

Pre Operative Prediction of Difficult Laparoscopic Cholecystectomy Using Scoring System.

Dr Chandrakant.R.Kesari, Dr Bramhanand A Bhangargi

Abstract

Introduction: Laparoscopic Cholecystectomy (LC) is the gold standard now for symptomatic Gall stones. Any unexpected turn of events intra-operatively has significant implications which get multiplied many fold due to high number of procedures. Difficult cases can result in prolonged operative time, bleeding, bile spillage, conversion to open technique and bile duct injury resulting in unplanned prolonged hospital stay, increase in estimated cost to the patients and for the surgeon, it leads to increased stress during operation and time pressure to complete the operative list. If degree of technical difficulty could be predicted before starting the procedure, concerned team can be better prepared and adverse outcomes can be potentially minimized.

Aim:

1. To assess the preoperative predictors of difficulty in laparoscopic cholecystectomy.

2. To assess the preoperative risk factors based on the scoring system

Materials and Methods: In this Prospective study, sixty patients with indication for laparoscopic cholecystectomy admitted in general surgery department, ESIC MC & PGIMSR, Bengaluru with a Study period: December 2017 to June 2019.

All the patients were assessed pre-operatively according to history, clinical examination and sonological findings. Chi-square test and student t test were used for statistical analysis.

Results: Difficulty of doing surgery increased with age, history of previous admissions for acute cholecystitis, palpable gall bladder and obesity. No difference was found in difficulty score for impacted stone in neck of gall bladder, pericholecystic collection. Recurrent cholecystitis, prior-hospitalisation, length of hospital-stay and duration since first episode predicted a difficult LC but not duration since last episode. Presence of tenderness and Murphy's sign had no relation with the difficulty score.

Conclusion: Our results demonstrate that difficult LC can be predicted based on parameters on history and physical examination alone at the first visit of the patient to OPD. Both the patient and surgical team can, therefore, be better prepared for the possible complications and conversions in an environment of confidence and mutual trust. The scoring system evaluated has got sensitivity=96.0%, specificity=68.6%, ppv=68.6%, npv=96.0%.

Keywords: LC, Difficulty, scoring system.

Date of Submission: 06-07-2019

Date of acceptance: 20-07-2019

I. Introduction

Laparoscopic cholecystectomy is currently the established gold standard for symptomatic gall stones. LC is the most frequently performed operation at our institute. With evolution in biomedical technology and improved quality of instruments LC has become easier and safer operation to perform. Any unexpected turn of events intra-operatively has significant immediate and long-term implications for the patient, operating team, anaesthesia team, operation theatre management and the hospital in general. Another aspect is that high volume of cases, though good for the surgical skill learning curve, can induce a casual approach and limit preparedness for technical difficulty, thus catching the team off-guard. When a surgical team, unprepared for technical difficulties, struggles around unpaired vital structures like common bile duct, portal vein, common hepatic artery, significant morbidities and even mortality can result. Even if morbidity and mortality are avoided, a lot of un-booked time is lost, and skilled manpower can be squandered unnecessarily [1,2].

II. Materials And Methods

A prospective study was conducted at Department of Surgery, ESIC MC & PGIMSR, Bengaluru with a Study period: December 2017 to June 2019. After an informed consent, 60 patients undergoing elective laparoscopic cholecystectomy for symptomatic cholelithiasis performed by experienced surgeon in a single unit were included. Patients who had common bile duct stones, who had additional procedure to be done along with

laparoscopic cholecystectomy, patients unfit for anesthesia, equipment failure, those patients who were unwilling to give consent for the study, Pregnant women, Patient with acute cholecystitis duration more than 72 hours were excluded from the study.

A scoring system proposed by Randhawa and Pujahari [3] which included history, clinical and sonography findings.

PARAMETERS			MAX SCORE
AGE	<50yr(0)	>50yr(1)	1
SEX	F(0)	M(1)	1
H/O HOSPITAL	No(0)	Yes(4)	4
CLINICAL			
BMI	<25(0)	25-27.5(1) >27.5(2)	2
ABDOMINAL SURGERY	No(0)	Yes(1)	1
PALPABLE GB	No(0)	Yes(1)	1
SONOGRAPHY			
WALL THICKNESS	<4mm(0)	>4mm(1)	2
PERICHOLECYSTIC COLLECTION	No(0)	Yes(1)	1
IMPACTED STONE	No(0)	Yes(1)	1

EASY	0-5
DIFFICULT	6-10
VERY DIFFICULT	11-14

Patients admitted for elective LC who were included in the study were assessed and their history, clinical examination and investigations were reviewed. Based on these findings preoperative risk score was calculated on the basis of above scoring method, a day prior to surgery. Patients with scores of 0 to 5 were predicted as easy, patients with scores 6 to 10 as difficult and 11-14 as very difficult cases respectively. Pre-operative scores and prediction was blinded from operating surgeon.

All the operations were performed by one surgeon of a single surgical unit having more than four years of experience in laparoscopic operations. Surgery was done using carbon dioxide pneumoperitoneum with 14 mm Hg pressure and using one 5 mm and two 10 mm ports. Time taken was noted from first port site incision till last port closure. Duration of surgery, bile/stone spillage, injury to duct/artery and conversion to open procedure were recorded. Per operative objective assessment was done as easy, difficult and very difficult by an independent observer based on the parameters as shown in Table.

The following operative parameters were noted.

PARAMETERS	EASY	DIFFICULT	VERY DIFFICULT
TIME FOR SURGERY	<60 min	60-120min	>120min
STONE/BILE SPILLAGE	no	yes	-
INJURY TO CYSTIC DUCT/ARTERY	no	yes	-
CONVERSION TO OPEN CHOLECYSTECTOMY	no	no	yes

Per operative assessment was compared with preoperative prediction based on the scores to calculate the sensitivity and specificity of the pre-operative scoring system.

All statistical analyses were performed using Statistical Package for the Social Science version 20. p value of <0.05 was accepted as statistically significant. Sensitivity and specificity was calculated for prediction of easy and difficult case using two by two tables.

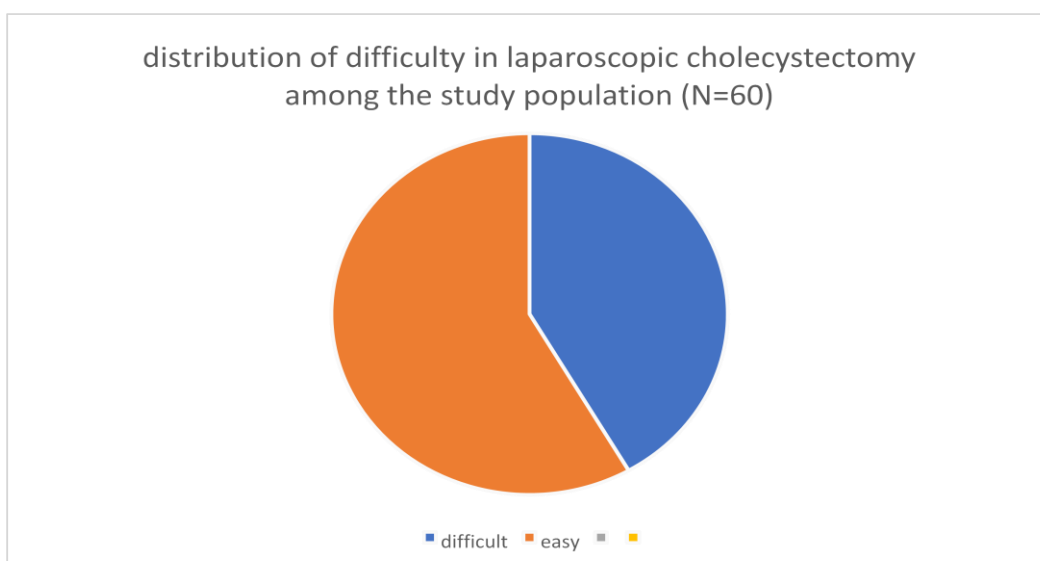
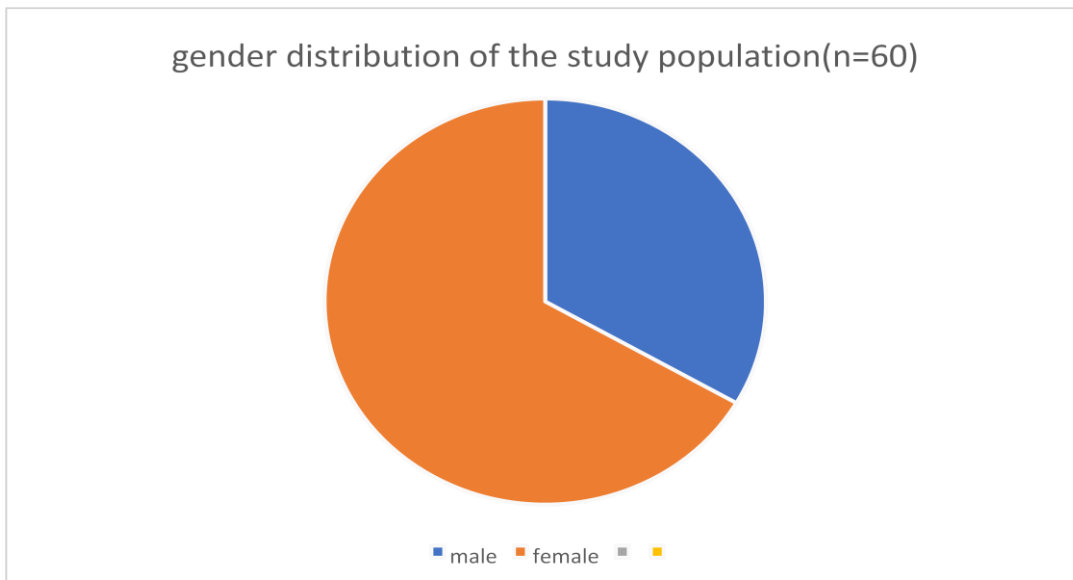
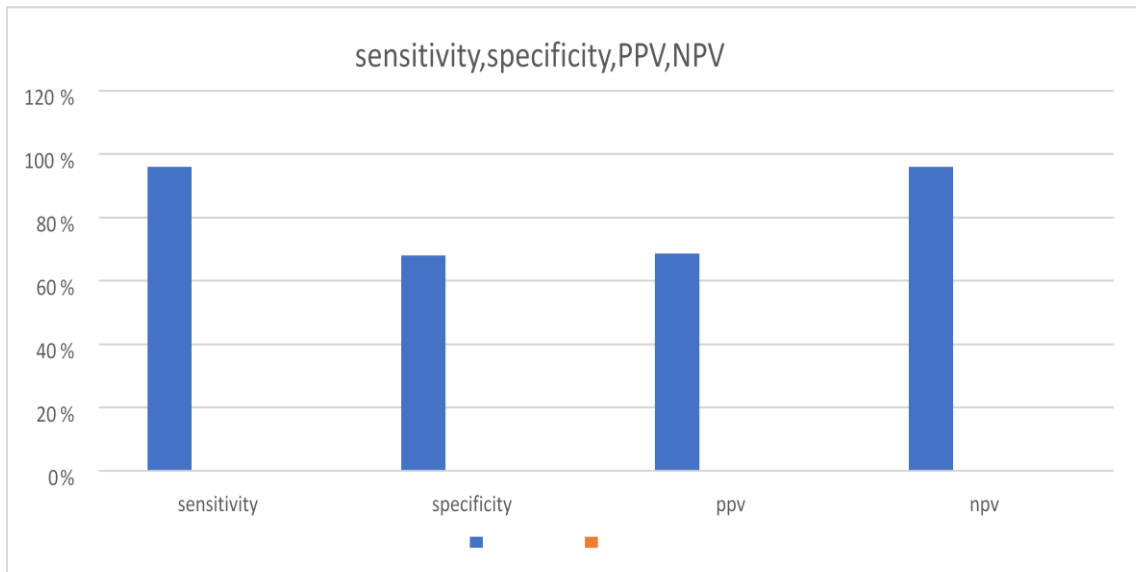
III. Results

Sixty patients were included in the study out of which 40(67 %) were female and 20(33%) were male. The minimum age of patient was 18 years and the maximum age of the patient was 71 years. maximum patients were from the age group 40-49 years. Out of 60 cases 41.7% (25) patients had difficult surgery and 58.3% (35) had easy surgery.

Because there was no prediction of very difficult cases based on pre-operative scores and only 2 (2 %) cases were found to be very difficult, difficult and very difficult cases were combined for further analysis.

Out of 60 patients, 25 had total score ≤ 4 and 35 patients had total score ≥ 5 .

Out of 25 patients with score ≤ 4 , 24 patients had easy surgery and 1 had difficult surgery. Out 35 patients with score ≥ 5 , 11 had easy surgery and 24 had difficult surgery. This study has got sensitivity=96.0%, specificity=68.6%, ppv=68.6%, npv=96.0%,



parameters	Total number	easy	Difficulty	P value	Statistical significance
Age(>50yrs)	14	4	10	0.0232	yes
Male patients	20	6	14	0.0041	yes
Previous admission for acute cholecystitis	15	3	12	0.0015	Yes
Abdominal scar	12(lower)	9	3	0.693	No
	4(upper)	1	3		
BMI >25	24	10	14	0.012	yes
Palpable gallbladder	11	2	9	0.008	yes
GB wall thickness(>4mm)	25	7	18	0.001	Yes
Impacted stone in the GB neck	5	4	1	0.1797	no
Pericholecystic collection	6	2	4	0.3833	no

IV. Discussion

Pre-operative prediction of difficult laparoscopic cholecystectomy has potential advantages for surgeons, patients and their relatives.[4-5] Surgeons may plan the operative list for the day based on the predicted difficult cases, to avoid time pressure if there is prolonged operative time in a difficult case and avoid unexpected conversion. This may help assign difficult case to an experienced surgeon with an equally experienced assistant. It is particularly applicable in places where most of the surgeons practice individually. Surgeon can seek for an experienced assistant or a senior colleague to accompany in a predicted difficult case. Hence the overall operative performance is not stressful to the surgeons and patients.

A difficult laparoscopic cholecystectomy can result in conversion to open procedure. Advantages of laparoscopic operation such as less pain, early recovery and return to work, less hospital stay and better cosmetics etc. are lost if operation is converted to open procedure. Conversion to open procedure is dependent on the patient's factors as well as experience of the surgeon and team. So the proper assignment of predicted difficult case to an experienced surgeon and team will definitely results in lesser conversion and higher benefits to such patients which has also been shown by Takegami et al. [6] A predicted easy case can be operated as day care surgical case and can be offered a new technique such as single incision laparoscopic surgery (SILS) and natural orifice transluminal endoscopic surgery (NOTES).

Patients may be counseled preoperatively about the possible difficult operation, prolonged hospital stay and possibility of conversion beforehand so that they are mentally prepared for that. Patient's relatives can also plan accordingly in a predicted difficult case keeping in mind the possibility of prolonged hospital stay and increased expenses.

Preoperative scoring can be an objective method to predict difficult case and could be better than the subjective guesswork. Various factors such as male sex, old age, upper abdominal tenderness, previous upper abdominal surgery, thick walled gall bladder and history of acute cholecystitis has been identified as a risk factors for conversion to open procedures. [7-9].

Randhawa and Pujahari have described a scoring system to predict a difficult laparoscopic cholecystectomy. They have developed a scoring system based on history, clinical examination and sonological findings to predict difficult cases with a total score of 15. The pre-operative score from 0 – 5, 6 – 10 and more than 10 predicted easy, difficult and very difficult cases respectively. The prediction was true in 88.8 % and 92 % in easy and difficult cases respectively with a sensitivity and specificity of 75% and 90.24 % respectively. The same scoring system was validated in a prospective study and found that the sensitivity and specificity of the scoring system was sensitivity=96.0%, specificity=68.6%, ppv=68.6%, npv=96.0%.

V. Conclusion

Laparoscopic cholecystectomy has established itself as one of the safest surgical procedures. The technique has been standardised and complication rate and conversion to open surgery are almost rare in experts' hands. LC is now considered the entry level surgery for the beginners in laparoscopy. With increasing awareness and trend of litigation, it is the responsibility of the surgeon to explain all the possible outcomes post-surgery, and even more so if the surgery is difficult and no time can be better than the patient's first visit to outdoor and conversation becomes more convincing if we can predict a difficult LC. A better planning can help

save both the time and the currency, establish a better patient surgeon relationship in terms of complications and in case conversion to open surgery occurs

References

- [1]. Hariharan D, Psaltis E, Scholefield JH, Lobo DN. Quality of Life and Medico-Legal [1] Implications Following Iatrogenic Bile Duct Injuries. *World J Surg.* 2017;41(1):90- 99. DOI: 10.1007/s00268-016-3677-9.
- [2]. Keus F, de Jong JA, Gooszen HG, van Laarhoven CJ. Laparoscopic versus open [2] cholecystectomy for patients with symptomatic cholelithiasis. *Cochrane Database Syst Rev.* 2006;4:CD006231.
- [3]. Randhawa JS, Pujahari AK. Preoperative prediction of difficult lap chole: a scoring method. *Indian J Surg [Internet].* 2009 Aug [cited 2014 May 5];71(4):198–201. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3452633&tool=pmcentrez&rendertype=abstract>
- [4]. Gupta N, Ranjan G, Arora MP, Goswami B, Chaudhary P, Kapur A, et al. Validation of a scoring system to predict difficult laparoscopic cholecystectomy. *Int J Surg [Internet].* Elsevier Ltd; 2013 Jan [cited 2014 May 5];11(9):1002–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23751733>
- [5]. Soltés M, Radoňák J. A risk score to predict the difficulty of elective laparoscopic cholecystectomy. *Wideochirurgia i inne Tech mało inwazyjne = Videosurgery other miniinvasive Tech / Kwart Pod patronatem Sekc Wideochirurgii TChP oraz Sekc Chir Bariatrycznej TChP [Internet].* 2014 Dec [cited 2015 Jan 14];9(4):608–12. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4280432&tool=pmcentrez&rendertype=abstract>
- [6]. Takegami K, Kawaguchi Y, Nakayama H, Kubota Y, Nagawa H. Preoperative grading system for predicting operative conditions in laparoscopic cholecystectomy. *Surg Today [Internet].* 2004 Jan [cited 2014 May 5];34(4):331–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15052448>
- [7]. Kama NA, Kologlu M, Doganay M, Reis E, Atli M, Dolapci M. A risk score for conversion from laparoscopic to open cholecystectomy. *Am J Surg [Internet].* 2001 Jun [cited 2014 May 8];181(6):520–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11513777>
- [8]. Lee NW, Collins J, Britt R, Britt LD. Evaluation of preoperative risk factors for converting laparoscopic to open cholecystectomy. *Am Surg [Internet].* 2012 Aug [cited 2014 May 8];78(8):831–3. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22856487>
- [9]. Schrenk P, Woisetschlager R, Rieger R, Wayand WU. A diagnostic score to predict the difficulty of a laparoscopic cholecystectomy from preoperative variables. *Surg Endosc [Internet].* 1998 Feb [cited 2015 Jan 14];12(2):148–50. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9479730>

Dr Chandrakant.R.Kesari. “Pre Operative Prediction of Difficult Laparoscopic Cholecystectomy Using Scoring System.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 7, 2019, pp 45-49.