

Incidence and Causes of Conversion from Laparoscopic to Open Cholecystectomy

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ABSTRACT:

BACKGROUND:

Conversion from laparoscopic cholecystectomy to open procedure should not be considered as a failure; in fact it is an option which should be considered under certain circumstances.

OBJECTIVE:

Calculation of the conversion rate from laparoscopic to open cholecystectomy and identify its direct causes and some of its risk factors.

PATIENTS AND METHODS:

Prospective study conducted in Baghdad teaching hospital and nursing home hospital in medical city complex for two years period. Patients with symptomatic gall stones were included in the study and prepared for laparoscopic cholecystectomy all cases were operated upon as elective cases.

RESULTS:

Two hundred and twenty one (221) patients were enrolled in the study, 177 female and 44 males with female to male ratio 4:1. The mean age of the patients was 38 year .six patients required conversion to open cholecystectomy with all over conversion rate 2.7%. In males the conversion rate was 4.5% and in female it was 2.2%.

CONCLUSION:

Conversion rate in our study is within the lower limits and accepted internationally. Dens fibrous adhesion is the main cause of conversion. History of acute cholecystitis is independent risk factor for conversion from laparoscopic to open procedure. Gender, age and history of jaundice or ERCP are not independent risk factor for conversion

KEY WORDS: conversion rate, laparoscopic, cholecystectomy.

INTRODUCTION:

Mouret introduced laparoscopic cholecystectomy in 1987. It has rapidly replaced open cholecystectomy as the standard treatment ⁽¹⁾ and considered The Gold standard treatment for symptomatic gallstone disease ⁽²⁾ Laparoscopic cholecystectomy showed higher benefits for patients with lower prevalence of postoperative complications, feeding earlier, shorter mean hospital stay and equivalent cost compared with open cholecystectomy ⁽³⁾. Conversion from laparoscopic to open procedure should not be considered as a failure, in fact it is an option which should be considered under certain circumstances for the sake of patient's safety, and timely conversion to open surgery can avoid complications of laparoscopic cholecystectomy ⁽⁴⁾.

Determining of conversion rate and identification of factors that reliably predict the need to convert the laparoscopic to open cholecystectomy would help with patient education and counseling and helps the surgeon to prepare better for intraoperative difficulties ⁽⁵⁾.

AIM OF THE STUDY:

To calculate the conversion rate from laparoscopic to open cholecystectomy and identify its direct causes and some of its risk factors.

PATIENTS AND METHOD:

Prospective study conducted in Baghdad teaching hospital and nursing home hospital in medical city complex for the period from the first of December 2011 till the first of December 2013 (two years period). Patients with symptomatic gall stones were included in the study and prepared for laparoscopic cholecystectomy. Full history and examination of the patient were performed and the patients were sent for the necessary heamatological and biochemical investigation.

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All cases were operated upon as elective cases; those patients with history of acute attack of cholecystitis were treated conservatively first and operated upon after at least six weeks of the attack with abdominal ultrasound confirming the subsiding of the acute inflammatory changes. Those patients with upper abdominal scars were excluded from the study. The operations were performed by senior laparoscopic surgeon using the classical procedure (closed CO₂ pneumoperitoneum induction by veress needle and the use of four ports).

We recorded the data regarding : age and gender of the patients , history of acute cholecystitis , jaundice , ERCP (endoscopic retrograde cholangio-pancreaticogram) , The operative findings and intraoperative complication and the conversion to open procedure . This information arranged in a Microsoft Excel working sheet, Fisher's exact test used to calculate the P value for numerical variables with level of significance less than 0.05.

T-test used to calculate the P value for the age variable.

RESULTS:

During two years period started from the first of December 2011 to the first of December 2013, two hundred and twenty one (221) patients were enrolled in the study, there were 177 female and 44 males with female to male ratio 4:1.

The youngest patient was a 7 years old girl with Wilson's disease and symptomatic gall stones, fortunately her liver function tests were normal and peaceful laparoscopic cholecystectomy done for her. The oldest patient was a 73 year old male with history of jaundice and endoscopic common bile duct stenting six months prior our laparoscopic cholecystectomy. The mean age of our patients was 38 year.

Out of 221 patients 6 patients required conversion to open cholecystectomy with conversion rate 2.7%.The causes of conversion and the ultimate surgical procedure shown in table (1).

Table1 : Cases of conversion from laparoscopic to open procedure.

Cause of conversion	No of patient	The open procedure
Dens adhesion and thick wall gallbladder with unclear Calot's triangle	4	Two patients had fundus first partial cholecystectomy
		One patient had cholecystostomy
		One patient had cholecystectomy
Partial common bile duct injury during dissection	1	cholecystectomy and T-tube insertion in the injury site
Morbid obesity and thick heavy omentum leading to difficult visualization	1	cholecystectomy

As seen in table (1) the most common cause of conversion is dens adhesion and thick wall gallbladder which make the grasping and handling of gallbladder difficult , the situation was more serious as the peritoneal layer over the calot's triangle is thick and fibrosed obscuring the biliary

anatomy so conversion to open procedure done to attempt cholecystectomy or cholecystostomy.

This conversion group of 6 patients were evaluated for some risk factors of conversion and compared to laparoscopic group .the results shown in table (2).

Table 2: Risk factors for conversion to open cholecystectomy.

factor	Conversion group Total N=6	Laparoscopic group N=215	P value*
Male gender	2	42	0.3
Mean age	47 year	38.1 year	0.08
History of acute attack	3	17	0.01
History of jaundice	0	6	1
History of ERCP**	0	5	1
* level of significance less than 0.05			
* ERCP = endoscopic retrograde cholangio pancreaticogram			

The cholecystectomy was more difficult in male patients 2 out of 44 male patient required conversion (4.5%). In female patients 4 out of 177 patients required conversion (2.2%). Though the incidence of conversion was higher in male but this difference was statistically not significant (P value 0.3). Patients with history of acute cholecystitis had higher conversion rate in comparison to patients without history of acute attack and found to be statistically significant risk factor (P value 0.01). The mean age of the patients with conversion was not significantly different than that of laparoscopic group (P value 0.08). the history of jaundice or ERCP (endoscopic retrograde cholangiopancreaticogram) did not affect the conversion rate (P value 1 for both)

DISCUSSION:

Gallstone disease prevalence in general population is 3% - 20% of the total population world-wide (6). Women are three times more likely to develop gallstones than men (7). This is basically due to the sex steroid hormone, estrogen and progesterone. These two hormones effect biliary cholesterol level and gallbladder motility(8). In our study ,the male patients present 20% of patients that is equal to the findings of Muhammad Rafique et al (9) and Jeremy M. et al (10). While Adnan Mehraj et al (2) and Hari et al (11) reported a male percentage of 11% and 14% respectively .

The prevalence of gall stones increases with advancing age due to increase in cholesterol content in bile (12). The mean age of our patients was 38 years, the same result reported by Saeed et al in Yemen (13) and close to that of Pervez et al and Krishnan et al (14, 15) in Pakistan and India respectively. While Ye Rim et al (16) in Korea and Vandersteeg et al (17) in Netherlands reported mean

age of 51 and 52 years respectively; this may be caused by dietary factors in different societies, but still need to be verified by more specified study.

In early years of laparoscopic cholecystectomy era ,the rate of conversion to open procedure was 2- 15% ; After years of learning and understanding the laparoscopic technique and increasing surgeons' experience ,the conversion rate has been dropped to approximately 1 - 6% (13). In our study the conversion rate was 2.7% which is equal to that of Pervez et al (14). Muhammad Rafique et al reported conversion rate of 0.6% (9). Saeed Hadi et al (13) reported conversion rate 8.3% and Vandersteeg et al conversion rate was 12% (17). Our conversion rate is within the lower range and is quite accepted internationally.

The most common cause of conversion in our study was dens adhesion that obscures the anatomy, especially that of Calot's triangle .That in agreement with other studies (9-17). Under such circumstances the decision to convert should be considered as a sign of surgical maturity rather than a failure and need to be taken at the time of recognition of a difficult dissection rather than after the occurrence of complications (9).

We reported one case of common bile duct injury (CBD) during dissection (0.4 %) which was recognized immediately and converted to open procedure. Jeremy M. et al (10) reported 0.5 % CBD injury with conversion. Maria Kapoor et al (4) reported 1.3% CBD injury; Saeed Hadi et al (13) reported 5% of CBD injury.

In our study one case (0.4%) converted because of the obesity of the patient with thick omentum which obscure the propare vision of Calot's triangle. Ahmad M. Sultan et al (5) and Hari Gopal et al (11) considered obesity as a risk factor for

difficult laparoscopic cholecystectomy but they did not report any case of conversion duo to obesity.

It is important to know some risk factors that give prediction of difficult laparoscopic cholecystectomies and conversion to open procedure will not only helps in patient counseling but also helps the surgeon to prepare better for intraoperative difficulties^(5,18)

In the literature, age is considered one of the risk factors for a difficult laparoscopic cholecystectomy. Reasons postulated include a long duration of disease and subsequent thickening and more contracted gall bladder wall⁽¹¹⁾. In our study we did not find a significant difference in age between the conversion and laparoscopic group (P value = 0.08) this in agreement with U Jethwani et al⁽¹⁸⁾ but disagree with others^(5,10,11,17). This can be explained by the fact that our patients were generally younger with mean age of 38 and it is lower than the mean age of other studies which ranged in 40s and 50s^(5,10,11,17) this may obscure the effect of age on conversion rate.

Several reports have identified male gender as a risk factor for conversion^(5,10,11,17,18). The exact explanation is not fully known but it may due to the fact that, men are more tolerant to pain than women or reluctant or too busy to seek medical advice⁽⁵⁾. In our study the male gender was not independent risk factor for conversion and there was no significant difference in comparison with female (P value = 0.3) this agree with Ashfaq et al⁽¹⁹⁾,Tayeb M et al⁽²⁰⁾, Rosen M et al⁽²¹⁾ and Kaafarani HM⁽²²⁾. In our study the history of acute attack specially if recurrent was independent risk factor for conversion (P value 0.01).duo to adhesion and fibrosis which make the anatomy unclear and the dissection ,this result was found in many other studies⁽⁴⁻²²⁾.

CONCLUSION:

Conversion rate in our study is within the lower limits and accepted internationally. Dens fibrous adhesion is the main cause of conversion. History of acute cholecystitis is independent risk factor for conversion from laparoscopic to open procedure. Gender, age and history of jaundice or ERCP are not independent risk factor for conversion.

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