



FACTORS ASSOCIATED WITH CONVERSION OF LAPAROSCOPIC CHOLECYSTECTOMY TO OPEN CHOLECYSTECTOMY; OUR EXPERIENCE

General Surgery

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ABSTRACT

BACKGROUND: LC has become the gold standard for treating symptomatic cholelithiasis. It is important to keep in mind that the primary goal of LC is the safe removal of the GB, Therefore conversion to open should not be deemed a failure. Conversion to laparotomy may definitively be identified with surgical anatomy in difficult dissection or to address intraoperative complications such as bleeding, biliary or bowel injury. Ideally conversion should be carried out before complication arises **Method and material:** The present study was done on 100 patients undergoing laparoscopic cholecystectomy in the Department of General Surgery at Mahatma Gandhi Hospital. Factors(brief history, preoperative investigation and ultrasound findings) that could help predict conversion of lap. Cholecystectomy to open were identified and were analysed with IBM.SPSS statistics software **Result:** Observation and analysis of all the parameters studied. Total 6 patients out of 100 cases were converted to open cholecystectomy i.e. conversion rate is 6%. Association of conversion with age was significant. Association of BMI with conversion rate was significant. no significant association of acute cholecystitis with conversion rate. no significant association of history of jaundice with conversion rate. Association of previous abdominal surgery with conversion rate was significant. Association of wbc count with conversion rate was not significant. There was significant association between GB wall thickness and conversion rate. No significant association of impacted stone with conversion rate. No significant association of pericholecystic fluid with conversion rate. **Colclusion:** In our study significant correlation was found between the following parameters and conversion BMI, Previous abdominal surgery and GB wall thickness rest factors were not significant.

KEYWORDS

Laparoscopic Cholecystectomy, Gall stone, cholecystitis

INTRODUCTION

By the advent of laparoscopy, cholecystectomy has been profoundly affected.

Since the National Institute of Health (NIH) consensus development conference (1992), Laparoscopic cholecystectomy has replaced open cholecystectomy (OC) as treatment of choice. After the inevitable learning curve, LC has become the gold standard for treating symptomatic cholelithiasis.

In 1990, 10% of cholecystectomies were being performed laparoscopically. In 2008, 7.5 lakh patients underwent cholecystectomy in US, out of which 90% operation were done laparoscopically.

It is important to keep in mind that the primary goal of LC is the safe removal of the GB, Therefore conversion to open should not be deemed a failure. Conversion to laparotomy may definitively be identified with surgical anatomy in difficult dissection or to address intraoperative complications such as bleeding, biliary or bowel injury. Ideally conversion should be carried out before complication arises.

The patient's condition, experience of the surgeon along with the technical factors, play a role in the decision for conversion into open cholecystectomy. Inability to define the anatomy and difficult dissection are the leading reasons for conversion followed by other complications like bleeding. The conversion rate for elective laparoscopic cholecystectomy is around 5%, whereas in the setting of acute cholecystitis it may be as high as 30%.

Sonography is a valuable tool to help surgeons detect gall bladder stones, estimate patient's surgical risks and suggest whether further work up of the bile duct is required.

Our purpose in this study was to estimate the rate of conversion and identify the factors responsible for conversion of laparoscopic cholecystectomy to open cholecystectomy. Hence, these findings will allow us to preoperatively predict and discuss the higher risk of conversion and allow for an earlier judgement and decision on conversion if intra-operative difficulty is encountered thus providing better surgical care to the patient.

METHOD AND MATERIAL

Source of data: The present study was done on 100 patients undergoing laparoscopic cholecystectomy in the Department of General Surgery at Mahatma Gandhi Hospital, Jaipur from January 2017 to July 2018.

INCLUSION CRITERIA

1. Age Group: 10-70 years
2. All Cases of cholelithiasis undergoing laparoscopic cholecystectomy

EXCLUSION CRITERIA

1. Patients who have previously undergone cardiac surgery
2. Cases with incomplete information with respect to anthropometry, laboratory investigations and ultrasonography findings.
3. Patients with pathologically detected malignancies or gall bladder polyps.

The selected patients were then informed about the procedure and written informed consent was taken. Patients were also informed about the possible conversion to open cholecystectomy preoperatively and consent was taken for the same

A detailed clinical History with special reference to duration of pain, its periodicity, aggravating and relieving factors, and time since last attack occurred was taken. The information was recorded in proforma. A detailed physical examination was done and recorded in proforma. And the following parameters were included were age, sex, BMI, h/o acute cholecystitis, h/o jaundice, previous abdominal surgery, WBC count, GB wall thickness, impacted stone at the neck of gall bladder and pericholecystic fluid

STATISTICAL ANALYSIS:

The collected data were analysed with IBM.SPSS statistics software 23.0 Veron. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2x2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

OBSERVATIONS AND RESULTS

A hospital based descriptive analytical type of observational study was carried out in the department of General Surgery in Mahatma Gandhi Hospital during the period from January 2017 to July 2018 including 100 patients undergoing laparoscopic cholecystectomy. All the details of the patients were recorded in the proforma.

Observation and analysis of all the parameters studied are as followed.

- Total 6 patients out of 100 cases were converted to open cholecystectomy i.e. conversion rate is 6%.
- p value <0.050 is taken as significant

AGE DISTRIBUTION AND ASSOCIATION WITH CONVERSION RATE

- Maximum Incidence is seen in the age group of 46-55 years followed by 36-45 years.

According to statistics, Chi square=7.591, p value 0.180 i.e. >0.050. So association of conversion with age is significant.

SEX DISTRIBUTION AND ASSOCIATION WITH CONVERSION RATE

Among 84 females 5 were converted to open cholecystectomy whereas among 16 males 1 was converted to open cholecystectomy

BMI and Conversion Rates

Conversion rate was maximum in higher BMI patients with p value- 0.001. Thus association of BMI with conversion rate is significant.

ASSOCIATION OF ACUTE CHOLECYSTITIS WITH CONVERSION RATE

Among 24 patients with acute cholecystitis, 2 patients had to converted to open cholecystectomy with p value- 0.628 indicating no significant association.

Table 4: Association of Acute Cholecystitis with Conversion Rate

			conversion to open		Total
			No	Yes	
H/O Acute cholecystitis	No	Count	72	4	76
		%	76.6%	66.7%	76.0%
	Yes	Count	22	2	24
		%	23.4%	33.3%	24.0%
Total		Count	94	6	100
		%	100.0%	100.0%	100.0%

Association Of History Of Jaundice With Conversion Rate:

Among 11 patients with history of Jaundice, 2 patients had to be converted to open cholecystectomy with p value- 0.129 which indicates no significant association.

Table 5: Association of History of Jaundice with Conversion Rate

			conversion to open		Total
			No	Yes	
H/O Jaundice	No	Count	85	4	89
		%	90.4%	66.7%	89.0%
	Yes	Count	9	2	11
		%	9.6%	33.3%	11.0%
Total	Count		94	6	100
		%	100.0%	100.0%	100.0%

ASSOCIATION OF PREVIOUS ABDOMINAL SURGERY WITH CONVERSION RATE:

Among 100 patients 34 patients had undergone previous abdominal surgery, out of which 4 patients had to be converted to open cholecystectomy. Out of 2 patients with supraumbilical scar both had to be converted to open. P value- 0.001 indication significant association.

Table 6: Association of previous abdominal surgery with conversion rate

			conversion to open		Total
			No	Yes	
Previous abdominal surgery	Infraumbilical	Count	30	2	32
		%	31.9%	33.3%	32.0%
	No	Count	64	2	66
		%	68.1%	33.3%	66.0%
	Supraumbilical	Count	0	2	2
		%	0.0%	33.3%	2.0%

Total	Count	94	6	100
	%	100.0%	100.0%	100.0%

ASSOCIATION OF WBC COUNT WITH CONVERSION RATE

Conversion rate was more in patients with WBC count >10000 (8%) as compared to patients with WBC count ≤10000 (5.79%) but p value is 0.660 indicating no significant association.

Table 7: Association of WBC counts with Conversion Rate

			conversion to open		Total
			No	Yes	
WBC Count	<=10000	Count	69	4	73
		%	73.4%	66.7%	73.0%
	>10000	Count	25	2	27
		%	26.6%	33.3%	27.0%
Total		Count	94	6	100
		%	100.0%	100.0%	100.0%

ASSOCIATION OF GB WALL THICKNESS WITH CONVERSION RATE

Among 5 patients with GB wall thickness >4mm, 2 patients had to be converted to open with 40% conversion rate. p value is 0.028 indicating significant association between GB wall thickness and conversion rate

Table 8: Association of Gb wall thickness with conversion rate

			conversion to open		Total
			No	Yes	
GB Wall Thickness (mm)	<=4	Count	91	4	95
		%	96.8%	66.7%	95.0%
	>4	Count	3	2	5
		%	3.2%	33.3%	5.0%
Total		Count	94	6	100
		%	100.0%	100.0%	100.0%

ASSOCIATION OF IMPACTED STONE WITH CONVERSION RATE

On ultrasound 11 patients had impacted stone at neck out of which 2 were converted to open. P value- 0.129 indicates no significant association.

Table 8: Association of Impacted stone with conversion rate

			conversion to open		Total
			No	Yes	
Impacted Stone	No	Count	85	4	89
		%	90.4%	66.7%	89.0%
	Yes	Count	9	2	11
		%	9.6%	33.3%	11.0%
Total		Count	94	6	100
		%	100.0%	100.0%	100.0%

ASSOCIATION OF PERICHOLECYSTIC FLUID WITH CONVERSION RATE

Out of 100 patients, 24 patients had ultrasonographic evidence of pericholecystic fluid among which only 2 patients required conversion to open with p value-0.628 indicating no significant association.

Table 9: Association of pericholecystic fluid with conversion rate

			conversion to open		Total
			No	Yes	
Pericholecystic fluid	No	Count	72	4	76
		%	76.6%	66.7%	76.0%
	Yes	Count	22	2	24
		%	23.4%	33.3%	24.0%
Total		Count	94	6	100
		%	100.0%	100.0%	100.0%

DISCUSSION

Laparoscopic cholecystectomy is an operative procedure that has spread widely and rapidly through the surgical community. The advantages and safety of laparoscopic cholecystectomy are well documented making it the procedure of choice in patients with symptomatic gall stones. Conversion to open cholecystectomy is required in varying proportion of patients despite these advantages and increasing experience in laparoscopic cholecystectomy, which ranges from 2% to 15% in different studies. In our study of 100 people, 6%

patients required conversion.

The importance of factors predisposing to conversion from laparoscopic to open cholecystectomy has been emphasised in several studies reported from the developed countries.

The final multivariate model in our study demonstrated that BMI > 25, previous abdominal surgery, GB wall thickness > 4mm are the factors associated with conversion to open cholecystectomy. Conversion rate is more in males but that is not statistically significant.

Age

No age is said to be immune to gallbladder disease, however they were more common in the third, fourth and fifth decades of life as 75% of the cases belonged to these decades. Maximum incidence was seen in the age group of 46-55 years i.e. 4 patients followed by that in 36-45 years i.e. 2 patients.

Our study population was younger, mean age 44.1 years. Daradkeh reported mean age of 47.2 years, whereas Bingener et al 40 years. All the 100 patients were planned for elective laparoscopic cholecystectomy. 6 out of the 100 patients i.e. 6 % were converted to open cholecystectomy. Workers like Thomas B Hugh et al, R Schmitz et al have reported a similar peak incidence in the 4th and 5th decade.

Sex

The main sufferers of gallbladder disease in our study were females as compared to males. Out of total 100 cases, 84 (84%) were females and 16 (16%) were males, which are very much similar to those observed by Frazee et al and U. Berggren et al. 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 hypercholesterolemia.

Symptomatology

BMI

In our study 40 patients had BMI > 25 out of which 4 (10%) had to be converted to open cholecystectomy. It was found that BMI had significant association with conversion to open. Daniel et al in their study of 1027 patients concluded that there is no increase risk of conversion with raised BMI. Jagdish Nachnani et al in their study of 106 patients concluded that BMI > 30 has significant association with conversion to open cholecystectomy.

H/O ACUTE CHOLECYSTITIS

Volkan Genc et al in their study of 5164 patients concluded that previous history or new acute cholecystitis are the two most frequent factors associated with conversion to open cholecystectomy as it changes the local anatomy and there is increased difficulty in dissecting Calot's triangle. It predisposes the patient to haemorrhage and causes an increased risk of gall bladder perforation. In our study of 100 patients there is no significant association between acute cholecystitis and conversion to open.

H/O Jaundice

Among 100 patients in our study, 11 had history of jaundice out of which 2 were converted to open procedure with p value 0.129 indicating no significant association.

Previous abdominal surgery

Out of 100 patients in our study group 34 had undergone previous abdominal surgery with 32 cases having infraumbilical scar and 2 patients having supraumbilical scar.

The cases with the history of supraumbilical scar had dense adhesions and both the cases had to be converted to open cholecystectomy, while out of 32 patients with infraumbilical scar only 2 had to be converted to open cholecystectomy.

Thus in supraumbilical scar cases, there are more chances of case to be difficult due to same area of working.

WBC Count

Samer A Kanaan et al in their study of 564 patients undergoing laparoscopic cholecystectomy in 1995 and 1996 concluded that acute cholecystitis with raised WBC count had increased conversion rate.

In our study out of 100 patients 27 had raised WBC count out of which

2 were converted to open cholecystectomy i.e. 7.4% conversion rate while in 73 patients with WBC Count ≤ 1000, 4 were converted to open cholecystectomy i.e. 5.4% conversion rate. Though conversion rate was more in patients with raised WBC Count, it was not statistically significant.

ULTRASONOGRAPHIC PARAMETERS

In our study, 5 out of 100 patients showed a thickened gall bladder wall on ultrasonography, of which 2 patients (40%) were converted. Out of the remaining 95 patients in whom the gall bladder wall wasn't thickened, 4 patients (4.2%) were converted.

In a study by Pawan Lal et al, 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 which was in accordance with the reports of other studies by Daradkeh et al, Alponat A et al, Jansen S et al, Santambrigo R et al and Chen RC et al.

Our finding coincides with these studies.

In our study 11 patients out of 100 had impacted stones at neck. Though impacted stone created difficulty in surgery, only 2 patients had to be converted to open which is not statistically significant.

Pericholecystic fluid indicates Acute cholecystitis leading to surgical difficulties and increased chances of intraoperative bleed. But in our study of 100 patients there was no significant association between pericholecystic fluid conversion to open.

Conversion to open technique is considered a major morbidity of LC as it loses its supremacy over open technique once the conversion takes place. The conversion rate in this study was 6% and this is comparable to the conversion rate of 2.6% to 14% reported in literature.

A comparative comparison of rates of conversion with other studies shows that the rate of conversion is high (7.5-16%) amongst studies from the Asian countries, whereas studies from Europe, USA and Australia are showing a decline in their conversion rates (2.6-4.2%).

CONCLUSION

The prospective study was conducted including 100 patients undergoing laparoscopic cholecystectomy, in Department of Surgery in Mahatma Gandhi Hospital, Jaipur over a period of 1 and ½ years from January 2017 to July 2018, to evaluate and correlate the association of the preoperative clinical findings and ultrasonographic findings with conversion of laparoscopic to open cholecystectomy. The parameters which were included were age, sex, BMI, h/o acute cholecystitis, h/o jaundice, previous abdominal surgery, WBC count, GB wall thickness, impacted stone at the neck of gall bladder and pericholecystic fluid. The abdominal ultrasound was done one day prior to planned laparoscopic cholecystectomy.

In our study we concluded that:

- Maximum patients with gall stone disease were in the age group of 46-55 years.
- Male to female ratio was 1:5.25
- The incidence of conversion to open was 6%
- In our study significant correlation was found between the following parameters and conversion
 - BMI
 - Previous abdominal surgery
 - GB wall thickness
- Conversion rate was more in male gender but it was not statistically significant.
- Acute cholecystitis makes the dissection difficult but did not have significant association with conversion to open cholecystectomy.

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