CONVERSION OF LAPAROSCOPIC CHOLECYSTECTOMY INTO OPEN CHOLECYSTECTOMY

Munir Ahmad, Riaz Ahmad, Ishaq Ahmad, Muhammad Naeem, Abid Haleem

ABSTRACT

Background: Laparoscopic cholecystectomy is an increasingly applied technique in every Surgical Unit for gallbladder disease around throughout the world. In particular, it represents the "gold standard" for the treatment of indicative gallbladder calculus's. It also replaced the conventional open cholecystectomy. Although not totally free of disadvantages, such as an increased incidence of iatrogenic injuries of the biliary tract, gut, bleeding and conversion into open cholecystectomy. The aim of study was to determine the frequency of conversion and factors for converting laparoscopic cholecystectomy into open cholecystectomy.

Material and Methods: This prospective descriptive cross sectional study was carried out at the Department of Surgery unit 'B', Khyber Teaching Hospital, Peshawar, over a period of two years from June, 2016 to May, 2018. All the patients was operated under general anesthesia by a consultant surgeon, well versed with laparoscopic cholecystectomy.

The technique used for all laparoscopic cholecystectomies was standard four ports. For conversion into open, a Kocher's incision was made. Operative surgeon decided for conversion on clinical judgment. Data regarding conversion of laparoscopic to open cholecystectomy and its factors were noted and recorded on especially designed proforma.

RESULTS: 21 (13.63%) were converted from laparoscopic cholecystectomy to open cholecystectomy.

As per factors of conversion, 14 (9.1%) were having dense adhesions, 5 (3.9%) patients were having bleeding whereas 1(0.6%) patients had bile duct injury.

Conlcusion: Laparoscopic cholecystectomy is a safe operation for treatment of symptomatic gall stones with acceptable conversion rate and the common causes for conversion were dense adhesion and bleeding due to inflammations making dissection unsafe.

Key Words: Laparoscopic Cholecystectomy, Gall Stones, Conversion.

INTRODUCTION

The gold standard surgical treatment of gallbladder disease is Laparoscopic cholecystectomy. Less pain after operation, early recovery, short stay in Hospital and cosmetically better results are the advantages of laparoscopic cholecystectomy over open cholecystectomy[1,2].

The causes of conversion of laparoscopic into open cholecystectomy depends on the expertise of surgeon, quality of instruments, biliary tract anatomy, acute cholecystitis and previous upper abdominal surgery. However expertise laparoscopic surgeon, better and sophisticated laparoscopic instruments and equipments with safety measure reduced the conversion rate. Even then conversion to open cholecystectomy in some cases remains unavoidable[3]. Although most of the time it can be successfully performed, However, technical difficulties can still make it necessary to convert to open cholecystectomy. Conversion rates reported in literature range from 0–20%[4,5].Conversion should not be considered as a complication of laparoscopic cholecystectomy rather it should be considered earlier for the safety of the patient[6]. Bleeding intraoperatively or postoperatively, bile leakage, gallbladder perforation, bile duct injury or visceral injuries are considered as true complications[7].

A study done by Memon W and his associates, found that frequency of dense adhesions was 66.6%, Bile duct injury 22.3% and Colonic Injury was 11.3% as factors for conversion of laparoscopic cholecystectomy into open cholecystectomy[8].

Gall stone disease is very common in our region and it is important to get evidence on this topic. No such study has been done before in our local population. Results of international studies cannot be generalized on our local population due to different genetic make-up and confounding variables. Therefore, we have planned to determine the frequency rate and factors of conversion of laparoscopic cholecystectomy into open cholecystectomy in our local popultion. Identifying the factors for the conversion will help the surgeon to consider the appropriate plan of action and is essential to obtain a proper informed consent prior to surgery.

Department of Surgery, Khyber Teaching Hospital Peshawar, Pakistan

Address for correspondence:
Dr. Munir Ahmad
Surgical 'D' Unit Khyber Teaching Hospital Peshawar, Pakistan
Cell: +92 3339493884
E-mail: drmahmad29@yahool.com

OBJECTIVE

To determine the frequency of conversion and causes for the conversion of laparoscopic into open cholecystectomy.

MATERIAL AND METHODS

This Cross Sectional Descriptive Study was conducted at General Surgical Department unit 'B' of Khyber Teaching Hospital, Peshawar, over a period of two years from June, 2016 to May, 2018 after obtaining approval from the institute ethics committee. Non-probability consecutive sampling technique was used. Sample size was calculated by following formula: $n = z^2pq/d^2$. Where expected proportion (Colonic Injury) P= 11.1%.[8] q= 1-p and d= 5% and Confidence level = 95% . Sample Size was n= 154. Patients with age more than 15 years and less than 70 years, both gender having symptomatic gallstones booked for planned laparoscopic cholecystectomy with ASA grade I or II were included and patients with history of jaundice, Acute cholecystitis, dilated common bile duct (>10 mm in diameter on ultrasound), previous abdominal surgery and immunocompromized, bleeding disorder were excluded from the study.

Patients fulfilling the inclusion criteria from Indoor General Surgical Department of Khyber Teaching Hospital Peshawar were included in the study. A detailed explanation about the participation in the study was given to the patient and a written informed consent was obtained explaining the risks and benefits of the study. Basic demographics like age, gender, duration of complaint, diabetes, hypertension and obesity (BMI≥ 30Kg/m^2) were noted. All the patients were operated under general anesthesia by a consultant surgeon having minimum of 5 years of experience and well versed with laparoscopic cholecystectomy.

The standard four- ports technique was used. A 10-mm port was inserted after giving incision just above or below the umbilicus. Pneumoperitoneum was created. A 10 mm port in the epigastrum and two 5-mm ports on right side of abdomen at mid clavicle and anterior axiliary line were inserted. Dissection was done with Maryland in Calot's triangle. Cystic artery and duct were identified and clipped separately and divided. From the liver bed gallbladder dissected with hook and extracted through port in epigastrum. The decision of conversion into open was made by operating surgeon and a Kocher's incision made when required. Data regarding conversion of laparoscopy to open cholecystectomy and its factors were noted by and recorded on especially designed proforma.

Data was analyzed with statistical analysis program (SPSS-version20). Frequency and percentage was computed for qualitative variables like gender, diabetes, hypertension, obesity, dense adhesions, intra-operative bleeding, bile duct injury, colonic Injury and conversion to open cholecystectomy. Mean ±SD was presented for quantitative variables like age, weight, height and BMI. Effect modifiers like age, gender, duration of complaint, diabetes, hypertension and obesity was controlled by stratification. Post stratification chi square test was applied with P-value ≤ 0.05 considered statistically significant.

RESULTS

A total of 154 patients were studied among which 58 (37.66%) were male and 96(62.33%) were female.

As per age wise distribution, 81 (52.59%) patients were recorded in 30-45 years age group whereas 73 (47.40%) were recorded in 46-60 years age group. Mean and SD for age was 44±9.21, for duration of complaint was 3±1.13, for weight was 82±5.60 and for BMI was 28.27±2.10.

76 (49.35%) patients had diabetes mellitus, 40 (25.97%) patients have hypertension and 28(18.19%) were obese.

As per conversion, only 21 (13.63%) laparoscopic cholecystectomy were converted into open cholecystectomy. As per factors of conversion, 14 (9.1%) were having dense adhesions, 6 (3.9%) patients were having bleeding whereas 1 (0.6%) patient had bile duct injury and gut injury was not noted in any of the case.

Stratification of factors of conversion to age and gender are recorded at Table No. I and II respectively.

DISCUSSION

The first laparoscopic cholecystectomy was done successfully by Eric Muhe in 1985[9]. After two years the method was improved by Philip Mauret and over the past two decades, it has become the gold standard procedure of gallbladder disease. It's advantages over open cholecystectomy are less postoperative pain, faster recovery, less hospital stay and better cosmoses[10].

Apart from general complications, the specific complications encountered during laparoscopic cholecystectomy are hemorrhage, gallbladder perforation, bile leakage, bile duct injury and perihepatic collection. Some of these complications necessitate the conversion into open cholecystectomy[11]. Conversion to open cholecystectomy is occasionally necessary to avoid or repair injury, delineate confusing anatomic relationships, or treat associated conditions[12].

Studies done by R Dennis et al, Gurkan et al, Costtantini et al, in which conversion rate from laparoscopic cholecystectomy into open cholecystctomy were 7.5%, 14.7% and 2.7% respectively[13-15]. The result of conversion is comparable to our study in which the conversion rate was 13.63%.

Eldar *et al*. reported that a higher conversion rate occurred with age over 50, 60, or 65 years, with total

Table 1: Stratification of Factors of Conversion With Respect to Age (n=154)

Age Range in years	Factors of conversion				Total	P- Value
	Dense adhesion	Bleeding	Bile duct injury	No conversion		
30-45	5(3.2%)	3(1.9%)	0(0.0%)	73(47.4%)	81(52.6%)	.396
46-60	9(5.8%)	3(1.9%))	1(0.6%)	60(39.0%)	73(47.4%)	
Total	14(9.1%)	6(3.9%)	1(0.6%)	133(86.4%)	154(100%)	

TABLE 2: Stratification Of Factors Of Conversion With Respect To Gender (n=154)

Gender	Factors of conversion				Total	P- Value
	Dense adhesion	Bleeding	Bile duct injury	No conversion		
Male	10(3.2%)	4(2.6%)	1(0.6%)	33(21.4%)	48(31.2%)	.000
Female	4(2.6%)	2(1.3%))	0(0.0%)	100(64.9%)	106(68.8%)	
Total	14(9.1%)	6(3.9%)	1(0.6%)	133(86.4%)	154(100%)	

white count over 13,000/ml or 15,000/ml, male gender, and history of biliary disease[13]. Similarly in our current study, we identified male gender to be associated with increased risk of conversion.

The main reason for conversion is failure of anatomical identification of Calot's triangle structures because of severe inflammation caused by recurrent attacks of cholecystitis. The dense adhesion around cystic artery and extrahepatic baillary ducts made chances of common bile duct injury[10]. The knowledge and recognition of anatomy is utmost for excellent outcomes. In our study, the most frequent reasons for conversion to open cholecystectomy were an inability to define anatomy and dense adhesions.

The effective and safe operation for the treatment of acute cholecystitis is laparoscopic cholecystectomy as reported in various studies with debate of optimal timing. Various randomized and nonrnadomized studies reported feasibility and safety of early laparoscopic cholecystectomy[3,6]. In our study we exclude acute cholecystitis cases.

Conversion rate was also higher in patients with previous upper abdominal operation. Previous abdominal surgery was included in the study and consider not a contraindication but associated with an increased need for adhesiolysis[14]. In our study we exclude patients of previous abdominal surgery. Ercan *et al*. studied the effect of previous abdominal surgery and to rate the conversion of laparoscopic into open cholecystectomies. They reported 13% conversion rate in 2963 attempted laparoscopic cholecystectomies[14].

This identification is not always possible; in fact, complications such as bleeding, accidental lesions of the biliary ducts or adjacent organs, intolerance to pneumoperitoneum may arise in the course of any laparoscopic intervention, even the apparently simplest, in which cases conversion is the only possible solution.

Memon W and his associates has found that frequency of dense adhesions was 66.6%, Bile duct injury 22.3% and Colonic Injury was 11.3% as factors for conversion of laparoscopic cholecystectomy into open cholecystectomy[8]. In our study 14 (9.1%) were having dense adhesions, 6(3.9%) patients were having bleeding whereas 1(0.6%) patient had common bile duct injury whereas colonic injury was not recorded in any of the case. The less number of conversion in our study may be due to exclusion of acute cholecystitis and previous abdominal surgeries cases, which are major conversion factor from laparoscopic cholecystectomy into open cholecystectomy.

In another study done by Volkan G and his associates has found that frequency of intra-operative bleeding was 0.27% as factor for the conversion of laparoscopic cholecystectomy into open cholecystectomy which is comparable to our study in which 1(0.6%) case of bleeding was recorded[15].

In another study done by Reddy SVR and his associates has found that frequency of obesity was 44.7%, hypertension 26.3% and Diabetes mellitus was 31.6% as factors for conversion of laparoscopic cholecystectomy into open cholecystectomy[16], which as compared to our study where 76 (49.35%) patients had diabetes mellitus, 40 (25.97%) patients had hypertension and obesity was recorded in 28 (18.19%).

We have not studied various factors like patients with acute cholecystitis, upper abdominal surgery which need further research. Symptomatic gallstone cases and ASA grade II patients are the limitations of our study.

CONCLUSION

Laparoscopic cholecystectomy is a safe operation for treatment of symptomatic gall stones with acceptable conversion rate and the common cause for conversion was dense adhesions which made procedure unsafe.

REFERENCES

1. Bittner R. Laparoscopic surgery: 15 years after clinical introduction. World J Surg. 2006;30:1190–203.
2. Ros A, Gustafsson L, Krook H, Nordgren CE, Thorell A, Wallin G, et al. Laparoscopic cholecystectomy versus mini-laparotomy cholecystectomy: a prospective, randomized, single blinded study. Ann Surg. 2001;234:741–9.
3. Singh K, Ohri A. Difficult laparoscopic cholecystectomy: A large series from north India. Indian J Surg 2006;68(4):205–8.
4. Southern Surgeons Club. A Prospective analysis of 1,518 laparoscopic cholecystectomies. NE.IM. 1991 ;324:1073-1078.
5. Soper NJ. Laparoscopic cholecystectomy. Curr Probl Surg. 1991 ;28;583--655.
6. Chandio A, Timmons S, Majeed A, Twomey A, Aftab F. Factors Influencing the Successful Completion of Laparoscopic Cholecystectomy. JSLS 2009;13(4):581–6.
7. Genc V, Sulaimanov M, Cipe G, Basceken SI, Erverdi N, Gurel M, et al. What necessitates the conversion to open cholecystectomy? A retrospective analysis of 5164 consecutive laparoscopic operations. Clinics (Sao Paulo) 2011;66(3):417–20.
8. Memon W, Khanzada TW, Samad A, Laghari MH. Laparoscopic cholecystectomy: conversion rate and its causes at Isra University Hospital, Hyderabad. Rawal Med J. 2008;33(2):159-61.
9. Bittner R. Laparoscopic Surgery: 15 Years after Clinical Introduction. World J Surg. 2006;30:1190-1203.
10. Reynolds W. The First Laparoscopic Cholecystectomy. JSLS. 2001;5:89-94.
11. Shamiyeh, A and Wayand W. Laparoscopic Cholecystectomy: Early and Late Complications and Their Treatment. Langenbeck's Archives of Surgery. 2004;389:164-71.
12. Tayeb M, Raza SA, Khan MR, Azami R. Conversion from Laparoscopic to Open Cholecystectomy: 226 Multivariate Analysis of Preoperative Risk Factors. J Postgraduate Medic. 2005;51:234-8.
13. Eldar S, Sabo E, Nash E, et al. Laparoscopic cholecystectomy for acute cholecystitis: prospective trial. World J Surg. 1997;21:540–545.
14. Ercan M, Bostanci EB, Ulas M, Ozer I, Ozogul Y, Seven C, et al. Effects of previous abdominal surgery incision type on complications and conversion rate in laparoscopic cholecystectomy. Surg Laparosc Endosc Percutan Tech. 2009;19:373- 8.
15. Volkan G, Marlen S, Gokhan C, Salim I B, Nezih E, Mehmat G, et al. What necessitates the conversion to open cholecystectomy? A retrospective analysis of 5164 consecutive laparoscopic operations. Clinics (Sau Paulo). 2011 Mar; 66 (3): 417-420.
16. Reddy SVR, Balamaddaiah G. Predictive factors for conversion of laparoscopic cholecystectomy to open cholecystectomy: a retrospective study. Int Surg J. 2016;3:817-20.