

A Study to Investigate the Various Factors and Conversion Rate of Laparoscopic to Open Cholecystectomy

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Conflict of interest: Nil

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 Lord Buddha Koshi medical College and Hospital, Saharsa, Bihar, India for one year.

Results: 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. 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. 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.

Conclusion: It can be reliably concluded that LC is the preferred method even in the difficult cases. Our study emphasizes that although the rate of conversion to open surgery and complication rate are low (7.5%) in experienced hands the surgeon should keep a low threshold for conversion to open surgery and it should be taken as a step in the interest of the patient rather than be looked upon as an insult to the surgeon.

Keywords: laparoscopic cholecystectomy, open cholecystectomy, conversion

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Introduction

After the first laparoscopic cholecystectomy was performed by Mühe in Germany in 1986, the procedure became one of the most common surgical procedures performed worldwide. [1] Conversion from laparoscopic cholecystectomy (LC) to open cholecystectomy (OC) may be resorted to for various reasons with reported rates of 1% to 15%. [2,3] Open conversion increases the operative time, complication rates, perioperative costs and the length of hospital stay. [4-6]

Difficult cholecystectomies are usually associated with severe inflammation that distorts the anatomy and renders dissection more difficult (i.e. acute cholecystitis, empyema, gangrene, perforation and Mirizzi syndrome) or with liver cirrhosis increasing the risk of bleeding and a higher probability of conversion. As laparoscopic skills increase surgeons become more able to utilise different techniques to reduce their conversion rates. Some strategies were

already well established in OC such as fundus first dissection (FFD) and subtotal cholecystectomy. [7]

The most recognizable causes for conversion are: obscure biliary anatomy, presence of dense pericholecystic adhesions, intraoperative bleeding, failure of the progression and suspicion of choledocholithiasis. [8,9] Open conversion increases the operative time, complication rates, perioperative costs and the length of hospital stay. [10-12] Difficult cholecystectomies are usually associated with severe inflammation that distorts the anatomy and renders dissection more difficult (i.e. acute cholecystitis, empyema, gangrene, perforation and Mirizzi syndrome) or with liver cirrhosis increasing the risk of bleeding and a higher probability of conversion. As laparoscopic skills increase surgeons become more able to utilise different techniques to reduce their conversion rates. Some strategies were already well established in OC such as fundus first

dissection (FFD) and subtotal cholecystectomy. [13] Acute cholecystitis was once considered a contraindication to LC. [14]

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.

Materials and Methods

This was a prospective clinical study consisting of 100 patients undergoing laparoscopic cholecystectomy in the Department of Surgery Lord Buddha Koshi medical College and Hospital, Saharsa, Bihar, 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 sub total 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

Gallstones are among the most common gastrointestinal illness requiring hospitalization with a prevalence of 11% to 36% in autopsy reports. The optimal treatment for patients with symptomatic cholelithiasis is cholecystectomy. [15] It is important therefore that there is standardization of documentation and communication, with risk-adjusted measures, to allow qualitative studies and outcome comparisons. Accurate and reproducible stratification of the severity of gallbladder (GB) disease requires a scoring/ grading system that is easily implemented, clinically and operatively relevant and simple. A number of publications have reported new scoring and grading systems. [16-19]

In 100 cases, 32 were males and 68 were females which were similar to those observed by Frazee et al [20] and U. Berggren et al. [21] The reason for the high incidence among females could be that pregnancy and child birth have a definitive influence on biliary tract disease, acting by casual stasis as well as weight gain and consequent hypercholesteremia. 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. 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.

Today ultrasonography is the best non-invasive, economical and an easily available investigation. 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

Laparoscopic Cholecystectomy is a safe and minimal invasive technique with 7.5% conversion rate. The main intra-operative causes of conversion from laparoscopic cholecystectomy to open were difficulty in identifying the anatomy as a result of dense adhesions and anatomical variations followed by bleeding in the Calot's triangle, injury to the CBD, Duodenal Injury and Instrument Failure. It is therefore, mandatory to explain to the patients about the possibility of conversion to open technique at the time of taking consent for Laparoscopic Cholecystectomy. Conversion from laparoscopic to open procedure should not be considered a complication but rather a reflection of sound surgical judgement in difficult case.

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