International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Study on the Predictive Factors for Difficult Laparoscopic Cholecystectomy

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Abstract: ***Background: Laparoscopic cholecystectomy is one of the most common operations performed by general surgeon. This study was performed to evaluate the factors of difficult laparoscopic cholecystectomy preoperatively. Methods: The study was carried out in Silchar Medical College & Hospital, Assam, a tertiary care center. In present study we included 100 patients of cholecystitis on the basis of history, clinical examinations and USG findings and they underwent laparoscopic cholecystectomy during the period of September 2014 to September 2015. These all patients were evaluated for a group of risk factors preoperatively and operation time and conversion to open was evaluated depending on certain factors. Results: The preoperative parameters that significantly predicted difficult laparoscopic cholecystectomy are based on the clinical criterion of presence of local signs of cholecystitis, male gender, hypertension, diabetes mellitus, ASA PS II in addition to ultrasonographic criteria of liver fibrosis, large solitary stones, thick wall and contracted gall bladder. Conclusions: Clinical and ultrasonographic findings may help predict difficult LC.***

Keywords: Laparoscopic cholecystectomy, Impacted stone, Difficult laparoscopic Cholecystectomy

1. Introduction

Cholelithiasis is the most common biliary pathology affecting almost 10 -15% of general population in the western countries. In developing countries, including India the incidence of gall stone is increasing. The old concept that 'fatty, fertile flatulent ,female of forty' suffer from cholelithiasis (Rains and Ritchie,1985) does not always hold true as gall stones can be seen in this extremes of ages ,in both sexes and in thinly built as well as non-fertile females too. Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year, making cholecystectomy one of the most common operation by general surgeons.

In 1992 The National Institute of Health consensus development conference stated that laparoscopic cholecystectomy "provides a safe and effective treatment for most patients with symptomatic gallstones''. The reasons for preference of laparoscopic cholecystectomy are many. However, conversion to open surgery is inevitable in some cases. The common etiologies of such a conversion are intra-operative events and could not be used as factors to predicate conversions before operations [(1,2)] Pre-operative prediction of a laparoscopic cholecystectomy (LC) can assist the surgeon to prepare better for the the risk of conversion to open cholecystectomy[(3)] Hence the study was undertaken to determine predictive factors for difficult laparoscopic cholecystectomy so that we can evaluate the factors of difficult laparoscopic cholecystectomy preoperatively and take caution beforehand.

2. Materials and Method

The study was undertaken in the Department of General Surgery, Silchar Medical College and Hospital, Assam among 100 cases of cholecystitis. The study period was from September 2014 to September 2015. Inclusion criteria: Patients aged between 16-60 years presenting with symptoms and signs of cholelithiasis/cholecystitis and diagnosed by USG. Exclusion criteria: Patients <15 years of age, patients with CBD calculus, obstructive jaundice, raised ALP, dilated CBD, patients refusing surgery & not willing for LC. All the patients were assessed thoroughly by history and clinical examination. The diagnosis was made on the basis of history and clinical examination. The final diagnosis was made on the basis of USG findings and histological examination after the completion of operation.

Conversion to open: conversion to open cholecystectomy is a universal phenomenon. Conversion is taken as difficult laparoscopic cholecystectomy.

Intraoperative results of laparoscopic cholecystectomy were made arbitrarily as easy and difficult. Time taken from insertion of veress needle to closure of port site is less <1 hour was taken as easy and >1 hour or if there is conversion to open cholecystectomy was taken as difficult.

3. Results and Observation

As observed in the Table 1, there were 28 male and 72 female patients. Maximum (36%) number of cases were in the age group 36-45 years. The higher incidence was observed in 2 age group; 26-35 years and 46-55 years; both group constituting 22% each.

Table 1: Distribution of study population with respect to age and sex

Age group in years	*No of male*	*No of female*	*Total*	*Percentage*
16-25	2	10	12	12
26-35	5	17	22	22
36-45	8	28	36	36
46-55	10	12	22	22
56-65	3	5	8	8
Total	28	72	100	100

As shown in the table 2 prolonged operative time (> 60 mins) was statistically significant in cases with local signs of cholecystitis, ASA .PS II, hypertensive, diabetic and male gender and conversion to laparotomy was significantly associated with gender and local signs of cholecystitis.

Table 2: Easy / difficult laparoscopic cholecystectomy according to duration of surgery and conversion of surgery in the presence or absence of clinical risk factors

Preoperative risk factors		No. of patients	Duration in min		P value	Conversion to laparotomy		P value
			≤60	>60		Completed	Converted	
			No (%)	No (%)		N0(%)	No(%)	
Age in years	>45	30	26(26)	4(4)	0.413	27	3	0.425
	≤45	70	54(54)	16(16)		66	4	
ASA .PS	ASA 2	15	9(9)	6(6)	0.035	14	1	1.000
	ASA 1	85	71(71)	14(14)		79	6	
HTN	Present	21	13(13)	8(8)	0.013	18	3	0.158
	Absent	79	67(67)	12(12)		75	4	
DM	Present	17	10(10)	7(7)	0.016	15	2	0.339
	Absent	83	70(70)	13(13)		78	5	
Gender	Male	28	18(18)	10(10)	0.014	23	5	0.017
	Female	72	62(62)	10(10)		70	2	
BMI	Obese	18	15(15)	3(3)	1.000	17	1	1.000
	Non obese	82	65(65)	17(17)		76	6	
Local signs of cholecystitis	Present	16	9(9)	7(7)	0.009	12	4	0.011
	Absent	84	71(71)	13(13)		81	3	
H/O Abdominal Surgery	Present	23	17(17)	6(6)	0.405	21	2	0.659
	Absent	77	63(63)	14(14)		72	5	

In our study prolonged operative time (> 60 mins) was statistically significant in all parameters

Table 3: Easy / difficult laparoscopic cholecystectomy and Conversion to laparotomy according to duration of surgery in the presence and absence of ultrasonographic risk factors

Preoperative risk factor		No. of patients	Duration in min		P value	Conversion to laparotomy		P value
			≤60	>60		Completed	Converted	
			No(%)	No(%)		No(%)	No(%)	
Size of Gall bladder	Normal	77	67(67)	10(10)	0.001	72(72)	5(5)	0.914
	Contracted	13	9(9)	4(4)		12(12)	1(1)	
	Distended	10	4(4)	6(6)		9(9)	1(1)	
Gall bladder wall thickness	Thick	18	9(9)	9(9)	0.0004	17(17)	1(1)	1.000
	Normal	82	71(71)	11(11)		76(76)	6(6)	
Liver parenchyma	Normal	90	75(75)	15(15)	0.025	86(86)	4(4)	0.020
	Fibrosis	10	5(5)	5(5)		7(7)	3(3)	
Size of largest stone	>2cm	40	27(27)	13(13)	0.010	37(37)	3(3)	1.000
	≤2 cm	60	53(53)	7(7)		56(56)	4(4)	
Number of stones	Single	58	41(41)	17(17)	0.010	54(54)	4(4)	1.000
	Multiple	42	39(39)	3(3)		39(39)	3(3)	

4. Discussion

Conversion from laparoscopic to open cholecystectomy is considered as a sound judgement rather than failure to avoid complications and reduce morbidity. In this study, age was not found to be a statistically significant predictor of difficult LC. Similar was the findings of study done by S. S. Sikora et al [4]. However Brodsky, et al [5] & Liu, et al [6] identified age as a significant predictors. In our study ASA risk score was a predictor of conversion which is in line with the results obtained in other studies [7]. Some literatures found that patients with a history of cardiovascular disease and diabetes had an increased risk for conversion to open cholecystectomy particularly in male sex. Similar finding was there in our study and the relation was found to be statistically significant [8,9]. In our study, male sex was found to be a statistically significant predictor of difficult laparoscopic cholecystectomy which is similar to various available literatures [10,11]. In our series, BMI was not found to be a predictor of difficult cholecystectomy. This result was in conformity with few studies. [12,13]We did not find any significant correlation between past abdominal surgeries and difficulties encountered during LCwhich is similar to some studies.[14,15]. In our study, we found significant relation between local signs of cholecystitis and difficult laparoscopic cholecystectomy which is similar to a study done by Alponat et al. [16]In our study, patients with solitary and large stones inside the GB and liver fibrosis were associated with significantly longer operative time. Jansen et al.and Cuschieri found similar findings in their study.[17,18] In our study, the total rate of conversion from laparoscopic to open cholecystectomy was 8%, making it comparable to that reported in the last 10 years [19]

5. Conclusion

The conversion to open surgery is an unyielding complication of laparoscopic cholecystectomy.In the present study, the preoperative parameters that significantly predicted difficult laparoscopic cholecystectomy are based

on the clinical criterion of presence of local signs of cholecystitis, male gender, hypertension ,diabetes mellitus, ASA PS II in addition to ultrasonographic criteria of liver fibrosis, large solitary stones, thick wall and contracted gall bladder. It is important to state that liver fibrosis, local signs of cholecystitis and male gender are the most prominent predictor of difficult laparoscopic cholecystectomy and conversion to open procedure in our study. Hypertension, diabetes mellitus, ASA PS II, Large solitary stones, thick wall and contracted gall bladder are factors for difficult laparoscopic cholecystectomy in terms that in presence of these factors the intraoperative period will be lengthy but laparoscopic cholecystectomy can be completed. However, patient's BMI, previous abdominal surgery had no significant effect on the course of surgery. We conclude that the clinical and ultrasonographic findings may help predict difficult LC. This information may be useful to both the patient and the treating surgeon for avoiding unusual complication.

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