegmon identified in 24.74% of the cases (Table 2).

With the 24.75% cases or n=49 gall bladder phlegmon cases the adhesions with omentum were seen highest. The fibrinous

adhesions were found as in 19 cases while dense adhesion was found in 15 out of total 49 cases as Zulke type I/II and Zulke Type III/IV (Table 3).

The comparison of the various parameters within various groups showed that duration of operation was highest in group C cases while hospital stay post-surgery was also highest in group C. Duration of operation and hospital stay was lowest in the Group A cases. The rate of complication was however analyzed highest in the Group B cases. There was a significant p value variance within groups (Table 4).

Table 1: Frequency and gender distribution within various groups

Group	Duration	Age (years)	Total (%)	Male		Female		P value
				No.	%	No.	%	
A	<3 days	35.6±1.2	26 (13)	10	38.46	16	61.53	<0.05
B	3-7 days	46.2±1.1	128 (64)	46	35.93	82	64.06	
C	7-14 days	40.2±2.1	44 (22)	11	25.0	33	75.00	

Table 2: Operative parameters comparison within groups of acute cholecystitis

Parameters	Group A (n=26)	Group B (n=128)	Group C (n=44)	P value
Mean duration of operation (min)	18.6	32.6	56.3	0.001
Median of duration of operation	(15-21)	(17-61)	(29-92)	0.022
Ports used more than 3	-	25 (19.53%)	-	--
Mean hospital duration (days)	2.3	4.4	7.1	0.025
Rate of complications	1 (3%)	6 (4.6%)	4 (9.09%)	0.014

Table 3: Feature of cases presented with acute cholecystitis

Presentation	No.	%
Gall Bladder phlegmon	49	24.74
Gall Bladder empyema/mucocele	134	68.68
Gall Bladder perforation	13	6.5

Table 3: Gall bladder phlegmon types (n=49)

Phlegmon	Fibrinous adhesions	Dense adhesions
Using omentum	19	15
Using omentum + bowel	9	4
Pericholecystic-pus collection	2	-

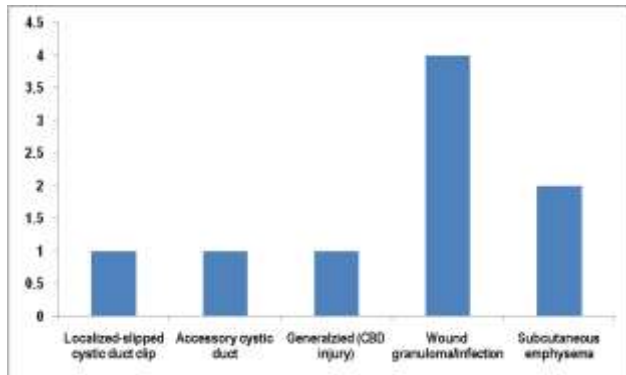


Fig. 1: Various post-operative complications identified in cases of acute cholecystitis

There were 9 cases out of total 198 cases where post-operative complication was significantly identified. Within the choleperitoneum the localized slip of clipped cystic ducts, accessory cystic duct, CBD generalized injury each was observed in single cases while Wound granuloma/infection was seen in 4 cases. Subcutaneous emphysema was also presented in 2 cases (Fig. 1).

There were 3.03% those cases which were converted to open surgery due to complication in laparoscopic surgery of acute cholecystitis at later stages. However, as the complete procedure of laparoscopic surgery was opted for their treatment hence making them to be considered as a part of laparoscopic surgery operated cases (Fig. 2).

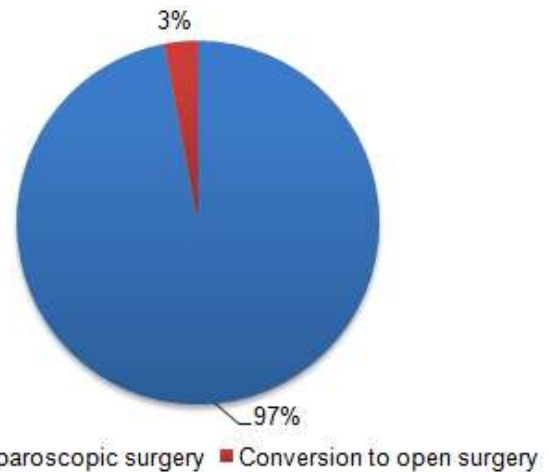


Fig. 2: conversion rate due to complication of acute cholecystitis cases

**DISCUSSION**

In the earlier time the laparoscopic cholecystectomy of the acute cholecystitis was a contraindication. However, with advancement in research and augmentation in the professional expertise this procedure is considered as successful albeit with certain important reservation. Due to rapid formation of edema and adhesion the cases of acute cholecystitis are operated within the first 48 hours of the admission.<sup>11,12</sup>

The study has reported higher number of the female cases than male patients undergoing acute cholecystitis surgery through laparoscopic procedure. Research has elaborated the fact that women within the age of 35-45 years have higher prevalence of developing acute cholecystitis. This is also important to note that men who are older than this age have high risk of comorbidities in addition to acute cholecystitis.<sup>13</sup>

The increase in operative time as observed in group B and Group C was a result of extra time acquired for negotiating of dense adhesions. Other reasons included veress needle adoption as well as enabling of sufficing grasper function was required. The edema of gall bladder made the grasping and the retraction process complicated. Similar result has been reported in previous

study data. It is important to note that the rate of complication in laparoscopic cholecystectomy is much lesser than in open surgery.<sup>14,15</sup> Only 4.8% of the cases presented in current research showed laparoscopic complication. Another study reported that Twenty-five complications occurred in 24 (16.5%) patients of the laparoscopic group, whereas 30 complications occurred in 25 (26%) patients of the traditionally operated group.<sup>16</sup>

The technical difficulties related with the laparoscopic cholecystectomy of the acute cholecystitis increase the risk of conversion rate higher within the cases. In current research there were 3.03% those cases where laparoscopic cholecystectomy could not be the successful option for removal of gall bladder and the operation was converted into open surgery.<sup>17,18</sup> Previous researches have documented the conversion rate as between 22% to 27.9% within acute cholecystitis cases. Although the one reported in the present study was much lower than previously reported data. This present result also suggests that the professional skill and expertise kept a reduction in overall conversion rate.<sup>19,20</sup>

## CONCLUSION

Laparoscopic cholecystectomy is a procedure which can be successfully achieved in acute cholecystitis cases. The duration of hospital stays and recovery is much higher than in open surgery cases. There are risks of conversion rate and complications but that can be avoided through surgical expertise.

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