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The Conversion Rate in Laporascopic Cholecystectomy in Patients Complaining of Acute and Chronic Cholecystitis

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Abstract

Background Laparoscopic cholecystectomy is the gold standard in the treatment of cholelithiasis, but there are still some patients requiring conversion to open cholecystectomy for several factors.

Objective To estimate the conversion rate and evaluate preoperative risk factors for conversion from laparoscopic to open cholecystectomy.

Methods 140 laparoscopic cholecystectomies were carried out from January 2008 to January 2011 at Al-Kindy Teaching Hospital. Preoperative clinical, laboratory and radiographic parameters for these patients assessed and analyzed prospectively.

Results Conversion to open cholecystectomy was needed in 30 patients (21.4%). Multivariate analysis identified male sex, with positive Murphy's sign, gall bladder wall thickness > 3 mm, a history of acute cholecystitis and time from the onset of symptoms till the time of surgery > 3 days as independent predictors of conversion rate to open cholecystectomy.

Conclusion The identification of certain risk factors for conversion from laporascopic to open cholecystectomy preoperatively such as male gender, age more than 40 years, onset of symptoms, gallbladder wall thickness can help the surgeon to plan and counsel the patients about the conversion rate.

Keywords Acute cholecystitis, laporascopic cholecystectomy, open cholecystectomy

Introduction

Gallstone disease is a global health problem. Most patients are asymptomatic, and gallstones are generally detected by ultrasonography during the evaluation of unrelated medical conditions [(1)]. Cholelithiasis affects approximat-ely 10% of the adult population in the United States and every year, approximately 500,000 cholecystectomies are performed [(2)].

It has been well demonstrated that the incidence of gall stones increases with age, an estimated 20% of adults over 40 years of age and 30% of those over the age of 70 years have biliary calculi. During the reproductive years, the female-to-male ratio is about 4:1, with the sex discrepancy narrowing in the older population to near equality. The risk factors predisposing to gallstone formation include obesity, diabetes mellitus, estrogen and pregnancy, hemolytic diseases, and cirrhosis [(2)].

Over the past two decades, laparoscopic cholecystectomy (LC) has become the gold standard for the surgical treatment of gallbladder disease. A shorter hospital stay (and, thus, a more rapid return to normal activity and work), less postoperative pain, a faster recovery, better cosmesis, and lower cost are some of the advantages of LC over open surgery [(3)]. The potential for conversion from a laparoscopic to an open procedure has been reported in the literatures with a high degree of variability,

ranging from 0% to 20% [4]. This variability is reflective of surgeon experience (including patient selection) and patient-specific risk factors often cited in the literature, including male sex, older age, acute cholecystitis and previous upper abdominal surgery [5,6]. Male sex is often cited as a risk factor for conversion to the open procedure [7].

Acute cholecystitis (AC) often requires emergency admission to the hospital. The traditional treatment of AC was conservative followed by cholecystectomy, usually 6 weeks to 8 weeks after discharge, although early cholecystectomy in patients with AC was shown to be safe and effective many years ago [8].

The two main controversies regarding the treatment of acute cholecystitis in patients fit for surgery are the timing of cholecystectomy (either initial conservative treatment followed by delayed cholecystectomy or planned early cholecystectomy), and the selection of the surgical procedure for cholecystectomy (either laparoscopic surgery or laparotomy) [9]. The currently available evidence predominantly supports immediate cholecystectomy on the basis that early surgery does not increase the risk of operative morbidity and mortality associated with early cholecystectomy [10] and that such a measure reduces the hospital stay for each patient by up to ten days, in contrast to conservative (late) cholecystectomy [11].

Laparoscopic cholecystectomy for an acutely inflamed gallbladder is technically more demanding than surgery for acute biliary pain without inflammation (biliary colic) because of severe inflammatory adhesions and distortion of the biliary anatomy; and the time interval from admission to surgery may affect conversion rates [12]. Since its introduction, LC has quickly become the most widely used treatment for gallstone disease, because of substantially less post-operative pain and a shorter recovery time compared to open cholecystectomy (OC) [13]. Randomized trials have also shown that early LC (within 72 hours of admission) for the treatment of AC is safe, feasible, and associated with a shorter hospital stay [14].

Methods

A cross sectional study with analytic content was carried out at Al-Kindy Teaching Hospital from the period between January 2008 to January 2011. One handred and forty patients were admitted to Alkindy teaching hospital and Dar Al-Najat Private Hospital. The patients who were included in this study were divided into 2 groups:

Group 1: included 90 patients presented with signs and symptoms and radiological features of chronic cholecystitis(recurrent attack of pain at right upper quadrent of the abdomen and some times vomiting and by abdominal ultrasound there is single or multiple stones with or without increase thickness of the wall of the gallbladder).

Group 2: included 50 patients presented with signs and symptoms and radiological features of acute cholecystitis, presented with right upper quadrant pain which persist for more than twelve hours, fever (temp. > 37.5 ^{o}C), vomiting and some of them jaundice, tenderness, muscle guarding and positive Murphy's sign and some cases boas sign was positive, The clinical diagnosis was supported by ultrasonic features of acute cholecystitis which includes increases in the thickness and edema of the wall, gallbladder distension with the presence of non floating gallstones impacted in the Hartman pouch. They received intravenous fluid, antibiotics and analgesia and nasogastric tube when necessary.

All patients admitted to the hospital and prepared for laparoscopic cholecystectomy. Investigations done for all patients including full blood count, random blood sugar, blood urea and serum creatinine, general urine examination, abdominal ultra-sound, chest x-ray, and electrocardiography in patients more than 35 years old.

All patients were operated upon under general anesthesia and endotracheal intubation, classical four ports laporascopic cholecystectomy was planned and when there was a need for conversion it was done through right subcostal incision.

The main reason for the conversion was inability to safely display and identify anatomical

structures of Calot's triangle correctly secondary to severe inflammation or dense adhesions.
Postoperative follow up for all patients was done and postoperative events were recorded for every patient on preforma, statistical analysis was done by the measurement of the *P* value. A *P* value below 0.05 was regarded as significant.

Results

There were 140 patients in this study 90 patients in group 1, 13 (14.4%) of them converted to open cholecystectomy and 50 patients in group 2, 17 (34%) of them converted to open. Males show a significantly higher conversion rate than females in patients with chronic cholecystitis as shown in table 1.

Table 1. Relation between the sex and conversion into OC

Sex	Lapchole		Conversion	
	No.	%	No.	%
Male	25	27.8	9	69.2
Female	65	72.2	4	30.8
Total	90	100	13	100

P = 0.003

While the age showed no significant difference in the conversion rate as shown in table 2.

Table 2. Relation between age and conversion

Age	Lapchole		Conversion	
	No.	%	No.	%
≥ 40 years	48	53.3	8	61.5
< 40 years	42	46.7	5	38.5
Total	90	100	13	100

Table 3. Relation between clinical history and conversion

Clinical history		Lapchole		Conversion		*P* value
		No.	%	No.	%	
Pain	Positive	80	88.9	11	13.8	0.653
	Negative	10	11.1	2	20	
Murphy's sign	Positive	60	66.7	9	15	0.854
	Negative	30	33.3	4	13.3	
Temp. > 37.5 °C	Positive	8	8.9	1	12.5	0.886
	Negative	82	91.1	12	14.6	
Onset of symptoms	> 3 days	70	77.8	11	15.7	0.574
	< 3 days	20	22.2	2	10	

Table 4. Relation between the results of abdominal ultrasound and conversion rate

US results		Lapchole		Conversion		*P* value
		No.	%	No.	%	
Wall thickness	> 3mm	20	22.2	8	40	0.003
	< 3mm	7	77.8	5	7.1	
Distended gallbladder	Positive	50	55.6	6	12	0.525
	Negative	40	44.4	7	17.5	
Number of gallstones	Multiple	67	74.4	8	11.9	0.328
	Single	23	25.6	5	21.7	

There was no significant statistical difference in the conversion rate in relation to the clinical history as shown in table 3. There was statistically significant difference in conversion rate in relation to ultrasonic findings of increased wall thickness of the gall bladder as shown in table 4.

In patients with acute cholecystitis (group 2), there was a significant increase in the conversion rate in males as in table 5. While the age shows no significant effect on the conversion rate as in table 6.

Table 5. Relation between the sex and conversion

Sex	Lapchole		Conversion	
	No.	%	No.	%
Male	18	36	11	64.7
Female	32	64	6	35.3
Total	50	100	19	100

P = 0.039

Table 6. Relation between age and conversion

Age	Lapchole		Conversion	
	No.	%	No.	%
≥ 40 years	31	62	7	41.2
< 40 years	19	38	10	58.8
Total	50	100	13	100

There was a significant increase in the conversion rate in relation to the time between the onset of symptoms to the time of operation while other clinical features did not have any significance in this respect (Table 7). An increase in the wall thickness of gall bladder was found also to be a significant risk factor for conversion from LC to OC as shown in table 8.

Discussion

This study showed the conversion from laporascopic cholecystectomy to open cholecystectomy in group1was 14.4% and 34% in group 2, while the study of Lim et al showed that the conversion rates in cases with acute cholecystitis were reported in the literature to reach up to 27.7% [15] and Fried et al who found that in acute cholecystitis, the conversion rate can be as high as 30% [16], and the study of Habib et al who found that the rate of conversion to open surgery in cases of severe cholecystitis is 8.7-35% [17].

In this study, the conversion rate was found to be highly related to male gender 69.2% in in group 1 and 64.7% in group 2 with a statistically significant difference (*P* value 0.003 and 0.039 respectively). This coincides with the study of Volkan Genc *et al* who found that male gender was found to be the only statistically significant risk factor for conversion with a conversion rate of 2.5-fold in men than in women [18]. Ballal *et al* also found that the patient-related factors who were good predictors of conversion included male sex, emergency admission, old age, and complicated gallstone disease (*P* < 0.001) [19]. The study of Shamim *et al* showed that the conversion rate was higher in male patients (16.45% males vs. 5.09% female) [20]. This association may be due to the increased severity of gallstone disease in men [21].

Regarding the age we found that the patients aged more than or equal to 40 years have higher conversion rate than those less than 40 years (61.5% versus 38.5%) in group 1 and (41.2% versus 58.8%) in group 2 with no statistically significant difference , and this goes with Fried et al study who found that advanced age may be associated with increased postoperative complications and high conversion rates [22], while Shamim et al study found no risk of conversion was associated with increasing age(Age-wise conversion rates were: 2.31% in 20s, 8.06% in 30s, 7.49% in 40s, 7.98% in 50s, 4.21% in 60s, and 4% in 70s) [20].

Concerning the clinical history and conversion rate, we found that there is no significant risk for conversion in group 1 regarding the pain, morphy's sign, temperature and onset of symptoms, while in group 2 the pain was present in all patients 100% and 70% of patients complained for more than 3 days converted to open cholecystectomy with highly significant p-value(0.05) and this is similar to the study of Khan et al who found that conversion rate was significantly low (zero versus 32%: *P* = 0.01) if the procedure was performed within 48 hours from the onset of symptoms [23].

Regarding preoperative ultrasounic findings, this study showed that 40% of patients with gallbladder wall thickness more than 3mm in group 1 are converted to open cholecystectomy

in comparison with 7.1% with those with less than 3mm gallbladder wall thickness with highly significant p-value (0.003) while in group 2, 40% of patients with gallbladder wall thickness more than 3mm and 12.9% of them less than 3mm wall thickness were converted to open with significant p-value (0.033) and this is parallel to the study of Brodsky *et al* who found that the gallbladder wall thickness associated with a conversion rate of 58% [24] while study of Khan *et al* found that the conversion rate was significantly high (33% versus zero; *P* = 0.01) if the gallbladder wall was thickened [23].

In conclusion, the identification of certain risk factors for conversion from laporascopic to open cholecystectomy preoperatively such as male gender, age more than 40 years, onset of symptoms, gallbladder wall thickness can help the surgeon to plan and counsel the patients about the conversion rate.

Table 7. Relation between clinical history and conversion in acute cholecystitis

Clinical history		Lapchole		Conversion		*P* value
		No.	%	No.	%	
Pain	Positive	50	100	17	100	
	Negative	0	0	0	0	
Murphy's sign	Positive	45	90	14	31.1	0.401
	Negative	5	10	3	60	
Temp. > 37.5°C	Positive	67	74.4	8	11.9	0.328
	Negative	23	25.6	5	21.7	
Onset of symptoms	> 3 days	10	20	7	70	0.05
	< 3 days	40	80	10	25	

Table 8. Relation between the results of abdominal ultrasound and conversion

US results		Lapchole		Conversion		*P* value
		No.	%	No.	%	
Wall thickness	> 3mm	20	22.2	8	40	0.033
	< 3mm	70	77.8	9	12.9	
Distended gallbladder	Positive	50	55.6	10	20	0.803
	Negative	40	44.4	7	17.5	
Number of gallstones	Multiple	67	74.4	12	17.9	0.740
	Single	23	25.6	5	21.7	

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