SCIENTIFIC PAPER

Male Gender Impact on the Outcome of Laparoscopic Cholecystectomy

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ABSTRACT

Background and Objectives: Our aim was to assess the impact of male gender on the outcomes of laparoscopic cholecystectomy by eliminating associated risk factors for conversion.

Methods: A quantitative comparative study was set up on the background of our null hypothesis that male gender has no impact on the outcomes of laparoscopic cholecystectomy. We performed a retrospective study of 241 patients and recorded the duration of surgery, length of postoperative hospital stay, conversion rate, and procedure-specific complications. Risk factors for conversion were excluded. Inferential statistics were applied, and a 2-sided P value of $< .05$ was considered the cutoff point to indicate the amount of evidence against the null hypothesis. We used SPSS for Windows, version 12 (IBM, Armonk, New York). Parametric data were analyzed with the independent-samples t test, and nonparametric data were analyzed with the χ^2 test.

Results: A total of 175 women (72.6%) and 66 men (27.4%) underwent laparoscopic cholecystectomy. The mean age was 51.4 ± 14.8 years for women and 55 ± 12.7 years for men ($P = .08$). Women had a higher body mass index (28.4 ± 4.5) than men (26.8 ± 3.5) ($P < .005$). There were no statistically significant differences in the conversion rate and perioperative morbidity rate. The conversion rate was 2.9% for women and 7.5% for men ($P = .142$); the morbidity rate was 10.2% and 12.1%, respectively ($P = .66$). The mean duration of surgery was longer in men, at 67.9 ± 27.8 minutes, than in women, at 56.5 ± 23.98 minutes ($P < .002$). Both genders had an equal length of postoperative hospital stay, with 1.9 ± 1.8 days for men and 1.9 ± 2.1 days for women ($P = .8$).

Conclusions: Male gender has no impact on the outcomes of laparoscopic cholecystectomy. Gender affects the duration of surgery. Larger-scale studies may disclose the factors responsible for variations in the operative time.

Key Words: Coender risk factor, Laparoscopic cholecystectomy, Male risk factor.

INTRODUCTION

Laparoscopic cholecystectomy (LC) is one of the most popular procedures in laparoscopic surgery. The advantages of minimally invasive surgery undoubtedly have enabled the laparoscopic procedure to emerge as superior over conventional open cholecystectomy.[1–3]

Over the past 2 decades, identifying the risk factors accounting for the perioperative complications of LC has been of major interest. In the early years, Fried et al[4] evaluated 1,676 patients for risk factors that could predict conversion. The study concluded that acute cholecystitis, increasing age, male gender, obesity, and a thickened gallbladder wall found on ultrasonography were significant preoperative predictors of conversion.

Nevertheless, gender as a factor for conversion has attracted attention, and many studies have shown that symptomatic gallstones, inflammation, and fibrosis are more extensive in men than in women. The findings supported the observation of a higher rate of conversion in men than in women.[5] On the contrary, many studies have failed to conclude that male gender is a risk factor for conversion; rather, they noted a combination of risk factors, including increasing age, mode of pathologic presentation (acute cholecystitis), and a history of upper abdominal surgery.[6–10]

There has been general agreement that increasing age, acute cholecystitis, morbid obesity, a high American Society of Anesthesiologists (ASA) classification, and previous upper abdominal surgery are among the most impor-

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tant risk factors. However, despite extensive research, the controversy surrounding the role of gender as a risk factor in LC still exists.

The aim of this study is to investigate the role of male gender as an isolated risk factor responsible for the increased perioperative morbidity of LC by excluding associated risk factors.

MATERIALS AND METHODS

Methods

A quantitative comparative study was set up on the background of our null hypothesis that male gender, as an isolated risk factor, has no impact on the outcomes of LC.

The types of data gathered were quantitative numerical data, both discrete and continuous, as well as categorical unordered data, including age, gender, ASA class, and body mass index (BMI).

Elective LC was considered in this study, and the following data were recorded: duration of surgery from skin incision to skin closure, length of postoperative hospital stay, conversion rate, bleeding, bile duct injury, organ injury, biliary leak, pancreatitis, obstructive jaundice, and wound infection.

Exclusions

Risk factors that may have an impact on the outcomes of LC were excluded, including emergency LC, empyema and gangrenous gallbladder, upper abdominal surgery, morbid obesity, and ASA class 3.

Materials

The data were collected retrospectively from 2 hospitals in different geographic areas, 1 in England (site 1) and 1 in Wales (site 2). The surgical procedures were performed by 12 surgeons experienced in the field of LC. All the operating surgeons had no knowledge at the time of surgery of the plan to conduct this study. Theater databases from both sites were used to retrieve the number of LC procedures performed during the period of study.

The case notes of 315 patients who had elective LC at either site were reviewed by 5 surgical trainees. Of these patients, 241 met the established criteria for this study, with 153 from site 1, covering the year 2007, and 88 from site 2, covering the year 2003.

Statistics

The data were summarized using cross tabulation of descriptive statistics. Inferential statistics were applied to the data to value the effects and differences of the results for any significance. A 2-sided P value of $< .05$ was considered as the cutoff point to indicate the amount of evidence against the null hypothesis. We used SPSS for Windows, version 12 (IBM, Armonk, New York). Age, BMI, postoperative period, and duration of surgery were considered parametric and were analyzed with the independent-samples t test. The other outcome measures were considered nonparametric and were analyzed with the χ^2 test.

RESULTS

A total of 175 women (72.6%) and 66 men (27.4%) underwent LC. In most of the patients, the gallbladder histologic diagnosis was chronic cholecystitis, and this accounted for 68.4% of the studied specimens, whereas 31.6% of patients had cholelithiasis. The mean age was 51.4 ± 14.8 years for women and 55 ± 12.7 for men ($P = .08$). Women had a higher BMI (28.4 ± 4.5) than men (26.8 ± 3.5) ($P < .005$). The mean duration of surgery was longer in men, at 67.9 ± 27.8 minutes, than in women, at 56.5 ± 23.98 minutes; the difference was statistically significant ($P < .002$). Both genders had an equal length of postoperative hospital stay, with 1.9 ± 1.8 days for men and 1.9 ± 2.1 days for women ($P = .8$) (**Table 1**).

There was no statistically significant difference between the 2 genders in terms of conversion. In the female group, 5 patients (2.9%) required conversion: 2 (1.1%) because of bleeding and 3 (1.8%) because of difficulties encountered in dissecting the Calot triangle. In the male group, 5 patients (7.5%) required conversion: 2 (3%) because of bleeding and 3 (4.5%) because of difficulties encountered in dissecting the Calot triangle (**Table 2**).

Similarly, no statistically significant difference was found between women and men in the perioperative morbidity

Table 1.
Variables of Male and Female Patients Undergoing LC

	Men (n = 66)	Women (n = 175)	*P* Value
Age (y)	55 ± 12.7	51.4 ± 14.8	.08
Postoperative stay (d)	1.9 ± 1.8	1.9 ± 2.1	.8
BMI	26.8 ± 3.58	28.4 ± 4.5	<.005
Operative time (min)	67.9 ± 27.8	56.5 ± 23.9	<.002

Table 2.
Difference in Conversion Rate Between Male and Female Patients Undergoing LC

	Men (n = 66)	Women (n = 175)	*P* Value
Conversion	5 (7.5%)	5 (2.9%)	.142
Bleeding	2 (3%)	2 (1.1%)	NS[a]
Difficulties encountered during dissection of Calot triangle	3 (4.5%)	3 (1.8%)	NS

[a]NS = not significant.

Table 3.
Differences in Perioperative Morbidity Rates Between Male and Female Patients Undergoing LC

	Men (n = 66)	Women (n = 175)	*P* Value
Bile duct injury	0	2 (1.1%)	NS[a]
Postoperative biliary leak	0	2 (1.1%)	NS
Postoperative pancreatitis	0	3 (1.7%)	NS
Postoperative jaundice	1 (1.5%)	3 (1.7%)	NS
Wound infection	2 (3%)	3 (1.7%)	NS
Conversion	5 (7.5%)	5 (2.9%)	.142
Total morbidity	8 (12.1%)	18 (10.2%)	.66

[a]NS = not significant.

rate: 10.2% and 12.1%, respectively ($P = .66$) (**Table 3**). In the female group, there were 2 bile duct injuries (1.1%) that were recognized during surgery and repaired at that time, with no similar biliary injury observed in the men. Acute pancreatitis was observed postoperatively in 3 women (1.7%) but no men.

Postoperative obstructive jaundice due to retained common bile duct stones was recorded in 3 women (1.7%), as compared with only 1 man (1.5%). Postoperative biliary leak developed in 2 women (1.1%); 1 case resolved with conservative treatment, and 1 required endoscopic retrograde cholangiopancreatography for stenting. Follow-up in the outpatient clinic showed port-site wound infections in 3 women (1.7%) compared with 1 man (1.5%).

DISCUSSION

Research series have shown that LC in men is associated with a higher morbidity rate than that in women. Male gender is usually accompanied by other risk factors that contribute to the increase in the perioperative morbidity rate. The study targeted the following questions: Is male gender an independent risk factor for conversion and an increased perioperative morbidity rate? Do we need to use a different consent process in male patients or to allow extra time for surgery scheduled in men or even defer the treatment of men (undergoing LC) to senior trainees?

Factors affecting the outcomes of LC have been heavily investigated over the past 2 decades, aiming to predict conversion and postoperative complications. Many studies have shown age (>65 years) to be a risk factor for increased perioperative morbidity and conversion rates because of associated acute cholecystitis and a high ASA classification.[11–17]

In a study by Merriam et al,[18] acute gangrenous cholecystitis was twice as likely to develop in men than in women, and male gender was a recognized factor for complicated cholecystitis. The study considered that these variations may be responsible for the noticeable impact on the outcomes in men. Accordingly, we excluded pathologic complications of gallstone disease including gangrenous cholecystitis, empyema of the gallbladder, and acute cholecystitis. Only confirmed histologic diagnoses of chronic cholecystitis and cholelithiasis were included.

In this study 91% of men were ASA class 1, and the mean age was 55.0 ± 12.7 years, with 16 men (24.2%) aged >65 years. Although we were unable to exclude the group of patients aged >65 years from the study because this may have affected the sample significantly, acute cholecystitis as an associated risk factor with increasing age was excluded.

Obesity and BMI >40 have always been considered risks for conversion in LC.[19,20] In this study the mean BMI for men was 26.8 ± 3.58, with a BMI <30 in 61 male patients (92.5%), a BMI of 38 in 1 patient (1.5%), and a BMI <34 in 4 patients (6%). None of the 5 patients with a BMI >30 underwent conversion or had perioperative morbidity.

Upper abdominal surgery was highlighted in many studies as a risk factor for conversion but was not considered a contraindication for LC. Karayiannakis et al[21] showed that an upper abdominal scar is not a contraindication for safe LC but is associated with an increased rate of conversion and postoperative morbidity including wound infection. A prolonged operative time may be attributed to adhesiolysis.[21,22] On the other hand, Schirmer et al[23] concluded that lower abdominal surgery has little impact on the outcome of LC.

According to these findings, we applied exclusions only to an upper abdominal scar to eliminate the impact of this factor on perioperative morbidity; lower midline and Pfannenstiel incisions were included and indeed did not interfere with the course of surgery.

Considering the excluded risk factors for conversion and perioperative morbidity, we observed a higher rate in the male group than in the female group; nevertheless, this observation was statistically insignificant. Furthermore, the study showed a higher biliary morbidity rate in the women as compared with their male counterparts, with no obvious explanation, and this also proved to be statistically insignificant.

Indeed, the study did not show statistically significant differences between the 2 genders with the sole exception of operative time. LC had a longer duration in men, at 68.9 minutes, compared with women, at 56.5 minutes ($P < .002$).

Although the study failed to show any statistical evidence that male gender has unique effects on the outcomes of LC, it did show that surgeons performing LC had to spend more time treating men than treating women. The difference of 12 minutes between the 2 genders may appear insignificant; however, extra minutes in the operating theater are not without additional risks. Conversion occurred after a median laparoscopic surgery time of 50 minutes. Complications are 4 times higher when LC operative time is greater than 2 hrs when compared with LC operative time between 30 and 60 minutes.

Although the difference indicates that the duration of LC in men, from start to completion, is longer than that in women, the study was unable to identify factors responsible for this observation and its impact on LC.

CONCLUSION

Male gender as an isolated risk factor has no impact on the outcomes of LC. Gender affects the duration of surgery because more time is required to complete LC in men than in women. Larger-scale studies may provide a different answer and disclose the factors responsible for variations in the length of surgery between the 2 genders and its impact on perioperative morbidity.

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