

A Study Assessing Conversion Rate and the Factors Responsible for Conversion of Laparoscopic to Open Cholecystectomy: An Observational Study

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Abstract

Aim: This study was conducted in an effort to determine the conversion rate and also identify the factors responsible for conversion of laparoscopic to open cholecystectomy.

Methods: This was a prospective clinical study consisting of 100 patients undergoing laparoscopic cholecystectomy in the Department of Surgery for one year.

Results: In 100 cases, 32 were males and 68 were females. The mean age was 43.7 in this research. Patients aged 17–75. At 41-50 years old, the incidence was highest, followed by 31-40. Out of 100 patients, 74 (74%) experienced right hypochondrium discomfort, 20 (20%) had epigastric pain, and 6 (6%) were asymptomatic. 32 individuals had nausea and abdominal discomfort, 20 had vomiting, and 17 both. 16% had hypertension and 11% had diabetes. 72 individuals had single calculi on ultrasonography, whereas 28 had multiple calculi. We found that thick adhesions (40%) and aberrant anatomy (10%) occluded individual anatomy at Calot's triangle, resulting in almost half of conversions.

Conclusion: Our research shows that even while the rate of conversion to open surgery and complication rate is low in competent hands, the surgeon should maintain a low conversion threshold and consider it as a step in the patient's interest rather than an insult.

Keywords: Laparoscopic Cholecystectomy, Open Cholecystectomy, Conversion.

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Introduction

Following Mühe's 1986 pioneering laparoscopic cholecystectomy in Germany, the operation quickly rose to prominence as a top surgical technique globally. [1] A reported incidence of 1% to 15% occurs when laparoscopic cholecystectomy (LC) is converted to open cholecystectomy (OC). This may happen for a variety of reasons. [2,3] Operative time, complication rates, perioperative expenditures, and duration of hospital stay are all increased with an open conversion. [4-6]

Cirrhosis of the liver increases the risk of bleeding and conversion, while acute cholecystitis, empyema, gangrene, perforation, and Mirizzi syndrome are examples of severe inflammation that can make dissection more difficult. With the development of more advanced laparoscopic methods, surgeons have additional tools at their disposal to lower their conversion rates. Fundus

first dissection (FFD) and subtotal cholecystectomy are two well-established methods in OC. [7]

Occurrence of choledocholithiasis, intraoperative hemorrhage, extensive pericholecystic adhesions, unclear biliary architecture, and failed progression are the most common reasons for conversion. [8,9] Overall, the operation takes longer, more complications occur, perioperative expenses rise, and the patient stays in the hospital longer after an open conversion. [10–12] Liver cirrhosis increases the risk of bleeding and conversion, while acute cholecystitis, empyema, gangrene, perforation, and Mirizzi syndrome cause severe inflammation that distorts the anatomy and makes dissection more difficult. With the development of more advanced laparoscopic methods, surgeons have additional tools at their disposal to lower their conversion rates. Fundus first dissection (FFD) and subtotal

cholecystectomy are two well-established methods in OC. [13] At one-point, acute cholecystitis was thought to be an absolute no-go for LC. [14]

The purpose of this research was to find out how often laparoscopic cholecystectomy turns into an open procedure, and what variables contribute to this trend.

Materials and Methods

This was a prospective clinical study consisting of 100 patients undergoing laparoscopic cholecystectomy in the Department of Surgery, ICARE Institute of Medical Science and Research & Dr BC Roy Hospital, Haldia, West Bengal, India for one year.

Inclusion Criteria:

- All patients of cholelithiasis undergoing laparoscopic cholecystectomy
- Patient's age >18 years

Exclusion Criteria:

- Patients unfit for general anesthesia
- Age <18 years.

A written informed consent obtained from patients included in the study and data collected on printed Performa included age, gender, history of pain in right hypochondriac region, jaundice, previous abdominal surgery, obesity and concomitant diseases (DM, HTN), white blood cell (WBC) count, preoperative liver function tests, ultrasound

findings of the gallbladder and suspicion of common bile duct stones.

Standard Laparoscopic cholecystectomy procedure performed. Adhesions of GB separated by blunt, sharp dissection and by use of suction cannula and gauze piece. Distended GBs decompressed by suction and aspiration. Cystic Duct and Cystic Artery identified, ligated and divided with endoclips. Wide Cystic Ducts suture ligated and divided. Fundus first method and subtotal cholecystectomies performed for unclear anatomy of Calot's triangle. GBs dissected from GB fossa by use of hook/spatula/scissors. Hemostasis achieved by using monopolar/bipolar cautery. GBs extracted through port site. GB fossas re-examined and suction dried. Port closure used for port site bleeding. Skin closure was done with skin suture.

The common reported etiologies of such a conversion are uncontrollable bleeding, adhesions, inflammation, anatomical variations, common bile duct (CBD) injury, vascular injuries, trauma of bile duct and other hollow viscera, presence of malignant pathologies, and technical failures. Surgeons' experience, no progression for 30 minutes are the indications for conversion.

Statistical analyses were performed using SPSS (Statistical Packages for Social Sciences) 11.5 software. The chi-squared test was used for comparisons of categorical variables. A value of $p,0.05$ was accepted as statistically significant.

Results

Table 1: Characteristics of the patients

Gender	N%
Male	32 (32)
Female	68 (68)
Age in years	
11-20	6 (6)
21-30	7 (7)
31-40	32 (32)
41-50	38 (38)
51-60	13 (13)
61-70	2 (2)
71-80	2 (2)

In 100 cases, 32 were males and 68 were females. The mean age in this study was 43.7 years. The age group of the patients ranged from 17 years to 75 years. The maximum incidence was seen in the age group of 41-50 years followed by 31-40 years of age.

Table 2: Chief complaint, Symptoms, Co-morbidities and ultrasound findings

Chief complaint	N%
Right hypochondrium	74 (74)
Epigastric pain	20 (20)
Asymptomatic	6 (6)
Symptoms	
Nausea with pain abdomen	32 (32)
Vomiting	12 (12)
Both	17 (17)

Co-morbidities	
Diabetes Mellitus	11 (11)
Hypertension	16 (16)
Ultrasound findings	
Single calculi	72 (72)
Multiple calculi	28 (28)

Out of 100 patients, 74 patients (74%) had a chief complaint of pain in the right hypochondrium, 20 patients (20%) presented with epigastric pain and the remaining 6 patients (6%) were asymptomatic (incidental cholelithiasis). 32 patients presented with nausea along with pain abdomen and 20 patients presented with vomiting, whereas 17

patients presented with both. 11% of patients suffered from Diabetes mellitus whereas 16% of patients were Hypertensive. On ultrasound, single calculi were noted in 72 patients whereas remaining 28 patients presented with multiple calculi.

Table 3: Reason for Conversion

Reason for conversion	No. of cases	Percentage (%)
Difficult anatomy due to:		
- Dense adhesions of Calot's triangle	4	40
- Anatomical variation	1	10
Bleeding from:		
- Calot's triangle (Cystic artery)	2	20
Common bile duct injury	1	10
Duodenal injury	1	10
Instrument failure	1	10

Difficult anatomy at Calot's triangle accounted for near one half of conversions; we observed that individual anatomy was obscured primarily by dense adhesions (40%) and aberrant anatomy (10%) was also noted.

Discussion

With a prevalence ranging from 11% to 36% in autopsy reports, gallstones are among the most common gastrointestinal illnesses necessitating hospitalization. Patients experiencing symptoms of cholelithiasis should undergo cholecystectomy as the gold standard treatment. [15] Thus, in order to facilitate qualitative research and outcome comparisons, it is critical that documentation and communication be standardized using risk-adjusted metrics. An easily implemented, clinically and surgically relevant, and straightforward scoring/grading system is necessary for the accurate and repeatable stratification of gallbladder (GB) disease severity. Multiple news outlets have covered the introduction of new grading and scoring systems. [16-19]

Consistent with the findings of Frazee et al. [20] and U. Berggren et al., we found that out of 100 cases, 32 were male and 68 were female. [21] Pregnancy and childbirth significantly impact biliary tract disease, likely through weight gain and hypercholesterolemia in addition to casual stasis, which may explain why it is more common in women. In this research, participants' average age was 43.7. Patients' ages varied from seventeen to seventy-five. People in the age bracket of 41–50

had the highest incidence, followed by those in the 31–40 age bracket. Out of 100 patients, 74 patients (74%) had a chief complaint of pain in the right hypochondrium, 20 patients (20%) presented with epigastric pain and the remaining 6 patients (6%) were asymptomatic (incidental cholelithiasis). Thirty-two patients complained of nausea and abdominal pain, twenty of those patients reported vomiting, and seventeen of those patients reported both symptoms. Among the patients, 11% had diabetes mellitus and 16% had hypertension. Only 28 out of 73 patients had multiple calculi detected on ultrasound; 72 patients had a single calculus.

The most effective, non-invasive, cost-effective, and widely accessible investigation available today is ultrasonography. On ultrasound, single calculi were noted in 140 patients whereas remaining 60 patients presented with multiple calculi. In a study by Pawan Lal et al [22], they found a good correlation between gall bladder thickness and conversion to the open procedure (sensitivity of 41.18%) and a positive predictive value of 70. In another study by Tayeb M et al [23], 58% of the patients with gallbladder wall thickness more than 3 mm were converted to open cholecystectomy, suggesting gall bladder thickness as a good predictive factor for conversion. In a retrospective analysis by Chahin F [24] over a 3-year period of 557 patients who underwent laparoscopic cholecystectomy; 88 patients had acute cholecystitis. He concluded that conversion rates were 22% in patients with acute cholecystitis as compared to 5.5% in case of patients with chronic

cholecystitis. Difficult anatomy at Calot's triangle accounted for near one half of conversions; we observed that individual anatomy was obscured primarily by dense adhesions (40%) and aberrant anatomy (10%) was also noted. Vecchio et al [25] and Magee et al [26] also found it as the most common reason for conversion observed in 41.5% and 48.5% of patients respectively.

With the passage of time the experience has grown, the laparoscopic technique has been understood and thus the conversion rate has reached a remarkably low level of 1-6%. [27] In our series, the conversion to open cholecystectomy was required in 15 patients with conversion rate of 7.5%. This rate is comparable to the results of most international studies published in early years of laparoscopic cholecystectomy (2- 15%), but remains higher than those results reported recently in last five years (1-6%).²⁸ This may be due to differences in institutional and individual practice including experience of operating team.

Conclusion

Instrument failure, bleeding in the Calot's triangle, damage to the CBD, duodenal injury, and difficulties in recognizing the anatomy due to extensive adhesions and anatomical variances were the primary intra-operative reasons of conversion from laparoscopic cholecystectomy to open. Therefore, while obtaining permission for a laparoscopic cholecystectomy, it is essential to inform patients about the potential of switching to an open method. The decision to go from a laparoscopic to an open operation in a challenging situation demonstrates excellent surgical judgment and should not be seen as a problem.

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