

# Factors affecting conversion of laparoscopic to open cholecystectomy

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## Abstract

**Introduction:** Laparoscopic cholecystectomy is the gold-standard operation for the treatment of cholelithiasis. Various factors affect the conversion of laparoscopic to open cholecystectomy.

**Methods:** In this prospective analytical study one hundred and sixty consecutive patients who underwent laparoscopic cholecystectomy were studied to see the factors that affect the conversion to open cholecystectomy. Factors contributing to conversion of laparoscopic to open cholecystectomy were analyzed.

**Result:** In this study the conversion rate of laparoscopic to open cholecystectomy was 6.25%. The most common cause for conversion was unclear anatomy and adhesion at the Calot's triangle and abnormal course of the cystic artery.

**Conclusion:** Proper knowledge about the anatomical variations of cystic duct and artery and timely conversion in cases of confusion can help prevent bile duct injuries during cholecystectomy.

**Key words:** Laparoscopic cholecystectomy, Conversion rate, Open cholecystectomy

## Introduction

First described in 1882 by Langenbuch, open cholecystectomy has been the primary treatment of gallstone disease for most of the past century. But M $\ddot{u}$ he of Boblingen, Germany, who performed the first laparoscopic cholecystectomy, revolutionized the treatment of calculous gallbladder disease in 1985. Currently it is estimated that more than 90% of the cholecystectomies are performed laparoscopically. Laparoscopic cholecystectomy provides a safe and effective treatment for most patients with symptomatic gallstones. Advantages of laparoscopic cholecystectomy are earlier return of bowel function, less post-operative pain, improved cosmesis, shorter length of hospital stay, earlier return to full activity and decreased overall cost though there is 0.5-0.6% risk of biliary injury.<sup>17</sup> Therefore, laparoscopic cholecystectomy is the gold-standard operation for cholelithiasis.

## Methods

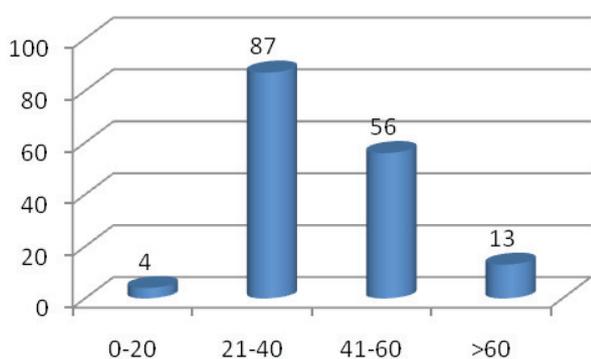
This is a prospective descriptive study conducted at Manmohan Memorial Hospital, Swoyambhu, over a period of one and half years (November 2013 to May 2015). There were total of one hundred and sixty patients who underwent laparoscopic cholecystectomy during this period. Detailed history and physical examinations including history of laparotomy, were done. All the patients then would undergo ultrasound scanning to evaluate the status of the gallbladder and the biliary system. Blood investigations included total and differential leucocyte count, Liver function test including serum bilirubin and alkaline phosphatase.

All patients with symptomatic gallstones, Gallbladder polyp of more than 1cm or patients with biliary pancreatitis, acute cholecystitis of less than seventy two hours were included in the study.

Preoperative history suggestive of acute cholecystitis of more than seventy two hours duration with thickened gallbladder wall of more than 4mm, gallbladder perforation, carcinoma of the gallbladder/ Gallbladder mass, dilated extrahepatic bile ducts or stone in the bile duct, deranged liver function test suggestive of obstructive jaundice, or persistently raised alkaline phosphatase were excluded from the study.

**Results**

The common age group affected is twenty to sixty years of age but 55% of the patients were of age group 21 to 40 years. (Figure 1) The eldest patient operated laparoscopically was of 87 years old female and youngest patient of 7 years female. Most of the patients (88%) were female and only 12% were males. In 69% of the patients there were multiple stones and in 31% of the patients there was single stone.



**Figure 1: Age distribution of patients**

Surgery was indicated for symptomatic gallstone in 43% of the patients while complications of the stone were the indication in 54.5% of the patients. In three percent of patients it was for the gallbladder polyp. (Table 1)

**Table 1: Indication for cholecystectomy**

Etiology	No of pts ( % )
Symptomatic cholelithiasis	69 (43)
Chronic calculus cholecystitis	54 (34)
Acute cal cholecystitis	28 (18)
GB polyp	5 (3)
Biliary pancreatitis	4 (2.5)

**Table 2: Indications for conversion**

Causes	No of pts
Adhesions in Calot’s triangle	3
Unclear anatomy	3
Acute inflammation	1
Impacted stone at Hartmann pouch	1
Aberrant concealed artery	2

Total converted cases were ten out of 160 patients which accounts for 6.25%. Main cause for conversion was unclear anatomy and the adhesion in the Calot’s triangle (60% of the converted cases). Other causes were impacted stone in the cystic duct compressing the hepatic duct (Mirizzi’s syndrome), acutely inflamed gallbladder and aberrant concealed cystic artery (20% of the converted cases). Among the converted cases males were four patients (ie 21% of the total male patients) and females were six (ie 4.25% of the total female patients).

**Table 3: Complications**

Complications	No of patients
Bleeding	2
Bile leak	1
Port site infection	4
Total	7

Complications that we came across during the operation were aberrant concealed artery leading to bleeding during dissection at Calot’s area in two patients which required conversion (Table 3). In both cases the course of the cystic artery was not in the usual pathway but rather posterior to the cystic duct. Postoperatively there was one bile leak which necessitated laparotomy on fourth postoperative day. In this patient the cystic duct was wider than usual and short. The reason for the bile leak was due to incomplete clipping of the cystic duct. Four patients had superficial surgical infection at the umbilical port site which was managed conservatively

**Discussion**

Laparoscopic cholecystectomy is now the established gold-standard method of treatment for the gallstone disease. There are factors, which influence in the conversion of laparoscopic to open cholecystectomy.

In our study the female patients constituted 88% of the total patients but in the literature it is lower.<sup>6, 7, 16</sup> Age groups most commonly affected is from 21 to 40 years which is similar to other studies.<sup>7,16</sup>

In our study conversion rate was 6.25% which is comparable to literature. Conversion rates vary from as low as 2.5% to as high as 26.1%.<sup>2,4,6,8,12,15</sup>

Factors for conversion to open cholecystectomy in our study were adhesion around Calot's triangle obscuring the anatomy, abnormal arterial course and acute cholecystitis. Male patients had higher conversion rate as compared to the female patients (21% males and 4.25% females).

In a review of ninety-one studies in Medline search, the rate of conversion varied from 0.18 to 30%.<sup>16</sup> In this review the most common causes for difficulty were male patients, increased age of the patient, acute and thick wall chronic cholecystitis, wide and short cystic duct, cholecysto-digestive fistula, previous upper abdominal surgery, obesity, liver cirrhosis, anatomic variation, cholangiocarcinoma and low surgeon's caseload. Similarly, infiltration/fibrosis of Calot's triangle and adhesions has also been reported to be a common cause of conversion.<sup>5</sup>

Postoperative complication rate in our study was 4.38%, which is comparable to that reported in the literature.<sup>6,7,9,10</sup> Bleeding around the Calot's triangle due to abnormal vessel anatomy and adhesions, post operative bile leak from cystic duct stump and port site infection were the complications we came across in our study. There was no mortality in our study.

In a prospective review during the early days of laparoscopic cholecystectomy from Brunei found the morbidity of 5% with one ductal injury (0.5%) and one mortality (0.5%) in an 87 years woman who developed postoperative bronchopneumonia.<sup>9</sup> A review of 2200 laparoscopic cholecystectomies as the treatment in gallstone disease published in 1994 reported a complication rate of 3.6% with port site infection in 2.2% patients, postoperative bleeding in 0.4% and hepatocholedochus in 0.4% patients and the mortality was 0.1%.<sup>12</sup>

## Conclusion

Proper preoperative workup and investigation can help to predict conversion during cholecystectomy. Male gender, patients with acute cholecystitis or history of cholecystitis in the past (leading to adhesions in the Calot's triangle) and Ultrasound finding of impacted stone in the cystic duct (leading to Mirizzi's syndrome) can affect conversion

to open cholecystectomy. Proper knowledge about the abnormal course of the cystic artery can also affect the outcome as in our study where it was observed in two patients which needed conversion.

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