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Original Research Article

Risk factors influencing conversion of laparoscopic cholecystectomy to open cholecystectomy

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ABSTRACT

Background: Gall stone disease is a common disease affecting human beings. Over the past two decades, laparoscopic cholecystectomy has become gold standard for the surgical treatment of gallbladder disease. The advantages of laparoscopic cholecystectomy over open surgery are a shorter hospital stay, less postoperative pain, faster recovery, better cosmoses. This study was planned to identify the circumstances and the risk factors influencing the conversion of laparoscopic cholecystectomy to open procedure.
Methods: This is a Prospective study conducted over a period of 24 months. A total of 50/500 patients who were electively posted for laparoscopic cholecystectomy and got converted into open cholecyctectomy were included in the study. The Factors recorded and analysed were Age and Sex of the patient, presence of diabetes mellitus, previous episode of Acute Cholecystitis, Body Mass Index, presence of abdominal scar, total count, Ultrasonagram Abdomen findings of Gallbladder wall thickness and presence of pericholecystic fluid.
Results: In our study, it has been observed that Patient Related Factors - Age >50yrs, Male gender, Presence of Diabetes Mellitus, Obesity, previous Abdominal surgeries and Disease Related Factors - previous episode of Acute Cholecystitis, presence of Acute Cholecystitis, Gallbladder wall thickness >4mm, presence of Pericholecystic fluid were found to be significant risk factors in conversion of laparoscopic to open cholecystectomy.
Conclusions: These risk factors help to predict the difficulty of the procedure and this would permit the surgeon to better inform patients about the risk of conversion from laparoscopic to open cholecystectomy.

Keywords: Conversion, Gall bladder, Laparoscopic cholecystectomy, Risk factors

INTRODUCTION

Gall stone disease is a common disease affecting human beings. Langenbach in 1892 done the first cholecystectomy but the first successful laparoscopic cholecystecomy was done in 1985 by Eric Muhe.[1] Two years later, Philip Mauret improved the method, over the past two decades, laparoscopic cholecystectomy has become gold standard for the surgical treatment of gallbladder disease. The advantages of laparoscopic cholecystectomy over open surgery are a shorter hospital stay, less postoperative pain, faster recovery, better cosmoses.[2] The complications encountered during laparoscopic cholecystectomy are numerous: some that are specific to this unique technique and some that are common to laparoscopic surgery in general. These include complications related to anesthesia; complications related to peritoneal access (e.g., vascular injuries, visceral injuries, and port-site hernia formation); complication related to pneumoperitoneum (e.g., cardiac complication, pulmonary complications, and gas embolism); and complications related to thrombo-

coagulation. Specific complication of laparoscopic cholecystectomy is hemorrhage, gall bladder perforation, bile leakage, bile duct injury, and perihepatic collection), and others such as external biliary fistula, wound sepsis, hematoma and foreign body inclusions. Some of these complications and several other factors can necessitate the conversion from laparoscopic cholecystectomy to open cholecystectomy.[3]

The conversion from laparoscopic cholecystectomy to open cholecystectomy results in a significant change in out-come for the patient because of the higher rate of postoperative complications and the longer hospital stay in addition to the effect and the long-term sequel of the cause of conversion itself as in bile duct injury.[4] Conversion to open cholecystectomy is occasionally necessary to avoid or repair injury, delineate confusing anatomic relationships, or treat associated conditions.[5] This study was planned to identify the circumstances and the risk factors influencing the conversion of laparoscopic cholecystectomy to open procedure. The aim and objectives of the study was to identify Patient related and Disease related variables that determine the conversion of laparoscopic to open cholecystectomy. To find out the preoperative factors that can predict the conversion of laparoscopic to open cholecystectomy.

METHODS

This is a Prospective study conducted over a period of 24 months. A total of 50/500 patients who were electively posted for laparoscopic cholecystectomy and got converted into open cholecyctectomy were included in the study.

Patients who were already planned for elective open cholecystectomy and for whom laparoscopic cholecystectomy was combined with other procedures were excluded from the study.

The Factors recorded and analysed were Age and Sex of the patient, presence of diabetes mellitus, previous episode of Acute Cholecystitis, Body Mass Index, presence of abdominal scar, total count, Ultrasonagram Abdomen findings of Gallbladder wall thickness and presence of pericholecystic fluid.

RESULTS

About 500 patients had undergone laparoscopic cholecystectomy over a period of 24 months. Among them 50 patients were converted to open cholecystectomy.

Table 1: Conversion rate.

Procedure	Total no. Of cases	No. of cases completed by laparoscopy	No. of cases converted to open	Conversion rate
No. of patients	500	450	50	10%

Table 2: Patient-related demographic factors.

Demographic factors		Total cases	Converted cases	Conversion rate
Age (Years)	<50	275	15	5.45%
	>50	225	35	15.55%
Gender	Male	181	32	17.67%
	Female	319	18	5.64%

On analyzing the age, 275 patients were less than 50 years and remaining were above 50 years. The conversion rate was 15.55% in the older age group, with P value of 0.005, this factor (Age >50) was statistically strongly significant.

The conversion rate was 17.67% in male population and 5.64% in female population, with P value of 0.048, this factor (Male Gender) was statistically moderately significant. 119 patients were diabetic among the 500 patients who underwent cholecystectomy, of which 32 cases were converted to open cholecystectomy with P value of 0.048, this factor (Presence of Diabetes mellitus) was statistically significant.

The conversion rate was 34% when the patient had previous episode of acute cholecystitis, with P value of <0.05, this factor (Presence of Previous Episode of Acute Cholecystitis) was statistically moderately significant. Among 103 patients with Body Mass Index was more than 25, 40 patients were converted to open, with P value of 0.008, this factor (Presence of BMI > 25) was statistically strongly significant. Hence obesity increased the chance the conversion. Presence the abdominal scar increases the chances of conversion by 36%, with P value of 0.000 (P < 0.001), this factor (Presence of Abdominal Scar) was statistically highly significant. 126 patients presented with acute cholecystitis, of which 48 patients had conversion to open cholecystectomy, with P value of

0.000 (P < 0.001), this factor (Presence of Acute Cholecystitis) was statistically highly significant.

Table 3: Patient and disease related factors.

Factors		No. of cases		P value
		Lap	Open	
Diabetes mellitus	Present	87	32	0.048 Significant
	Absent	363	18	
Previouss episode of acute cholecystitis	Present	19	17	0.05 Significant
	Absent	431	33	
Body Mass Index (BMI)	<25	387	10	0.008 Significant
	25-27.5	40	29	
	>27.5	23	11	
Abdominal scar	Supra Umblical Scar	4	6	0.000 Significant
	Infra Umblical Scar	8	12	
	No Scar	438	32	
Acute cholecystitis	Present	78	48	0.000 Significant
	Absent	372	2	
Total count	>11000	282	31	0.09 Not significant
	<11000	168	19	
Gall bladder wall thickness	<4mm	441	5	0.000 Significant
	>4mm	9	45	
Pericholecystic fluid	Present	8	39	0.000 Significant
	Absent	442	11	

Leucocytosis increases the chances of conversion, with P value of 0.09, this factor (Presence of Total count >11000) was NOT statistically significant. Thickened gallbladder wall increases the chances of conversion of laparoscopic to open cholecystectomy, with P value of 0.000 (P < 0.001), this factor (Gall Bladder Wall Thickness >4mm) was statistically highly significant. Presence of pericholecystic fluid increases the conversion rate, with P value of 0.000 (P < 0.001), this factor (Presence of Pericholecystic Fluid) was statistically highly significant.

DISCUSSION

Laparoscopic cholecystectomy has become the procedure of choice for management of symptomatic gall blad der stone disease.[6-10] The advantages to the patient and the economic benefits to society have been reported. However, the risk of conversion to open surgery is always present. The actual rates of conversion reported in literatures are quite variable ranging from 0% to 20%.[11] Conversion from laparoscopic to open cholecystectomy is required when safe completion of the laparoscopic procedure cannot be ensured. It is considered as a sound judgement rather than failure of laparoscopic surgery to avoid complications and reduce morbidity. The identification of parameters predicting conversion helps in preoperative patient counseling, provides for better perioperative planning and avoids laparoscopy associated complications by converting to open procedure as and when appropriate.[12-15] In our study it has been observed that Patient Related Factors - Age >50yrs, Male gender, Presence of Diabetes Mellitus, Obesity, previous Abdominal surgeries and Disease Related Factors - previous episode of Acute Cholecystitis, presence of Acute Cholecystitis, Gallbladder wall thickness >4mm, presence of Pericholecystic fluid were found to be significant risk factors in conversion of laparoscopic to open cholecystectomy.

Similar to our study, risk factors were analysed by Heng-Hui Lein, Ching-Shui Huang of Taiwan in 2002. They found that male patients had significantly longer (p = 0.04) operating time than females and the conversion rate to open cholecystectomy was also higher in male patients.[16] In 1994, Fried, et al published a study suggesting that the most significant predictors of conversion were increasing age, obesity, thickened gallbladder wall by pre-operative ultrasound and acute cholecystitis. Male sex was also one of them.[17] Brodsky, et al identified male gender and age >60years as being pre-operative factors associated with conversion in acute cholecystitis.[18] Similarly, Liu, et al found that age >65 years, obesity, elective laparoscopic cholecystectomy for acute cholecystitis, and a thickened gallbladder wall predicted higher incidence of conversion.[19] Schrenk P et al in their study have mentioned previous abdominal surgery as a risk factor predicting difficult laparoscopic cholecystectomy and higher conversion rates.[20] Michael Rosen, Fred Brody, Jeffrey Ponsky found in their series that obesity independently predicted conversion to open cholecystectomy in patients with acute cholecystitis.[21]

Simopon'os et al in their study had found diabetes as a predictor of difficult laparoscopic cholecystectomy.[22]

This preoperative prediction of risk factors may help surgeon to prepare better for intraoperative technical difficulties expected to be encountered and to make an early decision to convert, if dissection seems to be very difficult and non-progressive, to prevent unwanted biliary tract injuries and complication.

CONCLUSION

In conclusion, Patient Related Factors - Age >50yrs, Male gender, Presence of Diabetes Mellitus, Obesity, previous Abdominal surgeries and Disease Related Factors - previous episode of Acute Cholecystitis, presence of Acute Cholecystitis, Gallbladder wall thickness >4mm, presence of Pericholecystic fluid were found to be significant risk factors in conversion of laparoscopic to open cholecystectomy. None of these risk factors assessed were contraindication to laparoscopic cholecystectomy, but they may help to predict the difficulty of the procedure. This would permit the surgeon to better inform patients about the risk of conversion from laparoscopic to open cholecystectomy. The decision about when to convert to open cholecystectomy is made by the surgeon during the course of the procedure on an individual and often subjective basis.

"Need to convert is neither a failure nor a complication, but an attempt to avoid complication".

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