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ORIGINAL ARTICLE

Gender Impact on the Outcomes of Laparoscopic Cholecystectomy

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Abstract

Background: Laparoscopic cholecystectomy is now considered the preferred treatment for symptomatic gallstone diseases, establishing itself as the gold standard method.
Objective: The study was designed to evaluate the effect of gender differences on laparoscopic cholecystectomy outcomes after adjusting for potential causes of conversion.
Material and Methods: This retrospective cross-sectional study was conducted at PAC Hospital, Kamra, and PAF Hospital, Islamabad from January to December 2022. A total of 105 patients between ages 18-50 years, either gender, who underwent elective laparoscopic cholecystectomy were included. The outcomes such as age, body mass index, duration of surgery, and length of hospital stay were measured using the independent t-test.
Results: There were 62% females (n=65) and 38% males (n=40) who had laparoscopic cholecystectomy. Patients were on average aged 47.82±10.63 years old. The mean body mass index of patients was 27.1±2.02 kg/m^2. The duration of surgery was 62.52±2.66 minutes on average for males, and 54.72±1.94 minutes on average for females; this difference was significant (p= 0.0001). Hospital stays after surgery were comparable across the genders, at 1.96±0.90days for males and 1.95±0.92 days for females (p =0.901). There was no discernible variation in conversion between the genders.
Conclusion: Apart from the longer operative time required for male laparoscopic cholecystectomy, this study did not find gender as an independent risk factor for poor outcomes after laparoscopic cholecystectomy.

Keywords: Cholecystectomy, Laparoscopic, Conversion disorder, Gender identity, Risk Factor

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Introduction

Laparoscopic cholecystectomy (LC) is now the gold standard treatment for symptomatic gallstone disease (GSD).[1] Since its beginnings in 1989, it has seen extensive use. There are several benefits of LC over conventional open surgery.[2] Advantages include shorter time spent in the hospital, less pain and suffering during and after surgery, enhanced cosmetic outcomes, and less financial outlay.[3] However, there are times when it is necessary to resort to open surgery rather than attempting an LC. An open incision is required for 1.6% to 20% of LC.[4] Some individuals who undergo LC end up needing open external biliary fistula, and open cholecystostomy (OC) as a result of complications during the procedure.[5]

Peri-hepatic collection, calot's triangle adhesions, uncontrolled bleeding, hematoma, bile leakage, malignancies, bile duct, visceral injury, and other rare problems may occur.[6] Significant effort has been put in over the last two decades in an attempt to identify the root causes of peri-operative complications after LC

procedures.[7] A study has shown a correlation between predisposing risk factors and LC outcomes (such as conversion to open) including age ≥ 65, male sex, history of upper abdominal surgery, diabetes mellitus, obesity, acute cholecystitis, high BMI, etc.[8]

Recent years have shown that male gender is a significant factor in determining whether LC patients may need conversion to open surgery.[9] The more severe signs of gallstone disease in men may explain why males have been reported to convert at a higher rate than females.10 However, some studies done on males did not find that their gender was a risk factor for conversion.[11,12]

The study objective was to evaluate the effect of gender differences on LC outcomes after adjusting for potential causes of conversion.

Material and Method:

Study design, Place & Duration: After the ethical approval from the institutional review board, this retrospective cross-sectional study was conducted at PAC Hospital, Kamra, and PAF Hospital, Islamabad from January to December 2022.

Sample Size: Through non-probability consecutive sampling, 105 participants between ages 18-50 years old, of either gender who underwent elective laparoscopic cholecystectomy were included.

Inclusion & Exclusion Criteria: The inclusion criteria were patients with symptomatic gallstone disease planned for elective LC. Patients with complex or high-risk conditions including acute Cholecystitis, obstructive jaundice, acute pancreatitis, common bile duct dilatation, empyema of the gallbladder, or any malignancy were excluded. Additionally, patients with a history of prior upper abdominal surgeries or those requiring emergency LC were not included, as these conditions could significantly alter surgical complexity and outcomes.

The sample was carefully chosen to allow for the analysis of routine elective LC cases, minimizing confounding variables and ensuring that the study outcomes accurately reflected the procedure's efficacy and safety under standard conditions.

Study Outcomes: The outcomes of the study were as follows; patient's genders (male/female) data on clinical presentation, operational findings, conversion rates, duration of surgery, and peri-operative complications were documented. Additionally, the operating surgeon was tasked with classifying the complexity of adhesiolysis and dissection of Calot's triangle as easy, moderately tough, or very difficult. The inability to remove the entire gallbladder because of a frozen Calot's triangle, the need for extensive hydro-dissection to delineate the anatomy, or the consideration of conversion at some point due to difficulty in dissection were all taken into account while labelling a case as very difficult, even if the case was ultimately resolved successfully.

Statistical Analysis: The aforementioned data was cross-tabulated and compared between the gender differences. The data was analyzed using SPSS v 25. Parametric variables such as age, body mass index, time after surgery, and length of hospital stay were measured using the independent test. A p-value ≤0.05 was considered significant.

Results:

A total of 105 patients underwent laparoscopic cholecystectomy, with females accounting for 62% (n=65) and males 38% (n=40). Histopathological results showed chronic Cholecystitis in 70% of cases and cholelithiasis in 30%. Operative time was notably longer for males than females (p≤ 0.05)., while hospital stays were comparable across genders (p≥ 0.05). The overall demographic details and clinical parameters of the study participants are summarized (Table 1).

There was no discernible variation in conversion between the genders. 11.6% of females (n=7) needed conversion due to bleeding, while 16.6% (n=10) required conversion due to difficulty dissecting the Calot's triangle. 17.5% of males (n=7) were converted due to complications during the Calot's triangle dissection, and 12.5% (n=5) needed conversion due to bleeding (Table 2).

There was a significant difference in the overall peri-operative morbidity rates between females and males, 33.3% and 25.5 %, respectively (p≤ 0.05). 5% of females (n=3) had damage to their bile ducts that were discovered and treated after surgery, and 2 male patients had biliary injuries. 5%females (n=3) and 1 male had acute pancreatitis after surgery (Table 3).

Table 1: Demographic and clinical parameters of the study participants, n=105

Parameters	Males(n=40)	Females (n=65)	p-value
Age (years)	49.28±11.1	46.36±10.15	.389
BMI (kg/m2)	25.62±1.98	28.52±2.05	.0001
Postoperative stay (days)	1.96±0.90	1.95±0.92	.901
Surgery time (minutes)	62.52±2.66	54.72±1.94	.0001

Table 2: Comparison of male and female LC patients' conversion rates, n=105

Parameters	Males	Females	P-value

	(n=40)	(n=65)	
Conversion	7 (17.5%)	8 (13.3%)	.323
Bleeding	5 (12.5%)	7 (11.6%)	.160
Difficulties encountered during dissection of Calot triangle	7 (17.5%)	10 (16.6%)	.803

Table 3: Morbidity rates before and after LCsurgery for males and females, n=105

Parameters	Males (n=40)	Females (n=65)	P-value
Bile duct injury	2 (5%)	3 (5%)	.160
Postoperative biliary leak	2 (5%)	5 (8%)	.803
Postoperative pancreatitis	1 (2.5%)	3 (5%)	.160
Postoperative jaundice	3 (7.5%)	6 (10%)	.803
Wound infection	2 (5%)	3 (5%)	.323
Total morbidity	10 (25%)	20 (33.3%)	.001

Discussion:

As opposed to open surgery, LC offers several benefits and is hence the treatment of choice for gallstone disease.[13] Multiple studies have shown that surgical complications and conversion rates are both greater for men than for women during LC.[14,15] This study aimed to determine whether or not gender is an independent risk factor for conversion in LC. Studies have shown an increase in the incidence of GSD among reproductive-age women. Hypercholesterolemia has been linked to increased estrogen levels, directly or indirectly, as cholesterol serves as a precursor for the synthesis of steroid hormones, including estrogen. as is seen during pregnancy, oral contraceptive usage, and estrogen replacement treatment.16 The majority of our study participants were females (62%). Alqahtaniet al and Songraet al also found similar greater proportions of female patients.[13,15] The average age of participants in this study was ≤ 50 for both genders. Our results are in contrast with those of earlier research by Songraet al, which analyzed data from patients with a mean age of 40 years.15 The average patient age in other previous studies was found to be ≥ 50 for female patients and over 60 for male patients.[17,18]

Several studies have shown that having a BMI of 30 or more is a significant risk factor for an LC converting to an OC.7,11 The average male BMI in our sample was 25.62±1.98 and no male was converted due to their weight. 7 individuals underwent conversion and their mean BMI was below 30 Kg/m^2. Therefore, there was no evidence linking the LC conversion process to an increased risk of obesity. Obesity was not shown to be an independent risk factor predicting conversion in investigations by Warchalowskiet al and Manandhar et al.[10,19] The surgical prognosis of LC in patients with GSD may be affected by the presence of many comorbid diseases and the likelihood that LC will progress to OC may be increased due to thesefacts.18 Comorbidities were more common among females than males, and this difference was not significant in our study. However, Kumaret al found no significant variation in the incidence of comorbid illnesses between the genders.[20]

Our study showed that there was a significant difference in surgical time between the genders (p≤ 0.05). Similarly, several studies show that the average operation time is much greater in males than in females.13,14 The length of time patients spent in the hospital recovering after surgery was comparable for males and females in this study, corroborating previous studies.[14,20,21]However, there have been other reports that postoperative recovery time is lengthened for male patients.[15,17,18]

There are a few limitations to this study. To begin, there is an inherent bias in this retrospective research design since the data was gathered from patient records. The second limitation of our study is that it has a rather small sample size.

Conclusion:

Apart from the longer operative time required for male LC, this study did not find gender as an independent risk factor for poor outcomes after laparoscopic cholecystectomy. More extensive study is needed to determine the causes of the observed differences in surgical duration between the genders and the extent to which these differences contribute to peri-operative morbidity.

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