

Grading Operative Findings At Laparoscopic Cholecystectomy A Scoring System in Grh, Madurai

*¹Dr.A.M.Syed Ibrahim₁ms Fais ,²Dr.P.Manivannan₂ Ms

¹Professor, Department of General Surgery, Madurai Medical College, Madurai , Tamilnadu, India,

²post Graduate, Department of General Surgery, Madurai Medical College, Madurai, Tamilnadu, India

Corresponding author: Dr.A.M.Syed Ibrahim₁ms Fais

Abstract

Aim And Objective: Laparoscopic cholecystectomy has become the gold standard in the treatment of gallbladder pathology and is replacing open cholecystectomy. To study the scoring system of operative findings at laparoscopic cholecystectomy, to allow grading of the findings and standardize the degree of cholecystitis.

Methods: 50 patients who underwent Laparoscopic cholecystectomy for a period of 6 months were included in the study. The current scoring system proposed is based on the severity of cholecystitis and degree of potential difficulty with a score from 1 to 10. The key aspects of the score include access to the gallbladder including patient body mass index (BMI), the degree of pericholic and right upper quadrant adhesions particularly in patients who have had previous abdominal surgery, the presence of complicated cholecystitis and the time taken by the surgeon to achieve the triangle of safety with identification of the cystic artery and duct. With this scoring system a score of <2 would be considered easy, 2 to 4 moderate, 5–7 very difficult, and 8 to 10, extreme.

Results: In the present study the patients were selected from age 20 and above. The youngest age was 23 years and the oldest patient aged 84 years. most number of patients were above 50 years of age. Out of 50 patients , 25 were male and 25 were female patients.

The male to female ratio in this study is 1: 1. 12 patients had no adhesions over gall bladder, 10 patients had < 50% adhesions, 21 patients had >50% adhesions and 7 patients had the entire gallbladder buried under the omental adhesions. 47(94%) patients had distended gall bladder and 3(6%) patients had contracted gallbladder. 42(84%) patients in whom the gallbladder was able to grasp with the atraumatic forceps and in 8(6%) patients the gallbladder was not able grasp with the atraumatic forceps. 4(8%) patients had impacted stone in the Hartmann's pouch and remaining 46(92%) patients had no stones impacted in the Hartmann's pouch. 6(12%) patients who had adhesions from previous surgeries limiting the access to the gallbladder and calots triangle .Remaining 44(88%) patients had no such adhesions. h. 29(58%) patients had BMI of <30 and 21(42%) patients had BMI of >30. 7(14%) patients had pus leak from the gallbladder intraoperatively. Remaining 43(86%) patients had no such pus leakage from the gallbladder during the procedure. , the time taken to dissect the cystic artery took less than 90 min in 46(92%) patients . In remaining 4(8%) patients the dissection took more than 90 minutes. 10 patients had mild difficulty, 25 patients had moderate difficulty , 12 patients had severe difficulty and 3 patients had extreme difficulty. These 3 patients were converted for open cholecystectomy. 47(94%) patients were proceeded with laparoscopic cholecystectomy who were categorized into mild , moderate and severe grades. The 3(6%) patients with extreme grade were converted from laparoscopic to open cholecystectomy

Conclusion: this study has identified certain intraoperative variables to assess the difficulty of laparoscopic cholecystectomy in our setting. This study demonstrates that a scoring system predicting the difficulty in LC is feasible.

Date of Submission: 20-11-2017

Date of acceptance: 05-12-2017

I. Introduction

Cholelithiasis is the most common biliary pathology. Gallstones are present in 10 to 15% of the general population and asymptomatic in the majority (>80%). The prevalence of gallstone varies widely in different parts of the world. In India it is estimated to be around 4%. An epidemiological study restricted to rail road workers showed that north Indians have 7 times higher occurrence of gallstones as compared to south Indians. Changing incidence in India is mainly attributed to westernization and availability of investigation that is ultrasound in both rural and urban areas and due to change in socioeconomic structure. Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year. Cholelithiasis is rare in the first two decades. Incidence gradually increases after 21 years and reaches its peak in 5th and 6th decade. Women are more affected than men in the ratio of 4:1.

In 1992, The National Institute of Health (NIH) consensus development conference stated that laparoscopic cholecystectomy “provides a safe and effective treatment for most patients with symptomatic gallstones.” The advantages of laparoscopic cholecystectomy over open cholecystectomy are quick recovery of bowel functions, minimal pain in postoperative period, minimal hospital stay, earlier return to normal activity, and decreased overall cost. Laparoscopic cholecystectomy has become the gold standard in the treatment of gallbladder pathology and is replacing open cholecystectomy. The rate of conversion from laparoscopic cholecystectomy to open cholecystectomy is 5 to 10%

II. Objectives Of The Study

To study the scoring system of operative findings at laparoscopic cholecystectomy, to allow grading of the findings and standardize the degree of cholecystitis.

III. Materials And Methods

3.1 Study Criteria

A. Inclusion criteria:

50 patients who underwent Laparoscopic cholecystectomy for a period of 6 months were included in the study.

B. Exclusion criteria:

1. Laparoscopic cholecystectomy performed with other laparoscopic intervention in same setting.
2. Laparoscopic cholecystectomy with Common Bile Duct (CBD) exploration.
3. Absolute contraindications to Laparoscopic Cholecystectomy like cardiovascular, pulmonary disease, coagulopathies and end stage liver disease.
4. disease.
5. A Prospective study of all patients admitted in GRH for undergoing laparoscopic cholecystectomy will be used.
6. A minimum of 50 laparoscopic cholecystectomy will be studied during the period.
7. The current scoring system proposed is based on the severity of cholecystitis and degree of potential difficulty with a score from 1 to 10.
8. The key aspects of the score include access to the gallbladder including patient body mass index (BMI), the degree of pericholic and right upper quadrant adhesions particularly in patients who have had previous abdominal surgery, the presence of complicated cholecystitis and the time taken by the surgeon to achieve the triangle of safety with identification of the cystic artery and duct.

With this scoring system a score of <2 would be considered easy, 2 to 4 moderate, 5–7 very difficult, and 8 to 10, extreme.

3.2 The five key aspects include:

1. gallbladder appearance and amount of
2. adhesions,
3. degree of distension/contracture of the gallbladder,
4. ease of access,
5. local/septic complications,
6. time taken to identify the cystic artery and Duct.

Table 2 Operative Grading System for Cholecystitis Severity

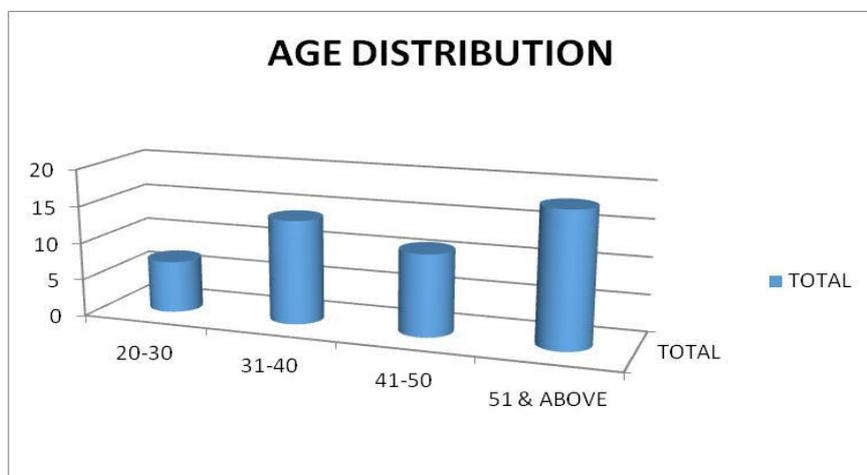
Gallbladder appearance	
Adhesions < 50% of GB	1
Adhesions burying GB	3
	Max 3
Distension/Contraction	
Distended GB (or contracted shrivelled GB)	1
Unable to grasp with atraumatic laparoscopic forceps	1
Stone ≥1 cm impacted in Hartman's Pouch	1
Access	
BMI >30	1
Adhesions from previous surgery limiting access	1
Severe Sepsis/Complications	
Bile or Pus outside GB	1
Time to identify cystic artery and duct >90 minutes	1
	Total Max 10
Degree of difficulty	
A Mild	<2
B Moderate	2-4
C Severe	5-7
D Extreme	8-10

IV. Result

This study included 50 patients who were studied prospectively over a period of seven months from January 2017 to July 2017. Patients who underwent laparoscopic cholecystectomy were graded intraoperatively using a scoring system into mild , moderate , severe and extreme difficult cholecystectomy and cases who came under extreme category were converted into open cholecystectomy .

4.1 Age distribution :

In the present study the patients were selected from age 20 and above. The youngest age was 23 years and the oldest patient aged 84 years. most number of patients were above 50 years of age.

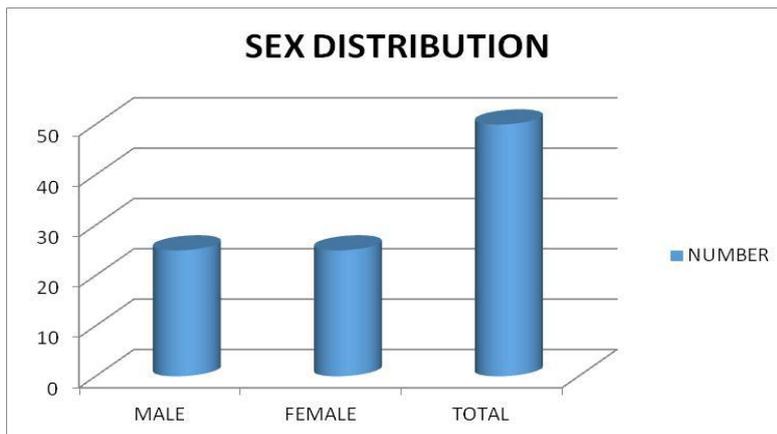


4.2 Sex distribution :

Out of 50 patients , 25 were male and 25 were female patients. The male to female ratio in this study is 1: 1.

SEX	NUMBER
MALE	25
FEMALE	25
TOTAL	50

AGE	NUMBER
20-30	7
31-40	14
41-50	11
51 & ABOVE	18
TOTAL	50
AGE	Number
20-30	7
31-40	14
41-50	11
51 & Above	18
TOTAL	50
Age	Number
20-30	7
31-40	14
41-50	11
51 & ABOVE	18
TOTAL	50

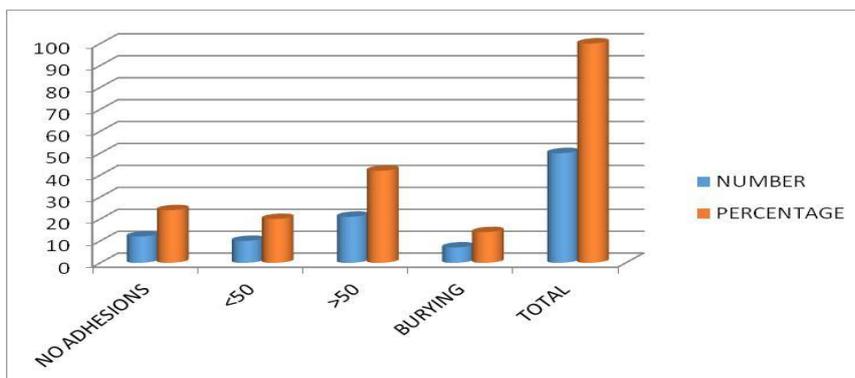


V. Intraoperative Factors

5.1 Gall Bladder Appearance:

Out of 50 patients studied, 12 patients had no adhesions over gall bladder, 10 patients had < 50% adhesions, 21 patients had >50% adhesions and 7 patients had the entire gallbladder buried under the omental adhesions.

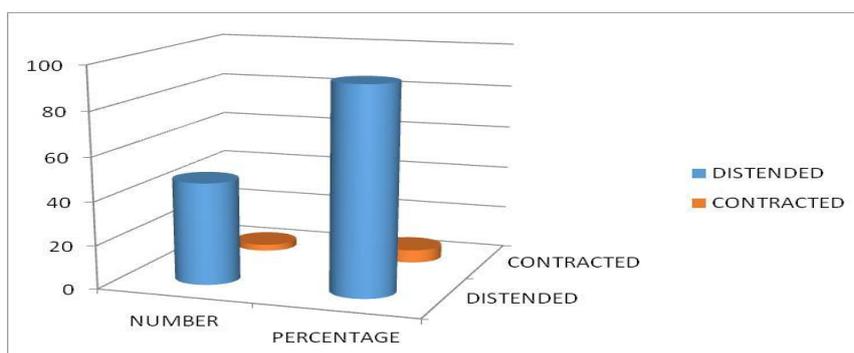
Adhesions Over Gb	Number	Percentage
No Adhesions	12	24
<50%	10	20
>50%	21	42
Burying Gb	7	14



5.2 Distended / Contracted Gallbladder :

In this study , out of 50 patients 47(94%) patients had distended gall bladder and 3(6%) patients had contracted gallbladder.

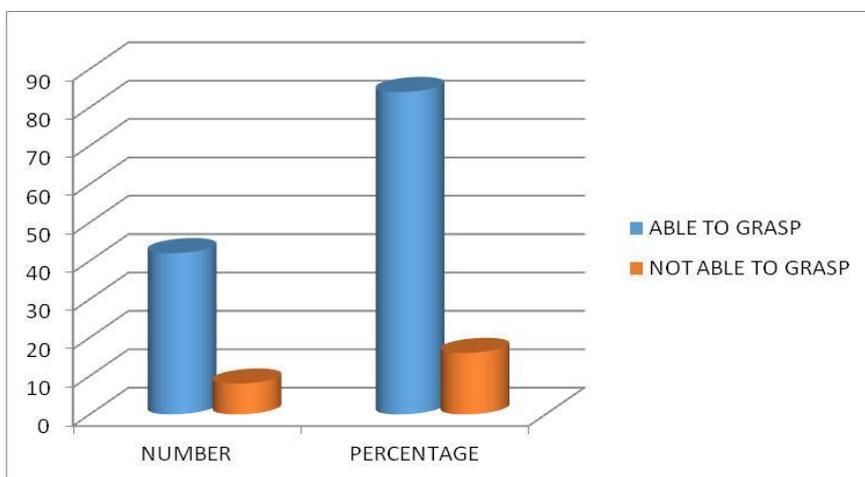
	NUMBER	PERCENTAGE
DISTENDED	47	94
CONTRACTED	3	6



5.3 Grasping With Atraumatic Forceps

In this study of 50 patients, there were 42(84%) patients in whom the gallbladder was able to grasp with the atraumatic forceps and in 8(6%) patients the gallbladder was not able grasp with the atraumatic forceps.

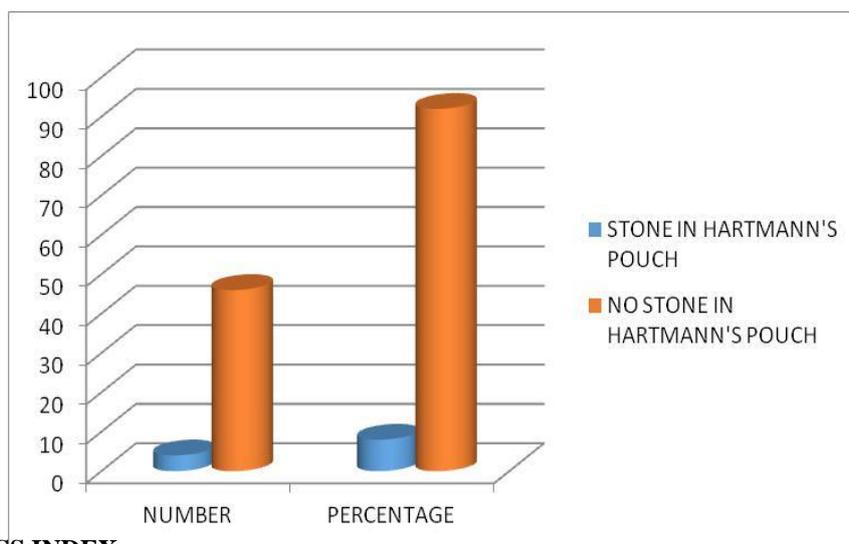
Grasping With	Number	Percentage
Atraumatic Forceps		
Yes	42	84
No	8	16



5.4 Stone >= 1cm Impacted In Hartmann’s Pouch:

In this study group of 50 patients , only 4(8%) patients had impacted stone in the Hartmann’s pouch and remaining 46(92%) patients had no stones impacted in the Hartmann’s pouch.

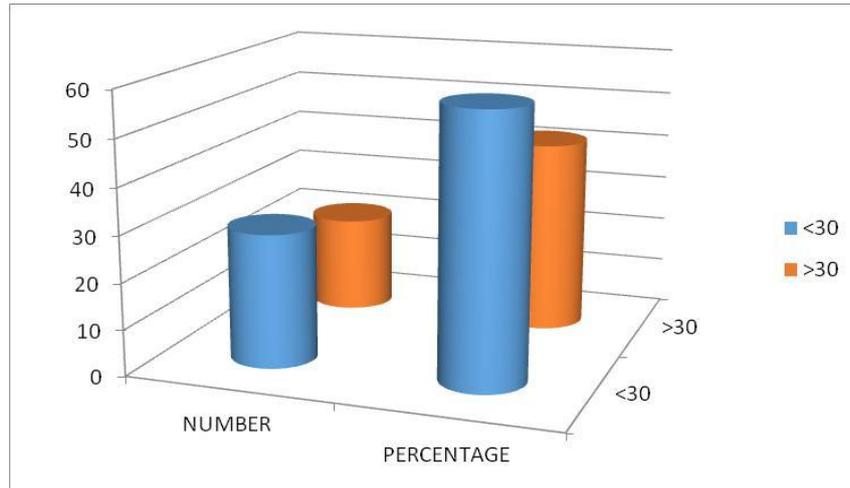
	NUMBER	PERCENTAGE
YES	4	8
NO	46	92



5.5 BODY MASS INDEX:

In the study, of 50 patients, 29(58%) patients had BMI of <30 and 21(42%) patients had BMI of >30.

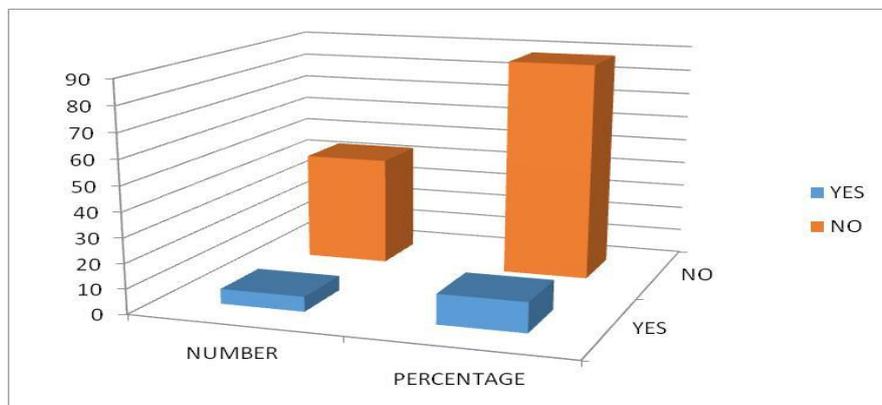
Bmi	Number	Percentage
<30	29	58
>30	21	42



5.6 Adhesions From Previous Surgery Limiting Access:

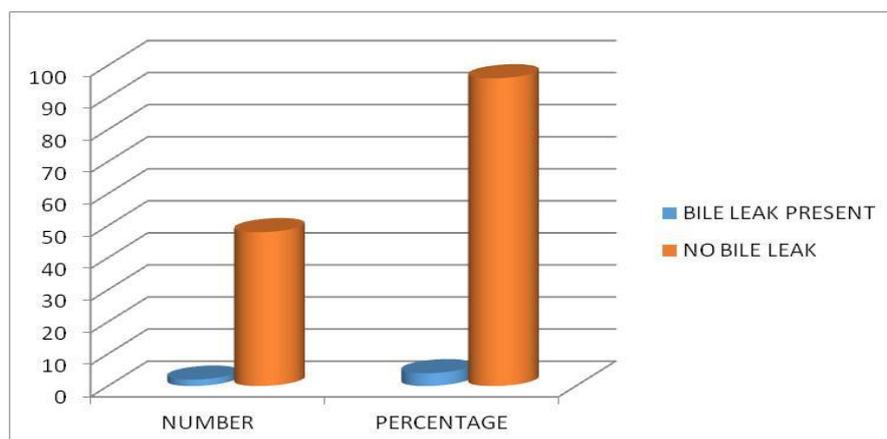
In this study of 50 patients, there were only 6(12%) patients who had adhesions from previous surgeries limiting the access to the gallbladder and calots triangle .Remaining 44(88%) patients had no such adhesions.

	NUMBER	PERCENTAGE
YES	6	12
NO	44	88



5.7 Bile Leak From Gall Bladder

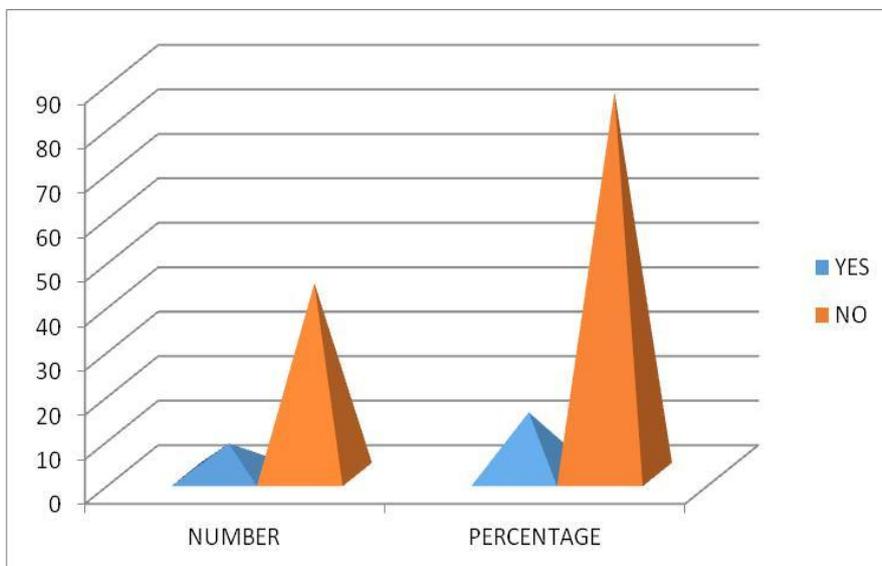
	NUMBER	PERCENTAGE
YES	2	4
NO	48	96



5.8 Pus Leak From Gallbladder

In the study of 50 patients , there were 7(14%) patients had pus leak from the gallbladder intraoperatively. Remaining 43(86%) patients had no such pus leakage from the gallbladder during the procedure.

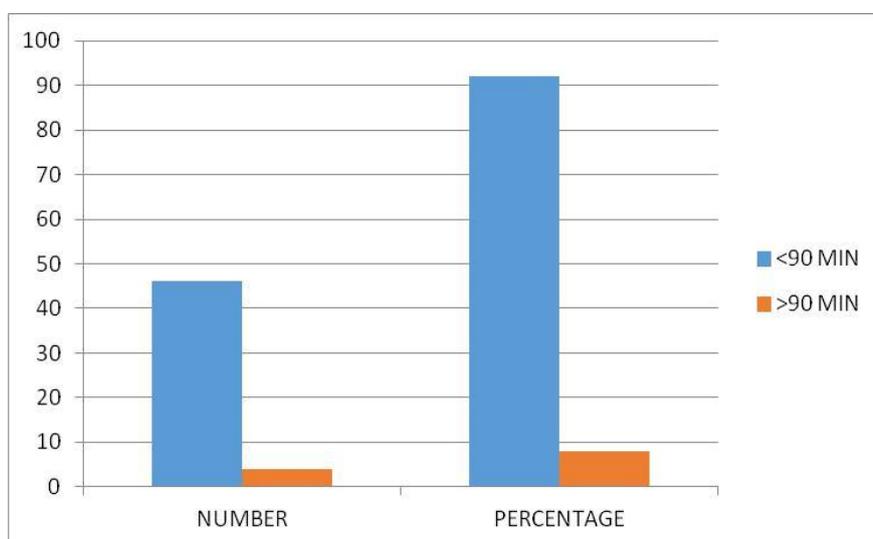
	NUMBER	PERCENTAGE
YES	7	14
NO	43	86



5.9 Time Taken To Identify The Cystic Artery

In the study of 50 patients , the time taken to dissect the cystic artery took less than 90 min in 46(92%) patients . In remaining 4(8%) patients the dissection took morre than 90 minutes.

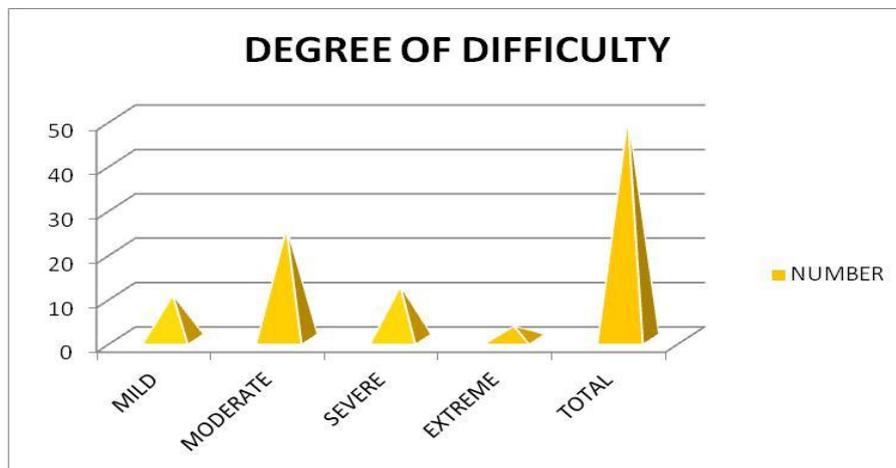
	NUMBER	PERCENTAGE
<90 MIN	46	92
>90 MIN	4	8



5.10 Degree Of Difficulty :

In the study of 50 patients , with all the variables discussed above a score is given for each of the variable and were graded into mild, moderate, severe and extreme with scores of <2, 2-4, 5-7 and 8-10 respectively. 10 patients had mild difficulty, 25 patients had moderate difficulty , 12 patients had severe difficulty and 3 patients had extreme difficulty. These 3 patients were converted for open cholecystectomy.

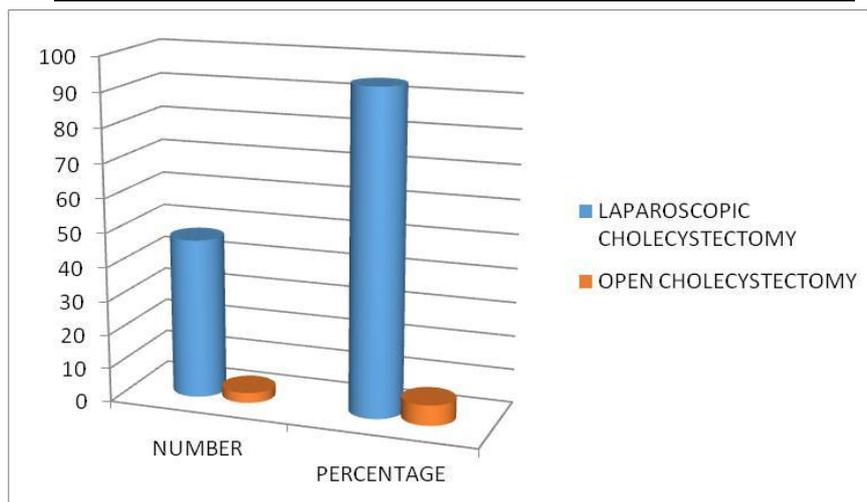
SCORE	NUMBER
MILD <2	10
MODERATE 2-4	25
SEVERE 5-7	12
EXTREME 8-10	3
TOTAL	50



5.11 Laparoscopic / Open Cholecystectomy

In the stud of 50 patients, 47(94%) patients were proceeded with laparoscopic cholecystectomy who were categorized into mild , moderate and severe grades. The 3(6%) patients with extreme grade were converted from laparoscopic to open cholecystectomy.

	NUMBER	PERCENTAGE
LAPAROSCOPIC CHOLECYSTECTOMY	47	94
OPEN CHOLECYSTECTOMY	3	6



VI. Discussion

The advantages and safety of laparoscopic cholecystectomy have been well documented and made it a standard of care for management of patients with gall stone disease. In spite of these advantages , conversion to open may be needed in few patients which ranges from 2- 15 % as shown in various studies. Hence it is important that the surgeon realise the need for conversion is neither a failure nor a complication but done only for the best interest of the patient. In this study patients who got admitted for symptomatic gallstones were evaluated for the procedure of laparoscopic cholecystectomy. 9 variables were taken for evaluation.

Acute cholecystitis will cause dense omental adhesions over the gallbladder . these adhesions will cause significant difficulty in the procedure . in our study most of the patients (28patients) had adhesions of more than 50% over the gall bladder. Of these 7 patients had their gallbladder entirely covered by the omental adhesions. These patients were given a score of 3 for this finding according to the scoring system. Distended gallbladder is another important finding intraoperatively. 47 patients had distended gall bladder among 50

patients in our study. 3 patients had contracted or shrivled gallbladder. Each were given a score of 1. In laparoscopic cholecystectomy, the gallbladder has to be grasped with the atraumatic forceps for lifting cranially which helps in the easier visualization of the Calot's triangle and makes dissection easier. In our study, in 42 patients out of 50, the gallbladder were able to be grasped by the atraumatic forceps. In remaining 8 patients the gallbladder could not be grasped with the atraumatic forceps, these eight patients were given a score of 1 each. Multiple gall bladder stones and large stone in neck of gall bladder causes distension of gall bladder and is associated with difficulty in grasping and rupture of gall bladder with spillage of bile and calculi intraperitoneally. In our study 4 patients had stone impacted in the Hartmann's pouch. They were given a score of 1 each. Obesity has been considered as a risk factor for difficult laparoscopic cholecystectomy and conversion as observed by. In our study, patients were divided into two groups, those with BMI below 30 and above 30. 21 patients had BMI of >30 and they were given a score of 1 each. Any previous abdominal surgery may cause adhesions between bowel and viscera of abdominal wall. There is a high risk of injury to these structures during insertion of first port and hence risk of conversion is high. In our study, 6 patients had undergone previous surgeries like tubectomy, appendectomy and caesarean section. These patients had an infraumbilical scar and previous abdominal surgery. They were given a score of 1 each. Bile leak and pus leak are two important intraoperative complications. Bile leak may be encountered during handling of overdistended gallbladder with the forceps causing rupture of the gallbladder. In our study, only 2 patients had bile leak out of 50 patients. They were given a score of 1 each. Pus in the gallbladder is called empyema gallbladder. Pus leak is another important complication of the procedure. Pus leak may occur by spontaneous rupture of the empyema gallbladder or intraoperatively when the gall bladder is grasped with the forceps. In our study, 7 out of 50 patients had pus leak intraoperatively. They were given a score of 1 each.

Dissection of the cystic artery and cystic duct is the most important step in the procedure of laparoscopic cholecystectomy. Critical view of safety triangle: method requires complete dissection of the cholecystohepatic triangle and separation of the base of the gallbladder infundibulum from the liver bed. When this view is achieved, the two structures entering the gallbladder can only be cystic duct and artery. Cystic artery is identified along with its anterior and posterior branches by blunt dissection. The cystic node sometimes overlies the cystic artery. Both the cystic duct and artery are clipped, two clips on the cystic duct side and one on the gallbladder side. Before clipping the cystic duct the stones in the cystic duct are milked back to GB, artery is divided before the duct but in certain cases duct is divided first to give exposure to the artery. When the time taken to identify these structures exceed 90 minutes we call it a difficult cholecystectomy. We had 4 patients out of 50 patients in our study in whom it took more than 90 minutes for the identify the two structures. They were given a score of 1 each.

We calculated the scores of each patient and were grouped into mild, moderate, severe and extreme degree of cholecystectomy with scores of <2, 2-4, 5-7 and 8-10 respectively. 10 patients had mild difficulty, 25 patients had moderate difficulty, 12 patients had severe difficulty and 3 patients had extreme difficulty. These 3 patients were converted for open cholecystectomy.

VII. Conclusion

This study has identified certain intraoperative variables to assess the difficulty of laparoscopic cholecystectomy in our setting. This study demonstrates that a scoring system predicting the difficulty in LC is feasible. At the end of this study the following conclusions may be drawn.

1. Elderly patients are more likely to have a difficult LC.
2. Obese patients tend to have more difficulties during surgery.
3. Omental adhesions entirely burying the gallbladder has difficulties in cholecystectomy.
4. Previous surgery predisposes towards difficulties in cholecystectomy.
5. Pus leak and bile leak tend to have difficulties in laparoscopic cholecystectomy.
6. Features like distended or contracted gallbladder, intraperitoneal adhesions, structural anomalies or distortions and the are signs that are associated with subsequent difficulties during the surgery.

Bibliography

- [1]. Rakesh Tendon, " Diseases of gallbladder and biliary tract". API text book of medicine, Dr. Siddarth N Shah, 7th edition, 2003, PP 642 - 644.
- [2]. Conference, N C. Gallstones and laparoscopic cholecystectomy: JAMA 1992; 269: 1018-1024.
- [3]. Ravi S Chari, MD and Shinul A Shah, MD. Biliary system, Sabiston textbook of surgery; Courtney M Townsend, R Laniel Beauchamp, B. Mark Evers, Kenneth L Mattox. 18th edition, Saunders Elsevier, vol 2, 2009. chapter 54, PP: 1547-1588.
- [4]. Boni L, et al. Infective complication of laparoscopic surgery. Surg infect (Larchmt), 2006; 7 suppl 2: S109-11.
- [5]. Stewart L, Oesterle A L, Erdan I, et al: pathogenesis of pigment gallstones in western societies: The central role of bacteria. J Gastrointest Surg 6: 891-903, 2002.
- [6]. Nakeeb A, Commuzzie A G, Martin L et al: Gallstones: Genetics versus environment. Am Surg 235; 842-849, 2002.
- [7]. Bellows C F, Berger C H, Crass R A: Management of gallstones. Am Fam Physician 72: 637-642, 2005. 115
- [8]. Glasgow R E, Cho M, Blutter M M, Et Al: The spectrum and cost of complicated gallstone disease in California. Arch Surg 135; 1021-1025, 2000.

- [9]. Ko C W, Lee S P; Epidemiology and natural history of common bile duct stones and prediction of disease, *Gastrointest Endosc* 56:S165,2002.
- [10]. Trownbridge R L, Rutkowski N K, Shojania K G: Does this patient have acute cholecystitis? *JAMA* 289: 80-86, 2003.
- [11]. Gibbons A: Geneticists trace the DNA trail of the first Americans. *Science* 259:312-313,1993.
- [12]. Alexander P Nagle, Nathaniel J Soper, James R Hines; Cholecystectomy (open and laparoscopic). Michael J Zinner, Stanley W Ashley; Maingot's Abdominal
- [13]. Operations; 11th edition, Mc Graw Hill, 2007. Chapter 32, PP:847-864
- [14]. 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.
- [15]. \14. Cullen J. Laparoscopic cholecystectomy: Avoiding complications. In: Birkett D H, Ronsky J L, Stiegmann G V. The SAGES manual- Fundamentals of Laparoscopic and GI Endoscopy. Springer, 2003: 137- 142.
- [16]. Deziel D, Millikan K, Economou S, et al. Complication of laparoscopic cholecystectomy: a national survey of 4292 hospitals and analysis of 77604 cases. *Am J Surg* 1993; 165: 9-14.
- [17]. The southern surgeons club. A prospective analysis of 1518 laparoscopic cholecystectomies. *N Engl J Med* 1991. 324:1073-1078.
- [18]. 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.
- [19]. Daradkeh S, laparoscopic cholecystectomy: What are the factors determining difficulty? *Hepatogastroenterology*. 2001 JanFeb; 48(37): 76-78.
- [20]. Jorgensen J O, Hunt D R: laparoscopic cholecystectomy. A prospective analysis of the potential causes of failure. *Surg laparosc endosc* 3: 49- 53, 1993.
- [21]. Pastulka P S, Bistrrian B R, Benotti P N, et al: The risks of surgery in obese patients. *Ann intern med* 104: 551-556, 1985.
- [22]. J. S. Randhawa . A. K. Pujahari, preoperative prediction of difficult lap chole: a scoring method. *Indian Journal of Surgery*, volume 71, number 4, July- August 2009, PP:198-201.
- [23]. Sir Alfred Cuscheri, "Disorder of the biliary tract". *Textbook of surgery*, Sir Alfred Cuscheri, 4th edition, Arnold publication, 2002 PP:375-453.
- [24]. Heng-Hui Lein MD, Ching-Shui Huang (2002) Male gender: Risk factor for severe sympatomatic cholelithiasis. *World J Surg* 26:598-601.
- [25]. 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.
- [26]. 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.
- [27]. 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.
- [28]. Maj. Alok Sharma, "Towards A Safer Cholecystectomy- The Fundus Porta
- [29]. Approach", *Indian Journal Of Surgery*, June 1997, PP. 141-145.
- [30]. 28. Hanif G Motiwala. (1991): *Operative Technique Cholecystectomy. A Study Of 250 Cases: Surgery In The Tropics* . Ed: Sakens: Jhawes Pk: Purohit A : Mc Millan India Ltd. , 1991, 56, 204.
- [31]. 29. Hermann R E. , "Biliary Disease In The Aging Patients.", New York, Masson,
- [32]. 1983, PP. 227-232.
- [33]. 30. Grading operative findings at laparoscopic cholecystectomy- a new scoring system Michael Sugrue1*, Shaheel M Sahebally1, Luca Ansaloni2 and Martin D Zielinski3; Sugrue et al. *World Journal of Emergency Surgery* (2015) 10:14 DOI 10.1186/s13017-015-0005-x
- [34]. 31. A comprehensive predictive scoring method for difficult laparoscopic cholecystectomy Mittalgodu Anantha Krishna Murthy Vivek, Alfred Joseph Augustine, Ranjith Rao ,J Minim Access Surg. 2014 Apr-Jun; 10(2): 62– 67. doi: 10.4103/0972-9941.129947
- [35]. 32. Solmaz A, Gülçiçek OB, Biricik A, Erçetin C, Yiğitbaş H, et al. (2016)
- [36]. Evaluation of the Parameters Increasing Intraoperative Difficulty Scores of Elective Laparoscopic Cholecystectomy. *J Liver Clin Res* 3(1): 1023

*1Dr.A.M.Syed Ibrahim Ims Fais . "Grading Operative Findings At Laparoscopic Cholecystectomy A Scoring System in Grh, Madurai." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* , vol. 16, no. 12, 2017, pp. 34-43.