

Evaluating the Conversion Rate and Factors Responsible for Conversion of Laparoscopic to Open Cholecystectomy: An Observational StudySantosh Kumar¹, Balkeshwar Kumar Suman², Shri Krishna Ranjan³¹Assistant Professor, Department of General Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India²Assistant Professor, Department of General Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India³Associate professor, Department of General Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India

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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 200 patients undergoing laparoscopic cholecystectomy at department of General Surgery for one year.**Results:** In 200 cases, 60 were males and 140 were females. The mean age in this study was 42.4 years. The age group of the patients ranged from 18 years to 76 years. The maximum incidence was seen in the age group of 41-50 years followed by 31-40 years of age. Out of 200 patients, 144 patients (72%) had a chief complaint of pain in the right hypochondrium, 44 patients (22%) presented with epigastric pain and the remaining 18 patients (6%) were asymptomatic (incidental cholelithiasis). 60 patients presented with nausea along with pain abdomen and 20 patients presented with vomiting, whereas 32 patients presented with both. 12% of patients suffered from Diabetes mellitus whereas 15% of patients were Hypertensive. On ultrasound, single calculi were noted in 140 patients whereas remaining 60 patients presented with multiple calculi. Difficult anatomy at Calot's triangle accounted for near one half of conversions (46.66%); we observed that individual anatomy was obscured primarily by dense adhesions (40%) and aberrant anatomy (6.66%) 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

Laparoscopic cholecystectomy (LC) represents the "gold-standard" for the treatment of symptomatic gallstones disease, being the most common intra-abdominal operation performed. Laparoscopic cholecystectomy not only is the cornerstone of management of biliary disease and cholecystitis but is one of the commonest operations in both elective and emergency surgery. It offers an unquestionable advantage over open cholecystectomy to the patient and the health care system. [1] Despite excessive development in surgical skills and methods as well as improvement in surgical instruments, the rate of conversion in laparoscopic cholecystectomy to open surgery is still common. In fact, conversion increases perioperative time, the number of complications, costs of intervention and

perioperative arrangements, the length of hospital stay, and other costs. [2,3] Unfortunately, conversion is also associated with severe complications including death, bile duct injury, bile leak, or bleeding, that frequently requires reintervention or transfusion. [2] Conversion rates in laparoscopic cholecystectomy vary widely across different medical centers, from 1 to 30 percent. [3] A conversion rate 5% to 10% has been reported on a nationwide basis. [4] Depending on specific circumstances, a conversion can be characterized as either elective, which is defined as the surgeon's decision to resort a laparotomy (because of obscure anatomy or lack of progress of the laparoscopic procedure) before being forced to do so as a result of a major intraoperative

complication or as enforced, when an intraoperative emergency such as uncontrollable bleeding or bile duct injury, occurs. [5]

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. [6,7] Open conversion increases the operative time, complication rates, perioperative costs and the length of hospital stay. [8,9,10] 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. [11] Acute cholecystitis was once considered a contraindication to LC. [12]

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 200 patients undergoing laparoscopic cholecystectomy at department of General Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for one year

Inclusion Criteria:

- All patients of cholelithiasis undergoing laproscopic 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 end clips. 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 fossa's 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	60 (30)
Female	140 (70)
Age in years	
11-20	10 (5)
21-30	16 (8)
31-40	60 (30)
41-50	80 (40)
51-60	24 (12)
61-70	6 (3)
71-80	4 (2)

In 200 cases, 60 were males and 140 were females. The mean age in this study was 42.4 years. The age group of the patients ranged from 18 years to 76 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	144 (72)
Epigastric pain	44 (22)
Asymptomatic	12 (6)
Symptoms	
Nausea with pain abdomen	60 (30)
Vomiting	20 (10)
Both	32 (16)
Co-morbidities	
Diabetes Mellitus	24 (12)
Hypertension	30 (15)
Ultrasound findings	
Single calculi	140 (70)
Multiple calculi	60 (30)

Out of 200 patients, 144 patients (72%) had a chief complaint of pain in the right hypochondrium, 44 patients (22%) presented with epigastric pain and the remaining 18 patients (6%) were asymptomatic (incidental cholelithiasis). 60 patients presented with nausea along with pain abdomen and 20 patients presented with vomiting, whereas 32

patients presented with both. 12% of patients suffered from Diabetes mellitus whereas 15% of patients were Hypertensive. On ultrasound, single calculi were noted in 140 patients whereas remaining 60 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	6	40
- Anatomical variation	1	6.66
Bleeding from:		
- Calot's triangle (Cystic artery)	3	20
Common bile duct injury	2	13.33
Duodenal injury	2	13.33
Instrument failure	1	6.66

Difficult anatomy at Calot's triangle accounted for near one half of conversions (46.66%); we observed that individual anatomy was obscured primarily by dense adhesions (40%) and aberrant anatomy (6.66%) 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. [13] 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. [14-17]

In 200 cases, 60 were males and 140 were females which were similar to those observed by Frazee et

al [18] and U. Berggren et al. [19] 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 42.4 years. The age group of the patients ranged from 18 years to 76 years. The maximum incidence was seen in the age group of 41-50 years followed by 31-40 years of age. Out of 200 patients, 144 patients (72%) had a chief complaint of pain in the right hypochondrium, 44 patients (22%) presented with epigastric pain and the remaining 18 patients (6%) were asymptomatic (incidental cholelithiasis). 60 patients presented with nausea along with pain abdomen and 20 patients presented with vomiting, whereas 32 patients presented with both. 12% of patients suffered from Diabetes mellitus whereas 15% of patients were Hypertensive.

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 [20], 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 [21], 58% of the patients with gallbladder wall thickness more than 3mm were converted to open cholecystectomy, suggesting gall bladder thickness as a good predictive factor for conversion. In a retrospective analysis by Chahin F. [22] 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 (46.66%); we observed that individual anatomy was obscured primarily by dense adhesions (40%) and aberrant anatomy (6.66%) was also noted. Vecchio et al [23] and Magee et al [24] 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%. [25] 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%). [26] 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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