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Research Article

Predictive factors for conversion of laparoscopic cholecystectomy to open cholecystectomy: a retrospective study

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ABSTRACT

Background: Laparoscopic cholecystectomy is the treatment of choice for symptomatic gall stones, though conversion to open cholecystectomy is a possibility. We have tried to estimate the risk factors which are associated with the conversion.
Methods: This retrospective study was conducted on 457 patients out of whom 38 were converted to open cholecystectomies. Patient's records were analyzed and their demographic detail, physical and clinical examination details were taken into consideration. Details of the laboratory investigations were also noted.
Results: 296 patients who underwent cholecystectomy were below the age of 60 years out of whom 9 had to be converted to open surgeries. 27 of 161 patients' above the age of 60 years were converted to open cholecystectomy, showing the age is one of the risk factors for conversion. There were a significant number of patients who were at a risk of myocardial infarction or had a previous history of MI. Another significant comorbidity was previous surgery because of the presence of adhesions and acute cholecystitis. Tenderness in right hypochondriac region was seen in 76.8% of the converted cases while only 44% in the Laparoscopic cholecystectomy (LC) patients had tenderness. Gall bladder was also palpable in 36.8% of the converted patients and was the gall bladder thickness over 3mm was seen in 57.9% of the patients.
Conclusions: A thorough review of all the risk factors if performed based on the physical, clinical and laboratorial data, before the surgery in any setup, will help the surgeons to encounter the difficulty during LC and if required convert the surgery to open cholecystectomy.

Keywords: LC, Open cholecystectomy, Conversion, Risk factors

INTRODUCTION

A gall stone is one of the most common health problems in the world. They are usually asymptomatic and are many times accidentally detected in ultrasonography during the evaluation of some other medical condition.

Laparoscopic cholecystectomy (LC) was first introduced in 1987, and since then, it has revolutionized the minimally invasive procedures. It had since then been recognized as the gold standard for the treatment for gall bladder diseases. LC has many advantages over open surgery with shorter hospital stay, less postoperative pain, smaller surgical scar thus more of cosmetic value, and lowercost.[1-5]

In spite of all these advantages, sometimes, complications related to anesthesia, peritoneal access, Pneumoperitonium, surgical exploration, thermo coagulation and increased incidence of iatrogenic lesions such as that to the biliary tract have been reported during a laparoscopic cholecystectomy. Anatomical, ductal and vascular anomaly or distorted anatomy following acute or chronic inflammation may further complicate the issue. In such difficult situations for LC, the surgeon may choose to perform open surgery.

This conversion should not be considered as a failure of surgery or inexperience of the surgeon, but rather a wise decision to avoid any risks or damage.

However, this would mean that the patient has a longer operative time, longer hospital stay and more postoperative morbidity and higher hospital costs.[6-10]

Therefore identifying the risk factors for the conversion before the surgery will help the surgeon to consider the appropriate plan of action and as a result counsel the patient accordingly. This identification is always not possible because during the laparoscopic surgery, accidental lesions of the biliary duct, excessive bleeding may result in conversion. However, there are a few potential risk factors which can be identified by a few laboratory tests, clinical and physical examination, ultrasound etc.[11-14]

We had aimed to identify these risk factors in our set up, so that we can plan our action accordingly.

METHODS

This retrospective study was conducted by the department of surgery in Viswabrathi Medical College between April 2014 to November 2015. All laparoscopic cholecystectomies performed during this tenure were taken into consideration. Out of them, all laparoscopies which were converted to open cholecystectomies were enrolled into the study. Patients whose records were incomplete or those who opted for open surgeries were excluded from the study. Patients with pathological detected malignancies or gallbladder polyps were also excluded from the study.

Detailed demographic details of the patients, mode of admission (emergency or elective) their clinical and physical examination details, past history of surgeries, history of the presenting illness, comorbidities were noted. All the laboratory investigation results including liver assessment tests, ultrasound findings, post-operative complications, reasons for conversion from laparoscopic to open surgeries were documented.

Chi square test was performed for comparison of the variables. SPSS 11.5 software was used for the statistical analyses. A value of $p < 0.05$ was considered statistically significant.

RESULTS

38 out of 457 cases of laparoscopic cholecystectomy surgeries were converted to open surgeries accounting for 8.3%. 326 (71.3%) women had opted for LC and 131 (28.7%) were males. Of the converted patients, 21 (55.3%) were females and 17 (44.7%) were males. The mean age of the patients in the LC group was 45.2±7.2 while in the converted group it was 58.3±6.9.

296 patients who underwent cholecystectomy were below the age of 60 years out of whom 9 had to be converted to open surgeries. 27 of 161 patients above the age of 60 years were converted to open cholecystectomy, showing the age is one of the risk factors for conversion (Table 1).

Table 1: Association of age as a risk factor for conversion.

Age	Total	Converted to open	P value
<60 yrs	296	9	<0.01
>60 yrs	161	27	

Table 2: Past history findings and comorbidities.

Findings	LC N=419	Converted N=38	P value
Obesity	133 (31.7%)	17 (44.7%)	NS
Hypertension	86 (20.5%)	10 (26.3%)	NS
Diabetes mellitus	94 (22.4%)	12 (31.6%)	NS
Mode of admission Elective Emergency	 407 (97.1%) 12 (2.9%)	 35 (92.1%) 3 (7.9%)	NS
Hepatitis	8 (1.9%)	1 (2.6%)	NS
Past history of acute pancreatitis	59 (14.1%)	4 (10.5%)	NS
Biliary colitis	46 (11%)	2 (5.3%)	NS
Acute myocardial infarction	39 (9.3%)	8 (21.1%)	<0.01
COPD	45 (10.7%)	3 (7.9%)	NS
Past history of previous surgery	54 (12.9%)	14 (36.8%)	<0.05
Acute cholecystitis	36 (8.6%)	13 (34.2%)	<0.005

The rate of emergency admission and for acute cholecytitis was similar for both these groups. There was no significance in the obesity, hypertension or diabetes of the patient. Neither was there any significance in the clinical features such as hepatitis, past history of acute colitis and pancreatitis, and COPD. Although there was a significant number of a patient who were at a risk of myocardial infarction or had a previous history of MI. History of a previous surgery also was a significant feature for conversions due to adhesions. Another significant comorbidity was acute cholecystitis (Table 2).

Table 3: Association of physical examination and laboratory diagnosis.

Findings	LC	Converted	P value
Tenderness in RHC	186 (44.4%)	29 (76.8%)	<0.005
Palpable gall bladder	11 (2.6%)	14 (36.8%)	<0.005
WBC < 9 x 10^3/dl > 9 x 10^3/dl	 327(78.1%) 92 (21.9%)	 13 (34.2%) 25 (65.8%)	<0.005
Bilirubin (direct) >0.15mg/dl	97 (23.2%)	9 (23.7%)	NS
Bilirubin (indirect) >1.2mg/dl	91 (21.7%)	6 (12.8%)	NS
Alkaline phosphatase >130 IU/l	106 (25.3%)	7 (18.4%)	NS
Gall bladder thickness > 3mm	69 (16.5%)	22 (57.9%)	<0.005
Edema in gall bladder	32 (7.6%)	22 (57.9%)	<0.005
Gall stones	54 (23.9%)	3 (7.9%)	NS
Pericholecystic fluid	29 (6.9)	19 (50%)	<0.005

Tenderness in right hypochondriac region was seen in 76.8% of the converted cases while only 44% in the LC patients had tenderness. Gall bladder was also palpable in 36.8% of the converted patients and was the gall bladder thickness over 3mm was seen in 57.9% of the patients (Table 3) which was significant.

DISCUSSION

The advantages and safety of LC have made it a standard procedure for the treatment of gall stones. But in spite of its many advantages, 2-15% of conversion rates have been reported in various studies. Conversion to open surgery from laparoscopic cholecystectomy is required when safe completion of the LC cannot be ensured. It is considered as a sound judgment rather than a failure of the LC to avoid complications and reduce morbidity.[15-17]

The identification of the parameters helps in predicting the conversion and counseling the patients and their families accordingly. In our study we have observed a significant rate of conversion in patients above the age of 60. This was in accordance with a study conducted by Constantine et al where patients above 60 years showed a higher tendency towards conversion. Other studies also showed similar results although in several other studies, age was found not to be one of the risk factors.[11,15,18-21]

Although the numbers of female patients were more than the males, the significance difference in the gender for conversion could not be ascertained in our study which was similar to other studies although it was in contrast to other studies where male gender was found to be more at risk. This increase was attributed to the presence of significantly more adhesions in males as well as anatomical difficulties.[9,10,18,19,22]

Obesity in many studies was found to be one of the contributing factors for conversion but this significance was not found in our study. Our study was corroborated by Constantine et al and Kama et al. Similar was the case with hypertension which was not found to be contribution factor in our study, though Livingston et al showed and association between hypertension and conversion though the reason for this association is unclear.[10,11,16,18]

Cardiovascular diseases have shown to be a risk factor for the conversion in our though it was in contrast to other studies.[18]

Among the physical examination and laboratory findings, the significant ones were tenderness in RHC and palpable gall bladder, thickness of the gallbladder being more than 3 mm and presence of edema in the gall bladder. Presence of pericholecystic fluid was also found to be an independent risk factor for conversion. These results were in accordance to a similar study by Tayeb et al. Although, few other scientists claimed this to be a weak predictor.[16,23]

Patients who have any of the risk factors preoperatively are likely to encounter complications postoperatively. Therefore, a thorough review of all the risk factors if performed based on the physical, clinical and laboratory investigation data, before the surgery in any setup, will help the surgeons to encounter the difficulty during LC.

CONCLUSION

Our study has shown age, past history of previous surgery, acute colitis to be some of the major risk factors for conversion of LC to open cholecystectomy. Other risk factors were tenderness in RHC, palpable gall bladder, edema in gall bladder, thickness >3mm and pericholecystic fluid to be other factors. A thorough review of all the results before surgery can help the surgeon to either perform LC or convert into open cholecystectomy.

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