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ORIGINAL ARTICLE

Pre-operative Prediction of Difficult Laparoscopic Cholecystectomy

PARKASH LAL[1], BUSHRA SHAIKH[2], SAIMA ATHAR[3], IMAMUDDIN BALOCH[4], AZHAR ALI SHAH[5], MUHAMMAD ASIF[6], CHAMPA RANI[7], NOSHEEN AZHAR[8], MUHAMMAD SHOAIB[9]
[1]Consultant Surgeon Ghulam Muhammad Mahar Medical College Hospital Sukkur
[2]Assistant Professor of Surgery, Ghulam Muhammad Mahar Medical College Hospital Sukkur
[3]Associate Professor of Anatomy, Liaqat National Hospital & Medical College Karachi
[4,5]Associate Professor of Surgery, Ghulam Muhammad Mahar Medical College Hospital Sukkur
[6]Associate Professor of Urology, Azra Naheed Medical College Lahore
[7,8]Department of Radiology, Ghulam Muhammad Mahar, Medical College Hospital Sukkur
[9]Professor of Surgery, Azra Naheed Medical College Lahore
Correspondence to Dr. Parkash Lal, Email: drpk2007@yahoo.com Cell: 03337185484

ABSTRACT

Aim: To evaluate the factors for prediction of difficult laparoscopic cholecystectomy preoperatively.
Methods: A Prospective Observational Study conducted at Surgical Unit II, Ghulam Muhammad Mahar Medical College Hospital Sukkur, from February 2020 to January 2021. Data was collected for 580 patients. All the patients fulfilling inclusion criteria were evaluated with following factors: age, gender, BMI, h/o previous GB disease, comorbids, h/o previous abdominal surgery, tender RHC, palpable gallbladder, ultrasonographic findings of gall bladder wall thickness, pericholecystic fluid collection & stone impaction at neck of gall bladder. Patients were assumed to be difficult on presence of one or more of above mentioned risk factors .laparoscopic cholecystectomy was performed by an experienced laparocopic surgeon. Peroperative findings and operative time was noted. Cases were considered difficult if operative time was >60 minutes or if the case was converted to open. All the information was recorded on predesigned proforma**.**
Results: Age ranged from 23 to 70 years (mean age = 46.37 years). 456 patients were female while 124 patients were male. Majority of patients in our study (n=390) had normal BMI(BMI=18.5-24.9)and next majority (n=132) belonged to overweight group(BMI=25-29.9) . On inquiry, 93 patients had history of previous gall bladder disease in form of cholecystitis. Out of 580 patients, 161 patients had one or more comorbids. 39 out of 580 patients had history of previous abdominal surgery. 78 patients had tender right hypochonrium. 62 patients had palpable gall bladder. On ultrasound 73 patients had gall bladder wall thickness >4mm. In 39 patients pericholecystic fluid collection was found. In 33 patients, stone was impacted at the neck of gall bladder. 161 patients were preoperatively labeled as difficult. All the patients underwent laparoscopic cholecystectomy. Mean operative time was 42.56 minutes. 512 patients underwent uneventful laparoscopic cholecystectomy, in 68 patients difficulty was encountered 11 patients were converted to open procedure.
Conclusion: We conclude that a careful insight in certain factors can predict the difficult laparoscopic cholecystectomy preoperatively. It acts as an important eye opener for surgeons to get an idea of the potential difficulty to be faced in that particular patient.
Keywords: Laparoscopic cholecystectomy, Preoperative, Gall stones, Difficulty

INTRODUCTION

Gall stones are the most common biliary pathology. It is estimated that gall stones affect 10-15% of the population in western world[1,2]. Treatment for symptomatic gall stones is Cholecystectomy that can be performed laparoscopically or by open procedure. No operation has been more profoundly affected by the advent of laparoscopy than cholecystectomy has. Laparoscopic cholecystectomy has more or less ended attempts at non invasive management of gall stones and has become the treatment of choice for symptomatic cholilithiasis[3]. Advantages of laparoscopic cholecystectomy over open procedure include better cosmesis, early recovery, reduced hospital stay and reduced morbidity[4]. Outcome of laparoscopic cholecystectomy can be affected by expertise of the surgeon and an expert is to be the right harmony between experience, technical skills and predispositions of the individual surgeon[5].

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At times even in the hands of an expert, Laparoscopic cholecystectomy becomes difficult. It is very tough but not impossible to say preoperatively whether it is going to be easy or difficult. There are multiple factors which if carefully assessed preoperatively can help in predicting the difficulty in laparoscopic cholecystectomy procedure. Preoperative difficulty estimation helps surgeons deciding whether to proceed with a minimally invasive approach, perform an open procedure or make a referral to a more experienced surgeon[6]. Internationally few studies have been done in this respect and in Pakistan the research is even more scarce.

Purpose of our study was to identify those factors which can actually detect difficulty in Laparoscopic cholecystectomy preoperatively.

MATERIALS & METHODS

Setting: A Prospective Observational Study was conducted at Department of Surgery, Ghualm Muhammad Mahar Medical College Hospital Sukkur from February 2020 to January 2021. After approval from Ethical Review Board,

data was collected for 580 patients. Sampling technique was non Probability Purposive.

Inclusion Criteria:

- All the patients who were planned to undergo laparoscopic cholecystectomy
- Age between 23 to 70 years

Exclusion Criteria:

- Suspected malignant gall bladder disease
- Laparoscopic cholecystectomy with Common Bile Duct (CBD) exploration.

All the patients fulfilling inclusion criteria were evaluated with following factors: age, gender, BMI, h/o previous GB disease, comorbids, H/O previous abdominal surgery, Tender RHC, palpable gallbladder, ultrasonographic findings of gall bladder wall thickness, pericholecystic fluid collection & stone impaction at neck of gall bladder. Patients were assumed to be difficult on presence of one or more of above mentioned risk factors (Table 1). Laparoscopic cholecystectomy was performed by an experienced laparoscopic surgeon. Peroperative findings and operative time was noted. Cases were considered difficult if operative time was >60 minutes or if the case was converted to open. All the information was recorded on predesigned proforma.

Data was analyzed on SPSS version 17. Frequency of gender, BMI, h/o previous gall bladder disease, comorbids, h/o previous abdominal surgery, tender RHC, palpable gallbladder and U/S findings was expressed as percentage. Mean and standard deviation was calculated for age & operative time. Chi-square test was used to find significant association between preoperative risk factors & final outcome. P-value of 0.05 was considered significant.

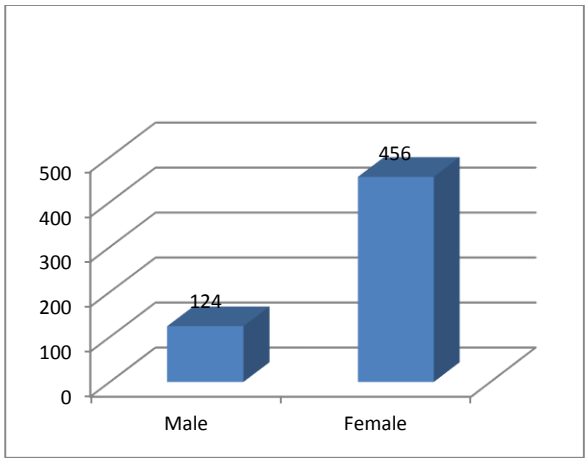
Table 1: Predictive association of preoperative risk factors with final outcome

Final outcome	Total	Age		Gender		BMI				Comorbids		H/O previous GB disease		Tender RHC		Palpable GB		Previous surgery			Ultra Sound findings			
		<50 years	>50 years	Male	Female	Normal(18-24.9 kg/m2)	Overweight (25-29.9 kg/m2)	Grade I obesity (30-34.9 kg/m2)	Grade II obesity (> 35 kg/m2)	Yes	No	Yes	No	Yes	No	Yes	No	Yes		No	Stone in GB with wall thickness < 4mm	GB wall thickness > 4 mm	Pericholecystic fluid collection	Stone impacted at neck of GB
																		Upper abdominal scar	Lower abdominal scar					
Easy	512	304	208	82	430	382	93	22	15	108	404	56	456	29	483	23	489	00	28	484	415	54	27	16
Difficult	68	36	32	42	26	08	39	14	07	53	15	37	31	49	19	39	29	01	10	57	20	19	12	17
Total	580	340	240	124	456	390	132	36	22	161	419	93	487	78	502	62	518	01	38	541	435	73	39	33
P value			0.837	0.03				0.05	0.02	0.05		0.02		.003		0.01		.001				.04	0.001	.01

RESULTS

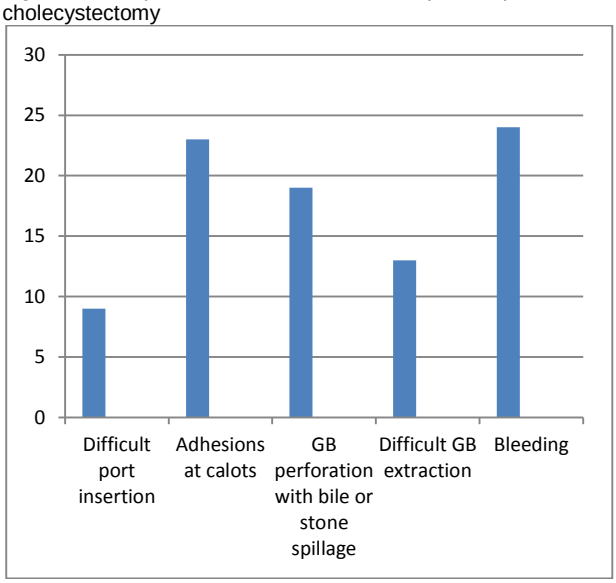
A total of 580 patients fulfilling the inclusion criteria were included in the study. Age ranged from 23 to 70 years (mean age=46.37 years) (Table 2). 456 patients were female while 124 patients were male. F:M was 3.6:1 (Fig. 1). BMI of all the patients was recorded. Majority of patients in our study (n=390) had normal BMI (BMI=18.5-24.9) and next majority (n=132) belonged to overweight group (BMI=25-29.9). On inquiry, 93 patients had history of previous gall bladder disease in form of cholecystitis. Out of 580 patients, 161 patients had one or more comorbids; Chronic liver disease (53), Diabetes Mellitus (45), Hypertension (63). 39 out of 580 patients had history of previous abdominal surgery; 38 patients had lower abdominal scar and just 1 patient had upper abdominal scar. 78 patients had tender right hypochonrium. 62 patients had palpable gall bladder. Ultrasound abdomen was done in all the patients. On ultrasound 73 patients had gall bladder wall thickness >4mm. In 39 patients pericholecystic fluid collection was found. In 33 patients, stone was impacted at the neck of gall bladder. 161 patients were preoperatively labeled as difficult cases due to presence of one or more of the preoperative risk factors as shown in the table. All the patients underwent laparoscopic cholecystectomy. Time taken to complete the procedure ranged from 30 minutes to 1.45 minutes (mean=42.56 minute). 512 patients underwent uneventful laparoscopic cholecystectomy, in 68 patients difficulty was encountered during the procedure due to reasons shown in the figure 2.

Figure 1: Gender distribution



11 patients were converted to open procedure. We found that male gender, BMI >30 kg/m2, previous attack of cholecystitis, tender RHC, palpable GB, any associated comorbidity, GB wall thickness >4mm, stone impaction at neck of GB on ultrasound are important preoperative predictors of upcoming difficult laparoscopic cholecystectomy with statistically significant results. However advancing age and finding of pericholecystic fluid collection on ultrasound were not found significant preoperative predictors of difficult laparoscopic cholecystectomy.

Figure 2: Per operative reasons for difficult laparoscopic cholecystectomy



DISCUSSION

Cholecystectomy is probably the first laparoscopic surgical procedure to be performed by general surgeons in many teaching hospitals and is the standard of care for patients with cholilithiasis[3]. This procedure is undergoing regular amendments with growing technology in order to make it safer, cosmetically acceptable, and cost effective but despite this surgeons sometimes encounter difficult cases[7]. Operative difficulty for laparoscopic cholecystectomy is hard but not impossible to predict. In this series we reviewed few factors which to some an extent preoperatively predicted difficult upcoming laparoscopic cholecystectomies.

In our study mean age was 46.37 years and majority were above 50 years. In a study done by Shiv K Bunker mean age was 42.16+/- 11.84[8]. In few other studies mean age ranged from 39.47 to 44.37 years[1,4,9,10]. Neither we assumed nor we found advancing age as a predictor of difficult laparoscopic cholecystectomy and this is supported by many other studies[1,7,11]. However one study found advancing age as a risk factor for difficult cases [12].Majority of patients in our study were female 454(78.2%) and female to male ratio was 3.6:1. While in a study done by Satoshi et al males predominated the females (65.6%)[13]. Male gender was associated with increasing difficulty in our study which is also found in other studies[1,7,10]. BMI was the major preoperative predictor of difficulty index. In present study majority of patients had normal BMI 390(67.24%) as the BMI increases the chance of encountering difficulty during surgery increases. Only 58 patients (10%) had BMI >30kg/m2 and majority of these posed difficulty either due to difficult port insertion or fat filled Calots triangle. This is comparable to other studies where patients with BMI >30 kg/m2 ranged from 14 to 30% and accounted for difficult surgery[7,8,11,14]. History of previous attack of cholecystitis was also an important predictor of difficult procedure in current study. Its frequency in our study was 93 patients (6.23%), which is supported by Bunker et al 9%[8]. However many other studies reported a higher number of patients having such history of acute attack in past (24-30%)[4,7,11,14]. 161 patients (27%)had one or other comorbids in our study while Randawa et al reported 22.6% patients having co morbidities[1] and Shiv K Bunker of 13%[8].comorbidty also predicts difficulty in the surgery[16]. Previous abdominal surgeries lead to intraperitoneal adhesions which account for difficult dissection; our study results also favour this view. 39 patients (6.72%) in our study had undergone abdominal surgery for various reasons, 38 had infraumbilical scar while only 1 had supraumbilical scar. M.Raza had 4 patients in his study with supraumbilical scars and Bunkar reported 31 operated patients with 2 such having upper scars [4,8]. Frequency of tender RHC was 78(13.4%) and palpable GB was 62 patients (10.6%).Both of which were important predictors of difficult lap cholecystectomies. In a study done by Khetan et al gall bladder was palpable in 2 patients while Nikhilagarwal had 10 patients with palpable GB[7,14]. Ultrasound findings in our studies. Few studies support our results, while others contradict[7,8,11,14,17,19,20,21]. Preoperatively we labeled 161(27%) patients as difficult due to presence of one or more risk factors. Shiv Bunkar assumed 11.6% cases as difficult, Randawa 21.9% and Ab Al 28%[1,8,11] while results of a study done in Bhagdad contradict[22].Peroperatively 68 patients finally proved to be difficult and among these 11 were converted to open. In other studies conversion rate ranged from 3.9% to 4.28%[23,24]. Relationship of preoperative risk factors and the final outcome is shown in Table 2.

CONCLUSION

We conclude that a careful insight in certain factors can predict the difficult laparoscopic cholecystectomy preoperatively. It acts as an important eye opener for surgeons to get an idea of the potential difficulty to be faced in that particular patient.

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