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Gender variation in operative findings and outcome in patients undergoing laparoscopic cholecystectomy at Birat Medical College Teaching Hospital

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Abstract

Introduction: Laparoscopic cholecystectomy is the gold standard treatment for symptomatic cholelithiasis. Despite advancement in surgical instrument and operating technique, conversion to open cholecystectomy is still worrisome concern to surgeons. There are various preoperative factors impacting on conversion. Male gender as an independent risk factor for conversion is still debatable.**Objectives:** This study aims to study the role of male gender, its impact on operative findings and conversion.**Methodology:** A total number of 131 patients diagnosed as symptomatic cholelithiasis and who fulfilled the inclusion criteria underwent laparoscopic cholecystectomy. Data related to patients demographics like age sex, intraoperative complications like bleeding, bile leak, duration of surgery, conversion if any was noted. Reason for conversion was also noted. Postoperative complications like pain, surgical site infection and duration of hospital stay was noted.**Results:** In this study, A total of 130 patients participated in this study of which 64 (51.70%) were male (M) and 66 (44.89%) were female (F). Mean age of presentation was 48.25 years, youngest being 23 years and elder being 78 years of age. Mean operating time was 40.66 minutes. Bile leak was seen in 2 patients in male (M) group while no such event was observed in the female group (p value 0.240). There was no organ injury observed in either group. 1 patient in the female (F) group had postoperative pancreatitis (p value 1.00). Postoperative obstructive jaundice was noted in 2 patients in female group (F), p value 0.496. It was observed that 7 male patients had conversion to open during the procedure while only 3 cases were converted in the female gender group, p value of 0.203. Bile duct injury was seen in 1 patient in male (M) gender group, p value 0.492. However, this injury was not seen in the conversion group. All cases undergoing conversion had mean operating time of 75.3 minutes and this was more in male (M) group.**Conclusion:** Laparoscopic cholecystectomy is difficult in male (M) gender group compared to females and operating time is also longer, however male gender is not an independent risk factor for conversion.

INTRODUCTION

Laparoscopic cholecystectomy is the gold standard procedure these days for symptomatic cholelithiasis, procedure being minimally invasive has benefits over conventional open procedures in terms of pain, shorter hospital stay and early return to work, less complications.¹ However despite advancement in laparoscopic

instrument and expertise of performing surgeon, conversion to open has been found in 3-10 % of cases.² Risk factors like acute cholecystitis, increasing age, previous upper abdominal surgery, male gender, obesity and thickened gallbladder wall has been seen as preoperative predictors of conversion.³ Intraoperatively anatomic abnormalities, extensive fibrosis, complications like bleeding, internal organ injury also result in conversion. Inflammation and fibrosis are seen more in male gender and this has been a cause of higher rate of conversion in men than women.⁴ Laparoscopy cholecystectomy has been found to more difficult and time consuming in male gender compared to women.⁵ There has not been much study on sex factor causing impact on laparoscopic cholecystectomy. This study aims at studying the impact of sex especially male gender in performing laparoscopic cholecystectomy in terms of conversion to open procedure, complications pain and length of hospital stay.

METHODOLOGY

Between July 2020 to Nov 2021, randomized descriptive, cross sectional observational comparative study was conducted in department of general surgery, BMCTH in patients with proven diagnosis of symptomatic cholelithiasis who presented in emergency and OPD. All patients willing for surgery laparoscopy between age group 17 to 70 years of age were included in this study. Patients who did not consented for participation, ASA grade 3 or more, morbidly obese, history of previous upper abdominal surgery, gangrenous and empyema gallbladder were also excluded from study. Patients having concomitant choledocholithiasis were also excluded from this study. Ethical clearance was taken from the institutional review committee of BMCTH (Ref: IRC-PA-133/2077-78)

Patients demographic data, detailed history and clinical examination was done at the time of diagnosis and noted in performa after informed consent for study. All participants were informed about the study. 130 patients meeting the inclusion criteria of symptomatic cholelithiasis during the study period were included in the study. All procedures were performed by trained laparoscopic surgeons. Surgeons were aware of the study being done.

Intraoperative data and finding was noted by resident doctors in a predesigned performa. All patient received similar

preoperative antibiotics and anaesthetic agents for induction and maintenance. In all the patients intraperitoneal access was achieved using trocars and standard four working ports were made. Intraoperative complications like bleeding, bile leak, duration of surgery, conversion if any was noted. Reason for conversion was also noted. All patients received similar analgesic, antacids, fluid and antibiotics during the postoperative period. Post operative complications like pain, surgical site infection and duration of hospital stay was noted.

Data collected were checked thoroughly for completion and error. Data were entered manually in windows excel sheet and coded and recorded digitally using an IBM Statistical Package for the Social Sciences (IBM SPSS Statistics; Armonk, NY, USA) on Windows version 22.0. The chi-square, Fisher's exact tests and cross tabulation were used to compare qualitative data. A p value of < 0.05 was considered statistically significant.

RESULT

A total of 130 patients participated in this study of which 64 (51.70%) were male (M) and 66 (44.89%) were female (F). Mean age of presentation was 48.25 years, youngest being 23 years and elder being 78 years of age. Mean operating time was 40.66 minutes. Bile leak was seen in 2 patients in male (M) group while no such event was observed in the female group, p value 0.240. There was no organ injury observed in either group. 1 patient in the female (F) group had postoperative pancreatitis, p value 1.00. Postoperative obstructive jaundice was noted in 2 patients in female group (F), p value 0.496. It was observed that 7 male patients had conversion to open during the procedure while only 3 cases were converted in the female gender group, p value of 0.203. Bile duct injury was seen in 1 patient in male (M) gender group, p value 0.492. All cases undergoing conversion had mean operating time of 75.3 minutes and this was more in male (M) group.

Of 7 male patients 3 had frozen calot's triangle making surgery difficult and decision to open was done. 2 had contracted gallbladder and adhesion was present, 2 had difficult anatomy, one (1) of which had bile duct injury hence converted to open surgery. Of 3 female gender patients converted to open cholecystectomy 2 had adhesion and only 1 patient had frozen calot's triangle.

Table 1: Demography, operating time and hospital stay

Variables of patient undergoing Laparoscopic cholecystectomy			
	Male Gender	Female Gender	P value
Age	51.70 +_ 14.35	44.89+ _13.80	0.346
Operating Time	44.33+ _15.24	37.11+ _12.38	0.516
Hospital stay	2.31+ _1.116	2.42+ _1.71	0.377

Table 2: Perioperative morbidity including conversion

Perioperative morbidity			
	Male Gender	Female Gender	P value
Bile duct Injury	1	0	0.492
Post-op bile leak	2	0	0.240
Post-op pancreatitis	0	1	1
Post-op Jaundice	0	2	0.496
Conversion	7	3	0.203

Table 3: Conversion and its causes in both genders

Reason for conversion	Male gender	Female gender
Frozen calot's Triangle	3	1
Adhesion	2	2
Difficult anatomy	2	0
Total	7	3

Table 4: Comparison with various study male as a determinant factor for conversion

Author/Year	Sample size	Conversion	P value	Odd ratio
Sippey, 2015 USA	7242	436	0.005	1.72
Sultan, 2013 Egypt	4698	234	<0.001	2.79
O'leary, 2013 Ireland	1061	58	0.015	-
Raman, 2012 USA	874	68	<0.001	3.0 (1.7-5.3)
Yajima 2012, Japan	407	47	0.047	2.0 (1.1-3.6)
Our study	130	10 (7 male, 3 female)	0.203	-

DISCUSSION

Laparoscopic cholecystectomy is gold standard surgical procedure for symptomatic cholelithiasis. There has been well established proven benefits of laparoscopic cholecystectomy in terms of lesser postoperative pain, reduced need of analgesia, shorter hospital stay and early return to work. However there are factors affecting perioperative morbidity.⁴ Conversion to open procedure is a worrisome matter to surgeons and for the patients, however conversion is not a failure for surgeons. There has been various study on these factors affecting conversion, including gender. Gender especially male gender, conversion to open is high and still it's a debatable question. Russels et al observed higher rate of conversion in male gender and suggested gallbladder disease in male gender as a separate entity.⁶ Zisman et al also observed higher rate of conversion to open during laparoscopic cholecystectomy and concluded that male gender have more anatomical variation and difficulties compared to female.⁷ In this study 7 male patients had conversion to open compared to 3 female patients. The rate of conversion was 7.69 %, which remains compliance with global rate of conversion from laparoscopic to open surgery in Cholelithiasis is 3-10 %.²

In our study conversion rate in male gender is twice as compared

to female gender. Difficult in dissection and inability to identify anatomical structures in calot's triangle due to frozen calot's triangle, adhesion, difficult anatomy and injury to bile duct were reasons for conversion in our study. Various literature and studies have shown frozen calot's triangle, adhesion and anatomical variation or difficulties as major associated factor for conversion and these factors are seen usually pronounced in male gender.^{8,9} However reason for increased risk of conversion in male gender is still not clear. Adhesion of gallbladder to surrounding adjacent structure is one of major risk factor. Akcakaya A et al in 2015 proposed that men have high muscle proportion and narrow chest circumference facilitating adherence of the gallbladder to adjacent gallbladder. Silent unnoticed episodes of acute cholecystitis may have occurred and may have been ignored.¹⁰ Male genders are usually more neglect to their health and seek medical attention usually at late stage. These may be the reasons for higher incidence of adhesion or frozen calot's triangle during surgery in male gender.¹¹

K Manandhar et al in 2019 in Nepal conducted similar study in 151 patients to determine whether male gender stands alone as risk factor for conversion of laparoscopic cholecystectomy to

open. Overall conversion rate was 4.6 % , 3 male and 4 female and concluded no significant association of male gender as risk factor for conversion ($p= 0.303$).¹² Coelho JCU et al in 2019 conducted similar study in 1647 patients and concluded that mean operating was longer in male gender than in female group ($p< 0.001$) however there was no difference between genders in regards to rate of conversion ($p= 1.0$).¹³ A Bahadur et al in 2020 in similar study suggested that male gender is not an independent risk factor for conversion in laparoscopic cholecystectomy.¹⁴ In our study we observed 7 male patients and 3 female patients ($p= 0.203$) had conversion to open during the procedure drawing similar inference that there is no significant association of male gender as risk factor for conversion. In our study mean operating time in male gender was significantly higher than female gender, p value 0.516 however this was not significant. This has been seen in various studies, the reason of longer operating time in male gender is possibly due to difficulty during operation may be due to either adhesion or difficult anatomical variation.¹¹

Alan Hu et al in 2017 systematic literature review of 30 studies on risk factors for conversion of laparoscopic cholecystectomy to open surgery, male gender was found to be significant determinant factor for conversion.¹⁵ 17 studies out of 30 studies had significantly shown male gender as important risk factor for conversion. This has been represented in table above. Philip Rothman J et al 2016, in their systematic review of 32 prospective studies, male gender as a significant risk factor for conversion was found in 21 studies.¹⁶ The quality of evidence for male gender as risk factor for conversion was low. Our study differs from above systematic literature findings. We believe that all these studies were before 2017 and coming to current days there has much advancement in medical sciences in terms of patient awareness, preoperative diagnostic ultrasound machines and laboratory equipment. New generation surgeons are much oriented to laparoscopic techniques, learning curve has been shorted. There are high quality and fine laparoscopic equipment, energy device and intraoperative visibility are improved resulting in improved surgeon's technical performance and ability to perform laparoscopic cholecystectomy even with adhesion and difficult anatomy. Public awareness and consciousness towards their health issues are also improving resulting to early diagnosis and management. These factor might have contributed to reduce rate of conversion.

CONCLUSION

This study concludes that there are various determinant factor for conversion in laparoscopic cholecystectomy, of which higher rates of conversion are observed in male gender compared to female and operating time is also comparatively longer, however there is no significant association.

RECOMMENDATIONS

Decision to convert in male genders should not be delayed especially if adhesion, distorted anatomy or frozen calot's triangle is found. An attempt to dissect is the least a surgeon must try, however conversion must not be taken as failure.

Furthermore research must be done to understand disease pathology and anatomy in male gender.

LIMITATIONS OF STUDY

This study has some limitations like sample size was limited due to time bound duration of the study and factors like BMI and obesity were not taken into consideration.

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CONFLICT OF INTEREST

None

FINANCIAL DISCLOSURE

None

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