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Does the male gender govern conversion of laparoscopic cholecystectomy?

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Abstract

Introductions: Laparoscopic cholecystectomy (LC) occasionally demands conversion to open cholecystectomy (OC) because of multiple risk factors. This study was conducted to find out whether male gender is a stand-alone risk factors for conversion of LC to OC.

Methods: This was a comparative analysis of conversion of LC to OC in patients operated for symptomatic cholelithiasis during June 2017 to May 2018 at Bir hospital, National Academy of Medical Sciences, Kathmandu, Nepal. The patients were divided into two groups: male (group 1) and female (group 2). Study variables included gender, America Society of Anesthesiologist class, history of upper abdominal pain within six weeks prior to surgery, upper abdominal surgery, emergency department visit due to upper abdominal pain, adhesion of gallbladder to adjacent structure and body mass index. Binominal logistic regression analysis of risk factors for conversion was conducted. Odds ratio (95% CI) was calculated. The p value ≤ 0.05 was considered statistically significant.

Results: Among 151 patients (male 39, female 112), 7 (4.6%, male 3 and female 4) had conversion from LC to OC. Male gender itself as an isolated risk factor had no significant association to conversion (p=0.303). There was no significant difference found for age, operating time and hospital stay. Previous emergency visit (p=0.020) and adhesion (p<0.030) were associated with conversion.

Conclusions: Male gender had no significant association for conversion of LC to open. Previous emergency visit due to upper abdominal pain and adhesion of gallbladder were associated risk factors for conversion.

Keywords: conversion, laparoscopic cholecystectomy, male gender, risk factors

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Introductions

Laparoscopic cholecystectomy (LC), due to its clear advantages over open cholecystectomy (OC), has become the gold standard for symptomatic cholelithiasis, which occasionally demands conversion to OC in 3-24% cases.[1] America Society of Anesthesiologist (ASA) class[2] is important factor which determines overall outcome of surgery. Even in experience hands, complications are determined largely by intraoperative difficulties requiring conversion.[3] Studies have shown that, acute cholecystitis, severe fibrosis, male gender, obesity, older age, and technical difficulties are the most common associated risk factors for conversion (3-24 %).[1,4-8]

Increasing age, acute cholecystitis, obesity, high ASA class and previous upper abdominal surgery are important risk factors for the conversion, and are more common in males.[9-11] The controversy about male gender as an isolated risk factor for conversion in LC still exists.

The aim of our study was to analyse whether male gender is an isolated risk for conversion from LC to OC.

Methods

A comparative study was conducted to find out whether male gender is an isolated risk factor for conversion from LC to OC in patients operated for symptomatic cholelithiasis during June 2017 to May 2018 in a surgery unit of surgical department, Bir Hospital, National Academy of Medical Sciences (NAMS), Kathmandu, Nepal. Ethical approval was obtained from institutional review board (IRB) NAMS.

Data were collected from hospital database. All patients who had LC and LC converted to OC with histology of chronic cholecystitis and cholelithiasis were included. The patients were divided into two groups according to the gender: male (group-1) and female (group-2). Both groups were compared in terms of age, the status of Calot's triangle (e.g. frozen Calot's), length of operation time, conversion rate, omental and organ adhesions to the gallbladder, BMI, discharge days, pain within last six weeks prior to surgery due to hepato-biliary pancreatic causes. BMI of 23 kg/m^2 or more was taken as risk factor.[12]

The exclusion criteria were acute cholecystitis, gallbladder empyema, gangrenous, perforations, malignancy suspected during exploration, or those requiring common bile duct exploration.

The seven variables included to analyse risks of conversion were gender, ASA score, history of upper abdominal surgery, upper abdominal pain within six weeks prior to LC, history of ED visit due to upper abdominal pain, adhesion of gall bladder to adjacent structures and BMI. Other parameters studied were age, operative time (skin to skin) and length of postoperative hospital stay. Four surgical residents helped in gathering data.

The LC with or without conversion were performed by four experienced surgeons. All procedures were performed with the standard four port techniques. To minimize individual surgeons bias on conversion, none of them knew about the ongoing study.

The data were analyzed using SPSS-16. Independent sample t-test were used for numerical (continuous and discrete) data. Binominal logistic regression analysis of risk factors to conversion was conducted and odds ratio (95% CI) calculated. The p-value ≤0.05 was considered statistically significant.

Results

There were 151 elective LC patients during study period, group-1 male 39 (25.8%) and group-2 female 112 (74.2%). The difference in mean age, duration of surgery and hospital stay were statistically not significant, p>0.05 in two groups, Table 1. There was no iatrogenic intraoperative injury.

There were total of 7 (4.6%) conversions, three in group-1 (male) and four in group-2 (female). The conversion rate in male was 3 out of 39 (7.69%) and in female 4 out of 112 (3.57%). All of the seven conversions had at least one risk factor, Table 2.

Table 1. Comparison of variables between group-1 (male 39) and group-2 (female) undergoing LC regardless of their risk factors

Parameter	Group-I (Male n=39)	Group-2 (Female n=112)	Total Cases	p value
Age mean±SD (Range)	47.51±12.75 18-70	41.92±12.64 17-85	43.36±12.86 17-85	>0.05
Operative time means in minutes±SD (Range)	70.64±39.340 25-165	62.01±30.314 30-180	64.24±32.847 25-180	
Hospital stay means in days±SD (Range)	2.95±4.812 2-32	2.29±2.211 1-25	2.46±3.094 1-32	

Table 2. Gender wise presence of risk factors in patients undergoing LC requiring conversion (n=7; male 3, female 4)

	Conversion Cases						
Risk Factors	1	2	3	4	5	6	7
Gender	Female	Female	Male	Male	Female	Male	Female
ASA≥2	No	No	No	Yes	Yes	No	No
History of upper abdominal surgery	No	Yes	No	No	Yes	No	No
History of upper abdominal pain within six weeks prior to LC	No	No	No	No	Yes	No	No
History of previous ED visit due to upper abdominal pain	Yes	No	No	Yes	Yes	No	No
Adhesion with adjacent structure(s)	Yes	Yes	Yes	Yes	Yes	Yes	No
BMI >23 kg/m^2	Yes	No	Yes	Yes	No	Yes	Yes

Table 3. Overall comparison between LC and conversion in regard to presence of risk factors

	With one or more risk factors	Without any risk factors	Total
Converted cases	7	0	7
Non converted cases	128	16	144
Total	135	16	151

Table 4. Comparison of risk factors and conversion (n=7) between two groups, male (39) and female (112) undergoing LC (n=151)

Risk Factors	Gender	Cases with risk factor	Cases without risk factor
ASA ≥2	Male	23/39 (58.97%)	16/39 (41.03%)
	Female	80/112 (71.43%)	32/112 (28.57%)
History with upper abdominal surgery	Male	36/39 (92.31%)	3/39 (7.69%)
	Female	89/112 (79.46%)	23/112 (20.54%)
History with upper abdominal pain within six weeks prior to LC	Male	30/39 (76.92%)	9/39 (23.08%)
	Female	84/112 (75.00%)	28/112 (25.00%)
History with previous ED visit due to upper abdominal pain	Male	32/39 (82.05%)	7/39 (17.95%)
	Female	90/112 (80.36%)	22/112 (19.64%)
Adhesion noted with adjacent structure(s)	Male	21/39 (53.85%)	18/39 (46.15%)
	Female	91/112 (81.25%)	21/112 (18.75%)
BMI >23 kg/m2 (≥ Increased risk)	Male	11/39 (28.21%)	28/39 (71.79%)
	Female	51/112 (45.54%)	61/112 (54.46%)

Table 5. Binominal logistic regression analysis of risk factors between patients undergoing LC with or without conversion

Risk Factors	Number of patients			Odds Ratio (95% CI)	P Value
	With conversion n = 7 (%)	Without conversion n = 144 (%)	Total n= 151		
Gender					
Female	4	108	112	2.25 (0.48-10.53)	0.303
Male	3	36	39		
ASA Score					
Normal Healthy patient (I)	5	98	103	1.17 (0.22-6.27)	0.852
Patient with mild systemic disease (≥II)	2	46	48		
History with upper abdominal pain within six weeks prior to LC					
No	6	108	114	2.00 (0.23-17.18)	0.528
Yes	1		37		
History with upper abdominal surgery					
No	5	120	125	0.50 (0.09-2.73)	0.423
Yes	2	24	26		
History with previous ED visit due to upper abdominal pain					
No	3	119	122	0.16 (0.03-0.75)	0.020*
Yes	4	25	29		
Adhesion noted with adjacent structure(s)					
None	1	111	112		
To Omentum	3	26	29	0.078 (0.008-0.781)	0.030*
To Stomach	2	3	5	0.014 (0.001-0.193)	0.002*
To Duodenum	1	4	5	0.036 (0.002-0.686)	0.027*
BMI					
Acceptable risk <23 kg/m^2	2	60	62		
Increased risk 23–27·5 kg/m^2	3	65	68	0.72(0.12-4.47)	0.726
High risk >27·5 kg/m^2	2	19	21	0.32(0.04-2.40)	0.266

* p≤0.05, statistically significant

Among 7-conversions, both groups had 3-conversions, one each due to bleeding, frozen Calot's, and adhesion of gallbladder. In group-2 one more conversion was due to dilated CBD post ERCP, Table 2.

Out of 151 cases, one or more risk factors were present in 135 (89.4%), of which 128 did not require conversion. Table 3.

More than half of the patients in each group had one or more of the risk factors (except BMI), Table 4.

The gender itself was not an isolated reason for conversion. Adhesion, history of hospital visit due to upper abdominal pain had significant association with conversion, Table 5.

Discussions

In our study, the overall conversion rate in male was more than female (7.69 % vs 3.57%), which is an indirect clue indicating more pronounced surgical difficulties in men. However, the rate of conversion in male gender was statistically not significant, odds ratio at 95 confidence interval was 2.25 (0.48-10.53), p=0.303, Table 5. Out of seven risk factors studied, we found significant association of conversion with adhesion of gall bladder to adjacent structures and history with previous hospital visit due to upper abdominal pain, Table 5.

Conversion of LC to OC procedure is not failure of the procedure, rather the decision is mostly taken to decrease the procedure

related morbidities. Male gender itself has been considered as one of the risk factors for the conversion.[13-15] However there are other studies which do not consider male gender alone as a risk for conversion.[16-18]

There have been general agreement that, besides the male gender, there are other significant predictors of conversion such as increased age, obesity, thickened gallbladder wall detected in preoperative biliary ultrasound, acute cholecystitis, morbid obesity, a high ASA classification, previous upper intra-abdominal (gastro intestinal) surgery.[3,18]

Controversies still exist on risk factors for conversion, and male patients undergoing LC have more surgical difficulties and increased conversion rates than females.[8,9,13,16] Studies report that male patients had advanced gall bladder disease when they seek treatment leading to difficulties in LC.[19-20] We excluded advanced pathological conditions of gallstone disease, the acute cholecystitis with or without gangrenous, empyema or suspicions of malignancy. Only histologically confirmed chronic cholecystitis and cholelithiasis were included for uniformity of the sample. This could be one of the reason why we did not find significant differences in the rate of conversion in males.

Upper abdominal surgery is considered a risk factor for conversion.[21] It is not a contraindication for LC[22], but may require prolonged operative time for adhesiolysis.[22,23] In our study with limited sample size, the patients having abdominal scar had no statistically significant role in the conversion (p=0.423).

One of the risk factors for the conversion is adhesion of gallbladder to adjacent structure.[24] Adhesion was present in almost all, except one female, of the converted cases in our study. It might be speculated that high muscle proportion and narrow chest circumference may facilitate the adherence of the gallbladder to adjacent organs in male.[25] In present study there was strong association in between adhesion and conversion (p=0.002 - 0.030). Since we do not routinely perform intraoperative cholangiogram in LC, we prefer to convert the cases if there are difficulties due to adhesion. This could be the reason why most of the patients with adhesion had conversion.

Obesity and BMI >30 have been considered risks for conversion in LC[21], and predictor of difficult LC if not conversion.[25] Although the obesity and BMI ≥ 30 have been considered risks for conversion in LC.[21,26] About 60% of our study population were within acceptable BMI. Two-time increase in conversion rate has been reported in BMI >27.2.[27] In our study, we did not find association obesity to conversion, out of 7-conversion, five had increased BMI, 3 (BMI 23-27.5, p=0.726) and 2 (BMI >27.5, p=0.266 respectively).

Some of the limitations of this study may be time bound cross-sectional design of one year with limited sample to draw strong conclusion that male gender is not a stand-alone predictor of conversion in LC.

Conclusions

Male gender alone had no significant association with the rate of conversion in LC. Adhesion of gall bladder and ED visit due to upper abdominal pain were associated with conversion.

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References

1. Tang B, Cuschieri A. Conversions during laparoscopic cholecystectomy: risk factors and effects on patient outcome. J Gastrointest

Surg. 2006;10(7):1081-91. DOI PubMed GoogleScholar
2. Doyle DJ, Garmon EH. American Society of Anesthesiologists Classification (ASA Class). Treasure Island (FL): StatPerls Publishing; 2019 Jan. PubMed GoogleScholar
3. Fried GM, Barkun JS, Sigman HH, Joseph L, Clas D, Garzon J, Hinchey EJ, Meakins JL. Factors determining conversion to laparotomy in patients undergoing laparoscopic cholecystectomy. Am J Surg. 1994;167(1):35-9. DOI PubMed GoogleScholar
4. Bingener-Casey J, Richards ML, Strodel WE, Schwesinger WH, Sirinek KR. Reasons for conversion from laparoscopic to open cholecystectomy: a 10-year review. J Gastrointest Surg. 2002;6(6):800-5. DOI PubMed GoogleScholar
5. Kama NA, Kologlu M, Doganay M, Reis E, Atli M, Dolapci M. A risk score for conversion from laparoscopic to open cholecystectomy. Am J Surg. 2001;181(6):520-5. DOI PubMed GoogleScholar
6. Livingston EH, Rege RV. Technical complications are rising as common duct exploration is becoming rare. J Am Coll Surg. 2005;201(3):426-33. DOI PubMed GoogleScholar
7. Sikora SS, Kumar A, Saxena R, Kapoor VK, Kaushik SP. Laparoscopic cholecystectomy - can conversion be predicted? World J Surg. 1995;19(6):858-60. DOI PubMed GoogleScholar
8. Bulbuller N, Ilhan YS, Baktir A, Kirkil C, Dogru O. Implementation of a scoring system for assessing difficult cholecystectomies in a single center. Surg Today. 2006;36(1):37-40. DOI PubMed GoogleScholar
9. Russell JC, Walsh SJ, Reed-Fourquet L, Mattie A, Lynch J. Symptomatic cholelithiasis: a different disease in men? Connecticut Laparoscopic Cholecystectomy Registry. Ann Surg. 1998;227(2):195-200. DOI PubMed GoogleScholar
10. Kartal A, Aksoy F, Vatansev C, Sahin M, Yilmaz O, Belviranli M, Karahan Ö. Does estrogen cause low conversion rates in laparoscopic cholecystectomies for acute and chronic cholecystitis in women? JSLS. 2001;5(4):309-12. PubMed GoogleScholar.
11. Zisman A, Gold-Deutch R, Zisman E, Negri M, Halpern Z, Lin G, Halevy A. Is male gender a risk factor for conversion of laparoscopic into open cholecystectomy? Surg Endosc. 1996;10(9):892-4. DOI PubMed GoogleScholar
12. WHO EC. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet. 2004;363(9403):157-63. DOI PubMed GoogleScholar
13. Lein HH, Huang CS. Male gender: risk factor for severe symptomatic cholelithiasis. World J Surg. 2002;26(5):598-601. DOI PubMed GoogleScholar
14. Kanaan SA, Murayama KM, Merriam LT, Dawes LG, Prystowsky JB, Rege RV, Joehl RJ. Risk factors for conversion of laparoscopic to open cholecystectomy. J Surg Res. 2002;106(1):20-4. DOI PubMed GoogleScholar
15. Sanabria JR, Gallinger S, Croxford R, Strasberg SM. Risk factors in elective laparoscopic cholecystectomy for conversion to open cholecystectomy. J Am Coll Surg. 1994;179(6):696-704. PubMed GoogleScholar
16. Rosen M, Brody F, Ponsky J. Predictive factors for conversion of laparoscopic cholecystectomy. Am J Surg. 2002;184(3):254-8. DOI PubMed GoogleScholar
17. Alponat A, Kum CK, Koh BC, Rajnakova A, Goh PM. Predictive factors for conversion of laparoscopic cholecystectomy. World J Surg. 1997;21(6):629-33. DOI PubMed GoogleScholar
18. Bazoua G, Tilston MP. Male gender impact on the outcome of laparoscopic cholecystectomy. JSLS. 2014;18(1):50-4. DOI PubMed GoogleScholar
19. White AK, Johnson M. Men making sense of their chest pain – niggles, doubts and denials. J Clin Nurs. 2000;9(4):534-41. DOI PubMed GoogleScholar
20. Ambe PC, Weber SA, Wassenberg D. Is gallbladder inflammation more severe in male patients presenting with acute cholecystitis? BMC Surgery. 2015;15:48. DOI PubMed GoogleScholar Web link
21. Ibrahim S, Hean TK, Ho LS, Ravintharan T, Chye TN, Chee CH. Risk factors for conversion to open surgery in patients undergoing laparoscopic cholecystectomy. World J Surg. 2006;30(9):1698-1704. DOI PubMed GoogleScholar
22. Karayiannakis AJ, Polychronidis A, Perente S, Botaitis S, Simopoulos C. Laparoscopic cholecystectomy in patients with previous upper or lower abdominal surgery. Surg Endosc. 2004;18(1):97-101. DOI GoogleScholar
23. Akyurek N, Salman B, Irkorucu O, Tascilar Ö, Yuksel O, Sare M, Tatlicioglu E. Laparoscopic cholecystectomy in patients with previous

abdominal surgery. JSLS. 2005;9(2):178-83. PubMed GoogleScholar Weblink
24. Shea JA, Healey MJ, Berlin JA. Mortality and complications associated with laparoscopic cholecystectomy: a meta-analysis. Ann Surg. 1996;224(5):609-20. DOI PubMed GoogleScholar
25. Akcakaya A, Okan I, Bas G, Sahin G, Sahin M. Does the difficulty of laparoscopic cholecystectomy differ between genders? Indian J Surg. 2015;77(Suppl 2):S452-6. DOI PubMed GoogleScholar
26. Nachnani J, Supe A. Pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters. Indian J Gastroenterol. 2005;24(1):16-8. DOI PubMed GoogleScholar Weblink
27. Hutchinson CH, Traverso LW, Lee FT. Laparoscopic cholecystectomy: do preoperative factors predict the need to convert to open? Surg Endosc. 1994;8(8):875-8. DOI PubMed GoogleScholar