

Reasons for Conversion of Laparoscopic Cholecystectomy to Conventional Cholecystectomy, in a Tertiary Care Hospital

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Abstract

Objective: To determine and assess the common causes of conversion of laparoscopic cholecystectomy to conventional cholecystectomy.

Methods: A cross sectional hospital based study was conducted in Surgical Unit-III, Abbasi Shaheed Hospital and Karachi Medical & Dental College. Overall 197 patients were selected through consecutive non probability sampling. Patients included were those with symptomatic cholelithiasis including acute cholecystitis, chronic cholecystitis and asymptomatic gall stones in which ultrasound abdomen demonstrated cholelithiasis with normal common bile duct. Written consent was taken from each admitted patients and assessed clinically and routine investigations (CBC, ESR, RBS, Urea, Creatinine, Liver Function test, Hepatitis Profile, X-ray chest, ECG and ultrasonography of abdomen) were done. Laparoscopic cholecystectomy was done under general anesthesia.

Results: Laparoscopic cholecystectomy was successful in 188 patients (95.43%) while in 9 patients (4.59%) laparoscopic cholecystectomy was converted to open cholecystectomy. Conversion was because of haemorrhage in one patient (0.51%), Common bile duct injury in one patient (0.51%), non-visualization of gall bladder in one patient (0.51%), shortage of time for laparoscopic cholecystectomy in two patients (1.02%), cholecystoduodenal fistula in two patients (1.02%) while two patients (1.02%) were converted to open procedure due to carcinoma gall bladder.

Conclusion: The conversion rate was five percent from laparoscopic cholecystectomy to open cholecystectomy hence laparoscopic cholecystectomy is a safe procedure. The knowledge of common reasons of conversion in our tertiary hospital will help to overcome these factors in future, which benefit in reducing cost and improve patients wellbeing.

Keywords: Conventional cholecystectomy, laparoscopic cholecystectomy, cholecystectomy, open cholecystectomy, cholelithiasis and cholecystitis.

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Introduction

Gall stone disease is a common health problem and laparoscopic cholecystectomy has become the gold standard of surgical treatment for the past two decades, reason is, patients have

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shorter hospital stay, less postoperative pain and good cosmesis¹. During laparoscopic cholecystectomy several complications have been reported², i.e. complications related to anaesthesia, difficult peritoneal access, pneumoperitoneum, surgical exploration, thermocoagulation, haemorrhage and several other factors can be the reasons for conversion from laparoscopic to open cholecystectomy³. In recent researches, these factors have been divided into three types; first type can be patient related, which is difficult anatomy, gallbladder severely adhered to liver due to which excessive bleeding occurs during cholecystectomy, second type is

surgeon related such as level of expertise and the third type is related to equipment such as equipment and electricity failure⁴. Conversion rate has been reported in different studies about 1.5-19%⁵. It has been observed that there is strong association between surgeon expertise, patient selection and quality of instrument to the conversion rate⁶. In under developed countries like Pakistan, there is a steep learning curve for this kind of surgery so, initially laparoscopic surgeons should be trained in minimal skill lab and then under supervision of trained laparoscopic surgeon for some period⁷. It is important to note that conversion should not be thought as a technical problem but it is a sensible decision on behalf of the surgeon and it should also not be assumed as lesser surgical ability. Now a days, cholecystectomy is safely done laparoscopically⁸. Major difference occurs in recovery as a result of increased rate of post-operative complication and longer hospital stays due to conversion of laparoscopic cholecystectomy into open cholecystectomy⁸ since laparoscopic technique has been introduced to the surgical field many surgeons did researches at their respective hospitals to measure different complications and conversion rate from laparoscopic cholecystectomy to open cholecystectomy so that this procedure could become more safe and cost effective. Through this study, we tried to have determined the rate and causes of conversion from laparoscopic to open cholecystectomy and the results were compared with those reported internationally.

Patients and Methods

This cross sectional hospital based study was conducted in Surgical Unit-III, Abbasi Shaheed Hospital and Karachi Medical & Dental College, Karachi. Although the sample size at prevalence of the problem 15% was 196 but we have decided to collect the data of all the patients admitted in one year and that were 197. Through consecutive non probability sampling, we have included patients with symptomatic cholelithiasis including acute cholecystitis, chronic cholecystitis and asymptomatic gall stones in which ultrasound abdomen demon-

strated cholelithiasis with normal common bile duct were included while all those patients who had positive hepatitis B or C, portal hypertension, gallbladder malignancy, empyema of gallbladder and severe cardiopulmonary disease or any other anaesthesia risk were excluded from this study. All patients were admitted and assessed clinically and routine investigations complete blood count (CBC), erythrocyte sedimentation rate (ESR), random blood sugar (RBS), urea, creatinine, liver function test, hepatitis profile, X-ray chest, electrocardiogram (ECG) and ultrasonography of abdomen were done before admission and anaesthesia assessment taken for elective cases while for acute cases these investigations were done immediately after admission. Patients were informed and written consent was taken about the study. Under general anaesthesia laparoscopic cholecystectomy was done with four port technique, pneumoperitoneum was created with the help of carbon dioxide, or gastric tube passed in all patients to avoid gastric dilatation. Cystic duct and cystic artery were identified after exposure of calot triangle, cystic duct was clamped by liga clips 400 and cystic artery ligated with liga clips 300. Gallbladder was removed from liver bed from neck to fundus in most of the cases, otherwise retrograde method (removal from fundus to neck) was used if required in few of the cases, bleeding was secured with the help of monopolar diathermy of the inferior surface of liver from where gallbladder was removed and it was delivered through umbilical 10mm port. Drain was placed in sub hepatic space in few of the cases where there was a doubt of bleeding or bile leakage postoperatively. Removal of drain was done after no significant drainage was observed within 24 hrs and patients were discharged on second postoperative day according to hospital protocol and followed up after one week. Results were analyzed on SPSS 16.0. As it was a cross sectional hospital based study, only frequencies and percentages were calculated for all the qualitative variables. However mean and SD was calculated for quantitative variable like age.

Results

In this study total patients (n=197) were included for laparoscopic cholecystectomy in which 20 patients (10.15%) were male and 177 patients (89.85%) were female the male to female ratio was 1:9 majority of the patient were between 21 to 40 years, 78 patients (39.6%) were between 41 to 60 years. Unmarried patients were 24 (12.2%) while 173 patients (87.8%) were married. Patients with acute condition were 28 (14.2%) and were admitted through emergency while 169 patients (85.8%) were in chronic condition and admitted throughout patient department. Out of 197 patients 32 (16.2%) patients were diabetic, 43 patients (21.8%) were hypertensive, 16 patients (8.1%) were jaundiced having total bilirubin >1gm/dl (Table 1). There were multiple gallstones in 158 patients (80.2%) while 39 patients (19.8%) had single gallstone. Fatty liver was found in 31 patients (15.7%) and only 5 patients (2.5%) had cirrhotic liver (Table 2). Surgery lasted for less than one hour in 172 patients (87.3%), in 21 patients (10.66%) surgery lasted for 2 hours while only in 04 patients (2.03%) it prolonged to more than two hours. Surgery was done by professor or associate professor in 140 patients (71.1%), 53 patients (26.9%) were operated by assistant professors and senior registrars while only 4 patients (2.01%) were operated by residents under supervision. Laparoscopic cholecystectomy succeeded in 188 patients (95.43%) while only in 09 patients (4.57%) laparoscopic cholecystectomy was converted to open cholecystectomy. In one patient (0.51%) conversion was because of haemorrhage, one patient (0.51%) was converted because of common bile duct injury, one patient (0.51%) was converted due to non-visualization of gall bladder, two patients (1.02%) were converted due to shortage ofoperational theatre time, two patients (1.02%) were converted due to cholecystoduodenal fistula while two patients (1.02%) were converted due to carcinoma gall bladder (Table 3).

Discussion

Laparoscopic cholecystectomy is the gold standard treatment for symptomatic and asymptomatic gallstones but sometimes conversion is required from laparoscopic cholecystectomy to open cholecystectomy for safety of the patient⁹. In Italy, a study was done by Licciardello et al in 2013 to identify the predictive factors of conversion from laparoscopic cholecystectomy to open in elective as well as in emergency cases and he showed that the increasing age, acute cholecystitis, comorbidities, deranged liver function test and inexperienced surgeons were the main factors¹⁰. However in this study, the causes for conversion included haemorrhage, anatomical variation, iatrogenic injury to the organs and duration. In our study, about 90% patients were female and only 10% were male, while in the previously mentioned study by Licciardello, et al, it was around 60% in females and 40% males. One study showed that male patients had an increased rate of conversion¹¹ while another study done by Tosun A showed that gender did not affect the conversion rate¹².

Most of our patients were married and only 12% were unmarried which is similar to other studies done in different countries¹³. Majority of the patients in our study were admitted electively and only 14% were admitted through the emergency department where they were treated initially conservatively then followed by laparoscopic cholecystectomy and this is somewhat similar to other studies¹⁰, while a study done in Germany by Ambe P et al. indicated that immediate laparoscopic cholecystectomy in acute cholecystitis within 24 hours, is not safer than when done after 72 hours of treatment¹³. Croo A et al did a study that showed that early laparoscopic cholecystectomy within 5 days of start of symptoms of acute cholecystitis is safer¹⁴ and this concept was also favoured by Yoh T. study and others¹⁵. About 16% patients in this study were diabetic (16% females and 15% males) in which 6.2% were converted into open cholecystectomy and therefore diabetes has some role for conversion to open cholecystectomy as also shown by a

Table 1. Demographic and co-morbid characteristics of the patients

Variable	N=197	Percentage %
Age (Yrs)		
<20	13	6.6
21-40	89	45.2
41-60	78	39.6
60+	17	8.6
Gender		
Male	20	10.2
Female	177	89.8
Marital status		
Married	173	87.8
Unmarried	24	12.2
Comorbidity		
Diabetes		
YES	32	16.2
NO	165	83.8
Hypertension		
YES	43	21.8
NO	154	78.2
Jaundice		
Bilirubin> 1gm YES	16	8.1
Bilirubin<1gm NO	181	91.9

Table 2. Sonographic Findings of the patients.

Variable	N=197	Percentage %
Clinical findings1		
Multiple gallstones	158	80.2
Single gallstone	39	19.8
Clinical findings2		
Fatty liver	31	15.7
Cirrhotic liver	5	2.5
Normal	161	81.9

Table 3. Surgeon's status and outcome of the surgery with reasons for conversion from laproscopic surgery to open surgery.

Variable	N=197	Percentage %
Surgery done by		
Professor & Associate professor	140	71.1
Assistant & Senior registrar	53	26.9
Resident medical officer	4	2.0
Duration of surgery		
<1hr	172	87.3
Up to 2 hrs.	21	10.7
>2hrs	4	2.0
Successful Rate	188	95.5
Conversion Rate	9	4.59
Reasons for conversion		
Due to cholecystoduodenal fistula	2	1.02
Carcinoma gall bladder	2	1.02
Shortage of O.T time	2	1.02
Haemorrhage	1	0.51
Common bile duct injury	1	0.51
Non visualization of gall bladder	1	0.51

study done by Costatini R in Italy¹⁶. Multiple gall stones were present in 80% of the cases while only 20% having single gall stone in our study but conversion may be because of a single large stone in gall bladder as shown by a study done in UK by Banigo A¹⁷. Jaundice was present in 8% of our patient and most of them were admitted through emergency in acute conditions and it is associated with the conversion to some extent¹⁸. Cirrhosis of liver is not a contraindication to laparoscopic cholecystectomy as about 2.5% of our patients were cirrhotic and no conversion was done in them as shown by other studies as well¹⁹. The duration of surgery was less than 60 minutes in most of the cases in both gender and it was only prolonged to more than two hours when conversion required while in some studies the duration of surgery was more than 60 minutes for laparoscopic cholecystectomy alone²⁰ and another study showed that gender affect the duration of surgery and male gender has prolong surgery time²¹. Abelson TS et al did a study in New York in 2011²² in which he showed that trained laparoscopic surgeons have lower rate of conversion and shorter operating time as compared to untrained laparoscopic surgeons which is similar to our study results where most of the surgeries done by trained senior surgeons and so conversion rate was minimal i.e. 4.6%, while another study done by Minutolo V. in Italy mentioned that conversion rate was higher in early laparoscopic cholecystectomy as compared to delayed laparoscopic cholecystectomy in acute Cholecystitis²³. The causes of conversion in our study was haemorrhage in one patient, common bile duct injury in one patient, contracted small gall bladder in one patient, cholecystoduodenal fistula in two patients, growth (carcinoma) in gall bladder in two patients while two patients were converted due to shortage of operation theater time but Kaplan D²⁴. In USA done a study in 2012 where he showed the causes of conversion were mainly common bile duct injury, vascular injury and gut injury while other studies showed the main reason for conversion were intraoperative bleeding and common bile duct injury^{11,25} and in other study the main reason for conversion was dense adhesion²⁶ and in some

study reasons were different²⁷. Over all conversion rate from laparoscopic cholecystectomy to open cholecystectomy in different studies is 5-15% while it is only 4.5% in our study.

After having this research results we recommend that no case should be converted just due to short of operation theater timings, staff should be informed before every laparoscopic cholecystectomy case that they might have to stay for some extra timings for procedure to finish. In our study two cases of carcinoma were selected for laparoscopic cholecystectomy whereas no carcinoma case should be taken in for laparoscopic cholecystectomy so that the rate of conversion should be relieved. This study was done in a single hospital where mostly cases done by seniors and professor, therefore the rate of conversion was so small. In other setting where junior surgeons are also doing the laproscopic procedure, the rate of conversion may be different.

Conclusion

The conversion rate was at minimal and hence laparoscopic cholecystectomy is safer than open procedure. The knowledge of common reasons of conversion in our tertiary hospital will help to overcome these factors in future, which benefit in reducing cost and to improve patients wellbeing.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study.

References

1. Bittner R. Laparoscopic surgery: 15 years after clinical introduction. *World J Surg* 2006;30:1190-203.
2. Yi F, Jin WS, Xiang DB, Sun GY, Huaguo D. Complications of laparoscopic cholecystectomy and its prevention: a review and experience of 400 cases. *Hepatogastroenterology* 2012;59:47-50.
3. Volkan G, Marlen S, Gokhan C, Bascenken SI, Erverdi N, Gurel M, et al. What necessitates the conversion to open cholecystectomy? A retrospective analysis of 5164 consecutive laparoscopic. *Clinics (Sao Paulo)* 2011;66:417-20.

4. Rashid T, Naheed A, Farooq U, Barkat N. CONVERSION OF LAPROSCOPIC CHOLECYSTECTOMY INTO OPEN CYSTECTOMY: AN EXPERIENCE IN 300 CASES. *J Ayub Med Coll Abbottabad* 2016;28:116-9.
5. Livingstone EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg* 2004;188:205-11.
6. Nair RJ, Dunn DC, Fowler S, McCloy RF. Progress with cholecystectomy: improving results in England and Wales. *Br J Surg* 1997;84:1396-8.
7. Ali SA, Soomro AG, Mohammad AT, Jarwar M, Siddique AJ. Experience of Laparoscopic Cholecystectomy During A Steep Learning Curve at A University Hospital. *J Ayub Med Coll Abbottabad* 2012;24:27-9.
8. Shamim M, Memon A, Bhutto A. Reasons of conversion of laparoscopic to open cholecystectomy in a tertiary care institution. *J Pak Med Assoc* 2009;59:456.
9. Sajid MT, Hussain SM, Bashir RA, Mustafa QA, Ahmed M, Halim A, et al. Laparoscopic cholecystectomy: experience at a tertiary level hospital. *J Ayub Med Coll Abbottabad* 2014;26:225-9.
10. Licciardello A, Arena M, Nicosia A, Di Stefano B, Cali G, Arena G, et al. Preoperative risk factors for conversion from laparoscopic to open cholecystectomy. *Eur Rev Med Pharmacol Sci* 2014;18:60-8.
11. Kamran K, Afridi ZU, Muqim RU, Khalil J. Does sex affect the outcome of laparoscopic cholecystectomy? A retrospective analysis of single center experience. *Asian J Endosc Surg* 2013;6:21-5.
12. Kim MS, Kwon HJ, Park HW, Park JY, Chung EC, Park HJ, et al. Preoperative prediction model for conversion of laparoscopic to open cholecystectomy in patient with acute cholecystitis: based on clinical, laboratory, and CT parameters. *J Comput Assist Tomogr* 2014;38:727-32.
13. Ambe P, Weber SA, Christ H, Wassenberg D. Cholecystectomy for acute cholecystitis. How time-critical are the so called "golden 72 hours" Or better "golden 24 hours" and "silver 25-72 hour" A case control study. *World J Emerg Surg* 2014;16:9:60.
14. Croo A, De Wolf E, Boterbergh K, Vanlander A, Peeters H, Troisi RI, et al. Laparoscopic cholecystectomy in acute cholecystitis: support for an early interval surgery. *Acta Gastroenterol Belg* 2014;77:306-11.
15. Yoh T, Okamura R, Nobuto Y, Wada S, Nakamura Y, Kato T, et al. Timing of laparoscopic cholecystectomy for mild and moderate acute cholecystitis. *Hepatogastroenterology* 2014;61:1489-93.
16. Costantini R, Caldaralo F, Palmieri C, Napolitano L, Aceto L, Cellini C, et al. Risk factors for conversion of laparoscopic cholecystectomy. *Ann Ital Chir* 2012;83:245-52.
17. Banigo A. Huge gallstone complicating laparoscopic cholecystectomy. *BMJ Case Rep* 2013.
18. Alievlu G. [Risk factors of conversion to laparotomy during the laparoscopic cholecystectomy]. *Khirurgiia (Mosk)* 2013:71-4.
19. McGillicuddy JW, Villar JJ, Rohan VS, Bazaz S, Taber DJ, Pilch NA, et al. Is cirrhosis a contraindication to laparoscopic cholecystectomy? *Am Surg* 2015;81:52-5.
20. Pariani D, Fontana S, Zetti G, Cortese F. Laparoscopic cholecystectomy performed by residents: a retrospective study on 569 patients. *Surg Res Pract* 2014.
21. Bazoua G, Tilston MP. Male gender impact on the outcome of laparoscopic cholecystectomy. *JLS* 2014;18:50-4.
22. Abelson JS, Afaneh C, Rich BS, Dakin G, Zarnegar R, Fahey TJ, et al. Advanced laparoscopic fellowship training decreases conversion rates during laparoscopic cholecystectomy for acute biliary diseases: A retrospective cohort study. *Int J Surg* 2014;13:221-6.
23. Minutolo V, Licciardello A, Arena M, Nicosia A, Di Stefano B, Cali G, et al. Laparoscopic cholecystectomy in the treatment of acute cholecystitis: comparison of outcomes and costs between early and delayed cholecystectomy. *Eur Rev Med Pharmacol Sci* 2014;18:40-6.
24. Kaplan D, Inaba K, Chouliaras K, Low GM, Benjamin E, Lam L, et al. Subtotal cholecystectomy and open total cholecystectomy: alternatives in uncomplicated cholecystitis. *Am Surg* 2014;80:953-5.
25. Karakayali FY, Akdur A, Kirnap M, Harman A, Ekici Y, Moray G. Emergency cholecystectomy vs percutaneous cholecystostomy plus delayed cholecystectomy for patients with acute cholecystitis. *Hepatobiliary Pancreat Dis Int* 2014;13:316-22.
26. Sultan AM, El Nakeeb A, Elshehawy T, Elhemaly M, Elhanafy E, Atef E. Risk factors for conversion during laparoscopic cholecystectomy: retrospective analysis of ten years' experience at a single tertiary referral centre. *Dig Surg* 2013;30:51-5.
27. Suliman E, Palade R. Laparoscopic cholecystectomy for treating acute cholecystitis - possibilities and limitations. *Chirurgia (Bucur)* 2013;108:32-7.
28. Asai K, Watanabe M, Kusachi S, Matsukiyo H, Saito T, Kodama H, et al. Risk factors for conversion of laparoscopic cholecystectomy to open surgery associated with the severity characteristics according to the Tokyo guidelines. *Surg Today* 2014;44:2300-4.