

**HOW SAFE IS LAPAROSCOPIC CHOLECYSTECTOMY? - A REVIEW OF 327 PATIENTS**

Shah Sheerin<sup>1</sup>, Kumar Abhishek<sup>2</sup>, Singla Pallavi<sup>3</sup>, Singla Karun<sup>4</sup>, Singla Sanjeev<sup>5</sup>, Singh Kuldeep<sup>6</sup>

<sup>1</sup>Assistant Professor, Department of Plastic Surgery, DMCH, Ludhiana.

<sup>2</sup>Assistant Professor, Department of General Surgery, GMCH, Chandigarh.

<sup>3</sup>Consultant Gynaecologist, PGI Satellite Hospital, Sangrur.

<sup>4</sup>Consultant Urologist, Mayo Healthcare, Mohali.

<sup>5</sup>Professor, Department of General Surgery, DMCH, Ludhiana.

<sup>6</sup>Ex-Professor and HOD, Department of General Surgery, DMCH, Ludhiana.

**ABSTRACT****BACKGROUND**

World over success of laparoscopic surgery has mirrored the success of laparoscopic cholecystectomy and it usually is the first surgical operation performed by a surgeon laparoscopically. Though regarded as safe, the anatomical variations in biliary tree and lack of experience to 3-dimensional view sometimes lead to unforeseen complications.

**MATERIALS AND METHODS**

This case series study was conducted to analyse the overall incidence of various complications of laparoscopic surgery in a mixed setup of senior and junior surgeons in the Department of Surgery in a tertiary care institute of Punjab, India.

**RESULTS**

A total number of 327 patients undergoing laparoscopic cholecystectomy were studied in the period from January 2008 to June 2009. Females outnumbered males in this study. The complication rate varied from 5.78% in patients with a diagnosis of cholelithiasis to 13.16% in patients undergoing cholecystectomy for acute cholecystitis. Complications were found to be higher in males and in age group of 60 - 69 years. The rate of intraoperative and postoperative complications is 4.59% and 2.1% respectively.

**CONCLUSION**

Proper preoperative assessment and pre-anaesthetic assessment can be helpful in prevention of laparoscopic complications. Whenever necessary, the conversion to open should not be delayed.

**KEYWORDS**

Laparoscopic Cholecystectomy, Cholecystectomy, Laparoscopy, Complications of Laparoscopy.

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**BACKGROUND**

Gallstones are the commonest disorders of the biliary tract and cholecystectomy is one of the commonest surgeries performed worldwide. In the 21st century, we are witnessing the dawn of a new era in which closed body operating procedures are being performed through minimal access.<sup>[1]</sup> As advances in laparoscopic surgery took place, Philippe Mouret of France described the first laparoscopic cholecystectomy in 1987.<sup>[2]</sup> World over the success of laparoscopic surgery has mirrored the success of laparoscopic cholecystectomy. At present, laparoscopic cholecystectomy is the most common and usually the first surgical operation performed by a surgeon laparoscopically. Such has been its impact and rate of acceptance among surgeons and the common man that it has already replaced open cholecystectomy, a tried and time-tested technique for gall stone disease of over a hundred years and has become a gold standard for the treatment of symptomatic cholelithiasis.

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*Corresponding Author:*

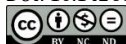
*Dr. Kumar Abhishek,*

*Assistant Professor, Department of General Surgery,*

*Sector-32, Government Medical College,*  
*Chandigarh.*

*E-mail: kumarabhishekdr@gmail.com*

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It is the most popular and the procedure of choice for the patients as well as the insurance companies because of lesser morbidity and shorter hospital stay. Although, it has been described to be a safe and effective treatment for symptomatic gallstones, the large variety of anatomical variations in the biliary tree and the lack of touch sensation and three dimensional view that is inherent to laparoscopy associated to this procedure with complications, some of which are similar to open cholecystectomy and some of which are peculiar to laparoscopic cholecystectomy.<sup>[3]</sup> Many of the injuries reported can be attributed to the inexperience of the surgeon and poor selection of the patients with risk factors or contraindications to laparoscopic surgery. The literature depicts a decrease in incidence of these complications in recent years, because of advent of newer instruments and better experience of surgeons.

The idea of the present case series was to study the overall and the relative incidence of complications of laparoscopic cholecystectomy in a mixed setup of senior and junior surgeons in the Department of Surgery in a tertiary care institute like Dayanand Medical College and Hospital, Ludhiana, Punjab.

**MATERIALS AND METHODS**

This case series study was conducted in the Department of Surgery, Dayanand Medical College and Hospital, Ludhiana and included all consenting patients undergoing laparoscopic

cholecystectomy during a one and a half year period from January 2008 to June 2009. The patients were assessed preoperatively by obtaining clinical history, routine blood tests, liver function test, chest x-ray, ultrasound abdomen and followed up intra-operatively as well as during the post-operative period.

Post-operative followup included daily assessment during the post-operative period of hospital stay as well as follow-up in the outpatient department over a 3 months period. Assessment was done at-

- 1 week post-operatively.
- 1 month post-operatively.
- 3 months post-operatively.

The data collected was compiled and analysed using appropriate statistical methods including Chi-square test, Z-test for proportions and Student's t-test for means. The data was analysed using Lotus 1-2-3 suite and StatPac Statistical Calculator Version 3.

**RESULTS**

This study was undertaken in the Department of Surgery in Dayanand Medical College and Hospital, Ludhiana and the patients undergoing laparoscopic cholecystectomy during a one and a half year period from January 2008 to June 2009. A total of 327 patients were included in the study. Of these 215 were females and 112 were males (reflecting the prevalence of the disease in females). The youngest patient in the study was 15 years old, while the oldest was 87 years old (mean age= 52 years). Table 1 shows that the commonest indication for surgery was cholelithiasis (52.91%), both in males and females followed by chronic cholecystitis. Elective cholecystectomy for a followup case of gallstone induced pancreatitis was the least common indication. Table 2 shows the comparison between indication of surgery and incidence of complications. The complication rate varied from 5.78% in patients with a diagnosis of cholelithiasis to 13.16% in patients undergoing cholecystectomy for acute cholecystitis. Clearly, acute cholecystitis was associated with higher incidence of post-operative complications, although the incidence was not significantly higher than the overall incidence. The incidence of complications was the most in patients between 60 - 69 years of age (12.68%). The incidence of complications in patients below 60 years of age was 5.56%, while for those above 60 years of age was 12.61%. The difference in incidence between the two groups was statistically significant (p value= 0.0419). This study showed that complications were more frequent in the male patients as compared to the female patients and the difference was statistically significant (p value= 0.0477). Table 3 highlights various intraoperative complications, which occurred in 15 patients. These included three anaesthesia related complications, out of which one patient who had respiratory failure after surgery and another patient had combined cardiac and respiratory failure post-surgery. The first patient ultimately succumbed to her respiratory failure, while the second recovered after conservative management. Two patients sustained hollow viscus injury while achieving peritoneal access. Both the patients sustained the injury during the insertion of the first trocar. Both injuries

were detected intra-operatively and necessitated conversion to open procedure for repair of bowel injury. There were two incidents, in which the patients developed subcutaneous emphysema as a complication of pneumoperitoneum. Both were managed conservatively and improved.

Intraoperative haemorrhage was reported in three patients. One of them had port site bleed and other two had cystic artery injury requiring conversion to open in one case, other being managed laparoscopically. All three patients recovered and were discharged. Gall bladder perforation with stone spillage occurred in 5 patients. These patients were managed with thorough peritoneal irrigation and meticulous stone retrieval. None of the patients developed any complication of retained intraperitoneal gallstone. There were no bile duct injuries or thermal injuries. In our study, a total of 11 complications were noted during the early post-operative period, out of which two had haemorrhage which was detected in the drains. Both required re-exploration for control of the haemorrhage. One of the patients had bleeding from the port site and the other had bleeding from the cystic artery stump, probably due to a slipped clip. Port site infection occurred in 6 patients and the epigastric port was the commonest port involved (4 out of 6 patients). One patient developed prolonged postoperative ileus manifesting as persistent vomiting and non-return of bowel movements. The patient was managed with nasogastric aspiration and intravenous fluids and nil by mouth. Two patients developed post-operative bile leak, which manifested as bilious drainage through the drain. Both the patients were discharged with their drains in situ. There were 25 conversions in our study. Out of these, 9 conversions were in male patients and the remaining 16 in female patients. Adhesions around the gall bladder were the most common indication for conversion to open cholecystectomy. The study showed that acute cholecystitis was associated with the highest conversion rate amongst all indications for laparoscopic cholecystectomy. The average duration of surgery was 73.56 minutes. Most of the surgeries took between 60 and 90 minutes. The difference between the incidence of complications in surgeries lasting less than 2 hours and those lasting more than 2 hours was statistically significant (p value > 0.4449). The study showed that the mean duration of post-operative hospital stay was 3.26 days. It was also seen that majority of the patients were discharged by the third post-op day, most on the 2<sup>nd</sup> post-op day. The mean duration of post-op hospital stay was significantly higher in the patients who had complications (mean= 4.5, p value= 0.0081).

Indication	Total	Males		Females		Overall
		No.	% age	No.	% age	
Acute Cholecystitis	38	10	9.01	28	12.96	11.62
Chronic Cholecystitis	67	21	18.91	46	21.29	20.49
Cholelithiasis	173	68	61.26	105	48.61	52.91
Choledocholithiasis	36	9	8.11	27	12.51	11.00
Followup case of gallstone pancreatitis	13	4	3.60	9	4.16	3.98

**Table 1. Indication for Surgery**

Indication (n)	Complications	
	No.	% age
Acute Cholecystitis (38)	5	13.16
Chronic Cholecystitis (67)	7	10.45
Cholelithiasis (173)	10	5.78
Choledocholithiasis (36)	3	8.33
Followup case of gallstone pancreatitis (13)	1	7.7

**Table 2. Distribution of Complications according to the Indication for Surgery**

Complication	No.	% age
Anaesthesia related complication	3	0.92%
Complications of peritoneal access	2	0.61%
Complications of pneumoperitoneum	2	0.61%
Intraoperative haemorrhage	3	0.92%
Bile duct injuries	0	0.00%
Gall bladder perforation and stone spillage	5	1.53%
Thermal injuries	0	0.00%
<b>Total</b>	15	

**Table 3. Relative Frequency of Intraoperative Complications**

## DISCUSSION

Laparoscopic cholecystectomy is the gold standard for symptomatic cholelithiasis.<sup>[4]</sup> This form of surgery when compared to open cholecystectomy leads to faster recovery, shorter convalescence and better postoperative outcome and is associated with fewer complications. Although, the complications associated with laparoscopic cholecystectomy are similar to those associated with open cholecystectomy, certain complications are either more common with laparoscopic cholecystectomy or peculiar to the laparoscopic technique.<sup>[5]</sup> As laparoscopic cholecystectomy has gained popularity, much time and expense has been devoted to studying the complications of this procedure.<sup>[6]</sup>

We performed a prospective analysis of laparoscopic cholecystectomies performed at our institution over a one and a half year period. Our study included 327 patients who underwent laparoscopic cholecystectomy at our institute between January 2008 and June 2009. We studied the incidence of various complications of laparoscopic cholecystectomy in our study population. The overall incidence of complications was 7.95%, which was comparable to the studies by Dexter et al (4.2%)<sup>[7]</sup> and Fullarton et al (5.9%).<sup>[8]</sup> In our study, the incidence of complications was significantly higher in the male sex as compared to the females (12.5% vs. 5.58%, p value 0.0477). This study as well as other literature depicts that male sex is an independent risk factor. On comparing patients below 60 years of age with those above 60 years, it was seen that the complication rate was significantly higher in the elder population (5.56% vs. 12.61%, p value= 0.0419). Eelco et al showed similar increase in complication rate with increasing age.<sup>[9]</sup> The maximum incidence of complications was found in patients undergoing laparoscopic cholecystectomy for acute cholecystitis. Similar results were seen by Eelco et al<sup>[9]</sup> in their study.

## Intraoperative Complications

The overall rate of intraoperative complications in this study was found to be 4.59%. Out of these anaesthesia related

complications were 1%, respiratory complications were 0.61% and cardiovascular complications was 0.31%. The results were comparable to those obtained by Dunn et al<sup>[10]</sup> from England and Wales, where the incidence of respiratory complications was 0.73% and cardiovascular complications was 0.4% in a similar study. The incidence of complications related to peritoneal access occurred in 2 patients, in whom there was injury to the small bowel. This incidence was 0.61%, which was comparable to that of Champault et al<sup>[11]</sup> in a survey of 41196 patients (0.32%). There were two instances of subcutaneous emphysema following laparoscopic cholecystectomy in our study (0.61%). Murdock et al reported a comparable incidence of the same (1.62%) in their study.<sup>[12]</sup> This study shows the incidence of intraoperative haemorrhage as 0.92%, which is significantly lower than the study by Malik et al<sup>[13]</sup> (2.86%), but higher than study by Deziel et al (0.25%). There were no bile duct injuries in our study. Our results were similar to the results of a large laparoscopic cholecystectomy study series by Deziel et al,<sup>[14]</sup> which reported an incidence of bile duct injury as 0.6%. Gall bladder perforation with stone spillage was the most common complication in our study (1.53%). This rate was significantly lower than that reported by Duca S et al (15.9%). The difference is probably because of the smaller size of sample in our study and because of underreporting of gall bladder perforation in the patient records.

## Post-Operative Complications

In our study, 7 patients had complications post-operatively. Port site infection was the most common post-operative complication in our study (1.83%). The commonest involved port site was the epigastric port, because most of the specimens were retrieved through this port. The result was similar to the results of Porte et al,<sup>[15]</sup> who reported port site infection to occur in 2% of cases. However, McGuckin et al<sup>[16]</sup> reported the incidence of port site infection to be 0.4% in their study, probably because they use disposable trocars. The incidence of post-op bile leak was found to be (0.61%). This was comparable to 0.3% incidence in the study by Deziel et al.<sup>[6]</sup>

Successful completion of laparoscopic cholecystectomy might not always be possible and circumstances may force conversion to the traditional open procedure. Conversion to open cholecystectomy however should not be regarded as a complication of laparoscopic cholecystectomy.<sup>[17]</sup> Rather, it should be thought of as a sensible decision to avoid causing unnecessary damage. In our study, there were a total of 25 conversions out of a total of 327 attempted laparoscopic cholecystectomies. The conversion rate was 7.65%, which was similar to the conversion rate reported by Shamiyeh et al<sup>[18]</sup> in 4505 patients (5.4%) and Rajdeep Singh et al<sup>[19]</sup> in a series from north India (8.1%). The most common reason for conversion in our study was adhesions surrounding the gall bladder, as was also shown by Shea et al<sup>[20]</sup> in his study.

The average duration of surgery in our study was 73.56 minutes. It was seen that the incidence of complications increased as the duration of surgery increased. The incidence of complications in patients whose surgery lasted more than 2 hours was significantly higher than in those whose surgery lasted less than 2 hours. Eelco J Veen et al<sup>[9]</sup> have published similar results. Majority of the patients in our study were discharged from the hospital by the 2<sup>nd</sup> post-op day (mean

hospital stay was 3.26 days). The duration of post-op hospital stay was significantly higher in those who had some complication following laparoscopic cholecystectomy as compared to those who had an uncomplicated post-op hospital course. The results of our study are similar to those of Eelco et al.<sup>[9]</sup>

### CONCLUSION

Though safe, laparoscopic cholecystectomies can cause complications, the rate of which was 7.95% in our study. The incidence of these complications is higher in males and in patients above 60 years. The rate of intraoperative and postoperative complications is 4.59% and 2.1% respectively. We found the conversion rate to open surgery as 7.65%. We recommend that proper preoperative evaluation should be done for fitness of laparoscopic surgery. There should be no hesitation in changing the approach to open surgery, if any unforeseen complication occurs.

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