The Present Scenario of Cholecystectomy

Rajesh Lonare[1], Rajkishore Singh[2], Nirpex Tyagi[3], Kulwant Singh[4]

People's College Of Medical Sciences And Research Centre, Department Of Surgery, Bhopal (M.P.)
Associate Professor, Department Of Surgery, People's College Of Medical Sciences & Research Centre,
Bhopal, (M.P.) INDIA.

Abstract:
Background: *The surgical management of the gall bladder pathology has changed because of development of laparoscopic cholecystectomy , ultrasound and endoscopic retrograde cholangiopancreatography (ERCP). The Present study compares various ultrasonographic & clinical criteria with reference to laparoscopic Cholecystectomy.*
Methods: *The study was done on 100 patients. They are of symptomatic cholelithiasis, requiring elective cholecystectomy, attending surgical OPD of People's College Of Medical Sciences & Research Centre and other center of Bhopal from january 2011 to 31st august 2015.*
Results: *Out of 100 patients only 18 of the patient were males rest 82 were female patients . The maximum incidence is seen in the age group of 35-40years . There were 18 patients with BMI more than 27.5 kg/m^2 . Sensitivity of ultrasonograhic prediction is 55.55%. 18 patients had history of previous abdominal surgery. Positive predictive value of gallbladder wall thickness to predict the difficult laparoscopic surgery is 77.77%. Best clinical predictor for predicting conversion to open procedure is BMI>27.5(highest Chi-square value 6.46, P value 0.040)* *Best sonographic predictors for conversion to open cholecystectomy are impaction of stone at neck of gallbladder and contracted gallbladder (highest Chi-square value 13.6)*
Conclusions: *Cholecystectomy is the most common procedure performed on the biliary tract and the second most common major abdominal operation performed today. In our study we have included 100 patients in which clinical and ultrasonographic parameters with reference to laparoscopic cholecystectomy were analysed.*
Keywords: *Ultrasonography(USG),Laparoscopic Cholecystectomy (LC) , Cholelithiasis, Endoscopic Retrograde Cholangiopancreatography (ERCP).*

I. Introduction

The gall bladder is second only to the appendix as the intra-abdominal organ most commonly requiring surgical intervention [1]. Most epidemiological studies, aimed at estimating gallstone prevalence and incidence rates, do not represent the general population. Until recently, data were mainly derived from autopsy studies (which were often subject to selection bias) and cholecystectomy rates (which fluctuate as much as fivefold between, different countries and periods of time) [2].

In almost all sonographic surveys, gallstones are more frequent in women than in men and the majority of individuals were unaware of having gallstones [3]. The treatment of choice for patients with symptomatic cholelithiasis is elective laparoscopic cholecystectomy (LC). Large series of patients undergoing elective LC for chronic cholecystitis report a mortality rate of approximately 0.1% [4].

The treatment of symptomatic cholelithiasis has been operative since 1882 when Langenbuch performed the first successful cholecystectomy in Berlin. Today, laparoscopic cholecystectomy is the gold standard of treatment compared to the open procedure offering reduced hospital stay, rapid mobilization, excellent cosmesis, rare wound complications and rapid return to normal lifestyle[5]. There has been an increase in the rate of cholecystectomies subsequent to the introduction of LC accompanied by evidence of lower clinical thresholds for operative therapy of gallstones[6].

The common aetiology of conversion from LC to open cholecystectomy is uncontrollable bleeding, adhesion, inflammation, anatomical variation, trauma of bile duct, presence of malignant pathologies & technical failure. The surgeon must also be facile with open biliary surgery for several reasons. First, the conversion rate to OC remains approximately 2–5% in most series. This is more common in the elderly and in the setting of acute cholecystitis. In these situations cholecystectomy will be more difficult and therefore experience and proper care are necessary to avoid technical errors that could lead to devastating complications. Secondly, there are specific instances when open surgery should be considered a wiser approach[7]. Our study the value of clinical & ultrasonography criteria in predicting intraoperative difficulties for patient undergoing LC & in identifying indicators for Conversion tool were assessed.

Patients And Methods.

Our study included 100 patients. They are of cholelithiasis, requiring cholecystectomy, attending surgical OPD of People's College Of Medical Sciences & Research Centre and other centre of Bhopal from january 2011 to august 2015. The study was conducted in the department of General Surgery People's College of Medical Sciences & Research Centre and other centre of Bhopal.

The selected patients were then told about the procedure and written informed consent was taken. Patients were also informed about the conversion to open cholecystectomy. All patients with symptomatic cholelithiasis were included. All age groups and both sex included in our series. Patients with other disease like peritonitis, acute pancreatitis, jaundice or abnormal liver function tests (LFT),empyema gallbladder with gall stones are not included in our study.

A detailed clinical history with special reference to duration of pain, its periodicity aggravating factor, relieving factor , time since last attack occurred and history of previous abdominal surgery. A detailed physical examination including BMI, any palpable mass in right hypochondriac region, tenderness, any operative scar mark and if present then its location was done and recorded.

Ultrasonography is the most common screening test for cholecystitis and cholelithiasis. It is easy, non-invasive, and a highly accurate imaging technique that can also detect associated lesion of the liver, pancreas, common bile duct (CBD) and kidneys. It detects gallstones with accuracy of more than 95% .

The Ultrasonography of the patients was done in the department of Radio diagnosis, PCMS&RC. The Patients were fasting overnight for the maximal distention of the gallbladder. The Ultrasonography was done on Diasonics spectra colour Doppler ultrasound on B mode, gray scale, and real time scan.The ultrasound was done in supine position and was repeated in reclining position to see for the mobility of stone (whether impacted in neck or not). The ultrasound was done with 3.5 MHz probe. The various clinical and ultrasonographic criteria were assessed. By taking above studies in consideration, in this study we will assess the value of clinical & ultrasonography criteria in predicting intraoperative difficulties for patient undergoing LC & in identifying indicators for Conversion tool.

II. Observation & Results

Observations and analysis of various parameters studied is as follows.
Following table 1 showing the age distribution.

Table 1: Age Distribution

Age(in years)	Number of patients	Percentage(%)
>50 years	24	24%
<50 years	76	76%
Total	**100**	**100%**

Mean age was 41.30 years. 16 cases (16%) were difficult on surgery and 10 cases (10%) converted to open procedure. There were 18 males (18%) , and among 18 males laparoscopic cholecystectomy was difficult in 8 males (8%) and converted to open in 6 cases (6%) . Table 2 showing sex incidence and conversion of LC to open cholycystectomy . Table 3 showing BMI and its correlation. Table 4 showing correlation between history of previous abdominal surgery and LC.

Table 2: Correlation Between Sex And Conversion To Open Cholecystectomy

Sex	Cases converted to open procedure	Cases not converted to open procedure	Total
Male	6	12	18
Female	18	64	82
Total	**24**	**76**	**100**

Table 3 : Correlation Between Bmi And Conversion To Ope Cholecystectomy

BMI	Number of cases converted to open procedure	Number of cases not converted to open procedure	Total
>27.5	10	8	18
<27.5	14	68	82
Total	**24**	**76**	**100**

Table 4 : Correlation Between History Of Previous Abdominal Surgery And Difficult Laparoscopic Cholecystectomy

History of previous abdominal surgery	Number of cases difficult on surgery	Number of cases not difficult on surgery	Total
Yes	12	6	18
No	24	58	82

Total	36	64	100

Sensitivity of clinical parameters to predict the conversion to open procedure is 75.00%. Specificity of clinical parameters to predict the conversion to open procedure is 52.63%. In ultrasonographic evaluation the finding in our current studies are as follows. Table 5 showing correlation of ultrasonographic prediction in performing LC , and table 6 showing correlation of ultrasonographic prediction and conversion to open procedure.

Table 5: Correlation Of Ultrasonograhic Prediction And Difficulty In Performing Laparoscopic Cholecystectomy

	Number of cases difficult on surgery	Number of cases to be easy on surgery	Total
Number of cases to be predicted difficult	20(a)	8(b)	28(a+b)
Number of case to be predicted easy	16(c)	56(d)	72(c+d)
Total	**36(a+c)**	**64(b+d)**	**100**

Table 6: Correlation Of The Ultrasonograhic Prediction And Conversion To Open Procedure

	Number of cases converted to open procedure	Number of cases not converted to open procedure	Total
Number of cases to be predicted difficult on ultrasound	16	12	28
Number of cases to be predicted easy on ultrasound	8	64	72
Total	**24**	**76**	**100**

There are 82 patients who were having gallbladder wall thickness less then 4mm(82%), and 18 patients with wall thickness more then 4mm(18%). Positive predictive value of gallbladder wall thickness to predict the difficult laparoscopic surgery is 77.77% Negative predictive value of gallbladder wall thickness to predict the difficult laparoscopic surgery is 73.17%. Positive predictive value of the gallbladder wall thickness to predict the conversion to open cholecystectomy is 66.66%

Negative predictive value of the gallbladder wall thickness to predict the conversion to open cholecystectomy is 85.36%. Table 7 showing correlation of the impaction of stone in the gallbladder neck with the difficult LC. Table 8 showing correlation of the impaction of stone in the gallbladder neck and conversion to open procedure.

Table 7: Correlation Of The Impaction Of Stone In The Gallbladder Neck With The Difficult Laparoscopic Cholecystectomy

Stone impacted at neck of gallbladder	Cases difficult on surgery	Cases easy on surgery	Total
Yes	14	2	16
No	22	62	84
Total	**36**	**64**	**100**

Table 8: Correlation Of The Impaction Of Stone At The Neck Of Gallbladder And Conversion To Open Procedure

Stone impacted at neck of gallbladder	Cases converted to open procedure	Cases not con0verted to open procedure	Total
Yes	12	4	16
No	12	72	84
Total	**24**	**76**	**100**

The above tables shows the best predictor of the difficult laparoscopic cholecystectomy is the combined ultrasonograhic parameters (highest Chi-square value=13.7), next best correlation is shown by impaction of stone at the neck of gallbladder followed, and best predictors for conversion to open cholecystectomy are impaction of stone at neck of gallbladder.

III.   Discussion
Symptomatic cholelithiasis is one of the most common conditions that a general surgeon will encounter . Symptomatic cholelithiasis includes a spectrum of clinical manifestations of varying severity. Some presentations can be managed medically with elective operation later; others are life-threatening and require emergent intervention. This algorithm provides a general structure for decision-making that will be modified according to specifics of the individual patient and the available local expertise[8].

Brodsky, et al[9] identified male gender and age >60years as being pre-operative factors associated with conversion in acute cholecystitis. One Indian study by S. S. Sikora, Ashok Kumar, R. Saxena et al[10] in their series they failed to identify statistically significant correlation between age and conversion to open cholecystectomy. In this series, we found that sensitivity of age>50 years for prediction of difficult cases is 44.44% and specificity of age>50 years for prediction of difficult cases is 87.5%. Heng-HuiLein, Ching-Shui Huang[11] found that male patients had significantly longer (p = 0.04) operating time than females and they suggested that surgeons are more likely to offer men an open procedure rather than a laparoscopic procedure with a "high likelihood" of conversion so as the value in our series i.e. p value is 0.469 and Specificity of male sex to predict the conversion to pen procedure is 84.21%.

Michael Rosen, Fred Brody, Jeffrey Ponsky[12] found in their series that obesity independently predicted conversion to open cholecystectomy in patients with acute cholecystitis. In this series BMI>27.5 kg/m^2 shows correlation with conversion to open procedure P is 0.040, which is in concordance with other studies. In our study most of the patients with previous lower abdominal surgery were female. Based on our study, LC can be performed safely in patients with previous upper or lower abdominal surgery, if they do not have such conditions as acute cholecystitis, pancreatitis, CBD stones, and morbid obesity.

Gall stone size, Gallbladder wall thickness, gallbladder volume, number of stones, common duct size, and stone impaction in the neck of gallbladder. Of these parameters only gallbladder wall thickness, common bile duct diameter, contraction of gallbladder and stone impaction shows the maximum correlation with the difficult laparoscopic cholecystectomy and/or conversion of laparoscopic cholecystectomy to open procedurethis is in agreement with the other studies[13.] Of the four ultrasonic parameters studied common bile duct diameter more than 6 mm, the number of cases in our study were not enough to give a significant statistical value. This is due to the reason that the patients with common bile duct stones were not included in the study.

Gallbladder wall thickness is one of the ultrasonic parameters most extensively studied for the gallstone disease. The positive predictive value of the gallbladder wall thickness is 77.77 % for predicting the difficult laparoscopic cholecystectomy though the sensitivity of the test is only 38.89% for predicting the difficult laparoscopic cholecystectomy. The various surgical parameters taken for assessing the operative technical difficulty namely the time taken for surgery more than 90 minutes and time taken to dissect Calot's triangle and gallbladder bed more than 20 minutes is well calculated. The laparoscopic cholecystectomy in expert hands should not take more than 45 to 50 minute[14,15].

One another good criteria for prediction is stone impacted at the neck of gallbladder. Of the 16 cases with the stone impaction at the neck 14 cases were difficult on surgery and 12 out of 14 cases were converted to the open procedure. So based on our series we can conclude that clinical and sonographic value plays important role to predict LC as difficult one and prone to conversion or open procedure, and best predictors are BMI and impaction of stone at the neck of gallbladder.

IV.   Conclusion

From this study we conclude that pre-operative clinical parameters and ultrasonograhic parameters are good predictor in laparoscopic cholecystectomy in majority of the cases and should be used as a screening procedure. Ultrasonograhic parameters are better than clinical parameters but when used in combination with preoperative colour Doppler ultrasound can predict difficult laparoscopic cholecystectomy more accurately. It can help surgeon to get an idea of the potential difficulty that he can face in that particular patient. The most valuable assessment the ultrasound can give is gall bladder wall thickness, gall bladder size CBD diameter and CBD stones and any abnormal anatomy of the biliary tract if present.

References

[1].   Joe J. Tjandra, Gordon J.A. Clunie, Andrew H. Kaye, Julian A. Smith.3 edtn.Textbook of Surgery. Gallstones. 2006.109
[2].   Acalovski M. Cholesterol gallstones: from epidemiology to prevenmtion. Postgrad Med J 2001; 77:221-229.
[3].   karaliotas , Broelsch ,Habib . Liver and Biliary Tract Surgery. Gall Stone Disease. 2006.149.
[4].   karaliotas , Broelsch , Habib. Liver and Biliary Tract Surgery. Gall Stone Disease. 2006.150.
[5].   karaliotas , Broelsch ,Habib . Liver and Biliary Tract Surgery. Gall Stone Disease. 2006.155.
[6].   Legorreta A, Silber J, Constantino G, et al. Increased cholecystectomy rate after introduction of laparoscopic cholecystectomy. *JAMA* 1993;270:1429–1432 [PubMed: 8371441.
[7].   Maingot's Abdominal Surgery ,11 th edtn. Cholecystectomy .Chapter .32 2007 .
[8].   Jonathan A. Myers, Keith W. Millikan, Common Surgical Diseases Second Edition, Cholelithiasis. 2008.197.
[9].   Brodsky A., Matter I., Sabo E., et al. Laparoscopic cholecystectomy for Acute cholecystitis: can
[10].   the need for conversion and the probability of complications be predicted? A prospective
[11].   study. SurgEndoscUltrasound Intervent Tech. 14:755-760, 2000.
[12].   Sikora S.S., Kumar A., Saxena R., et al. Laparoscopic cholecystectomy: can conversion
[13].   be predicted? World J Surg, 1995; 19:858–860.
[14].   Lein H.H., Huang C.S. — Male gender: risk factor for severe symptomatic cholelithiasis.

[15].   World   J Surg. 26:598-601, 2002.
[16].   Rosen M, Brody F, Ponsky J.   Predictive factors for conversion of   laparoscopic
[17].   cholecystectomy. Am J Surg 2002; 184:254-8.
[18].   Santambrogio R, Montorsi M., Bianci P, Opocher E, Schubert L, Verga M, et al.
[19].   Technical difficulties and complications during laparoscopic cholecystectomy: predictive
[20].   use of preoperative ultrasonography. World J Surg1996; 20:978- 82.
[21].   Daradkeh SS, Suwan Z, Abukhalof MI: pre-operative ultrasonography and prediction of
        technical difficulties during laparoscopic cholecystectomy.World J Surg, 1998, 22(1): 75-7.
[22].   Alponat A, Kum CK, Koh BC, et al. Predictive factors for conversion of
[23].   laparoscopic   cholecystectomy. World J Surg, 1997, 21(6): 623-29.