

## Original Research

# Grading And Operative Findings At Laparoscopic Cholecystectomy: An Original Research

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### ABSTRACT

**Aim:** To assess and grade the degree of difficulty in laparoscopic cholecystectomy and their postoperative outcome using intra operative scoring system devised.

**Methodology:** One hundred three consecutive patients who underwent elective laparoscopic cholecystectomy in our institute, were included in the study. Inclusion criteria was all the cases of elective laparoscopic cholecystectomy and exclusion criteria was cases in which directly open cholecystectomy was performed. Intraoperative findings were assessed on the basis of five key aspects which includes: 1) Gallbladder appearance and amount of adhesions; 2) Degree of distension/ contraction of the gallbladder; 3) Ease of access; 4) Local/septic complications; and 5) Time taken to identify the cystic artery and duct.

**Results:** Total 103 patients of laparoscopic cholecystectomy were included in this study. The severity score was between 2-4 in 63 (61.16%) patients and between 5-7 in 20 (19.41%) patients. Mild to moderate degree of difficulty was encountered in 80 (77.66%), severe degree in 20 (19.41%) and extreme degree of difficulty in 03 (2.91%) patients in performing cholecystectomy and conversion to open surgery were done in 08 (7.76%) patients with score between 6 to 8

**Conclusion:** This scoring system is useful and reliable. If the intraoperative severity score is more, the severity of cholecystitis increases and then it is more difficult to perform laparoscopic cholecystectomy

**Keywords:** Laparoscopic Cholecystectomy, Open Cholecystectomy, Grading System, Intra Operative Findings, Pre-Operative Findings.

### INTRODUCTION

Laparoscopic Cholecystectomy has become increasingly common since 1980 and has replaced open cholecystectomy as the standard of care.<sup>1,2</sup> The laparoscopic approach causes less mortality and morbidity compared to conventional cholecystectomy. It also offers the advantage of being minimal invasive, less hospital stays, less post-operative pain and early recovery.<sup>3,5</sup> Management of cholelithiasis has seen a shift from conventional open

cholecystectomy to laparoscopic cholecystectomy.<sup>6-8</sup> Sometimes lap cholecystectomy becomes difficult and it takes longer time specially with bile/stone spillage and may require conversion to open cholecystectomy.<sup>8-11</sup> It has been seen that surgeons face difficulty during laparoscopic surgery when there are dense adhesions at Calot's triangle, fibrotic or contracted bladder.<sup>12</sup> Hence conversion to open cholecystectomy would always be considered as the part of safe surgical practise but a detailed understanding of the factors leading to conversion is important. There are numerous studies and scoring system which considers the pre operative factors for conversion to open cholecystectomy but there was no scoring system which considers intra operative findings.<sup>12-19</sup> Recently a new scoring system has been formulated which grades the intra operative findings during laparoscopic cholecystectomy and based on the final score, it is predicted whether the patient would require conversion to open cholecystectomy.<sup>20</sup> A difficulty grading scale, based on specific intra-operative findings was described by Nassar et al.<sup>21</sup> The comprehensive nature and simplicity of this grading system led to it being utilised in multiple studies of the suitability for certain techniques and of intra- and post-operative outcomes of laparoscopic cholecystectomy. We recently found that higher operative difficulty score was associated with worse clinical outcomes, including increased length of stay, complications, conversion to open surgery and 30-day mortality.<sup>22</sup>

### **AIM OF THE PRESENT STUDY**

To assess and grade the degree of difficulty in laparoscopic cholecystectomy and their postoperative outcome using intra operative scoring system devised.

### **METHODOLOGY**

This prospective study was conducted amongst 103 patients at our institute, from 2021 to 2022. The prospective study protocol was approved by local Ethical Committee. Informed consent was taken from all the participants included in the study. Preoperative workup of all the cases was done. Some cases were diagnosed as acute cholecystitis and empyema but gangrene of the gallbladder was not diagnosed preoperatively. All the cases were taken for elective laparoscopic cholecystectomy and were operated in different surgical units by surgeons with more than 10 years of experience in laparoscopic surgery. Inclusion criteria was all the cases of elective laparoscopic cholecystectomy and exclusion criteria was cases in which directly open cholecystectomy was performed. Pneumoperitoneum was created by Veress needle from in fraumbilical site or palmer's point. Intra operative findings were assessed on the basis of five key aspects which includes: 1) Appearance of gallbladder and number of adhesions; 2) Distension/contraction of the gallbladder; 3) Access to peritoneal cavity; 4) Any local/septic complications; and 5) Time taken to dissect the Calot's triangle. A Score of zero was given when there was no adhesion; Score 1 when <50% adhesion; Score 2 was given to amount of adhesion in between 50% and completely buried gallbladder; and Score 3 was given when gallbladder was completely buried in adhesion. The degrees of difficulty in laparoscopic cholecystectomy according to the severity of cholecystitis were graded with the total calculated score. Intraoperative scoring was done in all the patients who underwent laparoscopic cholecystectomy and based on these findings grading of the degree of difficulty and outcome of the surgery assessed. Descriptive statistical analyses were performed using Statistical Package for Social Sciences (SPSS) version 24.0, statistical software.

### **RESULTS**

The study enrolled 103 consecutive cases of laparoscopic cholecystectomy in which 74 were female (71.84%) and 29 males (28.15%). Majority of the female were between the age group of 28-55 years and males between 40-65 years. Various operative findings were scored from 1 to 10 as per the operative predictors for difficult laparoscopic cholecystectomy. The scoring is

grouped as < 2, 2-4, 5-7, and 8-10 and is graded respectively as mild, moderate, severe and extreme degree of difficulty. Degrees of difficulty were assessed and mean of the severity score calculated. (Table 1)

**Table 1: Scoring for various operative predictors for difficult laparoscopic cholecystectomy**

Operative Predictors	Score
Difficulty in Access	
BMI >30	1
Adhesions from previous surgery limiting access	1
Gallbladder and Omental Adhesion	
No adhesion	
Adhesions < 50% of GB	
Adhesions burying GB	
*Score 0 for no adhesion; Score 1 for <50% adhesion; Score 2 for adhesion in between 50% and completely buried GB; and Score 3 when gallbladder is completely buried in adhesion.	
Appearance of GB	
Distended GB or contracted shriveled GB	1
Unable to grasp with atraumatic laparoscopic forceps	1
Stone impacted in Hartman's Pouch	1
Severe Sepsis or Complications	
Bile or pus outside GB or gangrene of GB	1
Time to identify cystic artery and duct >90 minutes	1
Total Max	10
Grading of Degree of Difficulty	
A-Mild	<2
B-Moderate	2-4
C-Severe	5-7
D-Extreme	8-10

Patient with symptomatic cholelithiasis (biliary colic) were 57 (55.33%) and their mean intraoperative score were 2.1. Although, the mean score just crosses 2, which comes under moderate degree of difficulty but in majority mild degree of difficulty encountered. Duration of laparoscopic cholecystectomy in symptomatic cholelithiasis (biliary colic) was between 25-38.33 minutes. Total 27 (26.21%) cases of acute cholecystitis were operated and their mean severity score found to be 3.3. Laparoscopic cholecystectomy is done in these patients with moderate degree of difficulty and without any morbidity. Average duration of laparoscopic cholecystectomy in these 27 cases was between 30-51.66 minutes. Cases with empyema of gallbladder were 11 (10.67%) and we encountered severe to extreme degree of difficulty. In five cases of empyema, open cholecystectomy done. The severity score in four of these cases were >6 and in one case it was 6. The indication for conversion in four cases were frozen Calot's with dense adhesion, subtotal cholecystectomy was done in these 4 cases. In one case conversion was done due to bile duct injury (0.97%). Average duration of cholecystectomy in empyema gallbladder was between 60-105 minutes. In three (2.91%) cases we found gangrene

of the gallbladder with dense adhesion at Calot's and pus spillage outside the gallbladder. The severity score in these cases were between 6-8 and severe to extreme degree of difficulty encountered. Out of these 103 cases, laparoscopic cholecystectomy was done in 92.23% (95 patients) and degree of difficulty was from mild to severe. In the majority, we encountered moderate degree of difficulty in performing laparoscopic cholecystectomy whereas conversion to open cholecystectomy and subtotal cholecystectomy was done in 7.76% (08 patients) and degree of difficulty were found to be severe to extreme respectively. So, as the intraoperative severity score increased, the severity of cholecystitis increased and more difficulty encountered in performing cholecystectomy safely. Conversion to open surgery indicated in severe to extreme degree of difficulty. (Table 2)

**Table 2: Grading of difficulty encountered in different types of cholecystectomy**

Different Types of Cholecystectomy	No. of Patients	Severity Score			Grading of Difficulty
		<6	6	>6	
Laparoscopic cholecystectomy	95	90	5	-	Mild to severe
Lap to open cholecystectomy with bile duct repair	01	-	-	1	Severe
Lap to open subtotal cholecystectomy	07	-	1	6	Severe to extreme

## DISCUSSION

Intra-operative findings at the time of cholecystectomy vary according to the clinical presentation, and may lead to a range of operative challenges. The prediction of the difficulty encountered during the procedure can offer the surgeon a range of benefits, including surgical planning, informing the patient, and predicting certain outcomes, such as the potential for conversion to open surgery. We found increasing age to be a significant risk factor in predicting a difficult laparoscopic cholecystectomy. This was similar to most published scoring systems.<sup>9</sup> On the other hand, some studies<sup>15</sup> found that age had no significant correlation with difficulty when measured by the conversion rate. This could be due to the small sample size in these studies or, as reported by Mohanty et al.<sup>10</sup>, due to non-standardised experience of the operating surgeon. In risk scores where age was dichotomized, a cut-off value of 50 years was used in the majority of cases.<sup>4</sup> The role of gender in relation to the disease process resulting from gallstones has been explored by several published studies, with male gender being a common predictor of difficult cholecystectomy.<sup>12</sup> Yol et al. suggested that men with symptomatic gallstones are more susceptible to inflammation and fibrosis.<sup>22</sup> Nowadays, there is increasing pressure to perform laparoscopic cholecystectomy at index admission of acute cholecystitis. Intraoperative scoring system will provide indications for conversion to open surgery and allow for assessment of outcome.<sup>11</sup> Scoring and grading surgical conditions provide a uniform tool for reporting the severity of disease. Studies had claimed that repeated attacks of acute cholecystitis and hospitalization increases the difficulty of laparoscopic<sup>13</sup> cholecystectomy due to adhesions in pericholecystic region.<sup>13</sup> Our study also showing increase score in acute cholecystitis and its related complications. In our study, we encountered mild to severe degree of difficulty in 87.37% (90 patients) when the score was <6, we were able to complete the laparoscopic cholecystectomy but when it was > 6 conversion to open surgery done.

## CONCLUSION

This intra operative scoring system is useful and reliable in assessing the severity of cholecystitis and grading the degree of difficulty in performing laparoscopic cholecystectomy. It also gives indication for conversion in severe degree of cholecystitis.

## REFERENCES

1. Mc Kernan JB, Champion JK. Access techniques: Veress needle— initial blind trocar insertion versus open laparoscopy with the Hasson trocar. *Endosc. Surg. Allied Technol.* 1995; 3:35.
2. Ballem RV, Rudomanski J. Techniques of pneumoperitoneum. *Surg. Laparosc. Endosc.* 1993; 3:42.
3. Alexander JI. Pain after laparoscopy. *Br. J. Anaesth.* 1997; 79:369.
4. Rademaker BM, Kalkman CJ, Odoom JA, et al. Intraperitoneal local anaesthetics after laparoscopic cholecystectomy: effects on postoperative pain, metabolic responses and lung function. *Br. J. Anaesth.* 1994; 72:263.
5. Lee IO, Kim SH, Kong MH, et al. Pain after laparoscopic cholecystectomy: the effect and timing of incisional and intraperitoneal bupivacaine. *Can. J. Anaesth.* 2001; 48:545.
6. Murphy JB. The diagnosis of gall stones. *Am Med News* 1903:825-833.
7. Hanif G Motiwala: Operative Technique Cholecystectomy A study of 250 Cases: SURGERY IN THE Tropics Ed: Sakens: Jhawes PK: Purohit A Mc Milan India Ltd 1991, 56, 204.
8. Jaskiran S. Randhawa, Aswini K. Pujahari: Preoperative prediction of difficult lap chole: a scoring method, *Indian J Surg* (July- august 2009) 71:198-201.
9. Alexander P Nagle, Nathaniel J, Soper James R Hines; Cholecystectomy (open and laparoscopic). Michael J Zinner Stanley W Ashley; Maingot's Abdominal.
10. Strasburg S M, Hertl M, Soper N S. An analysis of the problem of biliary injury during laparoscopic cholecystectomy. *J Ann Coll Surg* 1995; 180: 101-125.
11. Birkett D HRonsky J LStiegmann G V. The SAGES manual- Fundamentals of Laparoscopic and GI Endoscopy. Springer 2003: 137- 142.
12. Gupta N, Ranjan G, Arora MP, Binita Goswami, Poras Choudhary, Arun Kapur, et al: Validation of a scoring system to predict difficult laparoscopic cholecystectomy. *International Journal of Surgery* 2013;11: 1002-1006.
13. Kama N A, Dogary M, Dolapa M. Reise, Attli M, et al! Risk factors resulting in conversion of laparoscopic cholecystectomy to open cholecystectomy. *Surgical endoscopy*, Springer New York: V5 965-968.
14. Daradkeh S laparoscopic cholecystectomy: What are the factors determining difficulty? *Hepatogastroenterology*. 2001 Jan, Feb; 48(37): 76-78.
15. Jorgensen J O, Hunt D R: laparoscopic cholecystectomy. A prospective analysis of the potential causes of failure. *Surg laparos endosc* 3: 49- 53 1993.
16. Fried GM, Barkun JS, Sigman HH, Joseph L, Uas D, Garzon J, Hinchey EJ, Meakins JL (1994) Factors determining conversion to laparotomy in patients undergoing laparoscopic cholecystectomy.
17. Ahmet Alponat, Cheng K, Bee C Koh, Andrea R, Peter MY Goh (1997): Predictive factors for conversion of laparoscopic cholecystectomy. *World J Surg* 21:629-633. 37.
18. Kanaan SA, Murayama KM, Merriam LT, Dawes LG, Puystowsky JB, Reye RB, Jochi RJ (2002) Risk factors for conversion of laparoscopic to open cholecystectomy. *J Surg Res* 106:20-24.
19. Vivek MA, Augustine AJ, Rao R: A comprehensive predictive scoring method for difficult laparoscopic cholecystectomy. *Journal of minimal access surgery*. 2014; 10:62-7.

20. Michael Sugrue, Shaheel M, Sahebally Luca, Ansaloni, martin, D Zielinski: Grading operative findings at laparoscopic cholecystectomy- a new scoring system. *World Journal of Emergency Surgery*. 2015; 10:14.
21. Nassar A, Ashkar K, Mohamed A, Hafiz A (1995) Is laparoscopic cholecystectomy possible without video technology? *Minim Invasive Ther* 4(2):63–65.
22. Griffiths E, Hodson J, Vohra R, Marriott P, Katbeh T, Zino S et al (2019) Utilisation of an operative difficulty grading scale for laparoscopic cholecystectomy. *Surg Endosc* 33:110–121.