

Conversion Rate in Laparoscopic Cholecystectomy: A Review of 300 Cases

Raad S. Al-Saffar*, C.A.B.S; Fadhil A. Al-Janabi**, C.A.B.S; Abbas A. Al-Jubori***, C.A.B.S***

* *department of surgery and gastrointestinal center in Al-Sadur teaching hospital, Al-Najaf, Iraq.*

** *department of surgery in Al-Sadur teaching hospital, Al-Najaf, Iraq.*

*** *department of surgery in Al-Sadur teaching hospital, Al-Najaf, Iraq*

Abstract

Background : Prediction of a difficult laparoscopic cholecystectomy (LC) can help the patient as well as the surgeon to be better prepared for the intra-operative risk and the risk of conversion to open cholecystectomy. The difficult gallbladder is the most common 'difficult' laparoscopic surgery being performed by general surgeons all over the world and the potential one that places the patient at significant risk. We present our experience of 300 cases since September 2007 to December 2009 in a single center with respect to conversion to open cholecystectomy.

AIM: evaluation of difficult laparoscopic cholecystectomy and conversion rate in different 300 cases of cholelithiasis.

Methods: Patients who underwent laparoscopic cholecystectomy (LC) from September 2007 to December 2009 were analyzed. The cases were analyzed in relation to conversion rate to open surgery; factors affecting pulmonary disease were not included in the study.

Results: Out of 300 cases, 52 patients (17.33%) were identified as difficult cases. Laparoscopic cholecystectomy was successfully completed in 295 patients with a completion rate of 98.33%. Laparoscopic procedure had to be converted to the open procedure in 5 patients with a conversion rate of 1.66% of the total LCs performed and 9.6% of the difficult cases. Conversion had been done due to several reasons.

Conclusion: It can be reliably concluded that LC is the preferred method even in the difficult cases. Our study emphasizes that although the rate of conversion to open surgery and complication rate are low in experienced hands the surgeon should keep a low threshold for conversion to open surgery and it should be taken as a step in the interest of the patient rather than be looked upon as an insult to the surgeon.

Key words: conversion, laparoscopy, cholecystectomy.

الخلاصة

المقدمة: إن التنبؤ بصعوبة عملية استئصال المرارة بمنظار البطن يمكن أن يساعد المريض وكذلك الجراح للتحضير لأي خطر ممكن حصوله أثناء العملية أو خطورة التحويل إلى الجراحة المفتوحة لاستئصال المرارة. "المرارة الصعبة" هي الأكثر شيوعاً من بين أسباب "صعوبة الجراحة المنظارية" التي تجرى من قبل الجراحين في العالم والتي تعرض المريض إلى خطورة محتملة.

نحن نعرض خبرتنا في 300 حالة منذ شهر أيلول لسنة 2007 ولغاية شهر كانون الأول لسنة 2009 في مركز واحد (مستشفى الصدر التعليمي في النجف)، مع الأخذ بنظر الاعتبار معدل التحويل إلى الجراحة المفتوحة لاستئصال المرارة.

الطرق: المرضى الذين خضعوا لعمليات استئصال المرارة بمنظار البطن قد تم دراستهم وذلك بالعلاقة خصوصا مع معدل التحويل إلى الجراحة المفتوحة لاستئصال المرارة. أما العوامل التي تؤثر على الجهاز التنفسي لم تشمل بهذه الدراسة.

النتائج: من ضمن 300 حالة، هنالك 52 مريض (17,33%) قد تم تعريفهم واعتبارهم "حالات صعبة". عملية استئصال المرارة بمنظار البطن قد أكملت بنجاح في 295 مريضا مع نسبة إكمال 98,33%. عملية استئصال المرارة بمنظار البطن قد حولت إلى الجراحة المفتوحة في خمسة حالات بنسبة تحويل 1,66% من إجمال الحالات المنظارية، و بنسبة تحويل 9,6% من "الحالات الصعبة". لقد كانت أسباب التحويل متعددة ومختلفة.

الاستنتاج: نستطيع أن نستنتج بثقة بان عملية استئصال المرارة بمنظار البطن هي الطريقة المفضلة حتى في "الحالات الصعبة". إن هذه الدراسة تؤكد بان بالرغم من أن معدل التحويل إلى الجراحة المفتوحة لاستئصال المرارة وكذلك نسبة حصول المضاعفات المحتملة، هي قليلة لدى الجراحين المتمرسين، إلا أن الجراح يجب أن يحتفظ (باعتبة منخفضة) للتحويل للجراحة المفتوحة وان تؤخذ بأنها خطوة لمصلحة المريض لا بأنها إجراء للجراح.

Introduction

Laparoscopic cholecystectomy (LC) has almost replaced open cholecystectomy as the therapeutic modality in the treatment of symptomatic gallstones. The difficult gallbladder is the most common 'difficult' laparoscopic surgery being performed by general surgeons all over the world and the potential one that places the patient at significant risk. A number of published clinical series (1,2,3,4) including this, emphasize the promising role laparoscopy is playing in treating gallbladder disease. In the beginning of LC, patients having acute cholecystitis, empyema, gangrenous gallbladder, cirrhotic patients, and Mirizzi syndrome were contraindication because of high risk of complications and conversion rate.⁽²⁾ After more than 10-12 years of learning and understanding the technique (3), and surgeons gaining more expertise, we thought it is imperative to reassess the feasibility of these complicated cases laparoscopically in terms of conversion rate. Prediction of a difficult laparoscopic cholecystectomy (LC) can help the patient as well as the surgeon to be prepared better for the intra-operative

risk and the risk of conversion to open cholecystectomy. We present our experience of 300 cases since September 2007 to December 2009 in a single center (Al-Sadur teaching hospital, by the same surgical team) with respect to conversion to open cholecystectomy.

Materials and methods

Patients who underwent LC from September 2007 to December 2009 were analyzed. Ultrasonography (USG) was the mainstay for the preoperative diagnosis of gallstone disease (Crade's criteria with common bile duct (CBD) status).⁽⁵⁾ Indications for LC included cholelithiasis and biliary colic, cholecystitis, symptomatic gallbladder polyps, gallstone pancreatitis, calcified gallbladder, large gallstone >2cm.⁽⁶⁾

Our policy has been to take up all the cases which merit cholecystectomy and are fit to undergo laparoscopy. Patients clinically having pain, rigidity, guarding and palpable lump or Phlegmon were taken up for LC once these clinical parameters resolved. Common bile duct stones were suspected preoperatively based on

raised alkaline phosphatase, dilated CBD on USG, stone visible in CBD on USG and history of jaundice. These patients were subjected to preoperative ERCP and after CBD clearance were included in the study and those who failed endoscopic clearance were subjected to open surgery and were not included in the study. We did not subject the patients to intraoperative cholangiography (IOC). The definition of difficult cholecystectomy is not consistent. We defined difficult cholecystectomy as (1) dense adhesions at the triangle of Calot (frozen triangle of Calot prohibiting proceeding laparoscopically without risk), (2) contracted and fibrotic gallbladder, (3) previous abdominal surgery, (4) gangrenous gallbladder, (5) acutely inflamed gallbladder, (6) empyema gallbladder (including Mirizzi syndrome Type II) (7) anatomical variation. The cases were analyzed in relation to conversion rate to open surgery, factors affecting the conversion and completion rate of LC. Patients having absolute contraindications to LC like cardiovascular and pulmonary disease were not included in the study.

Results

Laparoscopic cholecystectomy was performed in 300 patients during September 2007 to December 2009, out of which 36 were males and 264 were females with an average age of 38.6 years (range 16-64 years). Out of 300 cases, 52 patients (17.33 %) were identified as difficult cases. Laparoscopic cholecystectomy was successfully completed in 295 patients with a completion rate of 98.33%. Laparoscopic procedure had to be converted to the open procedure in 5 patients with a conversion rate of 1.66 % of the total LC performed and 9.6%

of the difficult cases. Conversion had to be done due to several reasons (Table - 1). Out of 23 patients who had dense adhesions in the triangle of Calot and unclear anatomy, two patients (8.7%) required conversion to open surgery. A total of 7 patients had contracted and fibrotic gallbladder, of which only one patient (14.28%) had to be converted. Out of 8 patients having acutely inflamed gallbladder, no patient had to be converted. Only one patient (20%) having empyema of gallbladder out of 5 patients had to be converted. Gangrenous gallbladder was the reason for difficult LC in two patients, but no one needed to be converted. There were six patients who have dense adhesions due to previous abdominal surgery, and LC was completed in all of them. Only one conversion was enforced due to CBD injury which was identified intraoperatively, due to anatomical variation and managed in the same sitting. Troublesome bleeding during dissection or during gallbladder removal from its bed occurred in eleven patients, which was managed successfully and no one needed conversion. It has been our policy to keep a drain after LC for 24 h. Four patients had increased postoperative bile leak, which spontaneously stopped within a period of 10 days, however, the source of the bile leak could not be identified. We categorize them as minor leak either from the gallbladder bed or from accessory cystic duct (Strasberg Type A). There was no mortality. Conversions were more in the first 150 cases as compared to the next 150 (Table 2). Operating time varied from 30 min to 1.5 h (mean 40 min). Age, sex, complicated gallbladder, and most importantly surgeon's experience were found as important determinants of successful outcome.

Table 1. Showing causes and number of difficult cases

Difficult cholecystectomy causes	number of cases	conversion rate
Dense adhesions of calot's triangle	23	2 (8.7%)
Contracted gallbladders	7	1 (14.28%)
Acutly inflammed gallbladder	8	0
Gangrenous gallbladder	2	0
Empyema of gallbladder	5	1 (20%)
Previous abdominal surgery	6	0
Anatomical variation	1	1(100%)
total	52	

Table 2. Showing total number of cases divides in 50 cases/300 chronologically

Number of cases	Number of difficult cases	conversion rate
0 ---- 50	14	2 (7.42%)
50 ---- 100	7	1 (7.42%)
100 ---- 150	9	1 (5.77%)
150 ---- 200	10	1 (5.2%)
200 ----250	7	0
250 ---- 300	5	0
Total	52	

Discussion

Philip Mouret in 1987 was the first to remove the gallbladder successfully through an unmagnified mechanical rigid pipe without doing laparotomy. Dubois is credited for popularizing LC.⁽⁷⁾ Initially, the complication rate with LC was high but as experience has grown, it has reached a remarkably low level at 2.0-6.0%.⁽⁶⁾ Although the incidence is still higher than the incidence after open surgery. Since 1990 many surgeons have attempted LC with reasonable success in difficult cases.^(2,3,4,8) Their results indicated that extensive experience with both open and laparoscopic biliary tract surgery is the most important ingredient of a successful outcome in the setting of difficult cases. The clinical profile of a patient can predict a difficult gallbladder surgery. Based on our experience we feel that even in a patient anticipated to have a difficult gallbladder one can complete the procedure laparoscopically. Hence our policy has been to take up all the cases fit to undergo laparoscopy for

LC. Conversion to open surgery is not visualized as a complication, rather a matter of sound surgical judgment as patient safety is of foremost importance. We had to modify our technique by (a) placing additional trocars to facilitate liver and duodenal retraction, (b) by aspirating the gallbladder through the 5 mm subcostal trocar, or (c) by using a 10 mm toothed grasper for grasping thick walled gallbladders. In cases with acute inflammation of the gallbladder, a peanut swab held in a grasper used for blunt dissection allowed planes to be opened up with greater ease and safety. Aspiration of the distended gallbladder allows confirming the diagnosis and at the same time makes the handling of the gallbladder easier during the subsequent dissection. In our experience the overall conversion rate was 1.66% of the total LCs performed and 9.6% of the difficult cases, which is in accordance with the literature (2-9%).⁽⁹⁾ Dense adhesions at the triangle of Calot's was the most common reason for difficult LC, with conversion rate (8.7%) to

open surgery⁽⁹⁾. The highest rate of conversion was in cases of empyema of gallbladder (20%). Only one conversion was enforced due to CBD injury which was identified intraoperatively and managed in the same sitting. Troublesome bleeding during dissection or during gallbladder removal from its bed occurred in eleven patients, which was managed successfully and no one need conversion. Few patients having increased bile leak postoperatively were managed conservatively and the leak ceased spontaneously within 10 days. We attribute our low rate of conversion to the fact that we have been operating with the same team and adhering to the basic principles of laparoscopic surgery. Although the rate of conversion in patients with empyema of gallbladder was 20%, we recommend LC in acute (complicated) cholecystitis where feasible as has been reported in the literature.⁽¹⁰⁾ We still believe from our experience that within 72 h of symptoms the tissue planes are edematous and inflamed but are easier to dissect, having no adhesions at all. But after 72 h, the tissue becomes more friable and becomes dangerous and risky to dissect till 3-4 weeks time when inflammation subsides and fibrosis sets in. Although we took up the patients for surgery even after 72 h in 22 cases and could complete them without conversion the intraoperative level of difficulty was high and it was risky and the mean operative time was much longer (65 Vs 40 min).

Most conversions happened after simple inspection or a minimum dissection, and the decision to convert should be considered as a sign of surgical maturity rather than a

failure. Conversion should be opted for in the beginning and at the time of recognition of a difficult dissection rather than after the occurrence of complication.⁽¹¹⁾ It is vital for the surgeons and patients to appreciate that the decision to go for conversion is not failure but rather implies safe approach and sound surgical judgment. It is, therefore, mandatory to explain to the patients about the possibility of conversion to open technique at the time of taking consent for LC⁽¹²⁾. In conclusion, LC is a safe and minimally invasive technique, with only low conversion rate and the commonest cause of conversion in this study was the presence of dense adhesions at Calot's triangle. Table (3) shows comparison of conversion rate reported by different studies in different places in the world.

Conclusion

It can be concluded that LC is the preferred method even in difficult cases. Our study emphasizes that although the rate of conversion to open surgery and the complication rate are low in experienced hands the surgeon should keep a low threshold for conversion to open surgery and it should be taken as a step in the interest of the patient rather than be looked upon as an insult to the surgeon.

References

1. Cameron JC, Gadacz TR. Laparoscopic cholecystectomy. *Ann Surg* 1991;213:1-2.
2. Kum CK, Goh PMY, Isaac JR, et al. laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 1994;81:1651-4.
3. Rattner DW, Ferguson C, Warshaw AL. Factors associated with successful laparoscopic cholecystectomy for acute cholecystitis. *Ann Surg* 1993;217:233-6.

Table 3. Comparison of Rates of Conversion in world literatures

Study:name of author	year	place	no. of cases	conversion rate
Fletcher et al (13)	1992	AUSTRALIA	186	3%(11% in difficult cases)
-Perissat J. (14)	1993	FRANCE	6110	3%(8% in difficult cases)
Lee FT et al(15)	1994	USA	587	6%
Sanabria et al (16)	1994	CANADA	628	5%(10% In difficult cases)
Margret et al (17)	1995	UK	443	10%
Vecchio et al (18)	1998	USA	114005	2.2%
Thompson et al (19)	2003	ITALY	1360	1.8%
-Kologlu et al (20)	2004	TURKEY	1000	3.2%(4.8% in difficult cases)
Guraya et al(21)	2004	Saudi Arabia	549	2.9%
Nachnani et al (22)	2005	INDIA	105	11.4%
Kuldip et al (23)	2005	INDIA	6147	0.36%(1.66% in difficult cases)
Tarcoveanu(25)	2005	Romania	6985	3.2%
Lim et al (26)	2006	Singapore	149	11.5%
Butt et a(27)	2006	Lahore	300	4%
Ishizaki et al (28)	2006	JAPAN	1179	5.3%(10.6% in difficult cases)
-Bakos et al (29)	2008	SLOVAKIA	1535	5.7%
Waseem et al(30)	2008	PAKISTAN	216	4%
Rosita et al (31)	2009	IRAN	793	9%

4. Zucker KA, Bailey RW, Flowers J. Laparoscopic management of acute and chronic cholecystitis. *Surg Clin North Am* 1992;2: 1045-67.
5. Crade M, Taylor KJ, Rosenfield AT, et al. Ultrasonic imaging of pericholecystic inflammation. *J Am Med Ass* 1980;244:708-9.)
6. Gadacz TR. Update on laparoscopic cholecystectomy, including a clinical pathway. *Surg Clin North Am* 2000;80:1127-45.
7. Dubois F, Icard P, Berthelot G, et al. Coelioscopic cholecystectomy. Preliminary report of 36. *Ann Surg* 1990;211:60-4.
8. Faber JM, Fagot H, Domergue J, et al. Laparoscopic cholecystectomy in complicated cholelithiasis. *Surg Endosc* 1989;3:1198-201.
9. Rosen M, Fred B, Jeffery P. Predictive factors for conversion of laparoscopic cholecystectomy. *Am J Surg* 2002;184:254-8.
10. WK, Sheikh Z, Nixon SJ, Paterson-Brown S. Role of laparoscopic cholecystectomy in the early management of acute gallbladder disease. *Br J Surg* 2005; Online Pub: March 18.
11. Juliane Bingener-Casey M.D., Melanie L. Richards M.D., William E. Strodel M.D., Wayne H. Schwesinger and Kenneth R. Sirinek M.D., Ph.D. *Journal of Gastrointestinal Surgery* Volume 6, Issue 6, November-December 2002, Pages 800-805
12. Francesco Domenico Capizzi, Luciano Fogli, Mauro Brulatti, Sergio Boschi, Marco Di Domenico, Vito Papa, Patrizio Patrizi. Conversion Rate in Laparoscopic Cholecystectomy: Evolution from 1993 and Current State *Journal of Laparoendoscopic & Advanced Surgical Techniques*. April 2003, 13(2): 89-91. doi:10.1089/109264203764654704.
13. D. R. Fletcher, R. M. Jones, B. O'Riordan and K. J. Hardy Laparoscopic cholecystectomy for complicated gallstone disease *Surgical Endoscopy* Springer New York,1992
14. Perissat J. Laparoscopic cholecystectomy: the European experience. *Am J Surg*. 1993 Apr;165(4):444-9. Links
15. Hutchinson H, Traverso LW, Lee FT- Laparoscopic cholecystectomy. Do preoperative factors predict the need to convert to open?, *Surg Endosc*. 1994 Aug;8(8):875-8; discussion 879-80.

16. Sanabria JR, Gallinger S, Croxford R, Strasberg SM, Risk factors in elective laparoscopic cholecystectomy for conversion to open cholecystectomy. *J Am Coll Surg.* 1994 Dec;179(6):696-704.
17. Margaret F. Fay, Risk Factors in Elective Laparoscopic Cholecystectomy for Conversion to Open Cholecystectomy *AORN*, Volume 61, Issue 2, February 1995, Pages 425-426
18. Vecchio R, Macfadyen BV, Latteri S. Laparoscopic cholecystectomy: Analysis of 114,005 cases of United States series. *Int Surg* 1998;83:215-9.
19. M. H. Thompson and J. R. Benger Cholecystectomy, Conversion and Complications, *HPB Surg.* 2000 August; 11(6): 373-378.
20. Kologlu M, Tutuncu T, Yuksek YN, Gozalan U, Daglar G, Kama NA. Using a risk score for conversion from laparoscopic to open cholecystectomy in resident training. *Surgery.* 2004 Mar;135(3):282-7.
21. Guraya SY, Khairy GEA, Murshid KR. Audit of laparoscopic Cholecystectomy: 5 years experience in a University Hospital. *Ann King Edward Med Coll* 2004;10:9-10.
22. Nachnani Jagdish, Supe Avinash, Pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters, *Indian Journal of Gastroenterology*, Year : 2005 | Volume : 24 | Issue : 1 | Page : 16-18
23. 23- Kuldip Singh, Ashish Ohri, Laparoscopic cholecystectomy - Is there a need to convert?, *journal of minimal access surgery*, Year : 2005 | Volume : 1 | Issue : 2 | Page : 59-62
24. Dholia KM, Memon AA, Sheikh MS. Laparoscopic cholecystectomy: Experience of 100 cases at a teaching hospital of Sindh. *J Liaquat Univ Med Health Sci* 2005; 4: 105-8.
25. Tarcoveanu E, Niculescu D, Georgescu S. Conversion in laparoscopic cholecystectomy. *Chir-urgie.*2005;100:437-44.
26. Lim Han Chau, Chung Ngai Tang, Ping Yiu Ha, Shek Yuen Kwok, Kwok Kay Yau, Michael Ka Wah Li, Wing Tai Siu, Anthony Chi Ngai Li Laparoscopic Cholecystectomy for Acute Cholecystitis: The Evolving Trend in an Institution, *Asian Journal of Surgery*, Volume 29, Issue 3, July 2006, Pages 120-124.
27. Butt AU, Sadiq I. Conversion of laparoscopic to open cholecystectomy-six years experience at Shalamar Hospital , Lahore. *Ann King Edward Med Coll* 2006;12:536-8.
28. (Ishizaki Y, Miwa K, Yoshimoto J, Sugo H, Kawasaki S. Conversion of elective laparoscopic to open cholecystectomy between 1993 and 2004. *Br J Surg.* 2006 Aug;93(8):905-6.
29. Bakos E. ,Dubaj M. ,Prekop I. ,Jankovic T. ,Conversion in laparoscopic cholecystectomy, *Bratisl Lek Listy*,2008;109(7),317-319.
30. Waseem Memon, Tariq Wahab Khanzada, Abdul Samad, M. Hussain Laghari, Laparoscopic cholecystectomy: conversion rate and its causes at Isra University Hospital, Hyderabad, (*Rawal Med J* 2008;33:159-161).
31. Changiz Gholipour1, Mohammad Bassir Abolghasemi Fakhree- Rosita Alizadeh Shalchi Prediction of conversion of laparoscopic cholecystectomy to open networks surgery with artificial neural, *BMC Surgery* 2009, 9:13doi:10.1186/1471-2482-9-13