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PREDICTION OF DIFFICULTIES DURING LAPAROSCOPIC CHOLECYSTECTOMY BY PREOPERATIVE CLINICAL EXAMINATION AND ULTRASONOGRAPHY

General Surgery

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ABSTRACT

Background: Cholelithiasis is the most common biliary pathology, with a prevalence of 10 to 15%. It is symptomatic in approximately 1to2% of patients. N I H consensus development stated that laparoscopic cholecystectomy "Provides a Safe and Effective treatment for most patients with symptomatic gallstones". In about 5 to 10% of laparoscopic cholecystectomy, conversion to open cholecystectomy may be needed for safe removal of gall bladder. The aim of this study was to predict the difficulty of LC and the possibility of conversion to OC before surgery using the clinical and ultrasonographic criteria in our set up. **Methods:** The present study was carried out in the Department of surgery, from SSG Hospital ,Vadodara from October 2019 to October 2020. A total of 50 patients were enrolled for the laparoscopic cholecystectomy. All patients who were included in the study were undergone detailed history and clinical examination. A number of clinical and ultrasonographical parameters were noted. **Results:** Amongst the 50 patients admitted for laparoscopic cholecystectomy, The highest age incidence of cholelithiasis was in the 4th decade, and was more common in females. Pain abdomen was the most common symptom. Ultrasonography detected gall bladder stones in all patients, wall thickening in 15 and pericholecystic fluid collection in 10. BMI>27.5 (P<0.001), history of prior hospitalization (P<0.0008), palpable gallbladder (p<0.0364), impacted stone (P<0.0103) and Pericholecystic fluid collection (P<0.0471) were significant predictors of difficult laparoscopic cholecystectomy. **Conclusions:** From this study, we conclude that the proposed scoring system had a positive prediction value for easy prediction of 94.7% and for difficult prediction of 100%. The conversion rate from laparoscopic cholecystectomy to open cholecystectomy was 10%.

KEYWORDS

Laparoscopic Cholecystectomy, Predictive Factors, Scoring System

INTRODUCTION

Cholelithiasis (gall stone disease) is a well-known disease worldwide. Its estimated incidence is 1.39/100 person/year, varying little between populations.[1,2] Ultrasonography is the most common screening test for cholecystitis and cholelithiasis. Cholecystectomy is considered the treatment of choice for symptomatic gall stone disease. Laparoscopic cholecystectomy (LC) has gradually replaced open cholecystectomy (OC) in the treatment of symptomatic gall stone disease and accepted as the gold standard.[3] Laparoscopic cholecystectomy (LC) is the gold standard technique for treatment of gallbladder disease in both elective and emergency surgery because it is associated with fewer postoperative complications and shorter hospital stay [4,5,6,7,8] Better cosmetic results, short hospital stay, early recovery and return to physical activity and work, all have contributed to the popularity of this technique.[9-11] In the beginning, patients with acute cholecystitis, empyema, gangrenous gallbladder, cirrhotic patients and Mirizzi syndrome, previous upper abdominal surgery, and morbid obesity were considered as contraindications for carrying out LC.[12] With growing experience most of the previous contraindications such as morbid obesity, previous upper abdominal surgery and acute cholecystitis are no longer absolute. The established limitations for use of LCH include the operating surgeon's experience and the degree of inflammation, especially in seriously complicated cases [13,14,15,16,17] .The term difficult cholecystectomy refers to multiple technical intra-operative difficulties that increases the risk of complications and significantly prolongs operation time.[18,19] It is important to know the different clinical, radiological parameter and specific predictor that give some prediction of difficult LC, which not only helps in patient counselling but also helps the surgeon to prepare better for intra-operative difficulties expected to be encountered. However, of all Laparoscopic cholecystectomies, 1-13% requires conversion to an open for various reasons [20]. Thus, for surgeons it would be helpful to establish criteria that would assess the risk of conversion preoperatively. This would be useful for informing patients and a more experienced surgical team could be assembled when risk for conversion appears significant. The aim of this study was to predict the difficulty of LC and the possibility of conversion to OC before surgery using the clinical and ultrasonographic criteria in our set up

METHODS

The method for the study included screening of patients who presented with upper abdominal pain, or vomiting or dyspepsia or jaundice. Such patients were studied in detail clinically and investigated as per the proforma detailed below. Ultrasound abdomen was done in all patients. Routine haematological and biochemical investigations were done. Investigations like OCG, PTC could not be done routinely due to lack of facilities. LFT was done in all patients. ERCP done in indicated patients, The patients confirmed by USG examination were evaluated with following factors: age, sex, h/o previous hospitalization, BMI wt. (kg)/ ht. (m^2), abdominal scar- supraumbilical or infraumbilical , palpable gall bladder, sonographic findings- wall thickness, Pericholecystic collection, impacted stone.

All the patients were received symptomatic treatment and vitamin K for 3-5 days preoperatively if needed. Following evaluation the patient will be subjected to laparoscopic cholecystectomy and time taken, biliary / stone spillage, injury to duct/ artery or conversion were noted. All the patients were operated by one surgical unit. Post operatively cases were followed up for any complication. Drain was removed between 2nd to 5th post OP day depending on the drainage- if put, and Suture removal was done 12th to 14th post OP day. All cases were followed up for any recurrent symptoms.

- Shape of gallbladder: Gallbladder was defined as contracted or distended depending on the shape and transverse diameter. It was defined as distended if the transverse diameter was greater than 5 cm
- Gallbladder wall thickness was estimated by using the maximal obtainable measurement (thick ≥3 mm vs. normal <3 mm)
- The calculus size (small <1 cm versus large ≥1 cm)
- The number of calculi (solitary versus multiple)
- Common bile duct (normal <6 mm versus dilated ≥6 mm)
- Stone impacted at neck of gallbladder or not
- Liver parenchyma (normal, fatty infiltration and liver fibrosis)
- Any evidence of acute cholecystitis and acute pancreatitis.

Procedure was explained to the selected patients and written informed consent was taken. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. p value of <0.005 was considered significant.

RESULTS

Amongst the 50 patients admitted for laparoscopic cholecystectomy, 15 (30%) were male and 35 (70%) female, with age ranging from 21-64 years. In our study 12 patients were considered obese (BMI>27.5 kg/m^2). Pain was the predominant symptom seen in all 50(100%) patients. All the 50 patients had stones in gallbladder, 33 patients had multiple calculi, 9 had solitary calculi and 8 had solitary impacted calculi. 19 patients had wall thickening and 8 had pericholecystic

collection. Out of the 5 patients in whom lap. was converted to open, 3 patients had Extensive adhesions with difficulty in dissection and 1 had uncontrolled bleeding from cystic artery which was anatomical variant. Another 1 had mass formation.

In the present study prior hospitalization, BMI >27.5, Palpable GB, Thick GB wall, Impacted stone and Pericholecystic collection were significant predictors of difficult laparoscopic cholecystectomy.

Table 1: Showing the age wise distribution of cholelithiasis.

AGE IN YEARS	PRESENT SERIES	%
11-20 yrs	0	0%
21-30 yrs	10	20%
31-40 yrs	17	34%
41-50 yrs	13	26%
51-60 yrs	9	18%
>61 yrs	1	2%

Table 2: Showing sex wise distribution of cholelithiasis

SEX	PRESENTSERIES	%
MALE	15	30%
FEMALE	35	70%

Table 3: Showing presenting symptoms

SYMPTOMS	PRESENT SERIES	%
JAUNDICE	1	2%
FEVER	6	12%
DYSPEPSIA	11	22%
VOMITING	19	38%
PAIN	50	100%

Table 4: Showing ultrasonography findings

ULTRASONOGRAPHY	NO OF CASES
Solitary impacted calculi	8 (16%)
Pericholecystic collection	8 (16%)
Solitary calculi	9 (18%)
Wall thickening	19(38%)
Multiple calculi	33(66%)

Table 5: Showing correlation of pre-op score and the outcome

PRE-OP SCORE	EASY	DIFFICULT	VERY DIFFICULT	TOTAL
0-5	36	2	2	40
6-10	0	7	2	9
11-15	0	0	1	1
TOTAL	36	9	5	50

Table 6: Showing the analysis of pre-operative outcome with the risk factors

RISK FACTORS	LEVEL	PER-OP OUTCOME		P Valve
		D-NO (%)	E-NO (%)	
AGE	<= 50 Y	8	32	1.000
	>50 Y	2	8	
SEX	FEMALE	9	25	0.6976
	MALE	3	12	
BMI wt(kg)/ht(m2)	<=25	1	26	0.4324
	25.1-27.5	1	10	
	>27.5	10	2	<0.0001
PREVIOUS SURG.	Nil	6	27	0.6959
	yes	3	14	
HOSPITALIZATION	Nil	6	39	0.0008
	Yes	4	1	
GB PALPABLE	NP	9	39	0.0364
	Yes	2	0	
USG- WALL THICK	N	1	34	0.0001
	Yes	9	6	
IMPACTED STONE	Nil	7	37	0.0103
	Yes	4	2	
P/C COLLECTION	Nil	6	34	0.0471
	Yes	6	4	

(D = difficult. ; E= Easy)

Table 7: Showing the comparision of current study with other studies

RISK FACTORS	LEVEL	PER-OP OUTCOME		P Value of current study	P Value of Randhawa and Pujahari	P Value of A.K.Khetan and Yeola
		D- NO (%)	E- NO (%)			
AGE	<= 50 Y	8	32	1.000 NS	0.937 NS	1.00 NS
	>50 Y	2	8			
SEX	FEMALE	9	25	0.6976 NS	0.736 NS	0.139 NS
	MALE	3	12			
BMI wt(kg)/ht(m2)	<=25	1	26			
	25.1-27.5	1	10	0.4324 NS	0.227 NS	0.209 NS
	>27.5	10	2	<0.0001 SS	0.010 HS	0.6424 NS
PREVIOUS SURG.	Nil	6	27	0.6959 NS	0.882 NS	0.1281 NS
	yes	3	14			
HOSPITALIZATION	Nil	6	39	0.0008 HS	0.001 HS	0.0419 SS
	Yes	4	1			
GB PALPABLE	NP	9	39	0.0364 MS	0.022 MS	0.1264 NS
	Yes	2	0			
USG-WALL THICK	N	1	34	0.0001 HS	0.038 MS	0.0008 HS
	Yes	9	6			
IMPACTED STONE	Nil	7	37	0.0103 MS	0.190 NS	0.6410 NS
	Yes	4	2			
P/C COLLECTION	Nil	6	34	0.0471 MS	0.999 NS	1.00 NS
	Yes	6	4			

DISCUSSION

Age Distribution

In my study majority of the patients in the present series were in the age group of 31-40 years of age, and 80% 0f the patients came under the age group from 21-50 years.[11] According to my study age is not a significant predictor since majority of the patients had easy cholecystectomy irrespective of age.[21]

Sex Distribution

In the present series, out of 50 patients 35 were females and 15 were male patients. The male: female ratio is 1:2.[3] Endogenous estrogen and progestin are attributed to this phenomenon. Sex is not a significant predictor in my study.

Past History

Of the 50 patients, 11 had undergone tubectomy, 2 had undergone LSCS, 1 had undergone appendicectomy, and 1 had undergone hysterectomy. 1 patient presented with obstructive jaundice due to CBD calculus, and he underwent ERCP with CBD stenting. 3 patients had attack of acute cholecystitis which required hospitalization and were managed conservatively. One patient had acute pancreatitis and was treated conservatively with hospitalization.

General survey revealed that 27(54%) patients had BMI < 25, 11 (22%) had BMI in the range of 25-27.5, and 12 (24%) had BMI >27.5.Among 12 patients 4 patients were hypertensive and 2 were diabetic. 1 patient had LRI. 1 patient was a known case of hypothyroidism and was on thyroid hormone supplementation. On inspection, scar due to previous surgery was seen in 17(34%) of the patients. Out of this all were infra umbilical scar.According to my study Obese patients had difficult cholecystectomy and BMI is a strong predictor and obesity associated with other co morbid conditions like diabetes and hypertension

Ultrasonography

Ultrasound was done as a routine investigation in all the patients. The sonological criteria used to diagnose gall stones were acoustic shadowing of the opacities in the gall bladder and change in the position of the opacity with the change in patient position.All the 50 patients had stones in gallbladder, 15 patients had wall thickening and 10 had pericholecystic fluid collection.33 patients had multiple calculi, 9 had solitary calculus and 8 had solitary impacted calculi.As per my study GB wall thickness and pericholecystic fluid collection are strong predictors of difficulty

Correlation Of Pre-op Score And The Outcome

Out of the 5 patients lap converted to open in 5 patients since 3 had extensive adhesions, 1 had aberrent anatomy another 1 had mass formationThe positive predictive value for easy prediction was 94.7% and for difficult prediction was 100%.Conversion rate from lap. cholecystectomy to open cholecystectomy was 10% in the present series.

CONCLUSION

From this study, we conclude that preoperative ultrasonography is a good predictor 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 that particular patient. The most valuable assessment the ultrasound can provide is gallbladder wall thickness, gallbladder size, stone size, common bile duct diameter, common bile duct stones, and any abnormal anatomy of the biliary tract, if present.

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