

## Analysis of Risk Factors for Conversion to Open Procedure during Laparoscopic Cholecystectomy

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### Abstract:

**Background:** Even though Laparoscopic Cholecystectomy is the standard gold treatment for Gallbladder diseases, needful prompt conversions are mandatory to avoid complications. Surgeons performing laparoscopic cholecystectomy should not think of conversion to open operation as a failure but rather as mature judgment. Knowledge regarding the underlying reasons for conversion can help surgeons to an earlier intraoperative decision to convert to open procedure if the difficulty encounters.

**Materials and Methods:** The Present clinical Study is a hospital-based retrospective study conducted at the Department of General Surgery, Government General Hospital, RIMS, Kadapa, Andhra Pradesh a teaching hospital attached to RIMS Government Medical College to determine factors influencing conversion of laparoscopic cholecystectomy to open cholecystectomy. The study period is from 1<sup>st</sup> May 2017 to 30<sup>th</sup> April 2019. The patients of all the surgical units of the hospital included in the study. The study group consisted of 340 patients with 214 women (62.95%) and 126 men (37.05%) from ages 18 to 79 years old. The patients were qualified for the operation both in the scheduled and emergency mode. The conversion was necessary in 31 cases (9.11%).

**Results:** Dense pericholecystic adhesions (45.16%), followed by bleeding from the GB bed and Cystic artery injury (22.58%) are the most common causes for conversion to Open Cholecystectomy.

**Key Word:** Laparoscopic Cholecystectomy; Risk factors for conversion; GB Adhesions; Bleeding from Cystic Artery.

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### I. Introduction

Laparoscopic cholecystectomy is a precious example of the surgical techniques which changed the thinking and operating habits of surgeons. Popularised in the late 1980s, LC revolutionised hepatobiliary and gastrointestinal surgery. Today, 92% of all cholecystectomies are done laparoscopically, and LC remains an integral part of training for the general surgery resident. Even though LC is the gold standard in the treatment of gallbladder diseases, needful prompt conversions are mandatory to avoid complications. Surgeons performing laparoscopic cholecystectomy should not think of conversion to open operation as a failure but rather as mature judgment and should not hesitate to convert to a traditional open cholecystectomy if the anatomy is unclear, complications arise, or reasonable progress is not on time, even if it means a more extended hospital stay for the patient as open laparotomy allows the additional tool of manual palpation and tactile sensation. This study focuses mainly to thorough knowledge regarding the underlying reasons for conversion and to help surgeons better prepared for preoperative assessment and to obtain the consent of patients about the conversion to be done if required so that patients could have adequate psychological preparation and planning of convalescence.

### II. Material And Methods

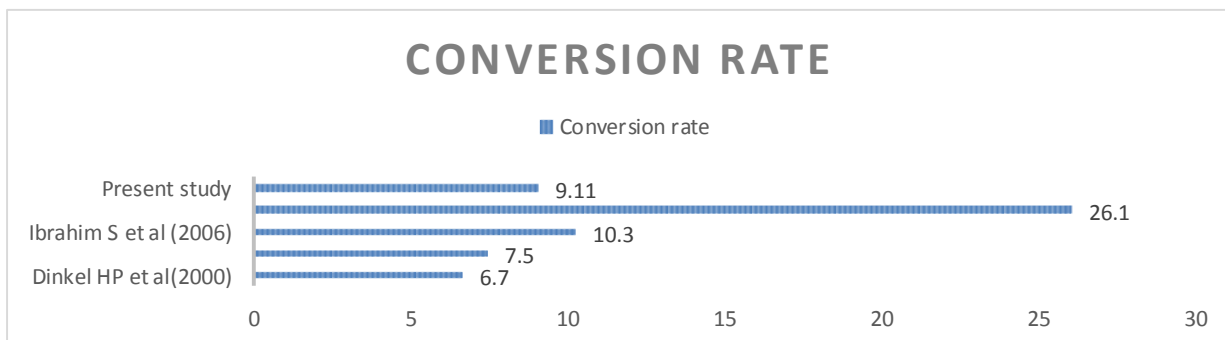
The Present clinical Study is a hospital-based retrospective study conducted at the Department Of General Surgery, Government General Hospital, RIMS, Kadapa, Andhra Pradesh a teaching hospital attached to RIMS Medical college to determine factors influencing conversion of laparoscopic cholecystectomy to open cholecystectomy. The study period is from 1<sup>st</sup> May 2017 to 30<sup>th</sup> April 2019. The patients of all the surgical units of the hospital are included in the study. The study group consisted of 340 patients with 214 women (62.95%) and 126 men (37.05%) from ages 18 to 79 years old. The patients were qualified for the operation both in the scheduled and emergency mode. The conversion was necessary in 31 cases (9.11%). The operation protocols are analysed retrospectively. Information was taken about the operating team, duration and course of the LC and the

complications leading to the open laparotomy. The inclusion criteria for LC were: all patients with symptomatic cholelithiasis, including acute cholecystitis, and ultrasound abdomen (US) demonstrating cholelithiasis and normal CBD. LC omitted in patients with portal hypertension, gallbladder malignancy, and any other anaesthetic risk. In patients with choledocholithiasis and acute pancreatitis, LC did after clearance of CBD by endoscopic retrograde cholangiopancreatography (ERCP). Cases done during the learning curve (first 50 cases by one surgeon) are not taken into the study. Equipment and instrument failure is not taken into consideration as we have well-equipped surgery Units and no cases encountered during study time. Cases with incomplete laboratory or histopathology data and patients who were lost to follow-up are excluded. Clinical data included palpable gall bladder (GB). Laboratory data included leukocytic count, Bilirubin, aspartate transaminase (AST), alanine transaminase (ALT) and alkaline phosphatase (ALP). Ultrasound with thick-walled GB of more than 4 mm, multiple stones or impacted stone in Hartmann's pouch and the presence of pericholecystic fluid. The operative time, operative complications, postoperative complications and hospital stay are recorded.

The records are analyzed with particular attention paid to the medical history, concomitant diseases, BMI, standard laboratory test results (the level of bilirubin, SGOT, SGPT, ALT and the number of leucocytes) and to the description of preoperative ultrasound findings such as the following: the number and diameter of stones, size of the gall-bladder, thickness of its wall. The standard four-trocar technique used for all laparoscopic cholecystectomy. In all cases, the operating Surgeon selected the route of access to the abdomen is open port placement. Pneumoperitoneum induced using CO<sub>2</sub> at a pressure of 14mm of hg. During surgery, a 30degree camera used. Hook cautery, graspers, Maryland forceps or scissors used for dissection. The decision for the open conversion is made by the operating surgeon.

### III. Results and Discussion

A total of 340 LCs attempted in the study period, out of which 31 were converted to open; thus, the conversion rate in our study was 9.11%.



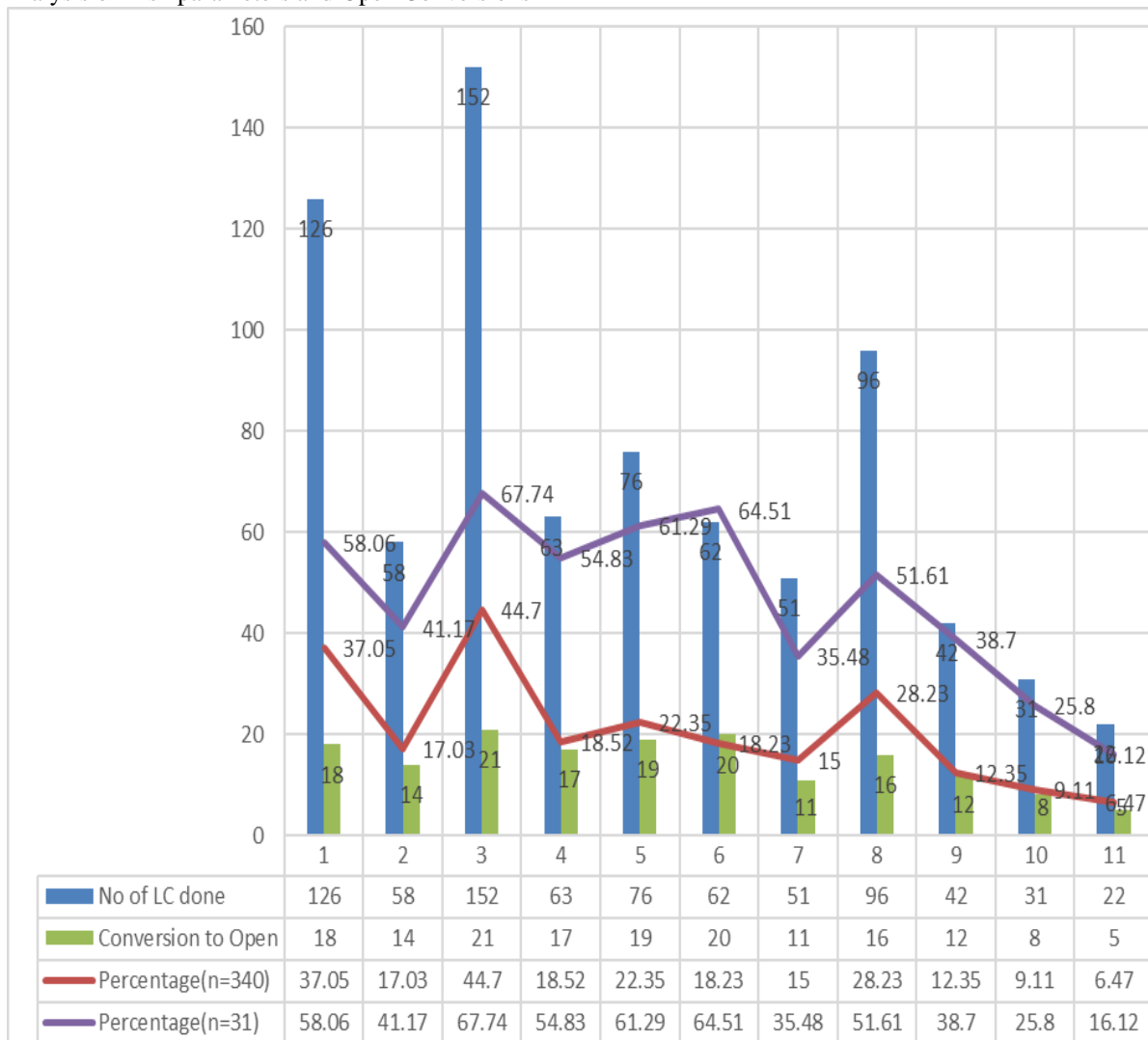
This study group of 340 patients comprises 214 women (62.95%) and 126 men (37.05%) from ages 18 to 79 years old. In the present study, Male demonstrated a conversion rate of 58.06% of total conversions. Several reports have identified the male gender as a risk factor for conversion, probably because of the more frequent association with severe, acute, and chronic disease. The more recent national American survey by Livingston et al. demonstrated that obese males with both acute and chronic cholecystitis incurred more than twice the risk of conversion than female patients. Patients above 65 years category comprise (41.17%). And patients with bodyweight more than 65kgs has the highest conversion (67.74%). Recurrent attacks, higher incidence of severe acute or even gangrenous cholecystitis, co-morbid cardiopulmonary disease, common bile duct stones, and previous abdominal surgery are contributing to higher conversion in elderly patients. Morbid obesity requires longer operative time and is associated with respiratory complications, higher conversion rate, and higher morbidity.

We try to evaluate data from the medical history, such as other concomitant diseases (diabetes, arterial hypertension). However, the results of the analyses of these indicators and their influence on conversion are not definitive. Simopoulos Cet al reflects that the presence of diabetic Mellitus in a patient is a compounding factor for conversion, but the presence of cardiovascular disease or hypertension has no such association with the conversion. Emergency LC has a higher conversion rate (27%) compared with the elective situation. Previous upper abdominal surgery is associated with an increased incidence of conversion. History of a previous upper abdominal surgery is an associated risk factor for conversion reported by other studies.

Elevated White blood cell (WBC) count.>10,000(51.61%), and Alkaline phosphatase (35.48%) reflect the severity of the inflammation of cholecystitis and have been identified as risk factors for conversion. Though works of literature states elevated C-reactive protein level appears to be the most powerful predictor for conversion, followed by the preoperative duration of symptoms, male gender, and WBC count, we have not

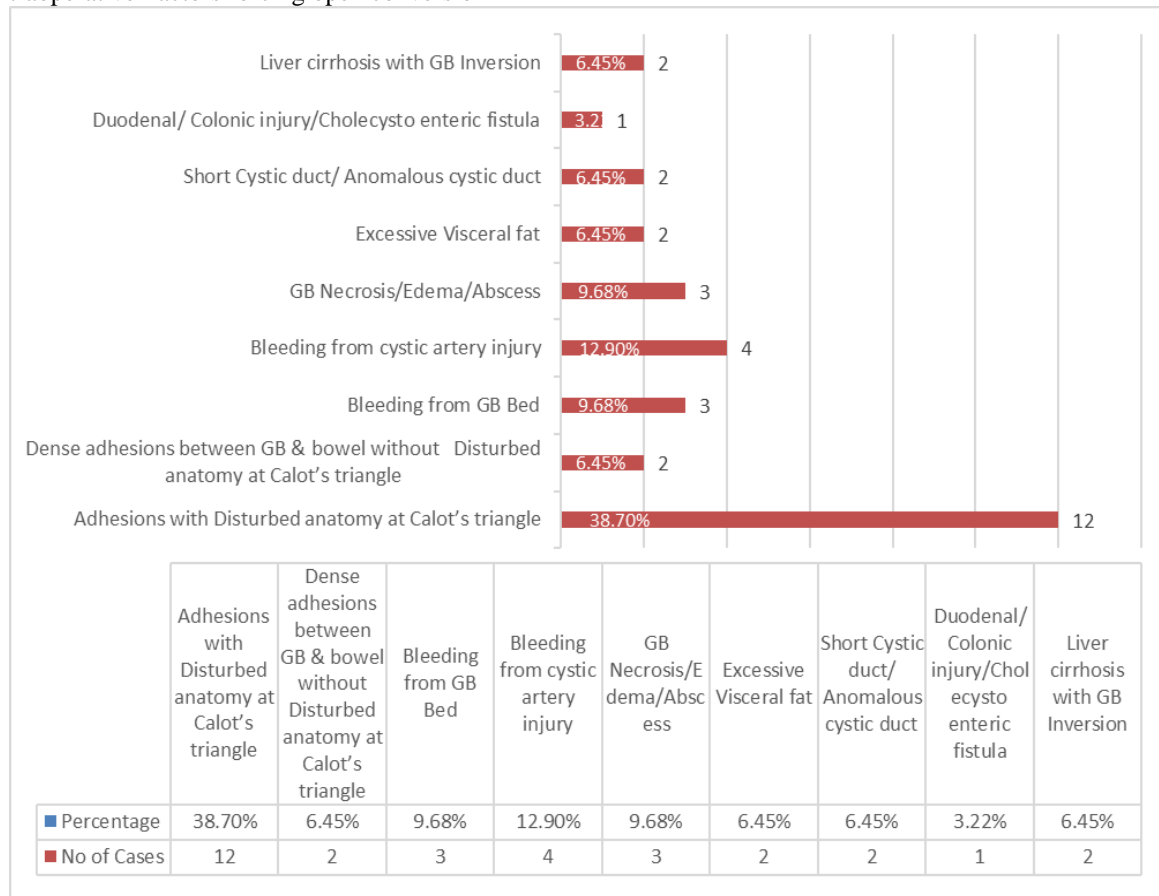
done C reactive protein estimations at our hospital. Conversion rates with Gallbladder wall thickness >4cm comprise 38.7%. Similarly, Jansen et al. in a series of 738 patients reported gallbladder wall thickness of more than 4mm as a high-risk factor for conversion. The difficult cholecystectomy in a thick-walled gallbladder may be due to difficulty in maintaining the grip on the gallbladder, or the gallbladder may be immersed in the gallbladder bed. The number of stones is not found to be a significant predictor of conversion. Similar observations have been reported by Carmody et al. Though the conversion rate in patients with a diameter of largest stone  $\geq 20$ mm was 25.80%, is a statistically significant, the more critical factor is impaction rather than size. Similar observations have been reported by Mcloughlin et al.

**Analysis of Risk parameters and Open Conversions**



The most frequent cause of conversion was dense pericholecystic adhesions (45.16%), followed by bleeding from the GB bed and Cystic artery injury(22.58%). A friable or gangrenous GB difficult to grasp accounted for three converted cases. The reasons for elective conversion in decreasing order of incidence are; inability to define anatomy secondary to adhesions, bleeding, and thickened or gangrenous Gallbladder. Other conversions were due to anomalous cystic duct, visceral injury and Liver Cirrhosis. A review of literatures (Tayeb M -56.2%; Simopoulos C-74.47%; Ibrahim S - 67.9%)brings out the fact that adhesions around gallbladder which make the dissection of the calot’s triangle both unsafe and difficult laparoscopically is the most common reason for converting the procedure to open. In the present study,Bleeding is the second most common cause of conversion and report similar observations found in Ibrahim S et al. and Tang B et al.. We have not published any Bile Duct Injury which is on the higher side in other studies Tayeb M et al., Misawa T et al., Simopoulos C et al. and Ibrahim S et al. reported an incidence of 2.73%, 0.64%, 2.13% and 1.9% respectively.

**Intraoperative Factors forcing open conversion**



**IV. Conclusion**

Dense pericholecystic adhesions (45.16%), followed by bleeding from the GB bed and Cystic artery injury(22.58%) are the most common causes for Conversion to Open Cholecystectomy. It is better to open one too many than to open one too few, even if it means a more extended hospital stay for the patient. Pre-operative prediction of a difficult laparoscopic cholecystectomy can help the surgeon to better prepare for risk factors or intra-operative complications and can help to predict the risk of conversion to open cholecystectomy.

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