

## Research Article

# The study of laparoscopic cholecystectomy and its conversion to open cholecystectomy: analysis of 100 cases in Navi Mumbai, India

Nandkishor Narwade\*, Tanveer Shaikh, Rishabh Jain, Naseem Khan,  
Mithilesh Ghosalkar, Sharique Ansari, Yashashvi Sharma

Department of Surgery, DY Patil College of Medicine, Nerul, Navi Mumbai, Maharashtra, India

**Received:** 03 October 2015

**Revised:** 05 October 2015

**Accepted:** 13 November 2015

### \*Correspondence:

Dr. Nandkishor Narwade,

E-mail: [nandkishorn54@gmail.com](mailto:nandkishorn54@gmail.com)

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## ABSTRACT

**Background:** Laparoscopic cholecystectomy has now become a better option instead of open cholecystectomy for the treatment of cholelithiasis that is it has become a gold standard for cholelithiasis condition. Last century has been the most fruitful era for the treatment of biliary tract disease as it saw the progress from open to laparoscopic surgery with single port surgery etc.

**Methods:** The purpose of our study is grading of Laparoscopic cholecystectomy and studying the outcome of problematic and challenging Laparoscopic cholecystectomy cases, its complication and management, to decide when to convert Laparoscopic cholecystectomy to open cholecystectomy. This study analyzes the conversion rate of laparoscopic cholecystectomy to open cholecystectomy in Navi Mumbai, India. This is a retrospective study of 100 patients conducted from October 2012 to October 2014.

**Results:** Out of the 100 cases 98 got successfully operated by Laparoscopic cholecystectomy. Only 2 cases out of 100 got converted from Laparoscopic to open cholecystectomy and they belonged to grade E with empyema.

**Conclusions:** Laparoscopic cholecystectomy has become the procedure of choice for management of symptomatic gall bladder. Laparoscopic cholecystectomy intra operatively for grade A to E where Grade A is very easy level of performing Gall bladder surgery to Grade E where conversion is 100% due to bad.

**Keywords:** Cholelithiasis, Laparoscopic cholecystectomy, Complication, Conversion

## INTRODUCTION

Introduction of laparoscopic cholecystectomy techniques has made a revolution in gastro intestinal surgery in recent years. Minimal invasive surgery, cure and safety of patient are the priority of the modern surgical method. Cholelithiasis the most common digestive disorder was traditionally being dealt by convention or open surgery. Laparoscopic cholecystectomy has proved and increased the importance of minimal access. It is very safe and easy

because of better magnification. Advantages of Laparoscopic cholecystectomy are that it has shortened hospital stay, less morbidity, mortality, a quicker return to work and with good cosmetic result. Nowadays conversion rate to open cholecystectomy is reduced. Even most difficult laparoscopic cholecystectomies have been performed successfully without complications. Certain Factors determining conversion of Laparoscopic to open in today's set up are previous surgery leading to dense adhesions, Bile duct or cystic duct injury, Bleeding from

cystic artery or liver fossa, Carcinoma of Gallbladder, Post ercp difficult adhesions and patient with choledocholithiasis which is failed in endoscopic extraction of stones such difficult cases are still challenge to trained laparoscopic surgeon, and postoperative complications are known and should be considered while operating.

Grading of laparoscopic cholecystectomies was done from 'A' to 'E' categories. In our study we consider grade 'A' to 'E' cases and their outcome, complications and its management and which cases should convert to open cholecystectomies. The grades are as follows

#### Grading of laparoscopic cholecystectomies

1. Laparoscopic cholecystectomy done without difficulty clear calot's triangle.
2. Laparoscopic cholecystectomy done with flimsy adhesions due to previous cholecystitis attack but calot's triangle is clear.
3. Laparoscopic cholecystectomy done in cases with dense adhesions in calot's triangle dissected with difficulty with electrocautery or aqua dissection.
4. Laparoscopy cholecystectomy due to chronic cholecystitis with dense adhesion, Empyema gallbladder and gangrenous gallbladder.
5. Conversion to open cholecystectomy after Laparoscopic cholecystectomy due to various reasons (a)Dense adhesion, (b) Mass formation (c) Chronic cholecystitis, (d)Empyema or gangrenous gall bladder, (e) Intraoperative complications and (f) Ca gall bladder.

#### METHODS

The study subjects were patients, admitted with diagnosis of symptomatic cholelithiasis, who subsequently underwent cholecystectomy at tertiary hospital from 25<sup>th</sup> October 2012 to 25<sup>th</sup> October 2014.

All the patients were selected randomly, and as per the proforma, all the patients were interviewed for detailed clinical history and examined. They were then subjected to routine blood, urine and other investigations and an abdominal ultrasound was performed in all cases.

**Inclusion criteria:** Patients with acute calculous cholecystitis, proven by USG with at least one attack of upper abdominal pain and considered fit for elective cholecystectomy was included in the study.

**Exclusion criteria:** The patients with following conditions were excluded from the study:

- History or investigations suggesting CBD stones.
- History of prior abdominal surgery.

A written informed consent was taken from all patients before their inclusion in the study. The study was approved by the ethical committee of the hospital. A complete study was done and analyzed regarding the patients undergoing laparoscopic cholecystectomy and the conversion rates to open cholecystectomy among them. Total no of patients selected for this study was 100. All the patients were kept nil by mouth overnight, prior to surgery and were given a dose of prophylactic antibiotic one hour prior to surgery. All the patients were asked to evacuate bladder prior to surgery. All the surgeries were performed under general anesthesia, by the surgical team consisting of consultants and residents.

#### RESULTS

**Table 1: Age Distribution.**

Age in years	No of patients	Percentage
<21	5	5
21-30	17	17
31-40	28	28
41-50	20	20
51-60	14	14
61-70	14	14
71-80	2	2
Total	100	100

**Table 2: Gender Distribution.**

Gender	No of patients	Percentage
Female	66	66
Male	34	34
Total	100	100

**Table 3: Grade of Laparoscopic Cholecystectomy.**

Grade of Laparoscopic Cholecystectomy	No of patients	Percentage
A	35	35
B	27	27
C	26	26
D	10	10
E	2	2
Total	100	100

**Table 4: Conversion to open Cholecystectomy.**

Conversion to open	No of patients	Percentage
Laparoscopic	98	98
Open	2	2
Total	100	100

**Table 5: Intra operative findings vs grade.**

Intra operative findings	Grade					Total
	A	B	C	D	E	
None	35	0	0	0	0	35
Flimsy adhesions	0	26	0	0	0	26
Dense adhesion	0	0	22	2	0	24
Bleeding and bile leak	0	0	2	0	0	2
Lump formation	0	0	0	1	0	1
Empyema, gangrenous Gb with biliary peritonitis	0	0	0	6	2	8
GB anomalies	0	1	2	1	0	4
Total	35	27	26	10	2	100

In Grade E 2 patients were converted to open due to empyema of GB and gangrenous GB. However B, C, D

Category despite of all the difficulty, there was no conversion to open.

**Table 6: Post op complication vs grade.**

Post op complications	Grades					Total
	A	B	C	D	E	
Bile leak through drain	1	1	2	4	0	8
Reactionary haemorrhage	0	0	0	1	0	1
Wound infection	0	0	0	3	2	5
Total	35	27	26	10	2	100

In A and B category bile leakage up to 50 ml postoperatively through drain was managed conservatively. Biliary leakage gradually decreased and stopped within 3 days spontaneously without any intervention. In C and D category there was cystic duct blow out intraoperatively due to small rent between cystic duct and common bile duct biliary leakage was 100 ml

they were managed post operatively by ercp and stenting. In one patient of D category there was reactionary hemorrhage postoperatively. In this patient ultrasonography abdomen showed 200 ml blood collected in gallbladder fossa. Fresh frozen plasmas were transfused and injection vitamin k was given to patient to which patient responded well and there was no need for any further surgical intervention.

**Table 7: Conversion to open Vs grade.**

Conversion to open	Grade					Total
	A	B	C	D	E	
Laparoscopic	35	27	26	10	2	100
Open	0	0	0	0	2	2
Total	35	27	26	10	2	100

## DISCUSSION

Laparoscopic cholecystectomy is now considered more popular than traditional procedure. Most of the progress in the field of GB disease and treatment has been made in the last century but gallstone and their sequelae date back to 1085 -945 BC have been discovered in the mummy of Amen.<sup>1</sup> The first systematic data about the disease was published as "De medical historic mirabilis" by

Marcellus Donatus in 1596. The first cholecystectomy is credited to John Strong Bobbs on June 15 1867.<sup>1</sup> Karl Langenbach of Berlin performed first planned cholecystectomy on July 15 1882 using the aseptic technique of Joseph Lister.<sup>2</sup>

In 1901 George Kelling examined the abdominal cavity with an endoscope and named the procedure as celioscopy by using air through puncture needle to create

pneumoperitoneum.<sup>3</sup> In 1929 Kalk introduced a dual trocar and opened the way for diagnostic Laparoscopic.<sup>4</sup> In 1933 Fervers recommended CO<sub>2</sub> as insufflating agent on the basis of study comparing air, oxygen and CO<sub>2</sub> in 50 patient.<sup>3</sup> 1938 Janos V developed his spring loaded needle to create pneumoperitoneum and it is still in use.<sup>5</sup> In 1960 Prof Kurt S developed automatic insufflation device that monitored abdominal pressure and gas flow. He also developed endoscopic instrument like thermo coagulation angled lens, hook scissors, endloop applicator and irrigation- aspiration apparatus.<sup>6</sup>

Hasson proposed an open technique providing visualization of peritoneal cavity prior to trocar insertion and reduced the complication related to blind trocar entry.<sup>7</sup> First Laparoscopic cholecystectomy was performed by Philippe M in Lyon 1987. In 1999 Udwardi T performed the first Laparoscopic cholecystectomy in India.<sup>2</sup> Anderson et al compared the Laparoscopic vs open cholecystectomy and found physiologically and economically betterment of Laparoscopic cholecystectomy.<sup>8</sup> Atwood also studied the same in 115 cases and found the Laparoscopic cholecystectomy was safe, cost effective and there was faster recovery of patient.<sup>9</sup> Williams Jr studied 1283 open cholecystectomy and 1107 Laparoscopic cholecystectomy and found that there was increase in mortality rate in patients with acute cholecystitis treated with open cholecystectomy and secondly there was increase in complication in patients with chronic cholecystitis treated with open cholecystectomy with as compared with Laparoscopic cholecystectomy group.<sup>10</sup>

Harris studied 100 open / 100 Laparoscopic cholecystectomy and found that morbidity was 9% and mortality 1% in Laparoscopic cholecystectomy as compared to open cholecystectomy where morbidity was 13% and mortality was 2%.<sup>11</sup> Koperna has done study of acute cholecystitis in 49 patients for each procedure and found conversion rate 44.9%.<sup>12</sup> Complication rate after Laparoscopic cholecystectomy to be lesser. Bosch compared the economic benefits of 22 Laparoscopic cholecystectomy over 153 open cholecystectomy and found that operative time was 66 and 92 minutes respectively, complications was 9 and 6 cases respectively, post op stay 8 and 3 days.<sup>13</sup> Cost of Laparoscopic cholecystectomy was 18% less than open cholecystectomy because of shorter stay and less complication. Capizzi et al studied conversion rate in difficult Laparoscopic cholecystectomy in 1360 cases and overall conversion rate was 1.8%. Median operative time was 55 minutes without any mortality and post of complication.<sup>14</sup>

During the study period only 12.1% of cholecystectomy was performed by 59 surgeons who were carried out with conventional techniques. The marginally higher rate of biliary injury with Laparoscopic cholecystectomy and low incidence of complication such as bowel perforation unique to this procedure seem to be outweighed by low

rate of other complication such as death, hemorrhage and pulmonary problems. This study also shows that laser dissection or cautery is better for removal of gall bladder from hepatic bed. Both are effective and safe, on the evidence of this series as they are used by trained surgeon. Cautery is also cheaper.

## CONCLUSION

Laparoscopic cholecystectomy has become the procedure of choice for management of symptomatic gall bladder. At times it is easy and can be done quickly occasionally it is difficult and takes longer time. But there is no grading or scoring system available to predict the degree of difficulty of Laparoscopic cholecystectomy intra operatively. So our aim of this study was to develop a grading system to predict difficulty level of Laparoscopic cholecystectomy intra operatively for grade A to E where Grade A is very easy level of performing Gall bladder surgery to Grade E where conversion is 100% due to bad. The proposed scoring system is relative and can be written on patient's indoor paper as well as on discharge card to know the severity of the disease as well as difficulty during Laparoscopic cholecystectomy.

In our study conversion rate to open cholecystectomy even in C and D category of Laparoscopic cholecystectomy has decreased tremendously due to surgeon's experience in Laparoscopic cholecystectomy. The role of Aqua dissection (continuous water irrigation with pressure) has also proved beneficial in dissection of adhesions or achieving good hemostasis and better visualization of hepatobiliary triangle due to biliary leakage. In our center the conversion rates have decreased as a result of better techniques practiced while dissecting gall bladder and defining Calot's triangle clearly by using water irrigation, proper placement of ports, experience of surgeon and better Assistance, New Instruments and new electrosurgical equipment's (bipolar, vessel sealer) We have also found that the conversion to open cholecystectomy should be done in proper time without any hesitation in case of complications that could not be managed by laparoscopic surgery and conversion in such case reflects judgment and should not be considered as a complication.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Narwade N, Shaikh T, Jain R, Khan N, Ghosalkar M, Ansari S, et al. The study of laparoscopic cholecystectomy and its conversion to open cholecystectomy: analysis of 100 cases in Navi Mumbai, India. *Int J Res Med Sci* 2015;3: 3586-90.