

## To Predict a Difficult Laparoscopic Cholecystectomy Using a Scoring System and To Validate It

DrP.V.Buddha<sup>1</sup>, Dr N.Mahidhar<sup>2</sup>

<sup>1</sup> Professor of General Surgery, Rangaraya Medical College, Kakinada

<sup>2</sup> Post graduate in General Surgery, Rangaraya Medical College, Kakinada

Corresponding Author: DrP.V.Buddha

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### Abstract

**Background:** Laparoscopic cholecystectomy (LC) has become the procedure of choice for the management of symptomatic gall stone disease. At times it is easy and can be done quickly. Occasionally it is difficult and takes longer time. But there is no scoring system available to predict the difficulty of LC preoperatively. LC is one of the most common laparoscopic procedures being performed.

**Materials and methods:** A Prospective study of patients admitted from October 2017 to March 2019 for laparoscopic cholecystectomy in Rangaraya medical college, department of surgery at Government General Hospital Kakinada. 112 patients, who underwent laparoscopic cholecystectomies were studied during the period.

**Results:** The scoring system proposed by Randhawa and Pujahari is valuable and appropriate for predicting operative outcome in laparoscopic cholecystectomy. Advantage of this scoring system being it takes into consideration tests that are regularly done, it does not require special equipment, easily understood and adopted. This scoring system is apt for teaching institutions where surgeons of varied experience (freshly graduated surgeons to surgeons of more than two decades experience) are performing laparoscopic cholecystectomy i.e. it helps in allocating appropriate surgeries to appropriate surgeons based on prediction of difficulty by the scoring.

**Key words:** cholecystectomy, laparoscopy, scoring system

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### I. Introduction :

Laparoscopic cholecystectomy (LC) has become the procedure of choice for the management of symptomatic gall stone disease. At times it is easy and can be done quickly. Occasionally it is difficult and takes longer time. But there is no scoring system available to predict the difficulty of LC preoperatively. LC is one of the most common laparoscopic procedures being performed. Mouret introduced laparoscopic cholecystectomy in 1987. Laparoscopic cholecystectomy has replaced open cholecystectomy as the standard of treatment, as the advantages include decreased morbidity, reduced hospitalization, short recovery time, better cosmesis and overall less cost. However LC is technically more demanding and still in a substantial proportion of patients it cannot be successfully performed and for whom conversion to open cholecystectomy is required. A number of relative contraindications are there for LC such as morbid obesity, previous abdominal surgeries, perforated gall bladder, and old age. Also compared to open cholecystectomy, incidence of injuries to bile duct seems to be marginally more in LC. Preoperative prediction of the possibility of conversion to open surgery or difficulty during laparoscopic operation is an important aspect of planning laparoscopic surgery. This will help in appropriate utilization of manpower and O.T. resources and enable proper planning of surgeries with senior surgeons performing predicted difficult cholecystectomies at starting itself. It will also help in better counseling of patients regarding the procedure. The purpose of my prospective study is to predict a difficult laparoscopic cholecystectomy preoperatively by the use of a scoring system and to validate the scoring system. The scoring system is based on different parameters taken into consideration such as age, gender, BMI, any history of previous hospitalization, abdominal scar, and ultrasonography findings. The preoperative score thus obtained is then correlated with the intraoperative difficulty of laparoscopic cholecystectomy

### II. Materials & Methods:

A Prospective study of patients admitted from October 2017 to March 2019 for laparoscopic cholecystectomy in Rangaraya medical college, department of surgery at Government General Hospital Kakinada. 112 patients, who underwent laparoscopic cholecystectomies were studied during the period.

Patients diagnosed to have GB stones requiring cholecystectomy were evaluated with following factors age, gender, duration of illness, h/o previous GB disease, concurrent systemic illness, BMI (obesity), abdominal scar whether infraumbilical or supraumbilical, upper abdominal tenderness, palpable gallbladder, sonographic findings- gall bladder wall thickness, pericholecystic collection, size and number of calculi, anatomical anomalies. Following evaluation, patients were counseled regarding surgical options. Those willing to undergo LC and be part of the study were included. Procedures were graded based on individual surgeon's opinion as easy/difficult/very difficult. The parameters were analyzed to find their correlation to predicting difficult LC. Degree of difficulty was analyzed. The scoring system is adopted from the study done by authors Randhawa JS et al.

|                            |           |  |   |
|----------------------------|-----------|--|---|
| Age                        | <50(0)    | >50(1)                                     | 1 |
| Sex                        | Female(0) | Male (1)                                   | 1 |
| H/o hospitalisation        | N (0)     | Y(4)                                       | 4 |
| BMI                        | <25(0)    | 25-27.5(1) , >27.5(2)                      | 2 |
| Abdominal scar             | N (0)     | Infraumbilical (1) ,<br>Supraumbilical (2) | 2 |
| Palpable gall bladder      | N (0)     | Y (1)                                      | 1 |
| Wall thickness             | Thin (0)  | Thick >4mm(2)                              | 2 |
| Pericholecystic collection | N(0)      | Y (1)                                      | 1 |
| Impacted stone             | N(0)      | Y (1)                                      | 1 |

**Scoring System of Randhawa and Pujahari**

Score  $\leq 5$  was defined as easy, 6–10 as difficult and 11-15 as very difficult.

|                |   |
|----------------|---|
| Easy           | Time taken <60min<br>no bile spillage<br>no injury to duct, artery                      |
| Difficult      | Time taken 60-120 min<br>bile/stone spillage<br>injury to duct, artery<br>no conversion |
| Very difficult | Time taken >120min conversion   |

**Difficulty Criteria based on intra operative findings (Randhawa and Pujahari study)**

**Inclusion criteria:**

All patients diagnosed with cholelithiasis, undergoing LC and willing to be part of the study.

**Exclusion criteria:**

- Pediatric patients with gall stones.
- Suspected malignant gall bladder disease.
- Patient with gall stone pancreatitis at presentation/ obstructive jaundice

**III. Results:**

Age distribution:

Gall stone disease was found to be most common in 3rd and 4th decades in our study. Oldest patient was 85 years, youngest was 21 years.

Gender distribution:

Gall stone disease was found to be more common in females than males. No. of females – 68 (61%), No. of males – 44(39%)

Body Mass Index :

No. of patients with BMI <25 were 55 and BMI of 25-30 were 52 and >30 were 5 Maximum BMI recorded is 38, Minimum BMI recorded is 18

H/o previous hospitalization due to gall stone disease

In our study 18 patients had previous h/o hospitalization due to gall stone disease.

H/o previous abdominal surgeries

In our study 55 patients had no h/o previous abdominal surgeries.

57 patients had H/o abdominal surgeries, out of which 52 had infra umbilical scars, majority of which were tubectomy and cesarian section scars, others were appendectomy and hysterectomy scars etc., 5 patients had supraumbilical scars (like epigastric hernias, duodenal perforations etc.).

**Clinical features:**

A total of 112 patients presented to surgery OPD/ casualty. Of these majority (86 patients) presented with symptoms of pain in the upper abdomen of 1-3 days duration. Seven patients presented with pain abdomen of 3-5 days duration, all the above had colicky type of pain. Fourteen patients presented with nausea and vomiting as their main symptoms associated with vague chest pain and abdominal discomfort. Five patients presented with h/o on and off bloating sensation of abdomen with past h/o gall stone disease. On examination of the 112 patient only 67 patients had positive Murphy's sign, 6 had palpable GB. None of the patients had signs of peritonitis.

**Comorbidities:**

Diabetes mellitus was the most common comorbidity (42 patients). Seven patients had more than one comorbidity. Two patients were on antiplatelet medication which was stopped 4-5 days preoperatively.

**Ultrasound findings:**

GB wall thickness-Fifty three patients were found to have GB wall thickness of <4mm and fifty nine patients have GB wall thickness of >4 mm.

Presence of pericholecystic fluid-101 patients had no pericholecystic fluid and 11 patients had pericholecystic fluid. Of the 112 patients ultrasound showed 26 patients had solitary gall stone and 86 patients had to multiple gall stones. 10 of the 112 patients had impacted gall stone.

**Preoperative Score and intraoperative findings:**

Based on preoperative scoring (Randhawa and Pujahari) 93 patients were graded as easy, 17 patients graded as difficult and 2 as very difficult. Maximum score was 13 and minimum 0. Based on intraoperative findings 86 were graded as easy, 18 difficult and 8 very difficult.

#### **IV. Discussion:**

**(A) Statistical analysis of scoring system**

On comparing preoperative score with intraoperative assessment P value was <0.001, which is strongly significant, Fisher Exact test was used to find p value. Of the 112 patients studied: 93 scored preop easy, of which 83 were found easy intraop, 8 were difficult and 2 very difficult. 17 scored preop difficult, of which 10 were difficult intraop, 3 easy and 4 very difficult. 2 scored preop very difficult, and both were found very difficult intraop. On further analysing the results:

Of the 86 found intra-op easy, 83 were score pre-op easy, but 3 scored difficult.

Of the 18 found intra- op difficult, 10 scored pre-op difficult, but 8 scored easy. Of the 8 found intra- op very difficult, only 2 were scored pre-op very difficult.

**(B) Statistical analysis of the scoring parameters**

Analysis: Age was not found significant for predicting difficult LC. P value was 0.120, Chi-Square test is used to find significance. Age >50 years also was not found significant; P value was 0.307, Chi-Square test was used to find significance.

Analysis: Gender was not found significant in predicting difficulty of LC. P value was found 0.214 derived using Chi-Square test.

Analysis: History of previous hospitalisation due to gall stone disease was found strongly significant in predicting difficult LC with P<0.001, Chi-Square test has been used to find significance.

Analysis: BMI was found significant in predicting difficult LC in our study with P value of 0.053, Fisher Exact test was used to find significance

Analysis: Presence of abdominal scar was not found to be significant in predicting difficult LC, P value for this parameter was 0.536, derived using Fisher Exact test.

Analysis: Palpable GB was found to be strongly significant in predicting difficult LC with P value of <0.001, derived using Fisher Exact test

Analysis: Wall thickness of >4mm was found to be significant with P value of 0.034, Fisher Exact test was applied to find the significance.

Analysis: Presence of pericholecystic fluid was found to be strongly significant in predicting difficult LC with P value <0.001, significance was found by applying Fisher Exact test.

Analysis: Irrespective of no. of stone (solitary /multiple), impaction of stone predicts difficult LC and was found to be strongly significant, with P value of <0.001, derived using Fisher Exact test.

## V. Conclusion:

The scoring system proposed by Randhawa and Pujahari is valuable and appropriate for predicting operative outcome in laparoscopic cholecystectomy. Advantage of this scoring system being it takes into consideration tests that are regularly done, it does not require special equipment, easily understood and adopted. This scoring system is apt for teaching institutions where surgeons of varied experience (freshly graduated surgeons to surgeons of more than two decades experience) are performing laparoscopic cholecystectomy i.e. it helps in allocating appropriate surgeries to appropriate surgeons based on prediction of difficulty by the scoring. This, in turn, facilitates better preparedness with adequate back-up of senior surgeon, anesthetist, operation theatre staff and appropriate operation theatre equipment. Patients can be better counselled pre-operatively for possible consequences based on their scores by this scoring system

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