

# Evaluative Study of Outcome of Patients Undergoing Laparoscopic Cholecystectomy

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## ABSTRACT

**Background:** Laparoscopic cholecystectomy in management of gallbladder (GB) diseases requires scrutiny in term of indications, success and failure to give benefit to the patient. Its relevance and validity require to be assessed in present era.

**Materials and methods:** The study is carried out on patients admitted to municipal general hospitals of Ahmedabad. A total of 100 patients were observed and data were collected in the prescribed proforma consisting of details of the patient's history, clinical findings, pathological findings, radiological findings, operative findings, postoperative outcome.

**Results:** Observation and analysis of the data of the present series were interesting and important aspects were compared with the standard series. Injury to the biliary tree was the common reason for the conversion of laparoscopic cholecystectomy to open cholecystectomy.

**Conclusion:** With proper laparoscopic training and increasing experience of surgeons there is less chance to conversion of an open approach. Laparoscopic cholecystectomy is the best in terms of early recovery to routine life without any significant morbidity to the patient.

**Keywords:** Cholecystectomy, Evaluative, Laparoscopic cholecystectomy, Outcome.

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## INTRODUCTION

Now days laparoscopic cholecystectomy has gained popularity for the removal of a diseased gallbladder (GB). Laparoscopic cholecystectomy essentially has replaced the open technique for routine cholecystectomies.<sup>1</sup> Indications of laparoscopic cholecystectomy are symptomatic gallstones, cholecystitis of acute/chronic/acalculous types, biliary dyskinesia, gallstone pancreatitis, and gallbladder polyps and gallbladder mass.<sup>2</sup>

An increase in age has direct correlation with the increase in the incidence of gallstone diseases. Females are more prone to form gallstone than males. Approximately 10–15% of the population has gallstones without symptoms.

Laparoscopic cholecystectomy is associated with certain complications like biliary stricture, obstructive jaundice, biliary fistula, septicemia, paralytic ileus, etc. Bile duct injury (BDI) is one of the most common, and dreaded complications of cholecystectomy.<sup>3</sup> Single and multi-institutional experiences have cited bile duct injury rates from 0 to 2% during laparoscopic cholecystectomy compared with historical rates from 0 to 0.4% during open cholecystectomy.<sup>4,5</sup>

A few major complications especially – vascular are life threatening and lead to increase mortality rate, therefore it require conversion into an open surgical approach to treat them. Iatrogenic perforation of the gallbladder with spillage of stones in the peritoneal cavity was found with an incidence from 10 to 30%.<sup>6</sup> Almost all minor complications both biliary and non-biliary are usually treated conservatively.

### Common Anomalies and Variations of GB

Absent gallbladder – extremely rare, autopsy incidence of 0.03% has been reported.<sup>7</sup> Variation in size and shape of the gallbladder. Bilobed gallbladder, fundul diverticulum, phrygian cap, hour glass gallbladder.

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### Variation in Position

Left-sided gallbladder, floating gallbladder. Floating gallbladder occurs when there is an increase in the peritoneal investment; this condition occurs in 5% of patients and predisposes to torsion, resulting in gangrene or perforation of the viscus.<sup>8</sup>

Double gallbladder, duplication of gallbladder with two separate cavities and two separate cystic ducts has an incidence of approximately 1 in 4,000.

### AIMS AND OBJECTIVES

A study of the outcome of patients undergoing laparoscopic cholecystectomy with the following aims and objectives: (1) to estimate intraoperative and postoperative complications of laparoscopic cholecystectomy (2) to identify circumstances and risk factors that influence the complication of laparoscopic

cholecystectomy (3) to estimate the frequency of conversions to open cholecystectomy.

**MATERIALS AND METHODS**

About 100 patients of having symptomatic cholelithiasis, after taking written informed consent, admitted in one of the Municipal General Hospitals of Ahmedabad city, India, were studied during period of 2 years, i.e., from May 2019 to September 2021.

This is a prospective, observational, and randomized study.

**Inclusion Criteria**

- Patients above the age of 18 years.
- Patient with symptomatic cholelithiasis and are planned for laparoscopic cholecystectomy.
- Patients has given written informed consent.

**Exclusion Criteria**

- Patients not fit for laparoscopic surgery.
- Age <18 years.
- Patient with gallbladder malignancy and CBD stone. A total of 100 patients for the clinical study will be randomly selected, who are planned for laparoscopic cholecystectomy during the period of evaluation with the above inclusion and exclusion criteria.
- Out of 100 patients in 50 patients, pneumoperitoneum was created using a Veress needle and in the rest of 50 patients, pneumoperitoneum was created by the open method. All selected cases will be studied from admission till discharge up to patient resume their normal work.
- Evaluation of the following parameters was done in each patient: Safety and efficacy of the procedure. Procedure time.
- Intraoperation complications.
- Postoperative complication.
- Postoperative pain.
- Duration of stay in hospital.
- Duration required to get back to normal activities.

\*Mechanism of common bile duct injury: (Stewart–Way classification)<sup>9</sup>

Class I	The incision in cystic duct extended into CBD CBD mistook for cystic duct
Class II	Lateral damage to the CHD from cautery or clips placed on duct Associated bleeding and poor visibility
Class III	CBD mistaken for cystic duct, not recognized CBD, CHD, Rt, Lt hepatic ducts transected and/or resected
Class IV	RHD is mistaken for cystic duct, RHA is mistaken for cystic artery, RHD and RHA transected Lateral damage to the RHD from cautery or clips placed on the duct.

**RESULTS**

A total of 100 patients underwent laparoscopic cholecystectomy. All cases underwent thorough physical examination, preoperative evaluation, and routine investigations and were subjected to surgery, the study of age predisposition, clinical features, USG findings, diagnosis, their complications were meticulously recorded. Short term Outcome of the operation was taken into account.

**Table 1:** Distribution of patients according to USG finding of thick wall gallbladder

USG finding	Laparoscopic cholecystectomy		Laparoscopic converted to open cholecystectomy	
	Frequency	Percentage	Frequency	Percentage
Thickened GB wall				
Yes	8	8.69	4	50
No	84	91.30	4	50
Total	92	100	8	100

**Table 2:** Distribution of patients according to USG finding of pericholecystic free

USG finding	Laparoscopic cholecystectomy		Laparoscopic converted to open cholecystectomy	
	Frequency	Percentage	Frequency	Percentage
Pericholecystic free fluid				
Yes	12	13.04	3	37.5
No	80	86.95	5	62.5
Total	92	100	8	100

In the present study around 53% population belongs to 21–40 year age group, Out of them 78% of the study population were females and 22% were males.

As shown in Table 1 out of 100 patients 12 patients (12%) had thick-walled gallbladder.

In the present study, among laparoscopic cholecystectomy group 8.69% population had USG finding of thickened GB wall and in laparoscopic converted to open cholecystectomy group 50% population had thickened GB wall. The *p*-value from Chi-square test is 0.00056417 which is statistically significant (Significant at *p* < 0.05).

As shown in Table 2, around 15% of the study population had pericholecystic free fluid.

In the present study, among laparoscopic cholecystectomy group 12 patients (13%) had USG findings of Pericholecystic free fluid, and in laparoscopic converted to open cholecystectomy group 3 patients (37.5%) had pericholecystic free fluid. The *p*-value from Chi-square test is 0.063149 which is statistically not significant (Significant at *p* < 0.05).

Out of 100 patients, 3 patients had common bile duct injury and 2 patients had common hepatic duct injury. About 3 out of 5 patients with biliary tree injury were converted to open cholecystectomy which was managed by calling an experienced surgeon, T tube inserted and primary repair were done, while rest 2 cases were managed laparoscopically with primary repair.

Out of 100 patients – in 8 patients conversion into open cholecystectomy had to be done.

As shown in Table 3, 47 surgeries were done by surgeons whose experience was <5 years among them 14.90% of surgery converted to open cholecystectomy, and 53 surgeries were done by surgeon whose experience >5 years among them 1.89% surgery converted to open cholecystectomy. The *p*-value from Chi-square test is 0.016717 which is statistically significant (Significant at *p* < 0.05).

In the present study, 2% population had vessel injury, and 1 patient had an injury to the cystic artery. One patient had an injury to the right hepatic artery which was diagnosed intra operatively. Both the patients were converted to open cholecystectomy.

**Table 3:** Distribution of patients according to reasons for conversion of laparoscopic cholecystectomy to open cholecystectomy

Reason for conversion of laparoscopic cholecystectomy to open cholecystectomy	Frequency	Percentage
Dense adhesions	1	12.5
Due to bleeding	2	25
Injury to biliary tree	3	37.50
Difficult calots dissection	2	25
Total	8	100

**Table 4:** Distribution of patients according to the duration of postoperative stay

Duration of postoperative Hospital stay	Laparoscopic cholecystectomy		Laparoscopic converted to open cholecystectomy	
	Frequency	Percentage	Frequency	Percentage
0–3 days	79	85.86	0	0
4–7 days	8	8.69	0	0
8–14 days	5	5.43	6	75
15–21 days	0	0	2	25
Total	92	100	8	100

In the present study, around 13.04% population had drain insertion among the laparoscopic cholecystectomy group and 100% population had drain insertion among the laparoscopic converted to open cholecystectomy group. The *p* value from Chi-square test is <0.00001 which is statistically significant (significant at *p* < 0.05). A reason for drain insertion is mostly spillage of bile during surgery, intraoperative bile leak (biliary injury), or intraoperative bleeding from gallbladder fossa.

Table 4 presents the distribution of patients according to the duration of postoperative stay following laparoscopic cholecystectomy and laparoscopic cholecystectomy converted to open surgery. The data includes the frequency and percentage of patients in each category of postoperative hospital stay.

## DISCUSSION

A total 51 patients (around 51%) of the study population belonged to the 31–50 years age group. Females have a common preponderance to the development of gallstones found in our study around 78%.

In the present study, 77% population presented with RHC pain, 17% population presented with vomiting, and 45% population presented with biliary colic. About 4% population presented with all symptoms. Around 26% population presented with biliary colic and RHC pain and 38% population presented with vomiting and RHC pain.

In the present study, 60% population was diagnosed with cholelithiasis, 11% with chronic calculus cholecystitis, 10% with acute calculus cholecystitis, 10% with perforated GB, and 4% with empyema GB.

In the present study, 46% of the population exhibited single calculus in the GB while the rest 54% of the population presented with multiple GB calculus. About 12% of the study population had their GB wall thickened, and among them 4% converted to open surgery which is statistically significant, which suggest USG findings

of thickened gallbladder are positively associated with increased incidence of complications. Around 15% of the population had pericholecystic free fluid present in USG findings, among them 3% converted to open surgery, which is statistically not significant. These results were comparable to study Veen EJ et al.<sup>10</sup>

Radunovic M et al.<sup>11</sup> noted that the increased incidence of complications was seen in patients with ultrasonographic finding of gallbladder empyema and increased thickness of the gallbladder wall > 3 mm.

In 50% study population, pneumoperitoneum was created using a Veress needle among them 12 people (24%) developed port site bleeding. While in the other 50%, pneumoperitoneum was created via open method among them 7 people (14%) developed port site bleeding. Bleeding was stopped spontaneously by compressing the gauze piece.

In laparoscopic as well as laparoscopy converted to open cholecystectomy common complication found is bile duct injury. These Bile duct injuries can be evaluated via thorough clinical examination, standard preoperative evaluation, knowledge of hepatic biliary anatomy during surgery, the experience of the surgeon, and timely take a call for open conversion. Only 5% of cases in which bile duct injury occurred—they were managed by taking help of senior surgeon, intra biliary T tube insertion and primary suture repair.

In the present study, 10 patients developed postoperative bile leak. The Reason for bile leak in 3 patients was CBD injury (3%), while in the rest 7 patients (7%) bile leak was due to slippage of CD ligature/clips, which were confirmed by MRCP. These results were comparable to Mjäländ O et al.<sup>12</sup> in which out of 11,164 patients who underwent laparoscopic cholecystectomy, 57 (0.5%) cases had bile duct injury. Taki-Eldin A and Badawy AE<sup>13</sup> reported in the 2011–2015 outcome of laparoscopic cholecystectomy, 12 patients (2.4%) had post-op biliary leakage.

In total 8 patients open cholecystectomy had to be performed. The commonest reason for conversion of laparoscopic cholecystectomy to open cholecystectomy was Injury to biliary tree in 3 patients (37.50%), intraoperative bleeding in 2 patients (25%), and difficult calots dissection in 2 patients (25%). These observations are similar to the Paredes Cotore JP et al.<sup>14</sup> results shows that 5% were converted to open/laparotomy, also in Al-Kubati WR<sup>15</sup> reported 336 patients underwent LC, out of it 43 patients (12.8%) had planned laparoscopic operations converted to open cholecystectomy intraoperatively.

In our study the average operating time was 106 minutes. The results of the present study were comparable to Haynes JH et al.<sup>16</sup> study, in which the average operating time was 130 minutes. Taki-Eldin A and Badawy AE<sup>13</sup> reported in 2011–2015 outcome of laparoscopic cholecystectomy mean operative time was 65.94 ± 11.52 minutes.

Around 9% of the study population developed an infection at the surgical site, among the study population laparoscopic cholecystectomy was done in 92 patient among them surgical site infections were present in 6.52% of surgery, in lap converted open cholecystectomy was done in 8 patient among them surgical site infection was present in 37.5%. Taki-Eldin A and Badawy AE<sup>13</sup> studies had similar results in which, 4.3% developed wound infection in laparoscopic cholecystectomy.

Around 92% of cases underwent laparoscopic cholecystectomy and 85% of them were discharged within 3 days, 8% people

discharged between 4 and 7 days, and only 5% population discharged between 8 and 14 days, the reason for prolonged stay in the laparoscopic cholecystectomy group is due to postoperative bile leak, surgical site infection. On the other hand, 8% population underwent lap converted to open cholecystectomy among them 75% people discharged between 8 and 14 days, and 25% people between 15 and 21 days. These results are statistically significant, suggesting that patients undergoing uncomplicated laparoscopic cholecystectomy were discharged earlier. The average postoperative hospital stay in our study was 4.5 days.

Among the laparoscopic cholecystectomy group 92.39% population returned to routine life within 15 days and 7.60% population returned to routine life within 30 days due to postoperative bile leak and surgical site infection. Whereas Among laparoscopy converted to open cholecystectomy 62.5% population returned to routine life within 30 days and 37.5% population returned to routine life after more than 31 days, which is statistically significant. The average time to return to routine life in our study was 15 days.

No mortality was noted in our study. Patients in whom only laparoscopic procedure had been done exhibited statistically significant improvements in postoperative morbidity and cosmetics. Study results are comparable with Tambyraja AL et al.<sup>17</sup> Outcome of laparoscopic cholecystectomy, in which one patient with gangrenous cholecystitis died after laparoscopic cholecystectomy.

## CONCLUSION

In the last two decades laparoscopic cholecystectomy has gained so much popularity that one can say it should be the gold standard operative technique for symptomatic gallbladder calculi mainly due to it giving early postoperative recovery and lessening intraoperative time. It is used as a gold standard surgery for all types of gallbladder conditions like acute calculus cholecystitis, mucocele of GB, empyema of GB, etc.

Patients having perforated gallbladder, thickened GB, dense adhesions at Calot, pericholecystic free fluid are at a high risk of getting laparoscopic converted to open surgery. Common complications of laparoscopic cholecystectomy are postoperative bile leak and surgical site infection. Most of them were treated conservatively without further surgical intervention.

From the above data, one can say that in the hands of experienced surgeon with systemic laparoscopic training, there is a lesser chance of conversion into open surgery and overall it decreases complication rate.

Laparoscopic cholecystectomy requires fewer days of postoperative hospital stay, less postoperative pain, early mobilization, early discharge, and better cosmetics so patient satisfaction is achieved too. From All these advantages laparoscopic surgery should be excellent in creating early recovery to routine life without causing significant morbidity to the patient.

## DISCLOSURE STATEMENT

The authors of this article certify that there are neither any conflict of interest nor any funding from other organization involved in this study. We the authors completely assure and assign the copyrights of the articles to the journal in case of its publication.

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