



Short Communication

Frequency of Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy in a Low-Middle-Income Country

Nazish Iftikhar^{1*}, Maida Naeem², Shireen Sabir Ansari³, Abdul Raafay Shaikh⁴

¹Consultant, Agha Khan University Hospital, Karachi, Pakistan

²Registrar, Civil Hospital, Karachi, Pakistan

³Senior Registrar, Bahria University of Health Sciences, PNS Shifa Hospital, Karachi, Pakistan

⁴Research Associate, Tabbha Heart Institute, Karachi, Pakistan

***Corresponding author:** Nazish Iftikhar, Consultant, Agha Khan University Hospital, Karachi, Pakistan

Citation: Iftikhar N, Naeem M, Ansari SS, Shaikh AR (2023) Frequency of Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy in a Low-Middle-Income Country. J Community Med Public Health 7: 356. DOI: <https://doi.org/10.29011/2577-2228.100356>

Received Date: 09 August, 2023; **Accepted Date:** 16 August, 2023; **Published Date:** 21 August, 2023

Introduction

Worldwide, gallstones are a common disease with a prevalence of 10-15% in the developed world and 16% in Pakistan [1]. Risk factors for this condition are either genetic or environmental and lifestyle factors such as obesity and metabolic disease play a big role. Symptomatic gallstones can lead to complications hence usually prompt treatment, which is most often surgical [2].

Laparoscopic Cholecystectomy (LC) is the most common minimally invasive procedure in general surgery and the preferred method of surgical intervention in patients with cholelithiasis due to shorter hospital stay times, fewer complications and improved cosmesis [3]. Open Cholecystectomy (OC) is preferred where LC is not available or if there is significant risk of iatrogenic injury especially to the common bile duct from LC. Both of these are safe in their own right but conversion from laparoscopic to open cholecystectomy can lead to injury, post-operative complications and a longer hospital stay [4]. The rate of conversion ranges from 4.6-20% [5].

Risk factors for conversion in patients include maleness, obesity and history of previous abdominal surgery. Intra-operatively conversion is most frequently observed in patients with dense adhesions [6]. Patients selected for LC require pre-operative assessment for identification of factors that may lead to

conversion. This would minimize the need for conversion and help identify patients who should be selected for OC from the start. This study will seek to identify the frequency of conversion of LC into OC and the patient factors contributing to this pre-operatively and causes intra-operatively, and compare this to similar settings in the region in order to highlight changes needed to improve patient safety and to allow for better pre-operative decision making.

Materials and Methods

This descriptive, cross-sectional study was conducted at the Department of Surgery, Dr. Ruth K. M. Pfau Civil Hospital Karachi, from April 2021 till October 2021 for a period of six months. Willing patients of either gender in the age bracket of 18-70, presenting with symptomatic gallstones in the outpatient or emergency department indicated for LC, were included in this study. The exclusion criteria were gallbladder malignancies, polyps, or perforation and patients with a prior history of ERCP (endoscopic retrograde cholangiopancreatography).

A standard pre-designed structured questionnaire was used to record the findings. Demographic data recorded included age, gender, residence, occupation, socioeconomic status. Anthropometric measurements included height (with shoes), weight (clothed) and body mass index. Clinical features included history of previous abdominal surgery, diabetes mellitus, Common Bile Duct (CBD) diameter, pre-operative alanine transaminase

(ALT), alkaline phosphatase (ALP), aspartate aminotransferase (AST), gamma-glutamyl transferase (GGT), total leucocyte count (TLC), total bilirubin, number of stones in the gallbladder, size of stones and presenting symptoms.

The study was conducted after approval from the College of Physicians and Surgeons Pakistan. Written informed consent was taken from all participating patients wherein the purpose, associated risks and benefits of the study and laparoscopic cholecystectomy were briefed to them. Patient confidentiality was ensured throughout the study and their identity concealed.

Patients presenting to the OPD with symptomatic gallstones were recommended LC only after ultrasonographic confirmation, and were admitted a day before the planned procedure at which time their laboratory investigations (i.e. complete blood count and liver function tests) were conducted and documented. The decision to convert from LC to OC was upon the consultant general surgeon's discretion, the reasons for which were documented in the questionnaire.

Data Analysis

Data was entered and analyzed using SPSS version 21 (IBM). Qualitative data including gender, obesity, previous abdominal surgery, diabetes diagnosis, and hypertension were presented as frequency and percentage. Quantitative data including age, ALT, ALP, GGT, TLC, total bilirubin, number of stones, CBD diameter were presented as mean \pm standard deviation. Effect modifying variables like age, gender, obesity, previous abdominal surgery, diabetes, hypertension, elevated ALT, ALP, AST, GGT, TLC, total bilirubin, number of stones were stratified and compared using chi square statistics. A p-value of <0.05 was considered significant.

Results

A total of 137 patients scheduled for laparoscopic cholecystectomy were included in this study. The majority of patients (67.88%) were between 18-45 years of age with a mean of 41.54 ± 9.07 years.

Females accounted for 60.58% and males 39.42% with a male to female ratio of 1:1.6. The majority of patients (72.99%) had a BMI of ≥ 25 and the mean BMI was 27.53 ± 3.03 kg/m².

Patients without diabetes and hypertension made up 51.82% and 88.32% respectively. The bulk of patients (78.10%) did not have a history of previous abdominal surgery. Out of 137, 100 (72.99%) patients had 10 or more stones and the mean number of stones was 14.52 ± 6.78 .

Raised ALT was found in 51.09% of patients. A majority of patients did not have a raised AST (94.16%), total bilirubin (93.43%) or total leucocyte count (80.29%). Out of 137 patients, elevated GGT and ALP was found in 63 (45.99%) and 59 (43.07%) respectively. Mean ALT, ALP, AST, GGT, TLC & total bilirubin was 26.73 ± 5.19 IU/L, 67.49 ± 10.33 IU/L, 22.52 ± 6.78 IU/L, 14.52 ± 6.78 IU/L, 1044.52 ± 116.78 mm³ and 1.11 ± 0.05 mg/dl.

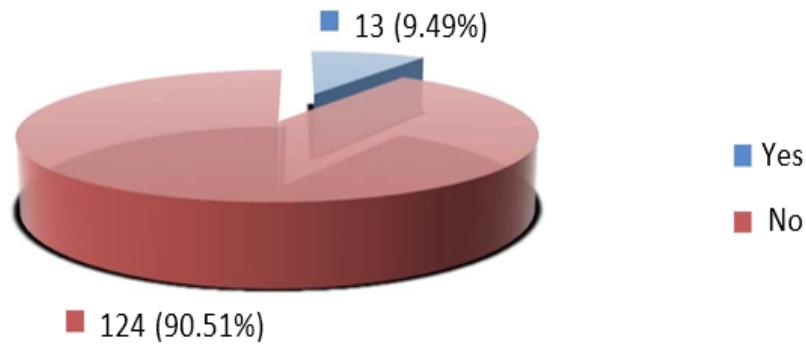
Conversion from LC to OC in patients presenting with cholelithiasis was seen in 13 (9.49%) patients out of 137, in the remainder the LC was continued to completion. As illustrated in the Table 1, the most common cause for conversion was intraoperative bleeding, which involved 6 (46.15%) patients, followed by adhesions in 4 patients (30.77%), suspicion of malignancy in 2 (15.38%) patients and gallbladder inflammation in 1 (7.69%) patient. Difficult anatomy did not spur conversion in our study.

Reason	No. of Patients	%
Difficult anatomy of calot's triangle	00	0.0
Gallbladder inflammation	01	7.69
Adhesions	04	30.77
Suspicion of malignancy	02	15.38
Intra-operative bleeding	06	46.15

Table 1: Frequency of conversion of laparoscopic cholecystectomy into open cholecystectomy among patient presenting with cholelithiasis (n=137).

Reason for conversion of laparoscopic cholecystectomy into open cholecystectomy (n=13). Factors associated with conversion of laparoscopic cholecystectomy into open cholecystectomy are shown in Table 2.

Citation: Iftikhar N, Naeem M, Ansari SS, Shaikh AR (2023) Frequency of Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy in a Low-Middle-Income Country. J Community Med Public Health 7: 356. DOI: <https://doi.org/10.29011/2577-2228.100356>



Effect modifiers		Converted	Not converted	p-value
Age (years)	18-45	08	85	0.607
	46-70	05	39	
Gender	Male	05	49	0.941
	Female	08	75	
BMI (kg/m ²)	<25	03	34	0.737
	≥25	10	90	
Hypertension	Yes	03	13	0.179
	No	10	111	
Diabetes mellitus	Yes	05	61	0.461
	No	08	63	
History of previous surgery	Yes	01	29	0.193
	No	12	95	
Elevated ALT	Yes	06	64	0.708
	No	07	60	
Elevated ALP	Yes	05	54	0.725
	No	08	70	
Elevated ASP	Yes	01	07	0.765
	No	12	117	
Elevated GGT	Yes	04	59	0.247
	No	09	65	
Elevated TLC	Yes	02	25	0.680
	No	11	99	

Elevated total bilirubin	Yes	00	09	0.315
	No	13	115	
Number of stones	<10	03	34	0.737
	≤10	10	90	

Table 2: Factors associated with conversion of laparoscopic cholecystectomy into open cholecystectomy.

Discussion

Laparoscopic cholecystectomy is now the gold standard for treatment of symptomatic cholelithiasis. This stems from its safety profile in emergent and elective situations along with a host of other benefits [3]. There remain circumstances in which conversion to open may be deemed necessary, and this is associated with increased morbidity [4].

Our primary goal was to ascertain reasons for conversion in a tertiary care government hospital setting in Pakistan, pre-operatively and intra-operatively.

A total of 137 patients were enrolled in our study over a period of 6 months, among which a conversion rate of 9.49% was reported, which is well within the range reported in other studies [7]. This was similar to other Pakistani centers which reported 9.52% and 6.7% [1,8]. Among Low-Middle Income Countries (LMIC) in the region, rates were reported as 9.9% in Bangladesh, 9% in India, but 4.5% in Iraq [9-11]. The incidence of cholelithiasis is generally higher and LC more widely available in Pakistan which could account for the discrepancy [12].

Our study reports a younger population, mean age 41.54 ± 9.07 years; Awan et al reported mean age of 45.6 ± 9.3 years whereas Agarwal et al reported 46.58 ± 12.81 years [4,13]. The majority of patients, 67.88%, were between 18-45 years which was in line with Naeem, et al., but dissimilar to Agarwal, et al. [1,13].

Generally, the literature states that advancing age is associated with conversion [14]. Females made up 60.58% of the population and males 39.42%; Agarwal et al also reported similar figures as did Subhan, et al. [15].

In our study the most common reason for conversion was reported to be bleeding (46.15%), similar to Radunovic, et al. and Agarwal et al., whereas for Naeem, et al. this accounted for the second most common cause [1,13,16]. Adhesions around the gallbladder are a leading cause for conversion in the literature

and in our study this was the second most common cause, which reflects the need to identify patients with significant gallbladder inflammation or previous abdominal surgery [4,10]. Contrasting with Amin et al and Awan et al, difficult anatomy was not a cause for conversion and this could reflect increasing surgeon expertise in dealing with obese patients in our region [4,5].

Obesity is a major patient factor which is known to be prevalent in patients who are eventually converted from LC to OC and our study reflected this as the majority (72.99%) of patients had a BMI above the norm, similar to Subhan, et al., Krishna, et al., and Chen G, et al. [15,17,18]. Obese patients require consideration and counseling beforehand so that they can be involved in decision making prior to choosing a treatment modality. Surgical centers in LMICs often do not have appropriate curricula and resources for training their minimally invasive surgeons. Careful dissection and consideration for anatomy in obese patients should be a part of minimally invasive surgical training in our region of the world especially with rising rates of obesity now known to be the trend [19,20]. Such patients need to be counselled adequately about the risk of conversion and involved in the decision about which procedure to carry out. This study recommends the use of scoring systems, which have shown great efficacy in other centers as a way of evaluating patients pre-operatively in order to reduce the rate of conversion of LC into OC and to ensure patient safety is kept paramount [21].

Conclusion

Laparoscopic cholecystectomy is a predominantly safe and effective procedure for patients with symptomatic gallstone disease even in LMIC. However, conversion to open cholecystectomy carries its risks and should be avoided. Efforts need to be made to reduce the conversion rate and bring it on par with the developed world and even better performing LMIC. Improvements in patient safety such as identification of patients at risk of conversion i.e. those with a higher BMI or those likely to bleed or have dense adhesions may help bridge this gap.

References

1. Naeem M, Waheed R, Maroof SA, Ahmad M (2017) Frequency of conversion of lap chole with open cholecystectomy. *Journal of Medical Sciences* 25: 68-71.
2. Santharaj S, Marahanumaiah S (2022) Pre-operative predictors of difficult laparoscopic cholecystectomy: a comparative study between two scoring systems. *International Surgery Journal* 9: 960-966.
3. Bhandari TR, Khan SA, Jha JL (2021) Prediction of difficult laparoscopic cholecystectomy: An observational study. *Ann Med Surg* 72: 103060.
4. Awan NA, Hamid F, Mir IN, Ahmad MM, Shah AA, et al. (2017) Factors resulting in conversion of laparoscopic cholecystectomy to open cholecystectomy-institution based study. *International Surgery Journal* 5: 132-137.
5. Amin A, Haider MI, Aamir IS, Khan MS, Choudry UK, et al. (2019) Preoperative and operative risk factors for conversion of laparoscopic cholecystectomy to open cholecystectomy in Pakistan. *Cureus* 11: e5446.
6. Thyagarajan M, Singh B, Thangasamy A, Rajasekar S (2017) Risk factors influencing conversion of laparoscopic cholecystectomy to open cholecystectomy. *International Surgery Journal* 4: 3354-3357.
7. Warchałowski Ł, Łuszczki E, Bartosiewicz A, Dereń K, Warchałowska M, et al. (2020) The analysis of risk factors in the conversion from laparoscopic to open cholecystectomy. *Int J Environ Res Public Health* 17: 7571.
8. Ahmed N, Ul-Hassan M, Tahira M, Samad A, Rana HN (2018) Intra-operative predictors of difficult cholecystectomy and conversion to open cholecystectomy—A new scoring system. *Pak J Med Sci* 34: 62-66.
9. Maitra TK, Ullah ME, Mondol SK (2017) Operative and postoperative complications of laparoscopic cholecystectomy: experience from a Tertiary Care Hospital of Bangladesh. *Bangladesh Critical Care Journal* 5: 11-16.
10. Yadav P, Agarwal S, Modhia D, Joshi A (2022) A study of factors associated with conversion of laparoscopic cholecystectomy to open cholecystectomy. *International Surgery Journal* 9: 1198-1202.
11. Faraj FH, Ismaeil DA, Ali HO (2020) Laparoscopic Cholecystectomy to Open Cholecystectomy in Sulaymaniyah Teaching Hospital, Incidence and Risk Factors Assessment. *Pakistan Journal of Medical and Health Sciences* 14: 1244-1248.
12. Bilal M, Haseeb A, Saad M, Ahsan M, Raza M, et al. (2016) The prevalence and risk factors of gallstone among adults in Karachi, south Pakistan: A population- based study. *Glob J Health Sci* 9: 106-114.
13. Agarwal S, Joshi AD (2020) Perioperative complications of laparoscopic cholecystectomy: a cross- sectional observational study. *International Surgery Journal* 7: 1490-1495.
14. Rothman JP, Burcharth J, Pommergaard HC, Viereck S, Rosenberg J (2016) Preoperative risk factors for conversion of laparoscopic cholecystectomy to open surgery-a systematic review and meta-analysis of observational studies. *Dig Surg* 33: 414-423.
15. Subhan F, Khan HG, Iqbal A, Ahmad S (2022) Cholecystectomy Via Laparoscopy for Acute Cholecystitis. *Pakistan Journal of Medical & Health Sciences* 16: 964-966.
16. Radunovic M, Lazovic R, Popovic N, Magdelinic M, Bulajic M, et al. (2016) Complications of laparoscopic cholecystectomy: our experience from a retrospective analysis. *Open Access Maced J Med Sci* 4: 641-646.
17. Krishna S, Yalla P, Shenoy R (2022) Factors Affecting Conversion of Laparoscopic Cholecystectomy to Open Surgery in a Tertiary Healthcare Center in India. *World J Lap Surg* 15: 1-7.
18. Chen G, Li M, Cao B, Xu Q, Zhang Z (2022) Risk prediction models for difficult cholecystectomy. *Wideochir Inne Tech Maloinwazyjne* 17: 303-308.
19. Wilkinson E, Aruparayil N, Gnanaraj J, Brown J, Jayne D (2021) Barriers to training in laparoscopic surgery in low-and middle-income countries: a systematic review. *Trop Doct* 51: 408-414.
20. Wong A, Naidu S, Lancashire RP, Chua TC (2022) The impact of obesity on outcomes in patients undergoing emergency cholecystectomy for acute cholecystitis. *ANZ J Surg* 92: 1091-1096.
21. Nassar AH, Hodson J, Ng HJ, Vohra RS, Katbeh T, et al. (2020) Predicting the difficult laparoscopic cholecystectomy: development and validation of a pre-operative risk score using an objective operative difficulty grading system. *Surg Endosc* 34: 4549-4561.