

Laparoscopic Cholecystectomy Open Conversion Causes and Incidence

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Abstract:

Background: Laparoscopic cholecystectomy (LC) has become the standard method of treatment for patients with chronic cholecystitis.

Objective: predict the risk of conversion preoperatively for selected patients arrange operating schedules, team and equipments. Minimize the procedure – related cost and help overcome financial constraint. Also prepare patients psychologically.

Patients and Method: Two hundred and fourteen patients presented with calculus cholecystitis underwent laparoscopic cholecystectomy at Gastroenterology and Hepatology Teaching Hospital and Dijla Private Hospital from November 2002 to June 2008. Patients' age, sex and clinical history were evaluated. All patients subjected to abdominal ultrasonic examination. Laboratory investigations with liver function test were also taken. All patients whom presented with acute cholecystitis and suspicious malignancies were excluded from this study.

Results: Out of (214) patients, 30 patients (14%) require conversion to OC. Significant predictors of conversion were: male gender, history of jaundice, presence of palpable gallbladder, and ultrasonic findings of contracted gallbladder. The main causes of conversion were obscured anatomy (56%), bleeding during dissection which difficulty to control by laparoscope (10%), and empyema of gallbladder 10%.

Conclusions: Initiation of international criteria for patients with high risk of conversion and for selection of patients for OC. Further evaluations of new risk factors are responsible for conversion.

Key words: Laparoscopic cholecystectomy, open cholecystectomy.

Introduction:

Laparoscopic cholecystectomy (LC) has become the standard method of treatment for patient with chronic cholecystitis (CC). It revolutionized minimally invasive procedures, decreased post-operative pain, earlier oral intake, early resumption of normal activities. It is associated with a lower morbidity, better cosmetic outcome, lesser hospital stay, and lower cost as compared to the conventional OC⁽¹⁾.

Despite recent reports on the safety and efficacy of LC in treating acute cholecystitis (AC), its role in the management of this condition remained controversial because of the potential hazard of severe complications and high incidence of conversion to open surgery. This conversion may result in loss of all the economic advantages of this minimally invasive procedure⁽²⁾.

However, substantial proportions of patients in whom LC cannot be successfully performed are converted to OC because of technical difficulty or intra-operative complication.

The need for conversion to laparotomy is neither a failure nor a complication, it may be helpful to determine risk of conversion of a LC to OC beforehand, these risk factors could be related to surgeon factors, patient factors, and possibly equipment factors⁽³⁾.

The aim of this study is to evaluate the risk factors for conversion of LC to OC in our set up. It was hoped that the prediction of a difficult procedure would allow the surgeon to discuss the likelihood of conversion with the patients and prepare them psychologically as well as plan their recovery

These risk factors would be able to predict the probability of conversion for those at a higher risk of conversion. Another benefit would be to allow more efficient scheduling of the operating lists and

ensuring the availability of a more experienced laparoscopic surgeon for the procedure.

Patients and Methods:

This study was conducted on 214 patients with CC attending the Gastroenterology and Hepatology Teaching Hospital, an academic and tertiary care hospital at Baghdad as well as Dijla Private Hospital during the period from November 2002 to June 2008.

All patients had symptomatic cholelithiasis; Patients with AC or with incomplete information or those not parallel to the laboratory investigations were excluded from this study. Three patients with suspected gallbladder cancer and one suspected case of cholangiocarcinoma were also excluded from the study.

Not all patients were enrolled in the study as LC, there were some cases converted to OC due to difficult anatomy, bleeding, presence of empyema, Mirrizi syndrome, or perioperative complication, as a conversion was necessitated.

A detailed information and physical examination in addition to laboratory investigations were obtained from each case including: age, sex, history of jaundice, endoscopic retrograde cholangiopancreatography (ERCP) which is diagnostic and or therapeutic, presence of palpable gallbladder, history of previous abdominal surgery, laboratory investigations as liver function tests and ultrasound findings, (gall bladder size, wall thickness, stones number, and common bile duct diameter).

The Statistical Package for Social Sciences (SPSS software version 11.5 (Chicago, Illinois, UAS) was used for data analysis (by descriptive statistics and chi-square test when suitable). P value < 0.05 was considered statistically significant.

Results:

Thirty patients out of a total 214 under the study had to be converted to OL, giving a conversion rate of 14%. Among those patients who were converted to OC, there were 11 males and 19 females.

Table 1 shows the distribution of cases according to reasons for conversion. From this table we found that obscured anatomy of gallbladder represents the commonest cause for conversion to OC (56.6%) followed by bleeding (10%) and empyema gall bladder (20%). The rate of OC due to obscured anatomy of gallbladder was higher among the male patients (81%) than in females (42.1%).

Table 2 shows that the dense inflammatory adhesion category of obscured anatomy constitutes the most common cause for OC (82.35%) followed by Mirrizi syndrome (11.76%) and dilated cystic duct (5.9%). The rate of OC was more among the males (88.9%) than females (75%) regarding dense inflammatory adhesion and dilated cystic duct. As shown in table 3, the rate of OC was significantly higher among male patients 11/33 (33.3%) than in females 19/181 (10.5%) (P=0.002). From the table 4, our results show that the mean age of patients with the conversion group was 44.8 years and that of the successful group was 41.7 years, this difference was not statistically significance.

Table 5 shows the relation of history of ERCP with conversion. Fourteen patients in the study underwent ERCP, 8 of them were later converted to OC giving conversion rate (57.1%), which is statistically significant (p value 0.001). Table 6 demonstrates that all patients with palpable gallbladder at clinical examination were converted to OC which is also of significant (p value 0.003).

Table 7 shows the relation between ultrasound findings and OC rate. Concerning gallbladder size, the total patients with small-sized gallbladder were 43, from which 12 cases (27.9%) were converted to OC with significant difference (P-value 0.001), While those with large-sized gallbladder, only 4/27 (14.9%) underwent conversion to OC; the difference was not statistically significant. Thick wall gallbladder was found in 89 patients, from which 17 patients (19%) were converted to open surgery and the difference was statistically significant. Regarding gallstones number, the results did not reveal any significant difference when compared to patients with solitary and those with multiple stones (P-value 0.5), while all patients diagnosed to have dilated common bile duct (7 patients) were converted to OC with significant difference (P-value 0.001).

Table (1): Distribution of cases according to reasons for conversion

	Total		Female		Male	
	N	%	N	%	N	%
Obscured anatomy	17	56.66	8	42.1	9	81.8
Bleeding	3	10	2	10.52	1	9.1
Empyema GB	3	10	3	15.78	0	0
CBD stone	1	3.33	1	5.26	0	0
Intrahepatic GB	1	3.33	1	5.26	0	0
GB mass suspension of cancer	1	3.33	0	0	1	9.1
Perforated GB	1	3.33	1	5.26	0	0
Slipping of cystic duct clips	1	3.33	1	5.26	0	0
CBD injury	1	3.33	1	5.26	0	0
Equipment failure	1	3.33	1	5.26	0	0
TOTAL	30	100	19	100	11	100

Table (2): Percentages of Obscured Anatomy categories in relation to OC.

	Total		Female		Male	
	N	%	N	%	N	%
Dense inflammation	14	82.35	6	75	8	88.89
Mirrizi syndrome	2	11.76	2	25	0	0
Dilated cystic duct	1	5.88	0	0	1	11.11
Obscured anatomy	17	100	8	100	9	100

Table (3): Relationship between sex and rate of conversion.

	Converted		Successful		Total		OR	P. value		
	N	%	N	%	N	%		lower	upper	
Male	11	33.30	22	66.70	33	100	4.26	1.79	10.13	0.002
Female	19	10.5	162	89.5	181	100				
Total	30	14	184	86	214	100				

Table (4): The relationship between the age group and rate of conversion.

	Mean	SD	t	Df	P-Value
Converted	44.77	12.94	1.287508	212	0.19
Successful	41.67	12.08			

Table 5: Relationship between history of ERCP and rate of conversion.

	Converted		Successful		Total		OR	95% C. I.		P-value
	N	%	N	%	N	%		lower	upper	
Positive	8	57.1	6	42.90	14	100	10.78	3.42	33.98	0.001
Negative	22	11.0	178	89.00	200	100				
Total	30	14.0	184	86.00	214	100				

Table (6): Relationship between patients with palpable gallbladder and rate of OC.

	Converted		Successful		Total		OR	95% C. I.		P-value
	N	%	N	%	N	%		lower	upper	
Positive	3	100.0	0	0.00	3	100.0				0.003
Negative	27	12.80	184	87.20	211	100.0				
Total	30	14.00	184	86.00	214	100.0				

Table (7): Relation between ultrasound findings and rate of OC.

		Converted		Successful		TOTAL		OR	95% C. I.		P-value
		N	%	N	%	N	%		lower	upper	
GB size	small	12	27.9	31	72.10	43	100				0.01
	large	4	14.8	23	85.20	27	100				
	normal	14	9.70	130	90.3	144	100				
	Total	30	14.00	148	86.00	214	100				
Thick-ness of GB	Thick	17	19.10	72	80.9	89	100	2.03	0.93	4.44	0.055
	Normal	13	10.4	112	80.6	125	100				
	Total	30	14.0	184	86.0	214	100				
Stone	Multiple	27	15.2	151	84.8	178	100	1.25	0.34	4.48	0.5
	Single	3	12.5	21	87.5	24	100				
	Total	30	14.9	184	86.1	214	100				
		Converted		Successful		Total		OR	95% C. I.		P-value
		N	%	N	%	N	%		lower	upper	
CBD	Dilated	7	100	0	0.00	7	100				0.001
	Normal	23	11.8	172	88.2	195	100				
	Total	30	14.9	184	86.10	214	100				

Discussion:

Conversion of laparoscopic to OC is not a sign of failure safety of the patient comes first^(4,5). Conversion should be contemplated earlier in the procedure. In the present study, the rate of conversion to OC was 14%. The rate of conversion varies with experience, it may be part of the learning curve and it is less important than safety. The rate varies from 5% to 15%⁽⁶⁻¹⁰⁾ and should be discussed with the patient prior to surgery as part of informed consent.

Indications for conversion are variable, and their prediction is very important, this may allow the patient to be better prepared for surgery and to plan their absence from work^(5-6,9). Also such prediction may allow a surgeon to be better prepared to take

extra precaution to reduce intra-operative complication, and to convert from LC. to OC at an earlier stage .

The risk of conversion to OC is related to surgeon factors, patient factors, and possibly equipment factors (failure of CO2 insufflators was faced in our study). The most common reason for conversion in our study was inability to delineate the anatomy. Three reasons, namely dense inflammatory adhesions, Mirrizi syndrome, and wide cystic duct in which suspicion of injury to the gallbladder duct were associated with difficulty in defining the anatomy⁽¹⁰⁾.

Older patients are probably at greater risk of conversion due to complications of metabolic decompensation, although the result in our study

shows increased risk of conversion more in older age group, but this is not a significant factor because of lower age incidence (fourth decade) of patient subjected to LC in our hospital⁽¹⁰⁾.

The increased risk of conversion in elderly patients (sixth decade) because of recurrent attacks of cholecystitis and complicated biliary tract disease has previously been demonstrated by several studies^(6,9-11). However, the patient and the surgeon should be aware of the increased risk of conversion in older age group and open surgery should be scheduled especially in the presence of other contributing risk factors, this will help in avoiding prolonged surgery as well as the risk of complications like injury to the biliary tree⁽¹⁰⁾.

Male patients have significant risk of conversion in our study. The reason of this high risk is unexplained, though male gender has been a significant risk factor in most series^(7,12-14). It has been observed that male patients have more intense inflammation or fibrosis, resulting in more difficult dissection both in the triangle of Calot and through the plane between the gallbladder and the liver.^(12,15-17)

Other significant risk factors in our study include history of jaundice, and past history of ERCP in which there was difficulty in defining the anatomy and these two factors were associated with scarred and fibrosed gallbladder with fibrous adhesions rendering laparoscopic dissection difficult.

The presence of palpable gallbladder during abdominal examination is associated with significant risk of conversion. This may be due to empyema or mucocele of the gallbladder, which are associated with dense inflammatory adhesions or presence of adhesion to nearby structures like the greater omentum, transverse colon, and the duodenum^(6, 8, and 12).

Big size of the gallbladder itself create a problem of handling it mandating aspiration of its content and resulting in lengthening of the operative time and sometimes conversion is recommended^(10,12).

If a prediction model based on the risk factors evaluated from our study can be applied in clinical setting, it can prevent the surgeon from persisting with difficult operation^(15, 18).

Patients with high predicted risk of conversion should be operated on either by or under the supervision of more experienced surgeon⁽⁹⁻¹⁰⁾, surgeons in the early phase of their training are advised to operate on patients with low risk of conversion⁽¹⁹⁻²¹⁾, especially if they are not operating under the supervision of an experienced laparoscopic surgeon⁽²²⁻²³⁾.

Also a high predicted risk of conversion may allow the surgeon to take an early decision to convert to OC when difficulty is encountered during dissection; this may shorten the duration of surgery and decrease the associated morbidity^(23,24). From this study we can identify the preoperative risk factors for conversion from LC to OC in our setting. Patient's factors, presentation, and preoperative ultrasonographic findings can all contribute to the prediction of conversion.

In our study, male gender, past history of jaundice, and palpable gallbladder, small contracted, thick wall gallbladder and dilated CBD were significant predictors for conversion from a LC to OC. These findings were compatible to other studies^(4-5,7,9).

However, recognition of these factors is important for understanding the characteristics of patients at high risk of conversion since they require longer hospital stay and place more demand on the health care facilities, it will also allow selection of cases for surgeon in early phase of learning, better organization for operating room schedule, ultimately leading in reduction in procedure – related costs.

Initiation of international criteria for continuous development of these procedures to assess patients whom have high risk of conversion and for selection of patients for OC. Further evaluations of new risk factors are responsible for conversion

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