



ORIGINAL ARTICLE

Outcome of laparoscopic cholecystectomy in terms of intraoperative complications in a tertiary care hospital.

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ABSTRACT... Objectives: The main objective was to evaluate the outcome of laparoscopic cholecystectomy in terms of intra-operative complications and the rate and reasons of conversion to open cholecystectomy. **Study Design:** Descriptive Study. **Setting:** Hayatabad Medical Complex, Peshawar. **Period:** June 2018 to May 2019. **Material & Methods:** After taking consent of Hospital ethical & research committee, patients admitted with clinical diagnosis of cholelithiasis and chronic cholecystitis, confirmed by abdominal ultrasound, undergoing laparoscopic cholecystectomy fulfilling inclusion criteria were selected. **Results:** A total of 150 were included in the study. Mean age was 39.2yrs with female to male ratio of 9.75:1. Laparoscopic cholecystectomy was successfully accomplished in 98% cases. In 2% (3 patients) converted cases the most common cause of conversion observed was dense adhesions in the calots triangle. Intra-operative complications were noted in 1.4% patients, those included bile duct injury and leakage from the gallbladder bed. However other complications such as bowel injury, blood vessel injury, and post operative hemorrhage did not occur. Overall morbidity was 1.4% with no mortality. **Conclusion:** Laparoscopic cholecystectomy is a safe and effective procedure in our setup to the accepted standards, as evident by the national and international studies. And it can be accomplished with minimal morbidity and low rate of conversion with the increasing surgeon's experience.

Key words: Cholelithiasis, Chronic Cholecystitis, Laparoscopic Cholecyctectomy.

INTRODUCTION

Gallstones are the most common biliary pathology and is the major health problem in adult population worldwide.^{1,2} The prevalence of cholelithiasis in adults in USA is 10-15% and in Europe is approximately 18.5%.³ Also in Pakistan it is the third most common cause of hospital admissions though data available is scanty but it accounts for 14%⁴ and 16%⁵ according to data obtained from Karachi.⁶ More than 80% of gallstones are asymptomatic while 1-2% of asymptomatic patients ultimately may develop symptoms requiring surgical removal, making cholecystectomy one of the most common operations performed by general surgeons.¹

Modern surgical endoscopes were first developed in early 1800s. Modern Laparoscopic surgery is becoming popular alternative to traditional

open surgical procedures. This is exemplified by introduction of laparoscopic cholecystectomy, which attracted only minor curiosity when first performed in 1987 in France by Mouret.⁷ Laparoscopic cholecystectomy was carried out in United States during the latter part of 1988 by McKernan and Saye and shortly thereafter by Reddick and Oslan. The procedure was then widely disseminated during 1989 and 1990 and superseded open cholecystectomy with rapidity that has never seen before. The first laparoscopic cholecystectomy was performed in Pakistan in 1991.

It has rapidly become the "gold standard" for the elective management of cholelithiasis and chronic cholecystitis.^{8,9,10} It is now increasingly used for cholecystectomy in acute cholecystitis.^{11,12} It is usually safe and cost effective leading to short

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hospital stay, less post operative pain, less complications, rapid return to normal activity and decreased mortality and morbidity.^{13,14}

A number of complications have been reported with laparoscopic cholecystectomy with the frequency of 3.6%.¹¹ These includes common bile duct injury, cystic duct injury, bleeding from gall bladder bed, duodenal injury, colonic injury, retained stones in common bile duct.^{13,14} The anesthesia related complications are intra-operative hypotension, arrhythmias, and increase in end-tidal-carbon dioxide.¹⁵ The risk of intra-operative injury during laparoscopic cholecystectomy is higher than in open cholecystectomy and it decline with increasing surgical experience and intra-operative use of cholangiography.¹⁶

Laparoscopic cholecystectomy is converted to open cholecystectomy if there is inability to identify anatomical structures correctly due to dense adhesions¹⁷, hemorrhage, bile duct injury, difficult dissection in calot's triangle, choledocholithiasis, and gall bladder cancer and if there is gut injury which is recognized during the procedure.¹⁸

The intra-operative complications in laparoscopic cholecystectomy have been debated in the West for the last decade and the intra-operative injury is higher than that in open cholecystectomy. It has been anticipated that this will diminish with increasing surgeon's experience in the use of laparoscopic cholecystectomy. Our local data is relatively scarce in this regard. This study will furnish important local epidemiologic data regarding the various outcome measures of laparoscopic cholecystectomy in our set up. This will help to improve the existing situation with a positive influence on the overall management of our patients.

MATERIAL & METHODS

This Descriptive study was conducted in the department of Surgery, Hayatabad Medical Complex Peshawar, from 01-06-2018 to 31-05-2019 after taking consent of Hospital ethical and research committee. The sample size was 150 patients, with 90% power of test and level of

significance is 5% under WHO software for sample size determination the sampling technique used was Non-probability consecutive sampling.

All patients of either gender aged over 14yrs with cholelithiasis and/or chronic cholecystitis, who underwent laparoscopic cholecystectomy. Patients not consented to participate in the study or those not willing for laparoscopic cholecystectomy, patients with acute cholecystitis, previous abdominal surgery, choledocholithiasis and patients with serious co morbidity were excluded from the study.

Patients fulfilling the inclusion criteria were included in the study; informed written consent was taken from all patients for participation in the study. Patients were assessed by adequate history, thorough examination and investigations (ultrasound abdomen, liver function tests in all patients, other investigations such as X-ray chest, ECG, complete blood count, blood sugar level, renal function tests where indicated). Patients diagnosed by ultrasound abdomen having cholelithiasis were selected for laparoscopic cholecystectomy. Pneumoperitoneum was created by Hassan technique and standard four ports were used for laparoscopic cholecystectomy. All complications, conditions leading to conversions of laparoscopic to open cholecystectomy were noted on the preformed proforma. All the data was recorded and observed by myself to exclude any bias in my study.

The data was analyzed through SPSS version 10 and various descriptive statistics were used to calculate frequencies, percentages, means and standard deviations. The numerical data such as age, gender were expressed as mean \pm standard deviation while the categorical data such as bile duct injury, blood vessel injury, bowel injury, post operative hemorrhage and causes of conversion like dense adhesions, CBD exploration etc. were expressed as frequency and percentages. The results were projected as tables and graphs.

RESULTS

One hundred and fifty patients were included in this study. 136 out of these 150 were females and

14 were male with the Female to male ratio of 9.7:1 (Table-I). Age of these patients ranged from 15-80 years with the mean age 39.2years.

Laparoscopic cholecystectomy was successfully accomplished in 147 patients (98%). Conversion to open cholecystectomy was required in only three patients (2%). Dense adhesions at the Calot's triangle were the single most common cause for conversion shown in (Table-III and Table-IV).

Complications occurred in 2 patients (1.4%) shown in Table-II, both these complications were not identified at the time of surgery and were picked up postoperatively: these were common bile duct injury and leakage from gallbladder bed. Other complications including bowel injury, blood vessel injury and postoperative hemorrhage did not occur.

	Age	Gender	Fre- quency	%age
N	150	Male	14	9.3
Mean	39.2000	Female	136	90.7
Std. Deviation	11.2673	Total	150	100.00

Table-I. Mean, Standard deviation, Age range of patients & gender wise distribution.

No.	Complications	Frequency	Percentage
1	Bile duct injury	1/150	0.7
2	Bowel injury	0/150	0
3	Blood vessel injury	0/150	0
4	Post-operative hemorrhage	0/150	0
5	Other (leakage from gallbladder bed)	1/150	0.7
	Total	2/150	1.4

Table-II. Frequency of complications in patient's undergone laparoscopic cholecystectomy.

Conversion to Open	Frequency	Percent
Yes	3	2.0
No	147	98.0
Total	150	100.0

Table-III. Frequency table of conversion of laparoscopic cholecystectomy into open cholecystectomy.

Reasons of Conversion	Frequency	Percent
Dense adhesions	3	2.0
Total	150	100.0

Table-IV. Frequency distribution of reasons of conversion to open cholecystectomy.

DISCUSSION

Laparoscopic surgery has changed the field of surgery since 1987, when first laparoscopic cholecystectomy was performed and with the experience its application has expanded rapidly and it has become the gold standard for the elective management of cholelithiasis and chronic cholecystitis.^{8,9,19} It is the commonest operation performed laparoscopically world wide. It is usually safe and cost effective. With the introduction of laparoscopic cholecystectomy there is a continuous decrease in the number of open cholecystectomies, in the developed countries open cholecystectomies account for less than 20% of all the cholecystectomies performed.^{20,21} While in the developing countries like Pakistan open procedure is still common due to lack of skills and unavailability of laparoscopic apparatus, the reported rate of open procedures in our country is 80% by Abbasi et al²², 21.3% by Raza et al², and 32% by Iqbal et al.²³

The present study elaborates the intra-operative complications and rate and reason of conversion to open procedure, no surgical procedure is without complications. A number of complications have been reported to occur with the laparoscopic cholecystectomy also.

Complications like injuries related to insertion of trocar such as vascular and gut injuries are reported by Diziet et al.²⁴ They reported 13 cases of aortic injury with single case of mortality. Similarly Raviaco et al.²⁵ reported one aortic injury and one to the middle colic artery.²⁶ In our study no port insertion related complications were noted.

In our study majority of the patients were female (90-97%), which is consistent with the national and international studies.^{21,27,28} Mean age and minimum age is slightly less than reported in other study.²⁰ Serious complications occur in

laparoscopic cholecystectomy fewer than 2% of all cases.²⁹ In our study the complication rate was 1.4% which is within the range and published reports (0.8-6%).³⁰ The overall complication rate in our study (1.4%) is far less than other studies, like Wagih Ghnnam et al³⁰ (3.24%) and Hussein et al (3.6%).¹¹

The two complications occurred in this study were: Single case of leakage from gallbladder bed (0.7%) and a single case of CBD injury (0.7%). The most debated issue has been the incidence of the common bile duct injury. The reported incidence of bile duct injury is between 0%-1% in laparoscopic cholecystectomy.^{29,31,32} Whereas in open cholecystectomy the overall risk of injury to CBD is 0.1-0.2%.³³

Whereas recent studies describe, experience of surgeon to be the most important risk factor for CBD injury i.e. when performed by experienced surgeon the incidence of CBD injury is less than 1% (0-0.8%).³⁴ CBD injury during laparoscopic cholecystectomy is an iatrogenic catastrophe associated with significant post operative morbidity and mortality, reducing the long term survival and quality of life of patient.³⁵ In United States of America and Britain 34-44% of surgeons have successfully cured a major bile duct injury of one to two such cases.³⁶ Evidence suggests that CBD injury should be managed by an experience hepatobiliary surgeon, and an early recognition of the injury affects directly on the outcome.

CBD injury if treated by surgeon has an increased risk of mortality (11%) at 9 years.³⁷ Most CBD injuries occur within the surgeons first 100 cholecystectomies. One third happen after surgeon has performed 200 cases.³⁶ It has been suggested that commonest cause of injury to bile duct is inability to properly diagnose the biliary anatomy as a result three quarter of such injuries are not recognized at the time of injury.³⁷

According to three population based studies, intraoperative cholangiogram has reduced the risk of bile duct injury, whereas in other studies cholangiography does not prevent injury rather correct interpretation of anatomy can prevent

this complication.³⁷ Though there is controversy of performing intraoperative cholangiography, there is enough evidence in favor of peroperative cholangiogram as it is likely to identify the injury at the time of surgery. As reported by Archer et al. 81% of CBD injuries were detected at the time of surgery when peroperative cholangiogram were done as compared to 45% when not done.³⁶

In our study both the complications were not detected at the time of surgery. For which later explorations were done and both were managed accordingly. Though these complications were less (1.4%) as compared to other studies as mentioned, still these can be prevented with the increasing surgeons experience and availability of peroperative cholangiogram.

In our study three cases out of one hundred and fifty were converted to open cholecystectomy so the conversion rate became 2% and the most common cause of these conversions was dense adhesions in the Calot's triangle. Conversion to open procedure is also related to surgeons experience in laparoscopic procedures but also the degree of difficulty during the procedure. There is a widely variable rates of conversions ranging from 2%-15% in different national and international centers³⁸, with higher rates of conversion to open procedure in the developing countries as compared to the developed countries.³⁹

Other reasons for conversion to open included hemorrhage in Calot's triangle, injury to stomach and gut, slipped liga clips, instrument failure etc.^{13,23} but we did not encounter these problems in our study. Our observation show fairly improved results as compared to other studies. Comparison of conversion rates are shown in table below.

Serial No	Study	Conversion Rates
1	Tariq Saeed et al ²⁶	5%
2	Wagih Ghnnam et al ³⁰	5%
3	Saeed et al ³⁸	3.2%
4	Raza et al ²	11.11%
5	Shammim et al ¹³	7.5%
6	Our study	2%

Table-V. Comparison of conversion of laparoscopic to open cholecystectomy in various studies.

Old age i.e. above 60 was predicting risk factor of conversion in Wagih Ghnnam et al³⁰ study but in our study mean age of converted cases was 52 years and less than 60 years. Our observation of conversion to open in patients of age more than 50 years is also supported by Simopoulos et al⁴⁰ and kanaan et al.⁴¹ Showing successful laparoscopic cholecystectomy in younger patients while patients requiring conversion had mean age more than 50.

Our all converted cases were female which is also supported by study of Rosen et al⁴² showing that male sex is not risk factor for conversion to open. On the other hand Wagih Ghnnam et al and simopolous et al showed male patients to have increased risk of difficult and unsuccessful LC.

CONCLUSION

The surgical experience and new laproscopic techniques have proved that laparoscopic cholecystectomy is a safe and effective procedure in our setup to the accepted standard as compared to the national and international studies. Availability of instruments and proper training of new surgeons are the main areas of concern to further improve the outcome of LC.



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No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Muhammad Sayyar	Data collection.	
2	Yousaf Jan	Data interpretation.	
3	Shaukat Hussain	Review article at end.	