

# PRE-OPERATIVE PREDICTORS OF DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY- A COMPARATIVE STUDY BETWEEN TWO SCORING SYSTEMS

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**Abstract-** This prospective observational study, conducted at the Kempegowda Institute of Medical Sciences and Research Centre from March 2021 to August 2022, aims to compare the determinants influencing the intricacies of laparoscopic cholecystectomy. With a primary focus on validating two predictive scoring systems, namely the Risk Score for Conversion from Laparoscopic to Open Cholecystectomy (RSCLO) and the New Scoring System (NSS), our investigation contributes to the critical domain of preoperative risk assessment. In a cohort comprising 100 patients diagnosed with cholelithiasis, a comprehensive preoperative scoring system based on presenting symptoms was meticulously correlated with intraoperative findings and subsequent postoperative outcomes. The univariate logistic regression analysis brought to light several statistically significant factors contributing to the complexity of laparoscopic cholecystectomy. These included BMI surpassing 27.5 kg/m<sup>2</sup>, the presence of a palpable gallbladder, a history of previous hospitalization for acute cholecystitis, sonological wall thickness exceeding 4mm, and the manifestation of pericholecystic edema. Of notable significance were the comparative performances of the RSCLO and NSS systems. The RSCLO system exhibited superior accuracy in predicting cases characterized by a lower risk of conversion, suggestive of a less challenging cholecystectomy. Conversely, the NSS displayed a remarkable sensitivity of 100% in identifying cases categorized as difficult and very difficult cholecystectomies. These findings not only underscore the clinical relevance of validated scoring systems for laparoscopic cholecystectomy but also offer practical insights into preoperative risk assessment, aiding surgeons in strategic surgical planning and providing enhanced patient counseling for optimal outcomes

**Keywords:** Difficult cholecystectomy, Laparoscopic Cholecystectomy, New Scoring system, RSCLO, Conversion.

## INTRODUCTION:

Laparoscopic cholecystectomy, a minimally invasive surgical technique for gallbladder removal, has emerged as the gold standard for the treatment of gallbladder diseases. Widely regarded for its advantages, including reduced postoperative pain, shorter hospital stays, and quicker recovery times compared to traditional open surgery, laparoscopic cholecystectomy is routinely performed by general surgeons. Despite its widespread success, the procedure may encounter challenges, prompting the need for conversion to open cholecystectomy. The decision to convert is often made on the operating table after an initial laparoscopic inspection.

Understanding the potential difficulties associated with laparoscopic cholecystectomy is crucial for surgeons in optimizing patient outcomes. To aid in this endeavor, various preoperative scoring systems have been developed to predict the likelihood of encountering challenges during surgery. These scoring systems aim to provide surgeons with valuable insights into the anticipated difficulty level of the procedure, assisting in informed decision-making regarding the choice of surgical approach.

This prospective observational study conducted at the Kempegowda Institute of Medical Sciences and Research Centre spans from March 2021 to August 2022. The primary objective is to comprehensively explore the factors influencing the complexity of laparoscopic cholecystectomy and, more critically, to validate two distinct predictive scoring systems: the Risk Score for Conversion from Laparoscopic to Open Cholecystectomy (RSCLO) and the New Scoring System (NSS).

Laparoscopic cholecystectomy, when confronted with challenges, can lead to an increased risk of conversion to open surgery, with potential implications for patient recovery and postoperative complications. Therefore, the identification of preoperative factors that may contribute to the difficulty of the procedure is paramount. This study seeks to fill this knowledge gap by systematically assessing a range of preoperative variables, from patient demographics to

symptomatology, with the aim of enhancing predictive accuracy and refining the preoperative decision-making process.

The scoring systems under scrutiny, RSCLO and NSS, represent concerted efforts to provide a systematic framework for preoperative risk assessment. The RSCLO system, developed to predict the risk of conversion during laparoscopic cholecystectomy, has demonstrated utility in identifying cases with a low likelihood of conversion, signifying a relatively straightforward procedure. Conversely, the NSS, a newer scoring system, aims to enhance sensitivity in predicting difficult and very difficult cholecystectomies.

As we delve into the intricacies of laparoscopic cholecystectomy, it becomes imperative to consider factors that may contribute to its complexity. Body mass index (BMI), for instance, has been implicated in surgical difficulty, with higher BMI values associated with increased technical challenges. A palpable gallbladder, indicative of inflammation or adhesions, presents another potential hurdle during the laparoscopic procedure. Previous hospitalization for acute cholecystitis may signify a history of recurrent or severe gallbladder disease, raising concerns about adhesion's and tissue inflammation that could complicate the surgery.

Sonological parameters, including gallbladder wall thickness exceeding 4mm, have been proposed as predictive indicators of difficult cholecystectomy. Furthermore, the presence of pericholecystic edema may signal an inflammatory response, contributing to increased surgical complexity. These factors, among others, warrant careful consideration in the preoperative evaluation.

By meticulously examination of these variables, our study aims to contribute valuable insights into the predictive capacity of the RSCLO and NSS scoring systems. The ability of these systems to discriminate between easy, difficult, and very difficult laparoscopic cholecystectomies will not only aid in surgical planning but also hold implications for patient counseling and informed consent.

In conclusion, this study addresses a critical aspect of contemporary surgical practice by investigating the factors influencing the complexity of laparoscopic cholecystectomy. Through rigorous examination of preoperative variables and the validation of two scoring systems, the research aims to enhance the predictive accuracy of difficulty in laparoscopic cholecystectomy, ultimately contributing to improved patient outcomes and informed surgical decision-making.

#### **AIM:**

**“TO DETERMINE THE PREDICTIVE FACTORS FOR A DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY BY COMPARING TWO SCORING SYSTEMS”**

#### **OBJECTIVES:**

- To validate 2 scoring systems in predicting difficult cholecystectomy i.e.,

A) Risk score for conversion from laparoscopic cholecystectomy to open cholecystectomy(RSCLO), Ankara Turkey 2000.

B) New scoring System, command hospital Bangalore, 2003

#### **MATERIALS AND METHODS**

##### ***Source of Data***

Patients undergoing Laparoscopic cholecystectomy in the Department of General Surgery, at KIMS Hospital and Research Center, Bangalore.

##### ***Type of study***

Prospective observational study

##### ***Duration of Study***

18 months (March 2013 to August 2015)

##### ***Place:***

Kempegowda Institute of Medical Sciences Hospital, Bangalore

***Sample size:*** 100 patients.

##### ***Inclusion Criteria***

All patients presenting with symptoms of gall bladder disease and diagnosed with the same and undergoing elective laparoscopic cholecystectomy.

##### ***Exclusion Criteria:***

The cases of Laparoscopic cholecystectomy converted to open due Equipment failure or emergency surgeries were excluded.

##### ***Protocol of the Procedure:***

- Detailed history of patient was elicited from each patient and chief complaints tat included are pain in upper abdomen, duration of pain, previous history of similar complaints, any hospital admission for these complaints, history of jaundice, previous history of endoscopic procedures were noted.
- After general physical examination and systemic examination, presence of jaundice was noted.
- Routine investigations like hemoglobin, total count, differential countm ESR, Renal function test, liver function tests etc were done for all patients.
- After taking physician fitness, pre anaesthetic evaluation was done for all patients.
- Informed written consent was taken explaining all possible complications including conversion to open cholecystectomy.
- Each patient was given a Pre operative score on the previous day of surgery according to the scoring systems under study and were compared with operative outcomes.
- The study was randomized, All patients received prophylactic antibiotics in the pre-operative period.
- Patients were taken for elective Laparoscopic cholecystectomy.

## METHODS

- Standard laparoscopy procedure was followed
- Surgeon and port positioning were according to north american guidelines
- Using standard two 5mm port and two 10 mm ports
- The timing was noted from the first port site incision till the last ports closure
- All the intraoperative events were recorded
- The entire cases received standard post operative care and follow up

On POD1 both the pre-operative scoring and intra operative events were compared and conclusions were noted in the proforma.

NEW SCORING SYSTEM/NSS{ developed by command hospital } Bangalore, Karnataka

HISTORY			MAX SCORE	
Age	<50 yrs	>50 yrs	1	
Sex	Female(0)	Male(1)	1	
H/O Hospitalization	N(0)	Y(1)	4	
CLINICAL				
BMI wt(kg)/ht(m2)	<25(0)	25-27.5(1)	>27.5(2)	2
Abdominal scar	N(0)	Y(1)	2	
Palpable GB	N(0)	Y(1)	1	
SONOGRAPHY				
Wall thickness	Thin(0)	Thick>4mm(2)	2	
Pericholecystic fluid	N(0)	Y(1)	1	
Impacted caLaparoscopic cholecystectomyulus	N(0)	Y(1)	1	
TOTAL			15	

Table : New Scoring System

Score Up to: 5-easy

6-10- difficult

11-15-very difficult

## Criteria for easy/difficult cholecystectomy

Easy

- Time taken<60 min
- No bile spillage
- No injury to duct, artery

Difficult

- Time taken 60-120 min
- Bile/stone spillage
- Injury to duct, artery

Very difficult

- Time taken > 120 min
- Conversion

**RISK SCORE FOR CONVERSION FROM LAPAROSCOPIC TO OPEN CHOLECYSTECTOMY(RSCLO), ANKARA, TURKEY.**

	VARIABLES	COEFFICIENTS
Age	>60	5
	<60	0
Sex	Male	11
	Female	0
Previous upper abdominal operation	Present	8
	Absent	0
Abdominal tenderness	Present	9
	Absent	0
Gall bladder wall(sonography)	Thickened	13
	Normal	0
Acute cholecystitis	Present	15
	Absent	0
	Constant	-20

Table

Maximum scores:

Scores changes between -20 and 41; the cutoff point for predicting the difficulty of operation is -3.

According to these results RSCLO Scores:

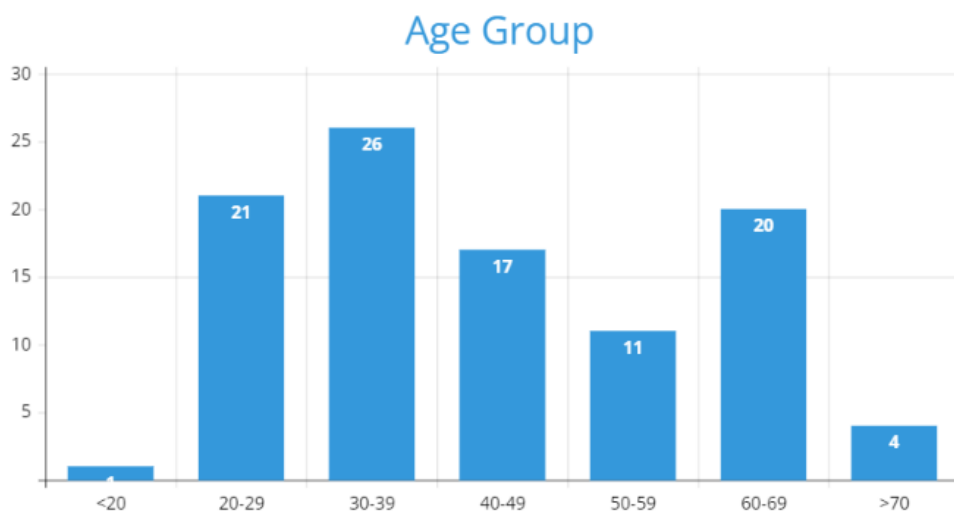
<-3 will be taken as low risk for conversion.

-3 or higher scores were taken as high risk for conversion

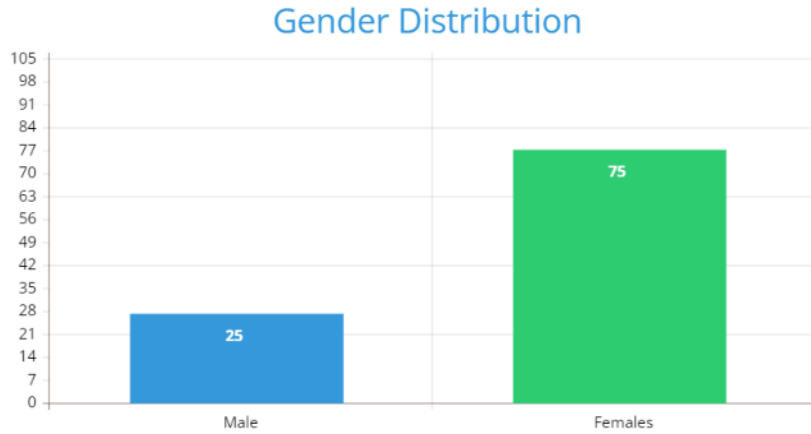
(difficult laparoscopic cholecystectomy I.e. conversion into open cholecystectomy)

**RESULTS:**

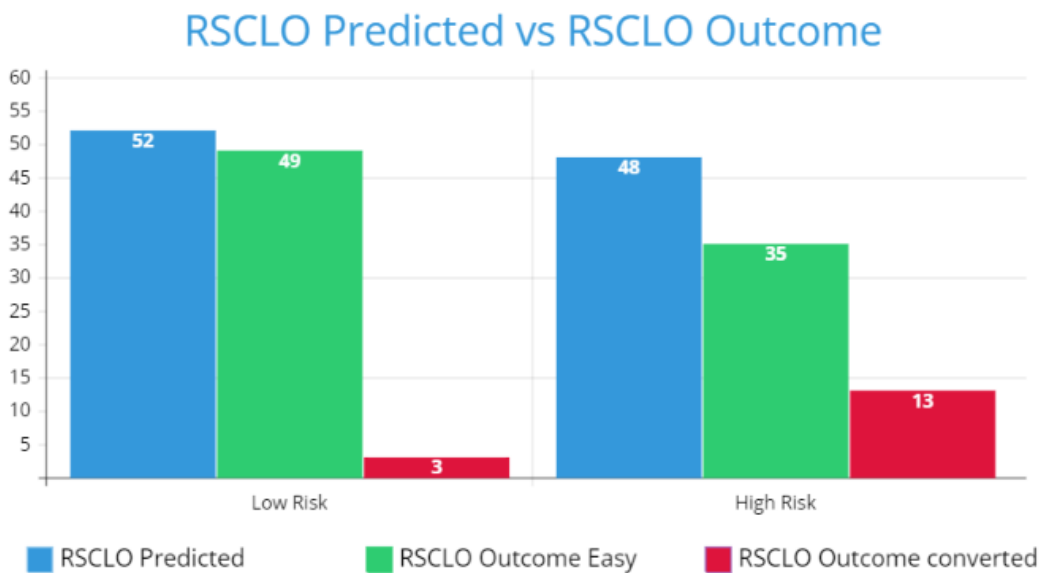
- The age of the patients ranged from 18yrs-74yrs with a mean of 46.50 yrs, maximum number of cases seen in 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> decade of life with peak incidence in the age group of 30-39yrs(26%).



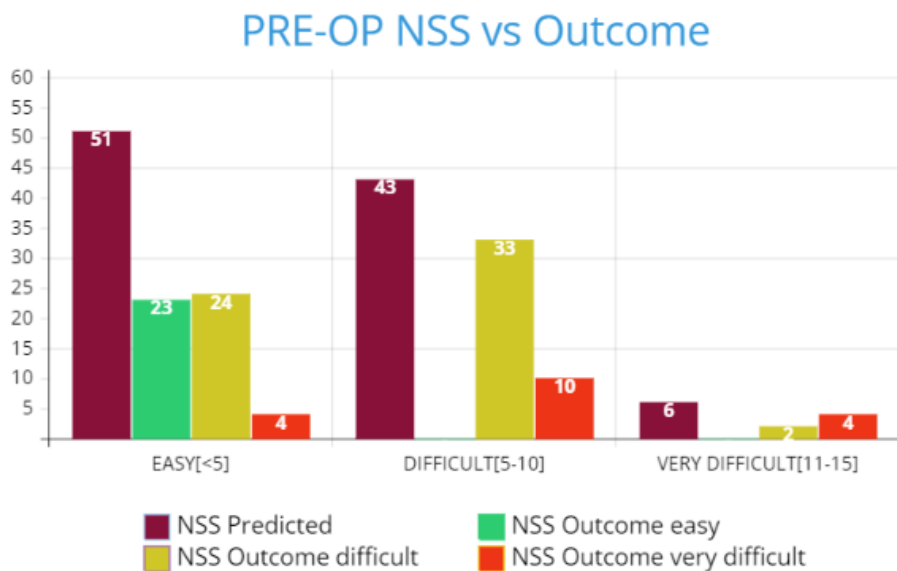
- In the study, 75 out of 100 cases were female, reflecting the established trend of higher gallstone risk in females. This increased risk have been attributed to hormonal influences like oestrogen, pregnancy and obesity. Genetic predisposition, age, and lifestyle choices also contribute, with postmenopausal women showing increased prevalence.



● RSCLO scoring system was a better predictor of easy cholecystectomy I.e., low risk conversion but a poor predictor of conversion to open with a sensitivity of 27% ( this doesn't match with other studies)



● New scoring system had a sensitivity of 69.8% in predicting easy cholecystectomy, 100 % sensitivity in predicting difficult and very difficult cholecystectomy.



**DISCUSSION:**

- This study was conducted to find predictive factors of a difficult cholecystectomy and validate to Preexisting scoring systems. We compared an international scoring system RSCLO(risk score for conversion from laparoscopic to open cholecystectomy) and Indian scoring System NSS(new scoring system).
- Many factors were found to be predictors for difficult cholecystectomy, age above 60 yrs makes surgery difficult and conversion is higher, probably due to repeated attacks of cholecystitis.
- BMI >25 kg/m<sup>2</sup> was found to be a significant predictor of difficult cholecystectomy.
- History of an acute attack requiring hospitalization made the surgery difficult in our study, there are reports of higher rate of bleeding, ductal injury and subsequent conversion in acute cholecystitis.
- Clinically palpable gallbladder is a predictor of difficult cholecystectomy with significant p value.
- Upper abdominal surgery is reported to have a higher rate of conversion and is attributed to dense adhesions, but it was not statistically significant predictor in our study.
- Dhanke et al concluded that factors independently-prior hospitalization, BMI>27.5, palpable gallbladder, thick gallbladder wall on USG, impacted stone at the neck and pericholecystic collection are strong predictors of difficult laparoscopic cholecystectomy. The New scoring system was applied as a whole, and had a positive predictive value for easy prediction of 94.05% and for difficult prediction of 100%.
- Mittalgodu anathkrishna et al derived a scoring system and validated it. Total parameters in his scoring system were 22, Including pre-operative physical examination, Laboratory parameters, sonology and intra-operative findings. He concluded that scoring system predicting the difficulty in Laparoscopic cholecystectomy is feasible.
- At the end of this study the following conclusions may be drawn;
  - ✧ Elderly patients are likely to have a difficult Laparoscopic cholecystectomy.
  - ✧ Females undergo this surgery more frequently but males tend to have difficult surgeries
  - ✧ Obese patients and those with Recurrent cholecystitis tend to have more difficulties during surgery
  - ✧ Preoperative USG can predict difficulties during Laparoscopic cholecystectomy

When our study was compared with other two Indian studies, our parameters which were statistically significant correlated well with other studies.

**CONCLUSIONS:**

This study helps both doctor and patient in an immense way, it helps us to be better prepared to take extra precautions to reduce intraoperative complications and to convert from Laparoscopic cholecystectomy to open cholecystectomy at an early stage.

“The need for conversion to laparotomy is neither a failure nor a complication, but an attempt to avoid complications”.

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