

Original Article

# A study on operative complications associated with laproscopic cholecystectomy

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## ABSTRACT

**Introduction:** Laparoscopic cholecystectomy has revolutionized general surgery. Despite the tremendous impact of laparoscopic cholecystectomy on the management of biliary pathology, surgeons continue to face challenges in the application of Laparoscopic cholecystectomy in daily practice. Laparoscopic cholecystectomy today can be a straight forward operation, but may also be an operative approach fraught with underlying complexities. The present study was undertaken with the aim of finding out the frequency of complications encountered with this procedure and the methods adopted to overcome these complications. Several aspects of these complications and their treatment possibilities are analysed.

**Methods:** This study is accomplished by studying 100 cases of laparoscopic cholecystectomy in one of the tertiary referral hospitals. Proforma was designed to include relevant demographic information, history of illness, examination findings and investigations concerned to the patients.

**Result:** The common indication for laparoscopic cholecystectomy in our study was chronic calculous cholecystitis. 82% patients had chronic calculous cholecystitis which was supported by histo pathological report. It was followed by acute calculous cholecystitis (10%), acute Acalculous cholecystitis (5%), GB polyp (2%), and empyema (1%). In our study 32 patients (32%) were male and 68 patients (68%) were female. The average patient's age undergoing laparoscopic cholecystectomy was ranging between 8 to 75 years. 11 patients (11%) were above the age 60 years. The average duration of the surgery was 88.13 minutes (range 45 – 300mins). The most common complication encountered in this study was gall stone and bile spillage intraperitoneally. Common bile duct injury, Bleeding from liver, hollow viscus injury are other intraoperative complications encountered.

**Conclusion:** Proper preoperative work up, knowledge of possible complications and adequate training makes this operation a safe procedure with favorable result and lesser complications.

**KEY WORDS:** Complications, Cholecystectomy, Laproscopy.

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## INTRODUCTION

Many have referred to the acceptance of laparoscopic cholecystectomy as a revolution

because of the speed and energy with which the technique was accepted. In 1990, 10% of cholecystectomies were being performed laparoscopically in the United States and by

1992; this percentage had risen to 80%. Immediately following the introduction of laparoscopic cholecystectomy, many authors have detected a dramatic increase in the amount of cholecystectomies performed in general hospitals. Many reasons have been proposed to explain this growth trend. Initially, it was speculated that the increase was due to a high number of patients who put off having the operation for fear of the consequences of the laparotomic approach, but then decided to be operated on given the favourable outcome related to laparoscopy [1,2,3].

## MATERIAL AND METHODS

This study is accomplished by studying 100 cases of laparoscopic cholecystectomy in the tertiary referral hospital at Karnataka during a period of 3 years. Proforma was designed to include relevant demographic information, history of illness, examination findings and investigations.

a) Inclusion criteria: All patients with gallbladder disease both symptomatic and asymptomatic.

b) Exclusion criteria: Patients with associated pathologies like choledocholithiasis, Gall bladder malignancy, major bleeding disorder, chronic liver disease or severe cardio vascular and pulmonary diseases.

Procedure is performed under general anesthesia. Pneumo peritoneum established by either 'closed' or 'open' technique. Additional operating port inserted in subxipoid and right subcoastal area. Patient placed in reverse trendelenberg position slightly rotated to left. Neck of gallbladder is retracted towards right iliac fossa exposing calot's triangle. Cystic duct is carefully defined, as is the cystic artery. Once the anatomy is clearly defined and triangle of calot has been laid wide open, the cystic duct and artery are clipped and divided. The gallbladder is then removed from gallbladder bed by sharp dissection. Once gallbladder is free it is removed via umbilicus. Ports are removed under direct vision to evaluate for potential bleeding. Specimen is sent to pathology department in 10% formalin for histopathological examination. Clinical diagnosis is confirmed by subjecting all specimens to thorough histopathological examination.

## RESULTS

**Table 1:** Operative Diagnosis.

Indications	Number of cases	Percentage %
Acute Calculus Cholecystitis	10	10
Chronic Calculus Cholecystitis	82	82
Acalculus Cholecystitis	5	5
GB Polyp	2	2
Empyema	1	1
<b>Total</b>	<b>100</b>	

**Table 2:** Age of patients.

Age	Number of patients	Percentage %
<20	3	3
21-40	50	50
41-60	36	36
>60	11	11

Range - 8 to 72 yrs.

Average - 40 yrs.

**Table 3:** Sex Distribution.

Sex	Number of patients	Percentage %
Male	31	31
Female	69	69

**Table 4:** Complications Encountered during laproscopic cholecystectomy.

Complications	Number of cases	Percentage %
<b>Intra operative hemorrhage</b>		
Veress needle & Trocar related	0	0
Bleeding from liver	2	2
Arterial Injury	1	1
<b>Biliary complications</b>		
Bile Leak & stone spillage	3	3
CBD injury	1	1
Hollow viscus injury	1	1
Diaphragmatic injury	0	0
Pneumoperitoneum related	1	1
Mortality	0	0
<b>Total</b>	<b>9</b>	<b>9</b>

Seven patients had wound site infection as an early post-operative complication. Other early post-operative complications like Bile leak, Enteric leak were not seen in our study.

Three patients suffered Port site hernia as a late post-operative complication. Other late post-operative complications like stricture, post-operative cholangitis were not encountered in our study.

**Table 5:** Conversion from laproscopic cholecystectomy to open cholecystectomy.

Type	Reason for conversion	Number of cases	Percentage %
Obligatory Conversion	Hemorrhage from cystic artery	1	1
	Hemorrhage from GB bed	1	1
	Gall stone spillage	0	0
	Hollow viscus injury	1	1
	CBD injury	1	1
Elective Conversion	Gangrenous GB	0	0
	Adhesion due to previous laparotomy	2	2
	pericholecystitis	0	0
	Obscure anatomy	1	1
<b>Total</b>		<b>7</b>	<b>7</b>

## DISCUSSION

Credit for performing the first laproscopic cholecystectomy procedure is now given to Dr. Erich Muhe of Germany. In September 1985 he performed his first laproscopic cholecystectomy, but his efforts were lost to the world after his patient unfortunately died of a postoperative myocardial infarction [4]. Risks and complications of laproscopic cholecystectomy neither over rated nor under rated. The most common complication encountered in our study was gall stone and bile spillage intraperitoneally. Totally three cases of bile & gall stone spillage was occurred. Of these two occurred during the separation of gall bladder from the GB fossa and one case during extraction of GB through one of the port. In all cases stones were retrieved laproscopically and a thorough saline wash was given and a suction drain was left in situ in the morrison's pouch. Aspiration of distended gallbladder before commencing dissection & use of laproscopic bag in friable gallbladder to retrieve the specimen can minimize these complications.

Incidence of Spillage of gallstones during laproscopic cholecystectomy (LC) is estimated between 10% and 30% [5,6]. This is higher than during open cholecystectomy (OC)[7,8]. Two main factors are predictive for the mishap of a gallstone spillage: the surgeon's experience in LC and the degree of inflammation [9]. However, most of the spilled stones do not cause symptoms. If they do, the time gap between the operation and the first clinical sign is usually wider [10]. In a retrospective analysis from

Switzerland only 1.4% of patients with spillage of gallstones during LC developed serious postoperative complications [11]. Horton and Florence reported that 5% of their patients showed symptoms [12]. Risk factors for the occurrence of symptoms after spillage are the stones' chemical composition and the presence of acute gallbladder inflammation or infected bile. Pigmented stones usually promote the genesis of abscesses more than the other types of stones do [13,14]. For prevention of such complications, every spilled gallstone should be removed, and the abdominal cavity rinsed with saline solution in case of gallbladder perforation. Because of the low morbidity of spilled gallstones, conversion to open procedure seems not to be justified.

Undoubtedly the most frequently reported complication in large series of laproscopic cholecystectomy is common bile duct injury. Results from open cholecystectomy indicate a Common bile duct (CBD) injury incidence of 0.125%–0.25% [15-21]. After the introduction of laproscopic cholecystectomy, early series reported a high increase of CBD injury, up to 2% [22-24] and 4% in acute cholecystitis [25]. This was interpreted as an effect of the "learning curve" [26,27]. Later on, the incidence balanced out at between 0.2% and 0.8%, which is still higher than in open surgery [28-32]. Incidence of Biliary injury in this study was 1%. One case of CBD injury was encountered during the study (Type E1, Strasberg injury). It was a complete transection of CBD, which was clipped and cut due to misidentified cystic duct and CBD due to anatomical variation i.e. low insertion of cystic duct. As the injury was identified intraoperatively, immediate repair was done after converting to open and proper delineation of anatomy. A choledochojejunostomy was performed.

Recent reports about the management and outcome of CBD injury indicated a coincidence with vascular injuries. Buell et al. reported combined injuries of up to 27%. The typical or classic injury is the defect lesion of the CBD. A part of the CBD is resected because of a misidentification of the cystic duct [33,34]. This mishap usually occurs because of too much antero-lateral traction of the gallbladder infundibulum.

One case of arterial injury occurred in our study. Bleeding occurred from cystic artery, which was identified after converting. Cases required to be converted to assess & control bleeding.

Two-thirds of external bleeding is seen postoperatively, after the pneumoperitoneum has been decreased, and most incidents require surgical intervention. The incidence of major vascular injuries in laparoscopy (including aorta, iliac vessels, vena cava, inferior mesenteric arteries and lumbar arteries) is 0.07%–0.4%, and for minor injuries (branches of the epigastric vessels, mesenteric and omental vessels) is 0.1%–1.2% [35] The mortality rate is 0.05%–0.2% [36].

Two cases of liver injury were encountered in our study. In all the cases bleeding has occurred from the GB bed due to wrong plane of dissection of gall bladder from the liver. In one case the bleeding was controlled with pressure & using monopolar cautery. Other case was converted to open procedure in order to control the bleeding.

Only few data are available on the real incidence of bleeding complications from the liver. In the meta-analysis from Shea 163 patients out of 15,596 that suffered bleeding required conversion (8%) [37]. Bleeding from the liver is mainly a situation in cirrhotic patients. These patients have often been classified as showing a contraindication for LC [38]. Recently, a meta-analysis that included 400 patients was published and demonstrated a significantly higher bleeding rate in cirrhotic patients (26% vs. 3.1%) and a significantly higher morbidity rate (20.86% vs. 7.99%) [39].

A single case of hollow viscous injury occurred in this study. There was an inadvertent superficial cautery burn to the 2<sup>nd</sup> part of duodenum. It was converted to open to assess the full extent of injury. The injury was superficial, didn't require any repair. However a tube drain was left insitu. Bowel injuries most probably occur during the insertion of the trocars, or during dissection or adhesiolysis. They often remain undetected during the operation. The incidence is about 0.07%–0.7% [40].

There was one pnemoperitoneum related injury in this study. Subcutaneous emphysema due to

wrong plane of insertion of veres needle and is subsided conservatively. Comparing with other studies, the creation of the pneumoperitoneum itself has a mortality risk of up to 0.2% [41]. The incidence of injuries from trocars or Veress needles is also up to 0.2% [42,43]; injuries during set-up of the pneumoperitoneum are responsible for 50% of all complications during laparoscopy [43]. Most of the recent articles show evidence that the Veress needle has a higher risk of causing an injury than the open technique has [44] the reason for conversion were classified as obligatory, where it was mandatory to convert due to complications encountered during the procedure and elective conversion where complications are foreseen in difficult cases like obscure anatomy, friable gall bladder or dense adhesions. Totally seven cases were converted to open to complete the procedure. Three patients were elective converted. Of these one had acute cholecystitis, had dense pericholecystitis and friable gall bladder. One patient had adhesions due to previous laparotomy. In one of the patient the anatomy was obscure. It was difficult to differentiate cystic duct from CBD. In these cases an early decision was taken to convert in view of preventing complications. Obligatory conversion was done in four cases. Reasons being the intra operative complications and has mandated conversion to deal with the complications.

Postoperative complications like umbilical port-site infection during cholecystectomy reported to be 9% [1] even for a difficult cholecystectomy [2]. The role of topical antibiotic prophylaxis is particularly useful in prevention of local infections in patients with other major risks, such as immunodeficient patients, patients taking immunosuppressive drugs, uncompensated diabetic patients, and others. In this study total seven (7%) cases reported. All cases were operated for acute cholecystitis and were treated with oral antibiotics and wound dressings.

Late post-operative complication in this study was port site hernia. The incidence of PSH in a range of laparoscopic procedures has been described as between 0.14% and 22% [4,45,46,47,48]. In this study three cases of PSH were reported, in all these cases gallbladder was

extracted by assisted extraction by extending the wound. It was not associated with bowel obstruction or strangulation and all cases were operated and mesh repair was done. The overall incidence of port-site hernia was 1.7% (range, 0.3% to 5.4). The most important factors were older age, higher body mass index, preexisting hernia, trocar design, trocar diameter, increased duration of surgery, and extension of the port site for gallbladder extraction.

## CONCLUSION

Laparoscopic cholecystectomy is a safe and effective procedure in all patients with gall stone diseases. Proper preoperative work up, knowledge of possible complications and adequate training makes this operation a safe procedure with favorable result and lesser complications. Although laparoscopic techniques have largely supplanted traditional methods of performing open cholecystectomy for most patients with chronic, uncomplicated cholecystitis and cholelithiasis, the open approach continues to be an effective therapy for the treatment of complicated gallstone disease. Converting to open procedure should not be regarded as a complication. Given the very low risk of having a complication from a lost stone, it is agreed that laparotomy is not indicated for stone retrieval.

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