

## Original Research Article

# A comparative study to assess the post-operative complications between laparoscopic cholecystectomy versus open cholecystectomy

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### ABSTRACT

**Background:** Cholelithiasis is a common problem these days. Earlier it was considered the health problem of the female only. But now it is quite common in the males also. The prevalence of gallbladder stone disease (GBSD) in female to male is 3:1 in 18-65 years age group. In the developed countries GBSD is common and occur in 7% in male and 15% in female with an overall prevalence of 11%. Cholecystectomy is one of the most common operation carried out in general surgery.

**Methods:** Our study was conducted on 60 patients divided in 2 groups of 30 each to compare post-operative complications between laparoscopic cholecystectomy and open cholecystectomy.

**Results:** As per findings of the present study duration of pain, rate of complications and total hospital stay were significantly lower in laparoscopic group. There was early removal of drainage tube, early stitch removal in laparoscopic group.

**Conclusions:** Laparoscopic cholecystectomy can be recommended as first choice operative treatment for patients with cholelithiasis as it provides better cosmetic results, lesser pain, early removal of drainage tube, lesser post-operative hospital stay and fewer incidence of surgical site infection. It should be an available option for all patients requiring elective cholecystectomy.

**Keywords:** Laparoscopic cholecystectomy, Open cholecystectomy, Gallbladder stone disease

### INTRODUCTION

Cholelithiasis is a common problem these days. Earlier it was considered the health problem of the female only. But now it is quite common in the males also. The prevalence gallbladder stone disease (GBSD) in female to male is 3:1 in 18-65 years age group. In the developed countries GBSD is common and occur in 7% in male and 15% in female with an overall prevalence of 11%.<sup>1</sup>

Gallstone disease is one of the commonest biliary tract disorders known since ages. Gallstones have been recognized since antiquity and have even been found during autopsies of Egyptian mummies. The Greek physician Trallianus described calculi within radicles of a

human liver. During the sixteenth century, Vesalius and Fallopius described gallstones in the gallbladders of dissected human bodies. In chronic cholecystitis the presence of bacteria in bile occur in >25% cases which leads to fever, nausea vomiting and pain. The presence of infected bile while going under elective cholecystectomy adds little to post-operative risk but the condition requires surgical intervention for total cure.<sup>2</sup>

Cholecystectomy is one of the most common operation carried out in general surgery. The first attempt at surgical treatment of gallstones is ascribed to John Stough Bobb, considered the father of gallbladder surgery, who successfully performed a cholecystotomy and extraction of gallstones in 1867. Traditional open cholecystectomy

(OC) was performed for the time in 1882 by Carl August Langenbuch who set the path for therapeutic surgical intervention for symptomatic cholelithiasis. Since ages OC has been the gold standard surgical treatment for cholelithiasis. One century later in 1985, Eric Muhe performed the first laparoscopic cholecystectomy by using a custom-made laparoscope called the “galloscope”, a haemoclip and a pistol-grip scissors. This represented one significant advance in surgery that opened the modern era in the surgical treatment of gallstones. Philippe Mouret performed Laparoscopic cholecystectomy (LC) on 17 March 1987 in Lyon, France. His technique was rapidly adopted and improved in France and was subsequently introduced to the rest of the world. Since then it became an established procedure due to its short hospitalization, less pain, more acceptable cosmetic results lesser morbidity and mortality rates which are the principal advantages of this technique.<sup>3</sup>

### ***Aim and objectives***

The aim of the study was to compare the post-operative complications between LC and OC.

Objectives of the study were: to assess the post-operative complications among patients with laparoscopic cholecystectomy, to assess the post-operative complications among patients with OC, to make comparison between LC and OC complications.

## **METHODS**

A hospital based prospective observational study was conducted in 60 patients admitted in Sri Guru Ram Das Hospital, Vallah, Sri Amritsar to compare the post-operative complications between LC and OC from January 2019 to June 2020. The present study was conducted in following two groups of 30 patients each: group A consisted of 30 patients who underwent LC and group B consisted of 30 patients who underwent OC.

Convenient sampling technique used to enroll the sample for study and samples were selected as per inclusion criteria.

### ***Inclusion criteria***

The following subjects were included in the study: subjects between 18 and 70 years of age, subjects who are willing to participate in the study, subjects who are fit to be operated under general anaesthesia and subjects who are admitted in Department of Surgery, SGRDIMR, Vallah, Sri Amritsar.

### ***Exclusion criteria***

Subjects aged below 18 and above 70 years of age, subjects who are with history or laboratory tests suggesting presence common bile duct stones, subjects who are not willing to participate in the study, subjects who are having

pregnancy, and subjects who not are admitted in department of surgery of SGRDIMS, Vallah, Sri Amritsar were not included in the study.

### ***Clinical evaluation***

History of admitted patients taken from patients while admitted and a case record form is filled for each patient documenting age, sex, address and clinical information, including chief complaints, duration of symptoms, predisposing factors and any previous history of treatment. Clinical manifestation includes biliary colic, nausea, vomiting, and tenderness.

The detail history is taken regarding the chief complaints, previous upper abdominal surgery, co-morbid conditions like diabetes mellitus, heart disease, jaundice, and hypertension. Detail clinical examination done which included general physical examination, detail systemic examination and local examination.

After detail history and clinical examination the patient is subjected to routine investigation like complete blood count (CBC), prothrombin time (PTI), urine C/E, random blood sugar (RBS), liver function test (LFT), blood urea, serum creatinine, viral markers and electrocardiography (ECG). The specific investigation like serum amylase and abdominal ultrasound will be done.

Preoperatively patient's history was assessed with special reference to pain, fever, nausea, vomiting, dyspepsia, jaundice, mass per abdomen, weight loss and decreased appetite. A careful emphasis was made to record the physical findings particularly icterus, tenderness in right hypochondrium and gallbladder mass. Laboratory testing and ultrasonography (USG) of gallbladder and common bile duct (CBD) was done. CBD stone was ruled out by USG abdomen.

A thorough preoperative anaesthetic evaluation was done and patient fitness for general anaesthesia was assessed. A dose of antibiotics (injection ceftriaxone 1 gm) was given intravenously 30 minutes before surgery.

Injectable antibiotics and analgesics were given post-operatively for 1 day. On next day they were given oral antibiotics and analgesics for another 3 days. Patients were started water and clear liquids orally in the evening after the operation followed by resumption of semisolid diet and solid diet orally on 1<sup>st</sup> post-operative day in most cases. Sutures were removed usually by the 1<sup>st</sup> week post-operatively in LC cases and 10-14<sup>th</sup> day post-operatively in OC cases. 30<sup>0</sup> laparoscope was used for all laparoscopic procedures.

The patient was reviewed post-operative follow up after 1 week, 4 weeks and 12 weeks.

Operative steps, intra and postoperative complication were noted in detail and tabulated.

Postoperative assessment with respect to postoperative hospital stay, complications including postoperative pain will be included as per protocol attached.

In the present study there was no conversion from laparoscopic to open cholecystectomy.

At the end of the study comparison was made between open and laparoscopic cholecystectomy regarding: criteria for selection and indication for surgery, complications-during post-operative period and follow up, resumption of oral intake, hospital stay and return to normal work.

**Methods of measurement**

The data was collected by using proforma as per the inclusion criteria. Collected data was measured by applying statistical methods: by calculating mean value, mean difference, standard deviation (SD) and percentage, by applying Chi-square test, by applying ‘t’ test and any other relevant test, after analysis the data was arranged in tables and graphs and diagrams for results interpretations.

**Statistical analysis**

Data from this study were systematically collected, compiled and statistically analyzed using the statistical package for the social sciences (SPSS) statistics-26 version to draw the necessary conclusions. The findings were tabulated as mean±standard deviation in the form of SD. The student t assay was used in parametric data. Using the Chi square test, quantitative variables were associated. The data was evaluated and the significance level was calculated with p<0.05 as significant and p<0.001 as highly significant as its 'p' value.

**RESULTS**

The mean age of the patients in group A was 42.27±16.08 years and in group B was 40.83±11.37years. There was no significant difference between the groups (p>0.05) as depicted in Table 1.

**Table 1: Distribution of the patients on the basis of age in both the study groups.**

Age (in years)	Group A (LC)		Group B (OC)	
≤30	9	30	7	23
31-40	7	23	11	37
41-50	5	17	7	23
≥51	9	30	5	17
<b>Total</b>	30	100	30	100
<b>Mean age</b>	42.27±16.08		40.83±11.37	
<b>P value</b>	0.692			

T test applied

There was female preponderance in both the groups (80% and 93.3% respectively) while there were 20% and 6.7% male patients in group A and group B respectively. There

was no significant difference between the groups (p>0.05) as depicted in Table 2.

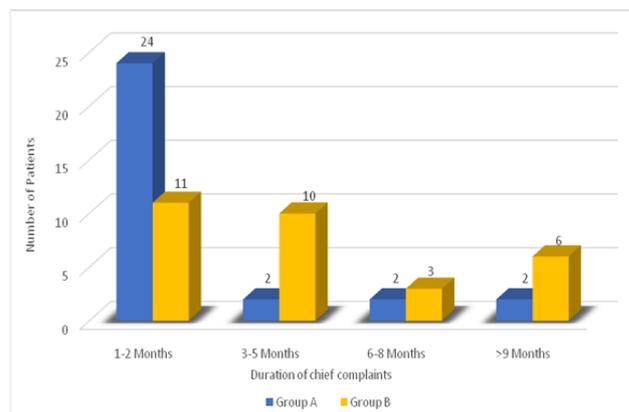
**Table 2: Distribution of the patients on the basis of gender in both the study groups.**

Gender	Group A (LC)		Group B (OC)	
	n	%	n	%
<b>Female</b>	24	80	28	93.3
<b>Male</b>	6	20	2	6.7
<b>Total</b>	30	100	30	100
<b>P value</b>	0.129			

In group A patients, duration of chief complaints for 1-2 months was 24 (80%), for 3-5 months were 2 (6.7%), for 6-8 months were 2 (6.7%) and for >9 months were 2 (6.7%). In the Group B patients, duration of chief complaints for 1-2 months were 11 (36.7%), for 3-5 months were 10 (33.3%), for 6-8 months were 3 (10%) and for >9 months were 6 (10%) with p value of the both groups is 0.006 which is highly significant statistically in both the groups as depicted in Table 3 and Figure 1.

**Table 3: Distribution of the patients on the basis of duration of chief complaints in both the study groups.**

Duration of chief complaints (months)	Group A (LC)		Group B (OC)	
	n	%	n	%
<b>1-2</b>	24	80	11	36.7
<b>3-5</b>	2	6.7	10	33.3
<b>6-8</b>	2	6.7	3	10
<b>&gt;9</b>	2	6.7	6	20
<b>Total</b>	30	100	30	100
<b>P value</b>	0.006			



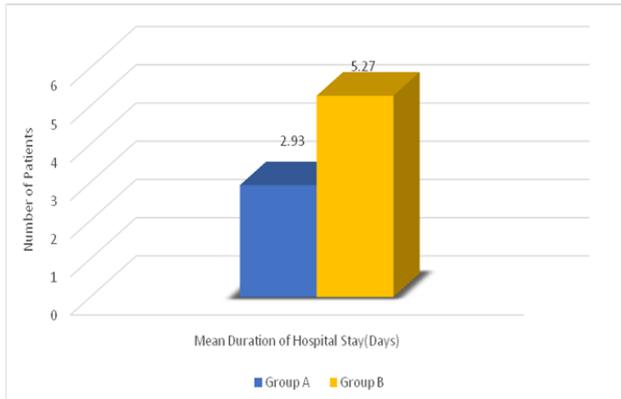
**Figure 1: Distribution of the patients on the basis of duration of chief complaints in both the study groups.**

The mean duration of hospital stay in group A and group B was 2.93±0.74 days and 5.27±1.6 days respectively. There was significant difference between the groups as per student t-test (p<0.05) as depicted by data in Table 4 and Figure 2.

**Table 4: Mean duration of hospital stay in both the study groups.**

Parameter	Group A (LC)	Group B (OC)	Mean difference	P value
<b>Mean duration of hospital stay (days)</b>	2.93±0.74	5.27±1.06	2.333	0.000

Data presented in mean±SD and t test applied



**Figure 2: Mean duration of hospital stay in both the study groups.**

In the group A patients having no post-operative fever was 26 (86.7%) and having post-operative fever was 4 (13.3%). In the group B patients having post-operative fever was 16 (53.3%) and having no post-operative fever was 14 (46.7%) with p value 0.001 which is highly significant statistically in both the groups.

In group A patients whose drainage tube was removed on 2<sup>nd</sup> post-operative day were 22 (73.3%), drainage tube was removed on 3<sup>rd</sup> post-operative day were 4 (13.3%), drainage tube was removed on 1<sup>st</sup> post-operative day were 4 (13.3%). In the group B patients whose drainage tube was removed on 3<sup>rd</sup> post-operative day were 22 (73.3%), drainage tube was removed on 4<sup>th</sup> post-operative day were 7 (23.3%), drainage tube was removed on 2<sup>nd</sup> post-operative day was 1 (3.3%). p value of the both groups is 0.000 which is highly significant statistically as depicted in Table 5 and Figure 3.

In group A patients on 1<sup>st</sup> week follow up there were no symptoms of adynamic ileus, bile leakage and wound infections in all the study subjects.

Thus 100% subjects had no symptoms. In the group B patients 20 (66.7%) had no symptoms, had adynamic ileus 4 (13.3%), 3 (10%) had wound infection, 3 (10%) had bile leakage. The p value of the both groups was 0.072 which is non-significant statistically.

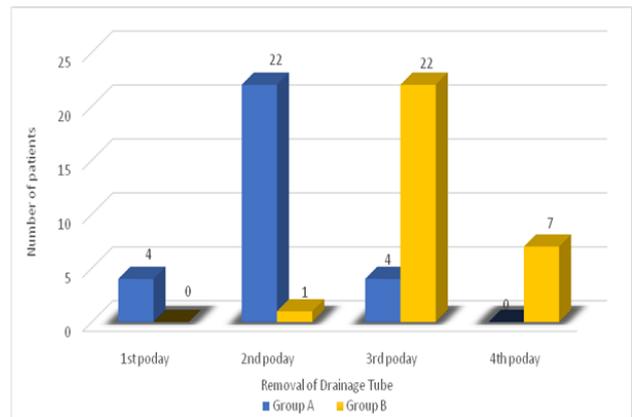
In the group A there were 21 (70%) patients whose stitches were removed on 7<sup>th</sup> post-operative day and 9 (30%)

whose stitches were removed on 8<sup>th</sup> post-operative day with mean value 7.3 and SD 0.47.

In the group B 19 (63.3%) patients whose stitches were removed on 12<sup>th</sup> post-operative day, stitches of 10 (33.3%) were removed on 14<sup>th</sup> post-operative day and stitches of 1 (3.3%) patients were removed on 11<sup>th</sup> post-operative day with mean value 12.63 and SD 1.00. The p value is 0.000 which is highly significant statistically in both the groups.

**Table 5: Distribution of the patients on the basis of removal of drainage tube in both the study groups.**

Drainage	Group A (LC)		Group B (OC)		P value
	n	%	n	%	
<b>1<sup>st</sup> post-op day</b>	4	13.3	0	0	0.000
<b>2<sup>nd</sup> post-op day</b>	22	73.3	1	3.3	
<b>3<sup>rd</sup> post-op day</b>	4	13.3	22	73.3	
<b>4<sup>th</sup> post-op day</b>	0	0	7	23.3	
<b>Total</b>	30	100	30	100	
<b>Mean±SD</b>	3.20±0.48		2.00±0.52		
<b>Mean difference</b>	-1.20				



**Figure 3: Distribution of the patients on the basis of removal of drainage tube in both the study groups.**

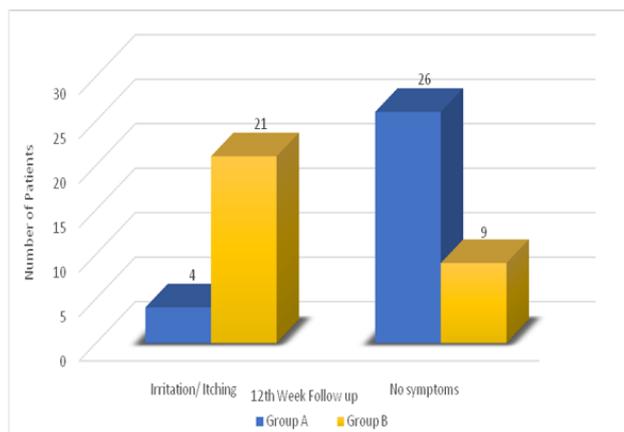
All patients have no post-operative unpleasant symptoms after 4 weeks of follow up. Thus, there was no postoperative complications after 4 weeks of postoperative follow up in both groups.

In patients of group A 26 patients (86.7%) had no irritation/itching on scar site and 4 (13.3%) had irritation/itching on scar site as post-operative complications after 12 weeks of laparoscopic cholecystectomy follow up.

In the group B which 21 (70%) patients had irritation/itching on scar site, 9 (30%) had no symptoms like irritation/itching on scar site. Thus, there was p value 0.000 of postoperative complications after 12 weeks of follow up which is highly significant statistically in both the groups as depicted in Table 6 and Figure 4.

**Table 6: Distribution of the patients on the basis of 12 weeks follow up in both the study groups.**

12 <sup>th</sup> week	Group A (LC)		Group B (OC)	
	n	%	n	%
<b>Irritation/itching</b>	4	13.3	21	70
<b>No symptom</b>	26	86.7	9	30
<b>Total</b>	30	100	30	100
<b>P value</b>	0.000			

**Figure 4: Distribution of the patients on the basis of 12 weeks follow up in both the study groups.**

## DISCUSSION

According to the present study, age in the group A cases upto 30 years of age was 9 (30%),  $\geq 51$  was 9 (30%), 31-40 years of age were 7 (23%) and 41-50 years of age was 5 (17%) with mean age=42.27, and SD=16.08. In the group B cases 31-40 years of age was 11 (37%) and 41-50 years of age was 7 (23%), upto 30 years of age was 7 (23%),  $\geq 51$  years of age was 5 (17%) with mean age=40.83, SD=11.37 and mean difference was 1.44 with p value=0.692 which was insignificant statistically in both the groups. This is similar to studies of Gangji et al and Bhar et al.<sup>4,5</sup>

According to present study, as per gender in the group A female cases were 24 (80%), males were 6 (20%). In the group B female cases were 28 (93.3%) and number of males were 2 (6.7%) with p value=0.129 which was insignificant statistically in both the groups. This is similar to studies of Gangji et al and Kumar et al.<sup>4,6</sup>

As per duration of hospital stay in the group A the mean value of duration of hospital stay of cases was 2.93 days with SD=0.74, which is shorter than group B cases. In the group B cases had mean value of duration of hospital stay was 5.27 days with SD=1.6, the mean difference of the both groups is 2.333 with p value=0.000 which is highly significant statistically in both the groups. This is similar to studies of Bhar et al, Talpur et al and Singh et al.<sup>5,7,8</sup>

In the present study, group A the duration of chief complaints for 1-2 months were present in the 24 cases (80%), for 3-5 months in 2 (6.7%), for 6-8 months in 2 cases (6.7%) and for >9 months in 2 cases (6.7%). In the group B duration of chief complaints for 1-2 months in the 11 cases (36.7%), for 3-5 months in 10 cases (33.3%), for 6-8 months in 3 cases (10%) and for >9 months in 6 cases (10%) with p value of the both groups is 0.006 which is highly significant statistically. These findings are not similar to study of Selmani et al.<sup>9</sup>

In the group A, cases had post-operative nausea, vomiting and pain were 14 (46.7%), nausea and pain in 10 cases (33.3%), had only pain 6 (20%). In the group B cases had nausea, vomiting and pain were 24 (80%), nausea and pain were 4 (13.3%), had pain were 2 (6.7%) with p value=0.226 which is not significant statistically in both the groups. These findings are similar to study of Bhar et al and Talpur et al.<sup>5,7</sup>

Drainage tube was removed on 2<sup>nd</sup> post-operative day in 22 in cases (73.3%), on 3<sup>rd</sup> post-operative day were 4 (13.3%), on 1<sup>st</sup> post-operative day were 4 (13.3%) of the total cases with mean value=3.20 and SD=0.48 of group A. In the group B cases drainage tube was removed on 3<sup>rd</sup> post-operative day were 22 (73.3%), on 4<sup>th</sup> post-operative day (23.3%), on 2<sup>nd</sup> post-operative day was 1 (3.3%). Mean value=2.00 and SD=0.52 with p value was 0.000 which is highly significant statistically with mean difference -1.20000. These findings are similar to study conducted by Bhar et al.<sup>5</sup>

In the present study, group A no case had symptoms of adynamic ileus, bile leakage and wound infections. In the group B 20 (66.7%) cases had no symptoms, 4 (13.3%) had adynamic ileus, 3 (10%) had wound infection, 3 (10%) bile leakage with p value of the both groups is 0.072 which is not significant statistically in both the groups. These findings are similar to study of Ahmed et al.<sup>10</sup> Total 26 (86.7%) cases had no irritation/itching and 4 (13.3%) participants had irritation/itching in group A as post-operative complications after 12 weeks of follow up. In the group B, 21 (70%) cases had irritation/itching, 9 (30%) had no symptoms like irritation/Itching with p value=0.000 of post-operative complications after 12 weeks of follow up which is highly significant statistically in both the groups. These findings are similar to study of Doke et al.<sup>11</sup>

## Limitations

The present study was limited to the patients who were admitted in the department of surgery, SGRD Institute of Medical Sciences and Research, Sri Amritsar. Further study can be conducted on larger sample size.

## CONCLUSION

As per findings of the present study duration of pain, post-operative fever, rate of complications, hospital stay, removal of drainage tube, removal of stitches were

significantly lower in laparoscopic group. In conclusion the main advantages of LC were reduced postoperative pain with less duration of analgesic intake, more rapid recovery, duration of chief complaints, post-operative fever, reduced hospital stay and early return to normal routine of daily activities. LC is a superior procedure in comparison to OC as regards to the results. Hence LC can be considered as better choice over OC in elective cases of gallstone disease.

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