

STUDY OF FACTORS RESPONSIBLE FOR CONVERSION IN LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Background: Laparoscopic Cholecystectomy has become the gold standard procedure for symptomatic Gall bladder disease since last three decades and was widely done all over the world which has significantly reduced the morbidity, hospital stay with better cosmetic results and early return to work. But it may not be always feasible to do a Laparoscopic Cholecystectomy due to various technical and patient related factors. This study aims to identify various factors leading to conversion of Laparoscopic cholecystectomy to open method and also to predict the factors which could lead to conversion to open and there by anticipating conversion intraoperatively. A conversion rate of 1.5 % to 19% has been reported in different studies. **Materials and Methods:** This was a Retrospective study conducted at Aarupadai Veedu Medical College for a period of 2 years, from March 2015 to February 2017. This study included 152 patients with symptomatic Gall bladder disease without CBD stones who underwent elective/emergency Cholecystectomy and various factors responsible for conversion were studied. **Result:** In this study a total of 40 cases required conversion to open cholecystectomy with a conversion rate of 25 % with analysis of various patient related factors like Obesity, Diabetes, Age, Gender and Anatomical factors like Gross infection of GB, Calculous cholecystitis, Frozen Callot's, Thick GB wall, Aberrant Anatomy of ductal and arterial system was done. Out of the factors analyzed which are responsible for conversion suppurative etiology was found in 19 patients, Frozen Callot's was observed in 9 patients, CBD injury in 1, Omental and bowel adhesions/injury lead to conversion in 3, Aberrant ductal and arterial anatomy in 4, identification of source of Bleeding in 2, Instrument failure (clip applicator) in 1, Mirizzi's syndrome (site of Calculi) in 1. **Conclusion:** Conversion rate in this study was 25 % which was significantly higher than the studies done in western countries. Factors like Gross infection of Gall bladder, Frozen Callot's, Obesity, Female gender, instrument failure and aberrant anatomy were responsible for conversion.

INTRODUCTION

Symptomatic Gall bladder disease is widely encountered problem now a days. Although majority of patients with gall stones are asymptomatic, in few they can cause significant symptoms and rest are diagnosed incidentally in asymptomatic patients. Laparoscopic cholecystectomy has become a gold standard procedure,^[1,2] for symptomatic gall bladder disease for more than 3 decades in India now. First Laparoscopic Cholecystectomy was performed by Eric Muhe in the year 1985.^[3] Later it was improved by Philip Mouret in 1987. Various factors can play a role in converting a Laparoscopic cholecystectomy to an open cholecystectomy. In spite of the

complications that are inherent to Laparoscopic cholecystectomy like increased incidence of bile duct injuries, Port site hernia formation, vascular injuries, visceral injuries, carbon dioxide narcosis, external biliary fistula,^[4] Laparoscopic cholecystectomy has many advantages like less morbidity (pain, wound complications) to the patient, shorter stay in the hospital, early return to the work, better cosmetic outcome.^[5] Whenever a conversion to open cholecystectomy is warranted, it should not be regarded as inefficiency of the surgeon rather a measure to prevent complications for the patient. A chronically inflamed and contracted gallbladder with thickened wall during laparoscopic cholecystectomy (LC) has an increased conversion

rate, the dense adhesions signified by chronic inflammation and were certainly due to the repeated attacks of acute cholecystitis. Rosen et al,^[6] reported that conversion from LC to open cholecystectomy was required in 5.3% of their patients. The common indication for conversion in their study was chronic inflammation, preventing accurate delineation of biliary duct Anatomy.

Patients should be well aware preoperatively and an adequate assessment of the risk factors for evaluating the possibility of conversion of a laparoscopic cholecystectomy to an open cholecystectomy must be done. Identification of these risk factors before the procedure can make the surgeon aware of possible conversion to open cholecystectomy and this would be beneficial for both patients and surgeons to prevent complications and medico legal implications.

MATERIALS AND METHODS

A retrospective study of 2 years duration was conducted from March 2015 to February 2017 in Aarupadai Veedu Medical College. A total number of 152 cases of Cholecystectomy were included in this study. After obtaining Institutional Ethical Committee approval and an informed written consent from patients the study was started in a tertiary care hospital. The aim of this study is to identify various factors leading to conversion of laparoscopic cholecystectomy to open cholecystectomy and to preoperatively predict the factors responsible and thereby anticipating conversion. Inclusion criteria is all patients with symptomatic Gall bladder disease who are scheduled to undergo Laparoscopic cholecystectomy and the exclusion criteria were patients with CBD stones and dilated CBD, previous upper abdominal surgery, patients with deranged liver function, carcinoma gall bladder and GB polyps.

Patients underwent all the relevant preoperative investigations like Ultrasonography of the abdomen, CECT abdomen (if needed), liver function tests, blood grouping and typing, Random blood sugars, Urea, Creatinine, Complete hemogram, Urine routine examination, Electrocardiogram, chest X ray, Bile/Pus Culture and Sensitivity.

Factors responsible for conversion such as Body Mass Index (obesity), Diabetes Mellitis, Age, Sex, Aberrant biliary arterial and ductal Anatomy, Frozen callot's, Thick fibrosed Gall bladder, Visceral injury, Bleeding, Suppurative conditions of Gall bladder like Mucocoele, Emphysematous gall bladder, Empyema gall bladder leading to gangrene, rupture and sepsis, Instrument failure were thoroughly analyzed. All patients were given preoperatively prophylactic 3rd generation cephalosporins. Pneumoperitoneum was created by both closed and open techniques according to patient factors and 4 ports were used for performing Laparoscopic cholecystectomy. Conversion was done either by Kocher's subcostal incision, Transverse or paramedian incision.

Statistical Analysis

Statistical analysis of various factors was done by SPSS software version (10.0) using Chi-square test where p values <0.05 were considered statistically significant.

RESULTS

A total of 152 cases of Laparoscopic cholecystectomies have been included in this study. Out of which 40 cases (25%) needed conversion to open cholecystectomy.

Table 1 shows Age distribution among patients who were converted to open and who did not require conversion. The risk of conversion was associated with increasing age, it was more in patients with 41 to 50 years age group.

Table 1: Age wise conversion rate

Age in years	Non converted Group (LC)	Converted Group (Open)	Conversion rate
20-30	28	3	10.7%
31-40	23	5	21.7%
41-50	18	11	61.11%
51-60	31	15	48.3%
61-70	12	6	50%
Total	112	40	-

Table 2: Depicts the causes for conversion, Suppurative etiology being the commonest cause

Causes of conversion	No. of cases converted (40)	Percentage of Conversion
Bleeding	2	5%
Instrument failure	1	2.5%
Frozen Callot	9	22.5%
CBD injury	1	2.5%
Omental and Bowel adhesions/ injury	3	7.5%
Mirizzi's Syndrome	1	2.5%
Aberrant duct Anatomy	4	10%
Suppurative etiology	19	47.5%

Table 3: Gender distribution among the patients

Gender	Converted	Nonconverted	Percentage	Total Patients
Male	17	74	42.5%	91
Female	23	38	57.5%	61
Total	40	112	100%	152

Table 3 shows the gender distribution of the subjects. There were total of 38 females and 74 males in nonconverted group, 23 females (52.5%) and 17

males (42.5%) in converted group. On total there were 61 females and 91 males. The rate of conversion is high among female patients in our study.

Table 4: BMI distribution among patients as the obesity is one of the important factors responsible for conversion

BMI	No. of Patients	Percentage	No. of patients converted	Percentage of conversion
<30	109	71.71	24	22.01%
>=30	43	28.28	16	37.20%
Total	152	100	40	

Table 4 shows the rate of conversion among obese (BMI >30) and non-obese (BMI <30) patients. The rate of conversion is significantly higher in obese patients that is 16 out of 43 obese patients (37.20%) have been converted to open cholecystectomy when

compared to 24 out of 109 non-obese patients (22.01%). Obesity is one of the important factors indirectly responsible for conversion of laparoscopic cholecystectomy.

Table 5: Microorganisms isolated on culture and sensitivity in gross infections of Gall bladder

Suppurative etiology	Number of cases	Percentage of conversion	Microorganism(s) isolated	Antibiotic Sensitivity
Mucocele	3	7.5 %	Klebsiella, Escherichia Coli, Pseudomonas aeruginosa	Cefotaxime, Ciprofloxacin
Emphysematous GB	5	12.5 %	Enterococci, Clostridia Perfringens	Piperacillin-Tazobactam, Cefepazone, Sulbactam, Ceftriaxone
Empyema	8	20 %	Escherichia Coli, Klebsiella	Ceftriaxone, Imepinem
Gangrene	3	7.5 %	Bacteroides fragilis, Escherichia Coli, Enterococcus, Candida	Meropenem, Cilastin, Polymyxin B
Total	19	47.5%	-	

Gross gall bladder infections cause significant morbidity in the form of persistent high grade fever, abdominal pain, wound infections, sepsis and lead to high conversion rate due to altered plain of dissection, oedema of tissues in and around gall bladder. These patients require broad spectrum antibiotics initially and later specific antibiotics based on the culture & sensitivity report to prevent sepsis. Pus or bile should be sent for culture & sensitivity for starting appropriate intravenous antibiotic therapy in these patients. 3rd generation Cephalosporins or quinolones should be started with or without Metronidazole as first line antimicrobials. Most often these patients require higher antibiotics to prevent wound complications and sepsis. Piperacillin-tazobactam, Carbapenems are the common higher antibiotics used to treat the severe infections of Gall bladder and rarely Colistin, Polymyxin B may be required to control the infection in few cases.

DISCUSSION

Laparoscopic cholecystectomy has been the gold standard procedure throughout the world for more than 3 decades now. There have been many studies conducted to evaluate the factors responsible for conversion of Laparoscopic cholecystectomy to open procedure and the conversion rates vary from 2 to 15%.^[7,9] In our study the conversion rate was found to be 25% which is definitely higher than the studies done in western countries. The factors responsible for

conversion can be surgeon related, equipment failure and patient's factors. In most of the situations patient's factors play a major role in conversion and occasionally equipment failure or surgeon related factors can contribute for conversion. In our study factors like suppurative etiology, age (>40 years), gender (females), obesity (BMI >=30) are the patient related factors which contributed to conversion of Laparoscopic cholecystectomy. Various studies,^[10,11] have found that male gender as a risk factor for conversion with probable reasons being due to more frequent association with severe disease i.e. both acute and chronic cholecystitis and due to higher percentage of intra-abdominal and visceral adipose tissue than women. In our study more female patients required conversion to open probably obesity being the main reason. Obesity has been found to be important cause for conversion in few international studies,^[12] like our study, reasons could be difficulty in creating pneumoperitoneum through thick anterior abdominal wall with fat, leak of pneumoperitoneum due liberal port incisions, displacement of port cannula, difficult dissection of bulky Callot's triangle, excess of omental fat adhesions around the common bile duct thus obscuring the normal anatomy. According to the study by Donkervoort et al., patients with BMI >25 were 3.4 times more likely to undergo conversion. In this study age above 40 years was found to be a significant factor for conversion of laparoscopic to open cholecystectomy. The reasons were probably due to longer disease course (long standing gall stones), repeated attacks of acute

cholecystitis,^[7] or due to many other co morbidities in middle aged and elderly patients.^[9] Other factors like number of Gall stones, size of the gall stones, Gall bladder wall thickness were found to be insignificant.

CONCLUSION

Laparoscopic cholecystectomy is the gold standard procedure for symptomatic gall bladder disease. It should be considered in almost all the cases requiring cholecystectomy with exception as a rule. Only in inevitable situations a laparoscopic cholecystectomy can be converted in to an open procedure. Such a conversion need not be considered as inefficiency of the surgeon but it is done for patient's safety and better outcome of the procedure. Prior consent must be obtained from all the patients for possible conversion of the procedure to avoid medicolegal implications. Instrument failure could be overcome by having back up or doing timely replacement before it malfunctions. Use of good quality instruments could avoid this factor leading to conversion to open method. Suppurative etiology may contribute to majority of the conversions, hence the surgeon should anticipate wound complications at the earliest and start appropriate intravenous antibiotics based on culture and sensitivity report to prevent complications like sepsis. Injury to the bile ducts due to aberrant ductal anatomy can be overcome by being aware of the possible variations of ductal anatomy and having a senior surgeon available for help in case of confusing ductal anatomy. Brief analysis of the above factors before planning a Laparoscopic cholecystectomy would help in minimizing complications and improve the outcome of the procedure.

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