



# Conversion Rate from Laparoscopic to open Cholecystectomy in AL-kindy Teaching Hospital, Baghdad

<sup>1</sup> Firas M Rashid , <sup>2</sup> Hameed AL Aaraji,  
<sup>3</sup> Sudad S ALhadad, <sup>4</sup> Samer F Naum



## ABSTRACT

**Background:** laparoscopic cholecystectomy (LC) is getting popularity for the treating of symptomatic gall bladder disease; conversion from laparoscopic to open cholecystectomy (OC) is also common.

**Objective :** To find out the prevalence of causes, risk factors of conversion from LC to OC among patient suffering from gall bladder disease, and to explore the most common causes of conversion from laparoscopic to open cholecystectomy.

**Methods:** This prospective study was conducted in the department of general surgery at Alkindy teaching hospital from first of January 2016 to the end of December 2017 .Nine hundred twenty patient were included. Patient age, gender, history of previous abdominal scar, common bile duct stone, ERCP, duration of symptom was included in our study.

**Results:** Seven hundreds twenty –seven patients 74.48% were females and 191 26.52% were males. The mean age of patient presented with gall bladder disease was 40.43 years. Thirty –eight patients were converted to open cholecystectomy. The most common cause of conversation was dense adhesions 42.1% - followed by bleeding 30.1%. Other common

causes of conversion were biliary anomalous anatomy 10.5%, common bile injury 5%, visceral injury and technical failure 7%.

**Conclusion:** The main perioperative cause for OC was dense adhesion around gall bladder and the male gender, increasing age, history of common bile duct stone removed by previous ERCP, history of previous surgery, are independent risk factors of difficult laparoscopic cholecystectomy.

**Keywords:** conversion, Laparoscopic cholecystectomy, opens cholecystectomy.

### <sup>1</sup>Corresponding author:

FICMS, Al- Kindy Teaching Hospital Surgery Department HDOS

<sup>2</sup> Assistant prof. Department of Surgery. Al-Kindy Collage of Medicine

<sup>3</sup> High diploma of anesthesia Al- Kindy Teaching Hospital, Anesthesia Department

Received at 10/4/2019

Accepted at 19/6/2019

## INTRODUCTION

Cholithiasis is one of the most common disease affecting human beings. Langenbach in 1982 performed the first cholecystectomy <sup>(1)</sup>, but the first successful LC done in 1985 by Eric Muhe. Two years later, Phlip Maurat improved the method. Over the past two decades, laparoscopic cholecystectomy (LC) had become most popular procedure for surgical treatment of gall bladder disease. The benefit of LC over open surgery are a shorter hospital stay, less postoperative pain, faster recovery, better cosmoses, lower rate of wound infection and post-operative ileus and cost effective <sup>(2)</sup>. The complications occur during LC are numerous: some are specific to this unique technique and are common to laparoscopic surgery in general; these include complications related to anesthesia ;complication related to peritoneal access e.g. Vascular injury, visceral injury -; complication related to pneumopreitonium e.g., cardiac

complication, pulmonary complication, and gas embolism ; and complication related to thrombo-coagulation. Specific complication of LC are hemorrhage, bile leakage, bile duct injury , and preihepatic collection, and other such as external biliary fistula, wound sepsis, hematoma and foreign body inclusion. Some procedure difficulties, patient factors and some unexpected adverse event during laparoscopic cholecystectomy lead to the conversion from LC to open cholecystectomy <sup>(3)</sup>. The conversion from LC to OC resulted in a significant change in the outcome toward the favors of patient. Surgeon denial to convert will lead to a higher postoperative complications and the longer hospital stay in addition to the effect and long term sequel of cause of conversion itself as bile duct injury <sup>(4)</sup>. Conversion to open cholecystectomy is occasionally necessary to ovoid or to repair injury, delineate confusing anatomy relationships, or treat associated conditions <sup>(5)</sup>.

## METHODS

This prospective study was conducted in the Surgical Department at Alkindy Teaching Hospital during the period extended from the first of January 2016 to the 31 of December 2017. 920 patients suffering symptomatic gall bladder disease needed to be treated surgically by laparoscopic cholecystectomy were included. Most patients were admitted on elective basis and 138 patients were admitted and operated upon in the acute cholecystitis within the first 72 hr.

Preoperative data included age, gender, duration of disease, previous abdominal operation upper and lower midline laparotomy, lower transverse incision, ultrasound wall thickness of the gall bladder, location of the stones, caliber of the common bile duct, hepatomegaly, pericholecystic fluid, history of CBD stone, history of previous ERCP.

Patient with pathologically detected malignancy or gall bladder polyp, sever cardio-pulmonary disease or any anesthetic risk. Cases with incomplete laboratory data are excluded.

A through record patient's data was performed, including the history and clinical examination, laboratory investigations e.g. complete blood count, virology screen, liver function test, renal function test, CXR, ECG, for patient  $\geq 40$  years. When conversion is required, open cholecystectomy is made. If any uncontrolled life threatened complication, failure of progress and prolonged the time during the laparoscopic cholecystectomy the patient will be shifted to open cholecystectomy and this was determined accurately by surgeon's peri-operative judgment.

Written consent was taken. Full discussion with each patient before operation including the possibility of conversion to open cholecystectomy. Patient's agreement for using his information in our research was

taken after insuring the confidentiality of his information. Statically data were introduced into personal computer IBM-Spss V.24 was used in statically analysis Tables and graphs were used to describe result two in depended sample *t* test *chi* square were used to find out difference between mean of continue variables and association categorical variable, p value less than 0.05 for significance result.

## RESULT

Nine hundred and twenty patients were exposed to laparoscopic cholecystectomy, 38 (4.1%) of them were converted from the LC to OC. The mean age of the studied patient was 40.43 ( $\pm 6.28$ ) years. Two sample t test showed that the mean age of patient exposed to OC was 46.84 ( $\pm 10.31$ ) years, which is significantly higher than the mean age of patient exposed to LC 40.15 ( $\pm 5.9$ ) years as shown in **Table 1**.

One hundred ninety-one patients (26.52%) were males. Thirteen (6.8%) of them were exposed to open cholecystectomy in comparison with 25 (3.4%) of females. There is significant association between gender and conversion to OC as shown in **Table 2**.

Eighty-three from our patient had previous abdominal surgeries, 20 of them had upper abdominal surgery. Twelve pts 60% - of those with upper abdominal surgery needed conversion to OC due to limit visualization of the gall bladder and adhesion caused by previous surgery P value 0.001. figure 3.

Our result showed that from 769 83.5% - patient exposed to LC with gall bladder wall thickness less than 3mm, 22 2.9% - of them were shifted to OC. While from 151 pts 16.5% - with gall bladder wall thickness  $\geq 3$ mm, 16 pts. 10.6% - were converted to OC P value 0.001 -. so there is significant association between gall bladder wall thickness and conversion rate. As shown in **Table 2**.

History of common bile duct stones removed by ERCP were found among 60 patient (6.6%) of all studied patients. Six patients of them (10%) - needed OC. Compared with 860 pts without CBD stones. Of them 3.7% - only were shifted to OC. Which is significant p value 0.018 - Table 2 One hundred and fifty-three 16.7 - of studied patient presented with feature of acute cholecystitis change. Eighteen pts 11.8% - of them needed OC compared with 767 pts presented with features of chronic cholecystitis, only 20 pts of them 2.6% - needed conversion to OC and that is significant. p value 0.001 - Table 2 It was found that 16 pts 42.1% - from 38 were converted to OC due to adhesion

around calot's triangle. Five patient 30.1% - due to uncontrolled bleeding obscuring the field. Four patient 10.5% - were converted due to anatomical anomalies low union of cystic duct with hepatic duct, intrahepatic gall bladder -. Malignancy, technical failure inadequate pneumoperitonium, difficult visualization due hepatomegaly -, bowel injury during insertion of first port or during dissection -, cholecysto-enteric fistula cholecystodoudenal fistula - were the cause of conversion in 12 pts 7% - or each which are converted from laparoscopic to open cholecystectomy.

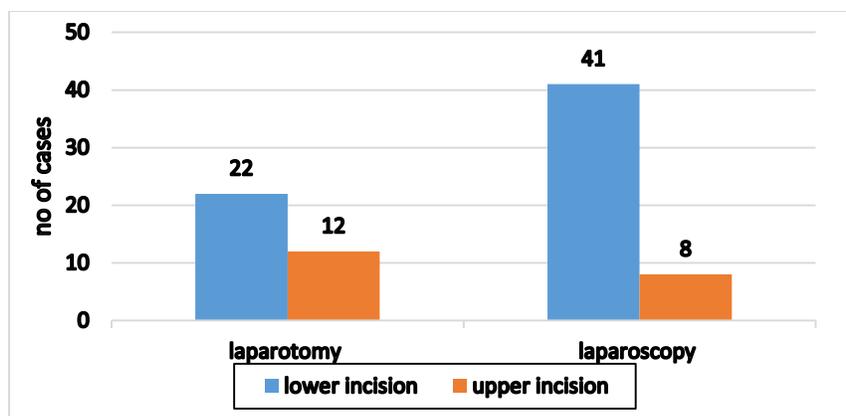
Common bile duct injury due to clipping, electrocautery was the cause of conversion in 2 pts. 5% - of the cases. Figure 4

**Table 1: distribution of studied cases according to age and cholecystectomy type**

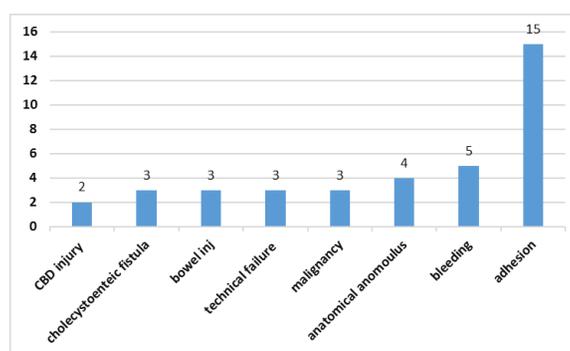
Groups	N (%)	Mean	SD	P value
Open cholecystectomy	38 (4.1)	46.84	10.310	0.001
Lap cholecystectomy	882 (95.9)	40.15	5.904	

**Table 2: Association between type of cholecystectomy and different variable**

		Laparotomy N=38		Laproscopy N=882 -		P value
		N	%	N	%	
Gender	Male= 191 26.52(% )	13	6.8	178	93.2	0.037
	Female=729 74.48(% )	25	3.4	704	96.6	
Previous surgery	No =837 90.10(% )	18	2.2	819	97.8	0.001
	Yes =83 9.9(% )	20	24.1	63	75.9	
Sonar wall thickness	≤ 3 mm= 769 83.5(% )	22	2.9	747	97.1	0.001
	> 3mm=151 16.5(% )	16	10.6	135	89.4	
Common bile duct stone	No =860 93.4(% )	32	3.7	828	96.3	0.018
	Yes =60 6.6 (% )	6	10.0	54	90.0	
Previous ERCP	No =858 93.2(% )	30	3.5	828	96.5	0.001
	Yes =62 6.8(% )	8	12.9	54	87.1	
Duration	Chronic = 767 83.3(% )	20	2.6	747	97.4	0.001
	Acute =153 16.7(% )	18	11.8	135	88.2	



**Figure 1 : Association between previous abdominal incision and type of cholecystectomy**



**Figure 2: Distribution of laparotomy cholecystectomy according to causes of conversion**

## DISCUSSION

According to published literatures in recent years, the conversion rate varies widely range from 2% to 15%<sup>6,7</sup>. In our study, the conversion rate was determined to be 4.1%, which is in range with rates reported in the literatures be due to the grown experience and understood laparoscopic technique. The patient risk factors such as male gender, age more than 46.84 years and prior abdominal surgery had been shown to be predictors of difficult laparoscopic cholecystectomy. The male gender is associated with higher likelihood of conversion which may be due to increase the severity of gall stone disease in males<sup>8</sup>. Our finding revealed that the conversion rate was 2- fold higher in men than women 6.8% vs 3.4% -, p value 0.037 -, compared

with data drained from the national hospital discharge by Livingston et al which reveal that the male with acute cholecystitis has higher risk for conversion 2.5% - than their female 1.5%<sup>9</sup>. Furthermore, Lein et al also noted that acute cholecystitis has proportionally higher incidence in male<sup>8</sup>. Our result are comparable with these finding.

Another risk factor for conversion was advanced age. Livingstone EH et al and Ibrahim S et al found a 2- 4 fold higher incidence of sever, acute and gangrenous cholecystitis and choledithiasis in elderly patient<sup>9,10</sup>. In our study the conversion rate in older patient group was higher than younger due to increase in the severity of cholecystitis, cholithiasis and comorbidity Table-1 -. Previous abdominal operation, even in the upper abdominal are not

contraindicated for safe laparoscopic cholecystectomy, however, previous upper abdominal surgery is associated with an increase in conversion rate, Jeremi et al investigate the effect of previous abdominal scars on the conversion rate in a series of 2963 attempt of laparoscopic cholecystectomy, they found a 4% conversion rate, of them 37.1% with a history of previous upper abdominal surgery<sup>11</sup>. In the current study, twelve patients 12.60% - in the converted group had a previous upper abdominal surgery due to limit visualization of the gall bladder and adhesion caused by previous surgery, which is significant. P value 0.001.

A history of CBD stones removed by preoperative ERCP was significant related to the need for conversion. Sarli et al reported a conversion rate of 8.3% when ERCP had been performed<sup>12</sup>. Ammori et al showed that previous ERCP predict more difficult cholecystectomy<sup>13</sup>. Most CBD stones originate in the gall bladder and migrate to the bile duct, the repeated passage of gall stones through cystic duct can cause an inflammatory change around the duct causing difficult dissection of Calot's triangle which may explain the significant increase in conversion rate among patient with CBD stones<sup>14,15</sup>. In our study the conversion rate for patients for CBD stones was 10% percent which is comparable with studies mentioned above.

The main reason of conversion in our study was dense and extensive adhesions around the gall bladder making dissection very difficult. Out of 38 converted cases 16 patients 42.1% - were converted due to adhesions. This is comparable with result reported by Jeremy et al<sup>11</sup> and Alpnat et al<sup>16</sup> who reported a conversion rate of 34.8% and 40% respectively due to adhesions.

Another cause of conversion in our study was uncontrolled bleeding in the surgical field from cystic duct, gall bladder bed

and hepatic artery, with a conversion rate of 13.1% which is lower than the result by Avgerinious et al who reported the rate of conversion due to hemorrhage 33.3%<sup>15</sup> - this difference may be due to the grown in skills and use of harmonic scrapple by our team.

## CONCLUSION

In summary we found that the main perioperative causes for conversion to open cholecystectomy were dense adhesions around the gall bladder. The male gender, increasing age, history of common bile duct stone removed by previous ERCP, history of previous surgery, are independent risk factors of difficult laparoscopic cholecystectomy.

**Recommendation:** in any difficult situation, a surgeon should seek consultation from a senior colleague and if it is not available the decision to convert to open procedure should be made earlier for the safety of the patient. Evaluation of the risk factors mentioned in our study for conversion from laparoscopic to open cholecystectomy preoperatively helps the surgeons to plan and counsel the patients about the conversion rate.

## REFERENCES

1. Bittner, R .laparoscopic surgery:15 years after clinical introduction. World journal of surgery, 2006 - 30,1190- 203.
2. Reynolds, W. the first laparoscopic cholecystectomy. 2001 - JSLS, 5, 89-94.
3. Shamiyeh, A. and Wayand, W. laparoscopic cholecystectomy : early and late complications and their treatment. Langenbeck's Archives of surgery, 2004 - 389, 164-171.
4. Sicklick, J.K., Camp, M.S., Lillemore, K.D., Melton, G.B., yeo, C.J., campbel, K.A., et al. surgical management of bile duct injuries sustained during laparoscopic cholecystectomy. Annals of surgery, 2005 - 241, 786-95.
5. Tayeb, m., Raza, S.A., Khan, M.R. and Azami, R. conversion from laparoscopic to open cholecystectomy: 2005 - 312-13.
6. Nuri Aydin Kama, M, kologlu, E. Reis, M. Atli and M. Dolapci: Risk score for

- conversion from laparoscopic to open cholecystectomy. *The American journal of surgery* June 2001; vol.181, issue 6, pages 520-25.
7. Singh kuldip and Ohri Ashish: laparoscopic cholecystectomy – is there a need to convert - *J Min Access Surg* 2005 -; 1:59-62.
  8. Lein HH, Huang CS. male gender: risk factor for sever symptomatic choledithiasis -. *World J surg.* 2002 -; 26: 598-601.
  9. Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg.* 2004 - ; 188: 205-211.
  10. Ibrahim S, Hean TK, Ho LS, Ravintharam T, Chye TN, Chee CH. Risk factors for conversion to open surgery in patients undergoing laparoscopic cholecystectomy. *World J Surg.* 2006 -: 30: 1698-1704.
  11. Jeremy M. Lipman MD, Jefer A. Claridge MD et al : preoperative findings predict conversion from laparoscopic to open cholecystectomy. *Surgery* volume 142, Issue 4, October 2007 -:556-65.
  12. Sarli L, Isuco DR, Roncorni L. preoperative endoscopic sphincterotomy and laparoscopic cholecystectomy for management of cholecystocholedocholithiasis -: 10 year experience . *world J Surg* 2003 -; 27: 180-86.
  13. Ammori BJ Davides D, Vezakis A, Larvin M, McMahon MJ. Laparoscopic cholecystectomy , are patient with biliary pancreatitis at increase operation risk - 2003 - 17: 777-80.
  14. Kaafarani HM, Smith TS, Neumayer L, Beger DH, Depalma RG, Itani KM. Trends, outcomes, and predictors of open and conversion to open cholecystectomy in veterans' health Administration hospitals -. *Am J Surg* 2010 -; 200: 32-40.
  15. Avgerinous C, kelgiorgi D, Touloumis Z, Baltatzi L, Dervenis C. one thousand laparoscopic cholecystectomies in a single surgical unit using the “critical view of safety” technique -. *J gastrointis Surg.* 2009 -; 13: 498-503.
  16. Alponat A, Kum CK, Koh BC, Rajnakova A and Goh PM: Predictive factors for conversion of laparoscopic cholecystectomy. *World J Surg* 2007 -; Jul-Aug; 21 16 -;629-33.