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PRE-OPERATIVE PREDICTION OF DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY USING CLINICAL, BIOCHEMICAL AND ULTRASONOGRAPHIC PARAMETERS

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Abstract

Aim: To Pre-operatively predict difficult laparoscopic cholecystectomy using clinical, biochemical & ultrasonographic parameters and to evaluate these parameters as predictors and also to calculate the conversion rates.

Materials and Methods The indoor patients admitted for laparoscopic cholecystectomy were included in this study. Informed consent was taken from the sample group after explanation and before inclusion into the study.

Results: Various clinical, biochemical and ultrasonographic parameters were statistically significant as predictors for difficult laparoscopic cholecystectomy. These parameters can aid in recognition of cases where an open cholecystectomy should be considered and the patient counselled preoperatively.

Conclusion: From this study, we can conclude that preoperative clinical, biochemical and ultrasonographic parameters are good predictors of difficulty in laparoscopic cholecystectomy in the majority of cases and should be used as a screening procedure. It can help surgeons to get an idea of the potential difficulty to be faced in a particular patient.

KEY WORDS: Difficult Laparoscopic Cholecystectomy, Conversion, Pre-Operative Prediction, Clinical Parameters , Biochemical Parameters , Ultrasonographic Parameters.

Introduction:

Cholecystectomy is the most common elective procedure performed on the biliary tract and the second most common abdominal operation performed today.¹ Over the past years, removal of gall bladder has been the primary mode of therapy for gall stone disease. Alternative modes include gall bladder dissolving agents, biliary lithotripsy and percutaneous cholecystolithotomy. The main disadvantage with these techniques is that the stone forming organ i.e gall bladder is left in situ resulting in recurrence

With more and more endeavors being made in the field of laparoscopy, more and more complicated cases which were relatively contraindicated a few years ago are now being tackled laparoscopically. However one should be very careful in the cases with complicated gallstone disease to avoid any disastrous complication. Safe dissection is the key to complete laparoscopic cholecystectomy successfully. Every case should be considered as difficult until completed successfully. Level of difficulty may vary with the skill and experience of the surgeon. An inexperienced surgeon ascending the learning curve may find conditions like intra abdominal adhesions, acutely inflamed friable gall bladder, gangrenous gall bladder and fibrotic Calot's triangle to be of insurmountable difficulty. However some conditions are really difficult to tackle irrespective of the experience and skill of the surgeon.

In spite of increasing expertise and advances in technology, conversion rate is still 1.5 to 35% in different centers.²⁻¹⁴ This conversion is neither a failure nor a complication, but an attempt to avoid complications. Conversion from laparoscopic to open cholecystectomy is required when safe completion of the laparoscopic procedure cannot be ensured. The identification of parameters predicting difficult laparoscopic cholecystectomy would be useful to improve preoperative patient counseling, provide for better perioperative planning, optimize operating room efficiency, and to avoid laparoscopic- associated cost & complications by performing an open operation when appropriate.

MATERIALS AND METHODS

The study was conducted in the department of general surgery, LLR & Associated Hospitals, GSVM Medical College, Kanpur from December 2020 to October 2022 on all patients of who were admitted in surgery ward for laparoscopic cholecystectomy.



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The study was conducted after approval from Ethical committee of GSVM medical college, kanpur. Written informed consent was obtained from each participant. The clinical details of the patients were recorded according to the Proforma and questionnaire form were prepared before the commencement of the study.

Study design : Descriptive prospective cross-sectional study

- Criteria for selection of patients was based on –

Inclusion criteria-

All patients with symptomatic gall stone disease admitted for laparoscopic cholecystectomy.

Exclusion criteria-

- Patients with common bile duct stone
- Patients with known carcinoma GB
- Acute cholecystitis more than 72 hours
- Patients with history of cholangitis
- Combined with other surgeries
- ASA score III/IV
- Instrument failure
- Any other organomegaly
- Per-op/pre-diagnosed case finding of Mirizzi's Syndrome

METHODS

- This prospective study was conducted on the patients admitted to from December 2020 2019 to October 2022 with symptomatic gall stone disease planned for laparoscopic cholecystectomy.

In our study, the Intraoperative findings which suggested Difficult laparoscopic Cholecystectomy Cases were:

- Total duration of surgery : >120 mins
- Total time taken to dissect calot's triangle : > 15 mins
- Total time taken dissect gall bladder from the gall bladder bed : >15 mins
- Tear of gall bladder and spillage of bile
- Conversion to open cholecystectomy
- Evaluation of these patients was done on the basis of patient characteristics –

I/ PATIENT PARTICULARS:

- 1) Name
- 2) Age
- 3) Sex
- 4) Religion
- 5) Occupation
- 6) Registration No.
- 7) Ward Name & Bed No.
- 8) Date & time of admission
- 9) Date & time of operation
- 10) Date & time of discharge

II/ HISTORY:

- 1) H/o jaundice
- 2) H/o vomiting
- 3) H/o any lump formation
- 4) Number of acute attacks in the past and its total duration
- 5) H/o previous abdominal surgery
- 6) H/o diabetes and any other chronic condition
- 7) H/o pancreatitis
- 8) Duration of illness



III/ PHYSICAL EXAMINATION:

- 1) Pulse- B.P- Icterus-
- 2) Any scar of previous abdominal surgery
- 3) Murphy's sign
- 4) Palpable G.B

IV/ PRE-OPERATIVE INVESTIGATIONS:

Bio-chemicals

- 1) TLC-
- 2) L.F.T:
S. bilirubin (T)- S. bilirubin (D)-
ALP-

V/ ULTRASOUND PARAMETERS

- 1) G.B contracted: yes/no
- 2) G.B wall thickness: < or >=3.6mm
- 3) Impaction at G.B neck: yes/no
- 4) Pericholecystic collection: yes/no
- 5) Mirizzi's syndrome: yes/no

VI/ OPERATIVE FINDINGS:

1. Total duration of surgery :
2. Total time taken to dissect calot's triangle :
3. Total time taken to dissect gall bladder from the gall bladder bed :
4. Conversion to open cholecystectomy : Yes/ No

VII/ REMARKS:

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Statistical analysis

The presentation of the Categorical variables was done in the form of number and percentage (%). On the other hand, the quantitative data were presented as the means \pm SD as median with 25th and 75th percentiles (interquartile range). The following statistical tests were applied for the results:

1. The association of the variables which were qualitative in nature were analysed using Chi-Square test. If any cell had an expected value of less than 5 then Fisher's exact test was used.

2. Receiver operating characteristic curve was used to find cut off point, sensitivity, specificity, positive predictive value and negative predictive value of age, number of acute attacks, GB wall thickness (mm), Operative time (minutes), Calot's dissection time(minutes) and Gb dissection time(minutes) for predicting difficult lap chole.

The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver 25.0.

For statistical significance, p value of less than 0.05 was considered statistically significant.

Observation and results

Clinical parameters	Frequency	Percentage
Age(years)		
21-30	41	16.40%
31-40	76	30.40%
41-50	79	31.60%
51-60	44	17.60%
>60	10	4.00%
Mean \pm SD	42.2 \pm 10.7	
Median(25th-75th percentile)	42(34-50)	
Range	21-72	
No chronic illness	248	99.20%
Hypertension	2	0.80%
Hypothyroid	1	0.40%
Presently acute attack	20	8.00%
History of upper abdominal surgery	2	0.80%
Gender		
Female	165	66.00%
Male	85	34.00%
Number of acute attacks		
0	96	38.40%
1	129	51.60%
2	16	6.40%
3	6	2.40%
4	2	0.80%
5	1	0.40%
Mean \pm SD	0.77 \pm 0.8	
Median(25th-75th percentile)	1(0-1)	
Range	0-5	

Table 1:-Distribution of clinical parameters of study subjects.



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Prediction by clinical parameters	Frequency	Percentage
Easy	223	89.20%
Difficult	27	10.80%
Total	250	100.00%

Table 2:-Distribution of prediction by clinical parameters of study subjects.

Clinical parameters	Easy(n=227)	Difficult(n=23)	Total	P value
Age(years)				
<=58	217 (93.94%)	14 (6.06%)	231 (100%)	<.0001 [†]
>58	10 (52.63%)	9 (47.37%)	19 (100%)	
No chronic illness				
No	0 (0%)	2 (100%)	2 (100%)	0.008*
Yes	227 (91.53%)	21 (8.47%)	248 (100%)	
Hypertension				
No	227 (91.53%)	21 (8.47%)	248 (100%)	0.008*
Yes	0 (0%)	2 (100%)	2 (100%)	
Hypothyroid				
No	227 (91.16%)	22 (8.84%)	249 (100%)	0.092*
Yes	0 (0%)	1 (100%)	1 (100%)	
Gender				
Female	152 (91.52%)	14 (8.48%)	165 (100%)	0.314 [†]
Male	75 (88.24%)	10 (11.76%)	85 (100%)	
Presently acute attack				
No	221 (96.09%)	9 (3.91%)	230 (100%)	<.0001 [†]
Yes	6 (30%)	14 (70%)	20 (100%)	
Number of acute attacks				
<=1	223 (99.11%)	2 (0.89%)	225 (100%)	<.0001*
>1	4 (16%)	21 (84%)	25 (100%)	
History of upper abdominal surgery				
No	226 (91.13%)	22 (8.87%)	248 (100%)	0.176*
Yes	1 (50%)	1 (50%)	2 (100%)	

Table 3:-Association of clinical parameters with easy/difficult lap chole.



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Figure 1:- Receiver operating characteristic curve of age for predicting difficult lap chole.

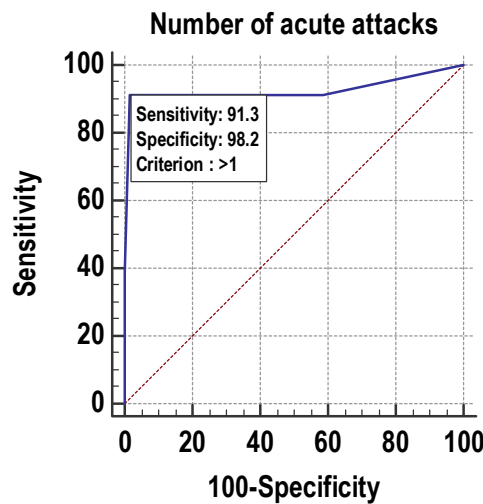
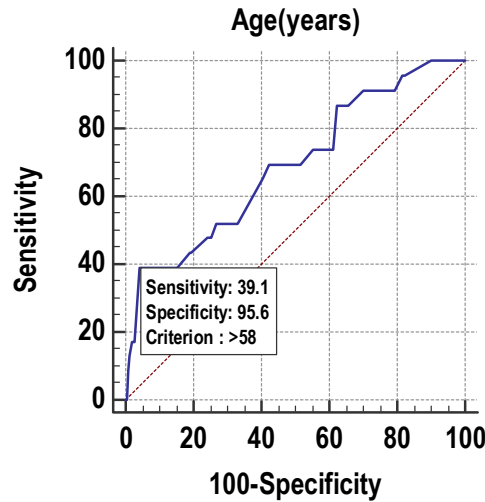


Figure 2:- Receiver operating characteristic curve of number of acute attacks for predicting difficult lap chole

Prediction by clinical parameters	Easy(n=227)	Difficult(n=23)	Total	P value
Easy	220 (98.65%)	3 (1.35%)	223 (100%)	<.0001*
Difficult	7 (25.93%)	20 (74.07%)	27 (100%)	
Total	227 (90.80%)	23 (9.20%)	250 (100%)	

Table 4:-Association of prediction by clinical parameters with easy/difficult lap chole



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Biochemical parameters	Frequency	Percentage
White blood cell count		
Normal	239	95.60%
Raised	11	4.40%
Total bilirubin		
Normal	244	97.60%
Raised	6	2.40%
Alkaline phosphatase		
Normal	243	97.20%
Raised	7	2.80%

Table 5:-Distribution of biochemical parameters of study subjects.

Prediction by biochemical parameters	Frequency	Percentage
Easy	235	94.00%
Difficult	15	6.00%
Total	250	100.00%

Table 6:-Distribution of prediction by biochemical parameters of study subjects.

Biochemical parameters	Easy(n=227)	Difficult(n=23)	Total	P value
White blood cell count				
Normal	225 (94.14%)	14 (5.86%)	239 (100%)	<.0001*
Raised	2 (18.18%)	9 (81.82%)	11 (100%)	
Total bilirubin				
Normal	227 (93.03%)	17 (6.97%)	244 (100%)	<.0001*
Raised	0 (0%)	6 (100%)	6 (100%)	
Alkaline phosphatase				
Normal	227 (93.42%)	16 (6.58%)	243 (100%)	<.0001*
Raised	0 (0%)	7 (100%)	7 (100%)	

Table 7:-Association of biochemical parameters with easy/difficult lap chole. * Fisher's exact test

Prediction by biochemical parameters	Easy(n=227)	Difficult(n=23)	Total	P value
Easy	226 (96.17%)	9 (3.83%)	235 (100%)	<.0001*
Difficult	1 (6.67%)	14 (93.33%)	15 (100%)	
Total	227 (90.80%)	23 (9.20%)	250 (100%)	

Table 8:-Association of prediction by biochemical parameters with easy/difficult lap chole.



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USG findings	Frequency	Percentage
Pericholecystic collection	5	2.00%
Stone at neck/ cystic duct	9	3.60%
Mirrizi's syndrome	0	0.00%
GB contracted	9	3.60%
GB wall thickness (mm)		
Mean \pm SD	2.38 \pm 0.7	
Median(25th-75th percentile)	2.2(1.9-2.6)	
Range	1.2-4.8	

Table 9:-Distribution of USG findings of study subjects.

Prediction by USG findings	Frequency	Percentage
Easy	228	91.20%
Difficult	22	8.80%
Total	250	100.00%

Table 10:-Distribution of prediction by USG findings of study subjects.

USG findings	Easy(n=227)	Difficult(n=23)	Total	P value
GB wall thickness (mm)				
<=3.4	226 (99.56%)	1 (0.44%)	227 (100%)	<.0001*
>3.4	1 (4.35%)	22 (95.65%)	23 (100%)	
Pericholecystic collection				
No	227 (92.65%)	18 (7.35%)	245 (100%)	<.0001*
Yes	0 (0%)	5 (100%)	5 (100%)	
Stone at neck/ cystic duct				
No	224 (92.95%)	17 (7.05%)	241 (100%)	<.0001*
Yes	3 (33.33%)	6 (66.67%)	9 (100%)	
Mirrizi's syndrome				
No	227 (90.80%)	23 (9.20%)	250 (100%)	NA
GB contracted				
No	221 (91.70%)	20 (8.30%)	241 (100%)	0.04*
Yes	6 (66.67%)	3 (33.33%)	9 (100%)	

Table 11:-Association of USG findings with easy/difficult lap chole.



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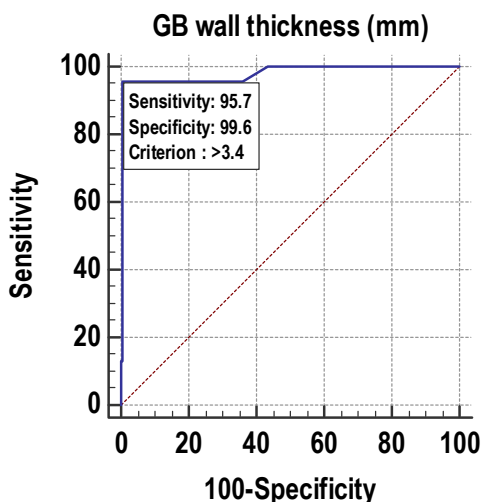


Figure 3:- Receiver operating characteristic curve of GB wall thickness (mm) for predicting difficult lap chole.

Variables	Age(years)	Number of acute attacks	GB wall thickness (mm)	Operative time (minutes)	Calot's dissection time(minutes)	Gb dissection time(minutes)
Area under the R OC curve (AUC)	0.69	0.926	0.979	0.989	0.958	0.975
Standard Error	0.0619	0.0474	0.0176	0.0116	0.0417	0.0253
95% Confidence interval	0.629 to 0.747	0.887 to 0.956	0.953 to 0.993	0.966 to 0.998	0.925 to 0.979	0.946 to 0.990
P value	0.0021	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cut off	>58	>1	>3.4	>110	>16	>15
Sensitivity(95% CI)	39.13%(19.7 - 61.5%)	91.3%(72.0 - 98.9%)	95.65%(78.1 - 99.9%)	95.65%(78.1 - 99.9%)	94.74%(74.0 - 99.9%)	94.74%(74.0 - 99.9%)
Specificity(95% CI)	95.59%(92.0 - 97.9%)	98.24%(95.5 - 99.5%)	99.56%(97.6 - 100.0%)	100%(98.4 - 100.0%)	99.56%(97.6 - 100.0%)	100%(98.4 - 100.0%)
PPV(95% CI)	47.4%(24.4 - 71.1%)	84%(63.9 - 95.5%)	95.7%(78.1 - 99.9%)	100%(84.6 - 100.0%)	94.7%(74.0 - 99.9%)	100%(81.5 - 100.0%)
NPV(95% CI)	93.9%(90.0 - 96.6%)	99.1%(96.8 - 99.9%)	99.6%(97.6 - 100.0%)	99.6%(97.6 - 100.0%)	99.6%(97.6 - 100.0%)	99.6%(97.6 - 100.0%)
Diagnostic accuracy	90.40%	97.60%	99.20%	99.60%	99.19%	99.59%

Table 12:-Receiver operating characteristic curve of age, number of acute attacks, GB wall thickness (mm), Operative time (minutes), Calot's dissection time(minutes) and Gb dissection time(minutes) for predicting difficult lap chole.

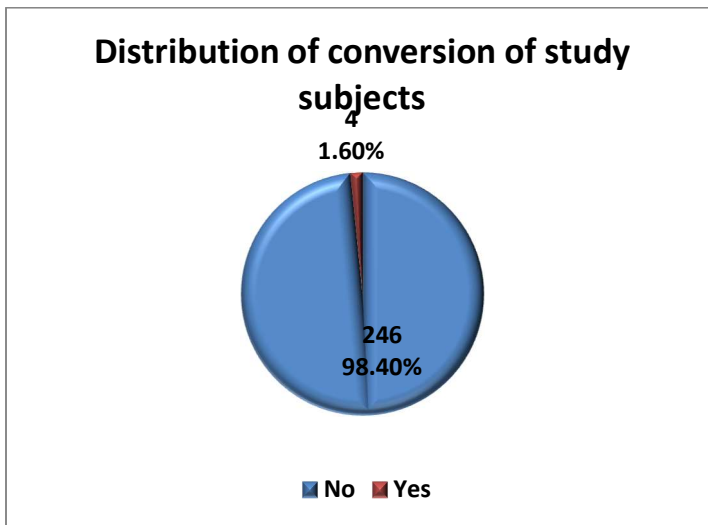


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Operative findings	Easy	Difficult	Total	P value
Operative time (minutes)				
<=110	227 (99.56%)	1 (0.44%)	228 (100%)	<.0001*
>110	0 (0%)	22 (100%)	22 (100%)	
Calot's dissection time(minutes)				
<=16	226 (99.56%)	1 (0.44%)	227 (100%)	<.0001*
>16	1 (5.26%)	18 (94.74%)	19 (100%)	
Gb dissection time(minutes)				
<=15	227 (99.56%)	1 (0.44%)	228 (100%)	<.0001*
>15	0 (0%)	18 (100%)	18 (100%)	

Table 13:-Association of operative findings with easy/difficult lap chole.



Discussion

Laparoscopic cholecystectomy has now become the gold standard for the treatment of symptomatic gallstone disease. In GSVM medical college & LLR associated hospital also it is one of the most common operations performed. The main aim of the study is to study the pre-operative prediction factors for difficult laparoscopic cholecystectomy using clinical, biochemical & ultrasonographic parameters. The specific objective of this study is to evaluate these predictors and also to calculate the conversion rate.

Laparoscopic cholecystectomy can be difficult in cases with dense adhesions and distorted anatomy. The various features that can increase the technical difficulty are adhesions in the Calot's triangle or frozen calot's, distorted anatomy, multiple acute attacks in the past, thick walled gallbladder, contracted gallbladder, Mirizzi's syndrome, impaction of stone at neck/cystic duct, previous upper abdominal surgery and acute cholecystitis. The conversion rates in various studies range from 1.5 to 35 %.^{10-14, 16}

The various preoperative parameters in literature for predicting difficult laparoscopic cholecystectomy are: age, sex, no. of previous acute attacks, previous upper abdominal surgery, raised bilirubin and ALP, raised WBC, gallbladder wall thickness, gallbladder volume, and number of stones, common bile duct size and stone impaction in the neck. In previous studies age > 65 years, male sex, previous upper abdominal surgery, gallbladder wall thickness, contracted gallbladder



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and stone impaction shows the maximum correlation with difficult laparoscopic cholecystectomy and/or conversion of laparoscopic cholecystectomy to open cholecystectomy.^{2-9, 11-14, 16}

In this study out of 250 cases, 23 cases were difficult including converted cases (9.2%). Out of 23, 4 cases got converted to open cholecystectomy with conversion rate of 1.6%. This conversion rate is less in comparison to several other studies.^{11-14, 16}

The age of the patients varied from 21 –72 years. The majority of patients were in the age group of 41 – 50 years. The mean age was 42.2 years with standard deviation of 10.7.

The age cutoff determined from our age was 58 years through ROC curve. So it is observed that with increasing age risk of difficult laparoscopic cholecystectomy increases. The observed disparity may be due to less number of patients above 65 years of age in this study. H. J. J. van der Steeg et al (2011)²⁵ found age more than 65 years to be significant independent predictive factors for conversion on multivariate logistic regression analysis.

Out of 250 patients, 85 were male and 165 were female. Male: Female ratio is 1: 5.15 which corroborates with the study of Ajay Anand et al (2007)²⁶ who also found female preponderance. Out of 23 difficult cases, 14 were females. From this we can conclude that difficult laparoscopic cholecystectomy was higher in female patients in this study which corroborates with the study of H. J. J. van der Steeg et al (2011) and Volcan et al (2011).^{19,25}

Overall 27 out of 250 patients were predicted to be difficult cases based on clinical parameters out of which 23 cases turned out to be difficult based on intraop finding. Among the clinical parameters, age >58 years (cut off from ROC curve) , female sex and no. of acute attacks >1 (ROC curve cutoff) were found to be significant predictors. This does not corroborates with the study of H. J. J. van der Steeg et al (2011)²⁵ who found male sex to be significant independent predictive factors for difficult lap cholecystectomy on multivariate logistic regression analysis.

In this study number of acute attacks more than one was significant predictor for difficult lap cholecystectomy from ROC curve cut off. Laparoscopic cholecystectomy done during an Attack of acute cholecystitis were difficult and were statistically significant in our study.

Among clinical parameters previous upper abdominal operation was not found to be significant in this study. However, Fanaei S A et al (2009) found previous upper abdominal operation to be significant predictive factors. This disparity may be due lesser number of cases with upper abdominal operation in this study.

Out of 250 patients 15 patients were predicted to be difficult based on biochemical parameters of which 14 were actually difficult on surgery which included 2 cases that got converted to open procedure. Amongst the biochemical parameters taken in this study, raised WBC count, bilirubin and ALP all three were significant preoperative predictor which corroborates with the study of Jeremy M. Lipman et al (2007).¹⁷ Wing-Hong Li (2009) et al found raised bilirubin to be significant in their study.⁹ Changiz Gholipour et al (2009) increase ALP also found it to be significant predictor in their study.²⁷

Out of 250 patients 25 were predicted to be difficult based on ultrasonographic parameters of which 22 were correctly found to be difficult on surgery. Out of these 22 difficult cases ,4 got converted to open procedure. In this study, a good correlation between gallbladder wall thicknesses with difficult lap cholecystectomy procedure was found which is in accordance with reports in other studies.^{4,5,15,20-22} In study by Carmody E et al (1994), however, the opposite is reported.²⁸ The ROC curve predicted the cut off for GB wall thickness to be >3.4 mm for difficult Laparoscopic cholecystectomy.

This study shows that stone impaction at the gallbladder neck is a significant predictor of conversion to the open procedure, which is contrary to the findings in other studies in which stone impaction is shown to have a moderate correlation.^{20,21} The main difficulty with stone impacted at the neck or Hartman's pouch is that it hinders holding of the gallbladder during dissection, and also due to impacted stone, the gallbladder is distended with mucus forming mucocele of the gallbladder, which is even more difficult to hold. In these cases, the gallbladder was emptied of its contents by



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aspirating the contents making the gallbladder more manageable. GB wall thickness >3.4 mm , pericholecystic collection and contracted GB were also found out to be significant for prediction of difficult laparoscopic cholecystectomy.

The contracted gallbladder on ultrasonography was found to be significant predictive factor in this study which corroborates with study of Pervez Iqbal et al (2008) who found contracted gallbladder to be significant.¹⁸ Since no cases of mirizzi's syndrome intraoperatively was found, it was not found to be significant predictive factor in this study. This disparity was due to lesser number of cases.

Difficult dissection secondary to adhesions was the most common cause for difficult laparoscopic cholecystectomy and/or conversion to open cholecystectomy in this study. The other causes of conversion were short & dilated cystic duct leading to inability to apply clips, bleeding from gallbladder bed and tear of cystic artery, tear of gallbladder with spillage of stones and bile. Other findings leading to difficult laparoscopic cholecystectomy were dense omental adhesions to the peritoneum leading to failure of port insertion, intra-op CBD stone seen and intraop cholecystoduodenal fistula. These various difficulties leading to operative time more than 120 minutes were taken as difficult cases. However, ROC curve suggested cut off for difficult laparoscopic cholecystectomy at operative time > 110 mins which turns out to be statistically significant and diagnostic accuracy of 99.60%.The laparoscopic cholecystectomy in expert hands should not take more than 45 to 50 minutes.^{6, 20,21} GB dissection time(>15 mins) and time taken for dissection of GB from GB bed(>15 mins) were taken as difficult cases. These 2 also turned out to be significant with ROC curve cutoff >16 mins and > 15 mins respectively.

The policy of our institute was late conversion only when sufficient time was given for dissection was given laparoscopically but failed to progress and anatomy still unclear. present. Intra-op CBD stone observation and failure of port insertion were causes of conversion. This probably accounts for the low conversion rate in our study. Since these surgeries were done by surgeons experienced in laparoscopic cholecystectomy of our institute, therefore the learning curve statistics do not apply to this study.

Conclusion:

The operative parameters taken to assess the difficulty of the laparoscopic cholecystectomy were total time taken to operate from the insertion of the trocar to the extraction of the gallbladder (more than 120 mins), tear of gallbladder with spillage of bile and stones, Calot's dissection time >15 mins and time taken for dissection of GB from GB bed > 15 mins and conversion to open cholecystectomy. ROC curve suggested cut offs which could be used for development of a scoring system. The various cut-offs calculated were:

- Age : > 58 years (Diagnostic accuracy: 90.40%)
- Number of acute attacks : >1 (Diagnostic accuracy: 97.60)
- Gb Wall thickness : >3.4 mm(Diagnostic accuracy: 99.20%)
- Total Operative time : >110 mins(Diagnostic accuracy: 99.60%)
- Calot's dissection time: >16 mins(Diagnostic accuracy: 99.19%)
- Time taken to dissect GB from GB bed: > 15 mins(Diagnostic accuracy: 99.59%)

In this study, female sex, acute cholecystitis, number of acute attack >1 , WBC more than 11000/ cumm, Total Bilirubin >1.2 mg/dl, ALP >245 IU/L, contracted gallbladder , Gb wall thickness > 3.4 mm, stone impaction at neck region, pericholecystic collection were found to be significant predictive factors for difficult laparoscopic cholecystectomy including conversion to open cholecystectomy.From this study, we can conclude that preoperative clinical, biochemical and ultrasonographic parameters are good predictors of difficulty in laparoscopic cholecystectomy in the majority of cases and should be used as a screening procedure. It can help surgeons to get an idea of the potential difficulty to be faced in a particular patient.



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23. Effect of Duration of Calot's Triangle Dissection on the Definition of Difficult Cholecystectomy Emin Köse Department of General Surgery, University of Health Sciences Okmeydanı Training and Research Hospital, İstanbul, Turkey.



Cover Page



24. Predicting Difficult Laparoscopic Cholecystectomy Based on Clinicoradiological Assessment : Ravindra Nidoni¹ , Tejaswini V udachan² , Prasad Sasnur³ , Ramakanth Baloorkar⁴ , Vikram Sindgikar⁵ , Basavaraj Narasangi⁶
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