



CLINICO RADIOLOGICAL PREDICTORS OF DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY

Urology

Dr. Tamal Kanti Sengupta	MS, Associate Professor, Department of General Surgery, Medical College, Kolkata, Kolkata – 700073
Dr. Naveen Kumar Gupta*	MS, MCh, Assistant Professor, Department of Urology, Institute of Post Graduate Medical Education And Research, Kolkata -700020, West Bengal, India. *Corresponding Author
Dr. Syed Danish	MS, Registrar, Columbia Asia Hospital, Salt Lake, Kolkata
Dr. Debarshi Jana	Young Scientist DST, Institute of Post-graduate Medical Education And Research, A.J.C. Bose Road, Kolkata-700020, West Bengal, India

ABSTRACT

The aim of the study was to identify the predictors of difficulty in laparoscopic cholecystectomy. Preoperative risk assessability would be useful for informing patients and a more experienced surgical team could be assembled when risk for conversion appears significant. In this study, time taken for the surgery, biliary/stone spillage, injury to duct/artery or conversion to open cholecystectomy was noted. In this study we concluded that BMI>27.5, history of prior hospitalization, palpable gallbladder, impacted stone and pericholecystic fluid collection were significant predictors of difficult laparoscopic cholecystectomy. Positive predictive value for easy prediction was 90.0% and for difficult prediction was 70.6%.

KEYWORDS

Laparoscopic Cholecystectomy, Radiological, Predictors, Outcome

INTRODUCTION

One of the commonest problems which affects the gastro intestinal system of individuals residing in the Indo- Gangetic belt is Gall stone disease or cholelithiasis. Prevalence of cholelithiasis varies worldwide and is dependent on age, ethnicity and gender.[1] The incidence of cholelithiasis in Indian adult population is estimated at 4%.[2] The increasing prevalence in India is attributable to the westernization of diet, socio economic changes and the widespread availability of low cost good quality ultrasound for initial screening of pain abdomen patients.

Since its inception in 1987, Laparoscopic cholecystectomy (LC) has gradually taken over from open cholecystectomy as the procedure of choice for management of Gall stone disease. For surgeons it would be helpful to establish some criteria that would assess the risk of conversion preoperatively. Preoperative risk assessability would be useful for informing patients and a more experienced surgical team could be assembled when risk for conversion appears significant. Thus this study is conducted at our hospital to predict the difficult laparoscopic cholecystectomy and conversion using various clinical and radiological parameters.

AIMS AND OBJECTIVES

To identify the predictors of difficulty in laparoscopic cholecystectomy.

STUDY PROTOCOL AND POPULATION

A prospective, study conducted for a period of 18 months at a tertiary centre in Eastern India. Screening of patients was done for cholelithiasis who presented with upper abdominal pain, or vomiting or dyspepsia or jaundice. For screening, abdominal ultrasonography (USG) for patients with cholelithiasis presenting with abdominal symptoms was done. Those patients confirmed as having cholelithiasis on ultrasound, were subjected to routine hemogram, liver and kidney function tests, coagulation profile, and biochemical investigations.

Exclusion criteria were patients with common bile duct (CBD) calculus, dilated CBD, deranged liver function tests, features of obstructive jaundice, age <15 years and those refusing laparoscopic cholecystectomy. The selected patients were evaluated for the following risk factors: age, sex, history of previous hospitalization, body mass index (BMI), presence of any supraumbilical or infraumbilical abdominal scar, palpable gallbladder, gallbladder wall thickness, pericholecystic collection, and impacted stone.

Following thorough clinical and investigative evaluation, all patients underwent laparoscopic cholecystectomy. In this study, time taken for the surgery, biliary/stone spillage, injury to duct/artery or conversion to open cholecystectomy was noted. All patients enrolled in the study

were operated by a single laparoscopic surgeon to avoid bias in surgical outcome. Postoperatively cases were followed up for any complication. Drain was removed between the 1st and 3rd postoperative day depending upon the amount of drainage. Suture removal was done on the 8th postoperative day for all the cases taking into account all aseptic precautions. All patients were followed up for seeing any recurrent symptoms or infection. Postoperatively, we defined the surgical procedure as easy, difficult and very difficult as described by Randhawa and Pujahari scale. Patients who had history of jaundice, choledocholithiasis, raised TLC count, suspected gall bladder mass and immunocompromised status were excluded from the study.

RESULTS

This study comprised of 200 cases that were studied prospectively over a period of 3 years, of which 60(30%) were males and 140 (70%) were females. Out of 200 patients, 196 had chronic cholecystitis and 4 had acute cholecystitis as per histopathological diagnosis. BMI of patients were, <25 in 63% patients; 25.1-27.5 in 20 (20.20%) patients and >27.5 in 18 (18.18%) patients. None of the patients had carcinoma gallbladder. No age criteria was there but maximum no of patients are between 31 to 40 years. Out of 200 patients 164(116/164—70.7%) patients were less than 50 years of which 116 were females and 48 were males(48/164---30.3%). This corresponds to literature of middle aged females preponderance of disease. In our study the youngest patient was 15 yrs old and oldest was 60 years. Majority of patients were in age group 31 to 40 years of age.

Correlation Of Preoperative Score And The Outcome

Preoperative score	Easy Laparoscopic Cholecystectomy	Difficult Laparoscopic Cholecystectomy	Very difficult Laparoscopic Cholecystectomy	Total
0-5	144	08	08	160
6-10	05	23	08	36
10-15	0	0	04	04
Total	149	31	20	200

Pain was predominant symptom in all 200 patients(100%) followed by vomiting with pain in 68 patients(38%).44 patients have dyspepsia(22%) and 4(2%) patients had jaundice. Fever was seen in 24 patients. 24% of patients had right hypochondrium tenderness, 19.5 % had murrphys sign positive and 8% had guarding and rigidity.

As this study is rural based medical college study and most of our patients were farmers with majority of them have BMI less than 30 Kg/meter square out of which 70.5% has BMI less than 27.5(Kg/Meter square). Thus BMI is not a risk factor in our study.

All of our patients underwent ultrasound examination one day prior to

surgery. About 34% had wall thickness >4mm, 66% had multiple calculi, 18% had solitary calculi, 16% had solitary impacted calculi and 16% had pericholecystic collection. 9% of the selected patients had leucocytosis.

Preoperative score Easy Laparoscopic Cholecystectomy Difficult Laparoscopic Cholecystectomy Very difficult Laparoscopic Cholecystectomy Total 10-514408081606-100523083610-15000404 Total 1493120200

Seven patients were converted to open cholecystectomy, out of these 7 patients 4 patients had extensive adhesions with difficulty in dissection and one had uncontrolled bleeding from cystic artery which was anatomical variant. Another one had mass formation. During lap cholecystectomy, 21 patients had stone spillage, 31 patients had bile spillage, 4 patients had bleeding, 17 patients went into post operative ileus which persist for greater than 48 hours and 2 patients developed port site infection. Average stay in hospital was 3.8 days. Drain was given in about 18% of the study population. Drain was generally removed on POD 1-3. The patients were followed for one month and stitches were removed on eighth post operative day.

DISCUSSION

The gold standard treatment of symptomatic cholelithiasis is laparoscopic cholecystectomy and preoperative prediction of the risk of conversion is an important step in planning laparoscopic surgery. The advantage of preoperative prediction is that early decision of conversion can be made so as to avoid unnecessarily prolonging the surgery and the complications of surgery and anaesthesia can be prevented.

Kama et al³ developed a risk scoring system for conversion of laparoscopic cholecystectomy to open cholecystectomy. The efficacy of this system has been proved.⁴ Another scoring system was developed by Randhawa and Pujari and was proved by Prashant S Dhanke and Subodh PU Gane⁴.

Middle age grouped females of cholelithiasis have the overall incidence of cholelithiasis greater as compared to male of the same age group. In this study the male:female ratio is 1:2.3.

Out of 200 patients for laparoscopic cholecystectomy seven patients (3.5%) were converted to open cholecystectomy and the cause for conversion was dense adhesion, recent attack of acute cholecystitis, abnormal bleeding from anatomically variant cystic artery. This is in consistent with study done by Schrenk et al⁵. In 5 out of 7 (71.4%) patients converted to open cholecystectomy were male. In our study the male sex was found to be a risk factor. Thus male sex as an independent risk factor for conversion is controversial.

It has been observed that male patients have more intense inflammation and fibrosis resulting in difficulty to dissect Calot's triangle and gallbladder bed dissection by Nachnani et al⁶ Russel et al⁷ have suggested that men tend to present late as they pay less attention to subtle symptoms, therefore, may have more advanced disease.

In our study majority of the patients were in age group 31 to 40 years and 80% of the patients came under the age group from 21 to 50 years, so in this study age is not a significant predictor since majority of the patients had easy cholecystectomy irrespective of age.

Obesity and presence of abdominal fat causes difficulty in the placement of the umbilical port because the umbilicus is displaced downwards and there is difficulty to identify umbilical fascia. We have majority of patients with BMI <25 Kg/m² sq. 40 out of 200 patients had BMI >27.5 Kg/M² square. 82.5% Patients (33/40) with BMI (>27.5 Kg/m² sq) had difficult laparoscopic cholecystectomy in terms of port placement, gall bladder retrieval, stone and bile spillage. Two out of seven patients that were converted to open cholecystectomy had BMI >27.5 Kg/M² sq. This is not in concordance with the study done by Bulbulla N et al. In our study BMI >27.5 Kg/m² sq is an important risk factor for predicting difficult laparoscopic cholecystectomy.

History taking and clinical examination was an important factor in this study. Pain was predominant symptom seen in all of our patients. Right hypochondrium tenderness and Murphy's sign was positive in 24% and 13.5% respectively signifying acute attack within one or two weeks.

Fever was present in 12% of patients. Fever invariably associated with

increased gall bladder wall thickness and pericholecystic fluid collection, those patients had difficult cholecystectomy. It was found that patients with fever and pericholecystic collection had significant high rates of difficulty (p=0.01), hence fever and pericholecystic fluid collection is a strong predictor of difficulty.

Four patients history of jaundice with deranged liver function especially alkaline phosphatase. It was obstructive in nature associated with pain and fever. MRCP was done in these patients. Two of them underwent open cholecystectomy with choledocholithotomy and they were excluded from the study population. Rest of two had normal MRCP underwent interval laparoscopic cholecystectomy. This is consistent with the study conducted by Jitendra Singh Yadav et al⁸.

Patients with history of previous hospitalization had difficult cholecystectomy, hence it is a significant predictor of difficulty. About 19% of the patients had h/o hospitalisation for acute cholecystitis. 82% patients had difficult laparoscopic cholecystectomy. The results were in concurrence with the studies done by Nachnani et al⁶ and Nikhil Agrawal⁹.

Raised leucocyte count more than 10000/cumm is not a predictive factor for difficult laparoscopic Cholecystectomy. This may be due to other causes other than gall bladder pathology leucocyte count may be raised. This is not significant in our study as we haven't selected patients for laparoscopic cholecystectomy during acute phase. This is in contrast with study conducted by Ravindra Nidoni et al¹⁰. Their study on 180 patients showed overall conversion rates of 5.6% and significant risk factors were TLC >11000/cumm, more than two cholecystitis attacks, thickness of gallbladder wall >3mm and pericholecystic fluid collection.

Out of 200 patients 44 had undergone tubal ligation, 8 had undergone LSCS, 4 had undergone appendectomy and 4 had undergone hysterectomy. One patient had upper and lower abdominal scar. Previous surgeries didn't affect the per operative outcome significantly, since many patients in our study had lower abdominal surgeries outnumbered the upper abdominal surgeries. In our study upper abdominal scar prolonged the duration of surgery. Port placement was done very cautiously. No incidence of conversion to open surgery was noted. These findings were same as in study conducted by Miller K et al.¹¹

Correlation Of Pre Op Score And The Outcome

	Positive predictive value	
	Easy	Difficult
Dhanke et al ¹²	90.05%	100%
Nikhil Gupta et al ¹³	90%	88%
Present Study	90.0%	70.6%

The positive predictive value for easy prediction was 90.0% and for difficult prediction was 70.6%. Conversion rate from lap to open cholecystectomy was 3.5% in present study.

Ultrasonography was done in all patients one day prior to surgery. All patients had stones in gallbladder, 15 patients had wall thickening and 10 had pericholecystic fluid collection. 66% had multiple calculi, 18% had solitary calculus of which 16% had solitary impacted calculi. This study shows the Gallbladder wall thickness and pericholecystic fluid collection are strong predictors of difficulty (p<0.0471).

Only 2 patients had infection of epigastric port site, dressings were done and it healed by secondary intention.

CONCLUSION-

In this study we concluded that BMI >27.5, history of prior hospitalization, palpable gallbladder, impacted stone and pericholecystic fluid collection were significant predictors of difficult laparoscopic cholecystectomy. Positive predictive value for easy prediction was 90.0% and for difficult prediction was 70.6%.

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