



FACTORS DETERMINING THE CONVERSION OF LAPAROSCOPIC CHOLECYSTECTOMY INTO OPEN CHOLECYSTECTOMY

General Surgery

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ABSTRACT

Background and Objectives: Cholelithiasis is one of the most common cause of acute abdomen. Laparoscopic cholecystectomy (LC) has become gold standard procedure for treatment of cholelithiasis and cholecystitis due to less morbidity and mortality, less hospital stay, post operative lesser pain and returning to normal activity sooner. In spite of all this, around 2-15% of the patient need to convert laparoscopic cholecystectomy (LC) into open cholecystectomy (OC) due to different factors. The present study aimed to determine the prevalence of conversion of laparoscopic cholecystectomy into open cholecystectomy and to assess the causes of conversion and risk factors associated to conversion. **Methods:** This study was conducted in department of general surgery at ANMMCH Gaya from 31st October 2021 to 1st November 2022 for the period of one year. Cases of cholelithiasis with or without cholecystitis, and other gall bladder pathology were included in the study. A team of expert surgeon performed laparoscopic cholecystectomy of all selected cases. The causes of conversion to open were systematically recorded by the surgical team and the risk factors (age, sex, obesity, history of previous abdominal surgery, gallbladder wall thickness) related to conversion from laparoscopic cholecystectomy to open cholecystectomy were recorded. **Results:** A total of 250 (M/F=80/170) patients were included in this study. The mean age of all patients were 43 ± 1.75 year for the male and female groups the mean ages were 44 ± 1.8 and 42 ± 1.7 years respectively. Of the total 250 (2%) cases, 200 (80%) patients had cholelithiasis with chronic cholecystitis, 45 (18%) had gallbladder stone with acute cholecystitis and 5 (2%) had gallbladder polyp. Open conversion was required in case of 20 patients. Thus, overall conversion rate was 8%. The common causes of conversion were a) Difficult Anatomy of Calot's triangle (42.1%), b) injury to cystic artery (21.1%), and c) injury to bile duct (15.8%). Both male and female had equal risk for conversion. The investigated risk factors like history of previous abdominal surgery, preoperative ERCP, acute cholecystitis, obesity, increased gallbladder wall thickness and older age has shown increased association with conversion. **Conclusion:** The study revealed that a very few patients (8%) needed conversion from laparoscopic cholecystectomy to open. The commonest cause of conversion was difficulty in defining Calot's triangle, injury to cystic artery and bile duct. The risk factors like previous abdominal surgery, preoperative ERCP, Gallbladder wall thickness, obesity and old age has shown minimal association with conversion.

KEYWORDS

Study materials and Methods :

The study was conducted at ANMMC Hospital, Gaya from 31st October 2021 to 1st November 2022. All cases of cholelithiasis with or without cholecystitis and other gall bladder pathology admitted in the hospital during above period were included in the study. Detailed clinical history was recorded. Clinical history included Age, Gender, previous abdominal surgery, preoperative ERCP, Jaundice, acute cholecystitis, obesity, Gallbladder wall thickness. The relevant biochemical and imaging investigation were performed for the diagnosis of cholelithiasis and associated pathology. Expert team of surgeon of ANMMC Hospital, Gaya performed laparoscopic cholecystectomy of all selected cases.

The data were presented as mean $\pm$ SD and percentages. Chi-sq test were used to determine the factors related to conversion.

RESULTS :

The age and sex distribution of the study population is presented in Table-1 which suggest that majority of the patients were female (66.7%). The mean ($\pm$ SD) age was 44 ± 1.9 years and 42 ± 1.6 years in case of male and female patients respectively. Majority of the patients (80%) selected for laparoscopic cholecystectomy had chronic cholecystitis and 18% had acute cholecystitis and 2% had other pathology like gallbladder polyp (Table-2).

Table-1: Age and sex distribution of study population

Age (in yrs)	Male		female		Total	
	number	percentage	number	percentage	number	percentage
20-30	4	5	13	7.64	17	6.8
31-40	20	25	70	41.18	90	36
41-50	30	37.5	30	17.64	60	24
51-60	18	22.5	40	23.53	58	23.2
>60	8	10	17	10	25	10
Total	80	32	170	68	250	100
Mean $\pm$ SD	44 ± 1.9		42 ± 1.6		43 ± 1.75	

SD – Standard deviation

Table-2 : Diagnosis following laparoscopic cholecystectomy based on histopathology

Final diagnosis	Number of cases	Percentage of cases
Cholelithiasis and chronic cholecystitis	200	80
Cholelithiasis and acute cholecystitis	45	18
Gallbladder polyp	5	2
Total	250	100

Of the total 250, the conversion from LC to OC was performed in 20 patient. Thus the conversion rate reached 8%. The causes for the conversion are shown in Table-3. The most common cause of conversion was difficult anatomy of Calot's triangle, which comprised 42.1%. The other major causes were injury to cystic artery (21.1%) and bile duct (15.8%). The risk factors for association with conversion of LC to OC were shown in Table-4. There was no/minimal association of gender, age, history of previous abdominal surgery, preoperative ERCP and jaundice with conversion. Likewise acute cholecystitis, obesity, gallbladder wall thickness were also found not significant.

Table-4: Factors associated with conversion to open cholecystectomy The dichotomised categories are tested by chi-sq, parenthesis indicates number

Variable s	Categories	No conversion		Conversion		P value
		numb er	percent age	numb er	percenta ge	
Gender	Female (170)	158	92.9	12	6.0	NS
	Male (80)	72	90	08	4.0	
Age	≥ 60 Years (20)	17	85.5	03	1.5	NS
	<60 years (230)	213	92.9	17	8.5	
Previous surgery	Upper abdomen (29)	23	79.3	6	3.0	NS
	Lower abdomen (43)	40	93.0	3	1.5	
	No surgery (178)	167	93.8	11	5.5	
Acute cholecys titis	Yes (40)	35	87.5	05	2.5	NS
	NO (210)	195	92.8	15	7.5	

H/O jaundice	Yes(20) No(230)	18 212	90.0 92.1	02 18	1.0 9.0	NS
Obesity	Yes(50) NO(200)	42 188	84 94	08 12	4.0 6.0	NS
Gallbladder wall	Thick(50) Normal(200)	42 188	84 94	08 12	4.0 6.0	NS
Preoperative ERCP	Yes(5) No(245)	4 226	80 92.2	01 19	0.5 9.5	NS

P-value after chi-sq, NS-Not significant

Table-3: The causes for conversion from laparoscopic cholecystectomy to open cholecystectomy

Cause for conversion	Number of patients	percentage
Difficult to define anatomy of calot's triangle	09	45.0
Suspicion of CBD injury	02	10.0
Bowel injury	01	5.0
Cystic artery bleeding	04	20.0
Bile duct injury	03	15.0
Suspicion of gallbladder cancer	01	5.0
Total	20	100

DISCUSSION:

For many years LC has been the standard treatment for symptomatic gallbladder disease(2,3,5).The identification of factors that predict the likely need to convert LC to an open procedure is important and beneficial in terms of patient education and postoperative expectation(3).This study did not consider the risk score as suggested by Chole's study group(3).However, the conversion rate of this study is consistent with the other studies(4,5,6).A study in England reported the overall conversion rate as 5.2%(4).Ishizaki et al observed the conversion rate from 5.3% to 10.6%(5).It may be mentioned that Sippey M et al(7) found age, male gender, obesity, preoperative alkaline phosphatase level, white blood cells count were independently associated with conversion to open cholecystectomy. In the present study age, gender and obesity were investigated but found not significant. Alkaline phosphatase and white blood cell count were not included in the study. Further study may be conducted to reveal the association of these factors to conversion. Patients with chronic cholecystitis were found as the most common candidates undergoing laparoscopic cholecystectomy. Very few patients required conversion from laparoscopic to open cholecystectomy. The most common cause of conversion was a difficult Calot's triangle followed by injury to cystic artery and bile duct. The other reported risk factor like previous abdominal surgery, preoperative ERCP , Gallbladder wall thickness, obesity and old age were found not associated with conversion to open cholecystectomy.

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