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Original Article

Clinicopathological Study of Granulomatous Lymphadenitis: A Descriptive Cross-Sectional Study in a Tertiary Care Centre.

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Abstract

Background:
The most effective treatment for cholelithiasis symptoms is laparoscopic cholecystectomy. However, the intraoperative findings determine the operation difficulties. To grade operating complexity, the Cuschieri and Nassar surgical difficulty score systems are frequently employed. It may be possible to anticipate surgical difficulties and enhance perioperative planning by evaluating their correlation with operating time.

Objective:
To assess the correlation between the length of laparoscopic cholecystectomy and the Cuschieri and Nassar surgical difficulty levels.

Methods:
This observational study included patients undergoing elective laparoscopic cholecystectomy. Intraoperative findings were graded using both Cuschieri and Nassar scoring systems. Operative duration was recorded in minutes. Statistical analysis was performed to determine the correlation between difficulty scores and duration of surgery.

Results:
Longer operating times were substantially correlated with higher Cuschieri and Nassar scores ($p<0.05$). The length of operation and rising difficulty grades were found to be positively correlated. An increase in age was associated with longer operating times and higher difficulty scores, most likely due to adhesions, fibrosis, and chronic inflammation. The participants' mean age was 41.1±12.17 years. The mean duration of surgery increased significantly with higher difficulty scores. Both Cuschieri and Nassar scores showed a positive correlation with operative duration ($p < 0.05$).

Conclusion:
In laparoscopic cholecystectomy, the Cuschieri and Nassar grading systems both accurately predict surgical difficulties. The Nassar score, on the other hand, has a stronger relationship with the length of the operation and could be a more accurate indicator of operating complexity.

Recommendation:
In order to enhance operative planning, patient counseling, surgical training, and risk management, Cuschieri and Nassar's difficulty scores should be regularly implemented into clinical practice. These scores are trustworthy intraoperative predictors of operative length in laparoscopic cholecystectomy.

Keywords: *Cuschieri grading systems, Nassar grading systems, Laparoscopic cholecystectomy, Comparative analysis, cholelithiasis.*
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Introduction

People have been suffering from gallstone disease for a very long time. The most common disorder affecting the biliary system, which is in charge of moving bile throughout the body, is gallstone disease. Over the course of centuries, cholecystostomy, cholecystolithotomy, and ultimately cholecystectomy were the various methods used to treat this illness. (1).

Age over 65, obesity, acute cholecystitis, males, prior abdominal surgery, adhesions, a confined gall bladder, a stone impacted in Hartmann's pouch, and several gall bladder stones are the most prevalent reasons for a difficult cholecystectomy. (2).

Over time, a number of rating systems have been created to forecast the difficulty of laparoscopic cholecystectomy. The majority of these have some predictive value and are based on preoperative clinical symptoms. Their precision is still restricted, though, until the gallbladder is directly seen during surgery, which enables a more accurate evaluation of surgical difficulty. Intraoperative grading techniques are comparatively rare and less frequently used than preoperative rating systems. (2).

A frequent surgical treatment with differing degrees of operating difficulty is laparoscopic cholecystectomy (LC). Surprisingly few grading systems exist for evaluating intraoperative difficulty, and none of them have become widely used in clinical settings. Creating a simple grading system could have a number of important advantages, including better risk assessment, standardized reporting guidelines, improved study comparability, and optimized surgical planning.(4).

The Nassar, Cuschieri, Parkland, and Sugrue scales are some of the commonly used surgical difficulties scoring systems. However, the length of operation is the most objective metric frequently used to evaluate surgical difficulties. Therefore, it is reasonable to predict that a longer surgery will be the outcome of a higher grade of surgical difficulty. (5).

To test this assumption statistically was the aim of our prospective study. The goal of the current study was to determine the statistical relationship between the length of laparoscopic cholecystectomy and the two most often used difficulty scoring systems, Nassar and Cuschieri.

Methods

STUDY SITE

Central Referral Hospital, a teaching hospital with 500 beds connected to the Sikkim Manipal Institute of Medical Sciences in Gangtok, Sikkim, has a general surgery department.

STUDY DESIGN:

The study was a prospective observational study

STUDY DURATION:

The study was conducted from January 2024 to December 2024.

STUDY POPULATION

The population group consisted of patients who had elective cholecystectomy procedures during the study period. Every year, Central Referral Hospital at Sikkim Manipal Institute of Medical Sciences in Gangtok performs over 500 cholecystectomies.

SELECTION CRITERIA

The research included all individuals who had laparoscopic cholecystectomy procedures performed between May 2023 and April 2024. Patients who consented to participate in the trial were all enrolled.

Inclusion Criteria:

1. Patients who underwent elective laparoscopic cholecystectomy.

Exclusion Criteria:

1. Patients who do not provide consent for participation in the study
2. Patients with jaundice
3. Pregnant patients
4. Patients with gall bladder malignancy
5. Patients in whom there was any deviation from the proposed procedure of laparoscopic cholecystectomy
6. Equipment failure affecting the duration of surgery

SAMPLE SIZE

At Central Referral Hospital SMIMS, Gangtok, about 500 laparoscopic cholecystectomies of varying degrees of difficulty were performed during the study period.

The study comprised all consecutive patients who gave their consent for an elective laparoscopic cholecystectomy during the study period. For this study, data for at least 300 patients

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were gathered, taking into account a 30–40% post-recruitment drop-off rate because of exclusion criteria or consent rejection.

The sample size was calculated using the formula:

$n = Z^2 \times p \times q / d^2$

Where:

Z = 1.96 (95% confidence level)

p = expected proportion

d = margin of error

Based on this, a sample size of 300 participants was included.

Ethical consideration

Ethical approval was obtained from the Institutional Ethics Committee. Written informed consent was obtained from all participants.

DATA ANALYSIS

Google Sheets and Microsoft Excel were used to enter the data, while SPSS® version 27 was used for analysis. Where appropriate, data were presented graphically.

The right methods were applied to the analysis. Pearson's approach was used to perform statistical correlation. The chi-squared test was used to analyze categorical data. Data were compared using ANOVA and the Student's t-test. Non-parametric tests, such as the Mann-Whitney U test and chi-squared, were used to compare nominal data. The categorical variables were shown as frequency and percent, while the continuous variables were shown as mean and standard deviation. For every statistical test, the significant cut-off p-value was ≤0.05.

Bias

Selection bias was minimized by including consecutive patients. Observer bias was reduced by using standardized scoring systems.

Results

A total of 320 patients were assessed for eligibility. Twenty were excluded due to incomplete data or conversion to open surgery. Three hundred patients were included in the final analysis.

Table 1. Comparison of age

	Study group	Population group	p-value (paired -Samples T test)
Age (in years)	41.1±12.17	40.5± 11.26	0.93

Table 1 shows the demographic characteristics of the study population. The majority of patients belonged to the middle-aged group, with a higher proportion of females compared to males. This reflects the known higher prevalence of gallstone disease among females.

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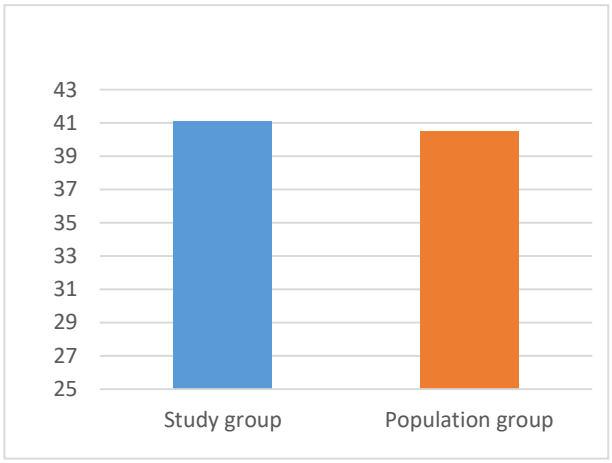
Graph 1. Age comparison (in years)



Graph 2. Age group comparison

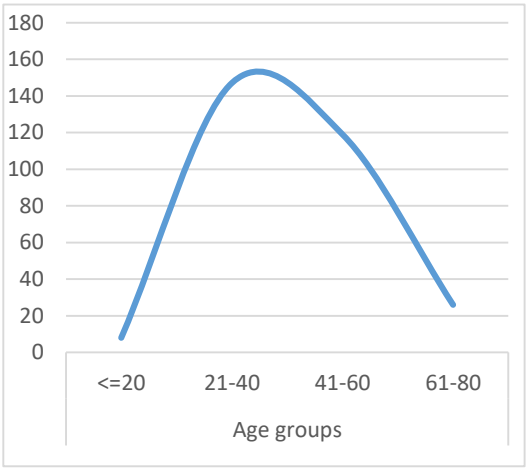
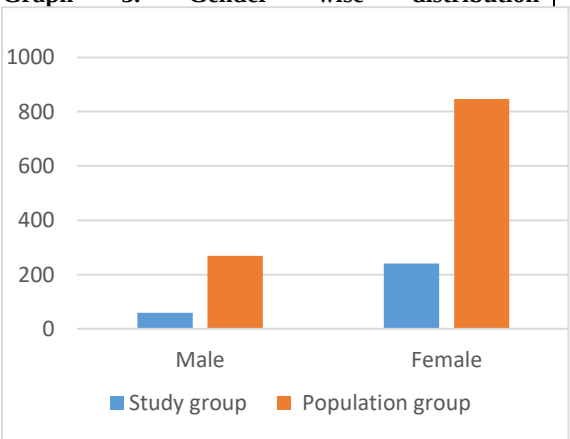


Table 2. Gender comparison

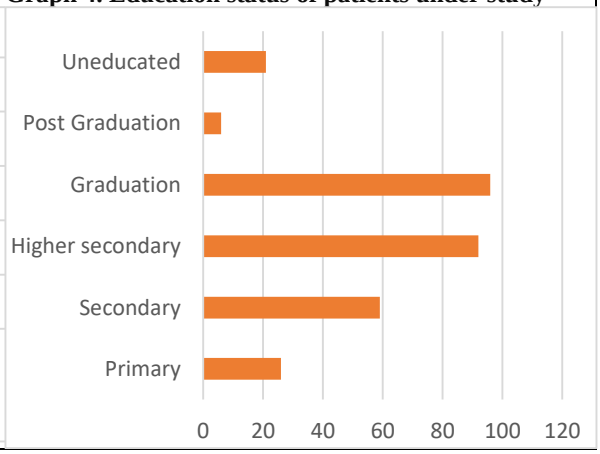
	Male	Female	p-value [χ^2 test]
Study group	59	241	0.10
Population group	269	847	

Table 2 demonstrates the distribution of patients according to the Cuschieri difficulty score. Most patients were categorized under lower to moderate difficulty grades, while fewer cases were observed in higher difficulty categories.

Graph 3. Gender wise distribution



Graph 4. Education status of patients under study



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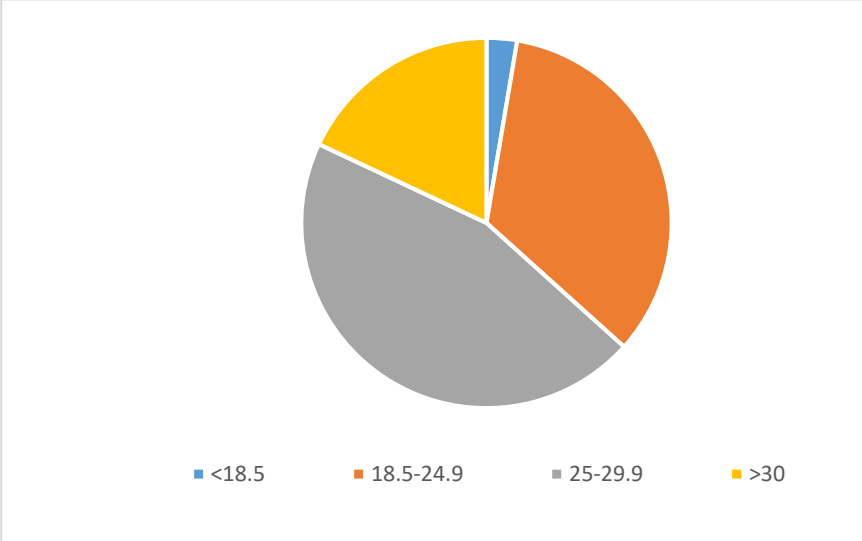
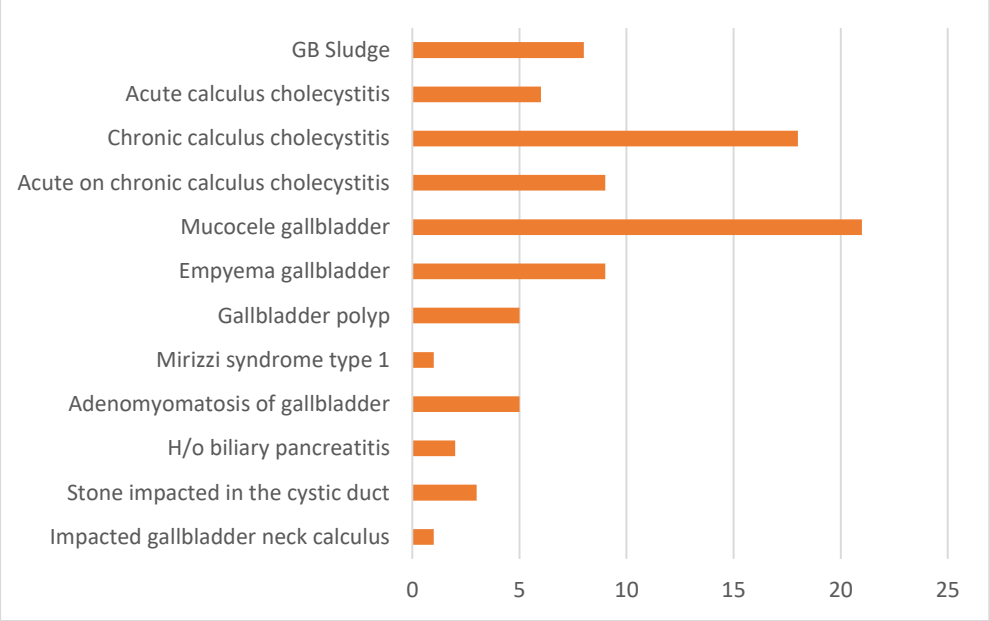
Graph 5. BMI distribution in the study group



Graph 6. Distribution of other conditions associated with cholelithiasis



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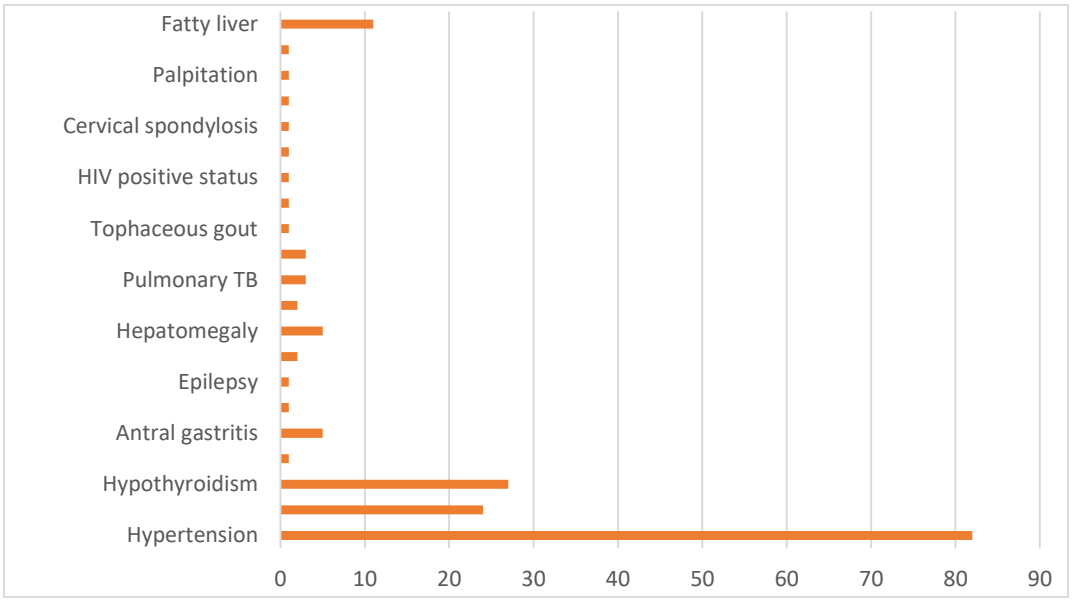
Graph 7. Distribution of Comorbidities in the study group



Graph 8. Ultrasound findings

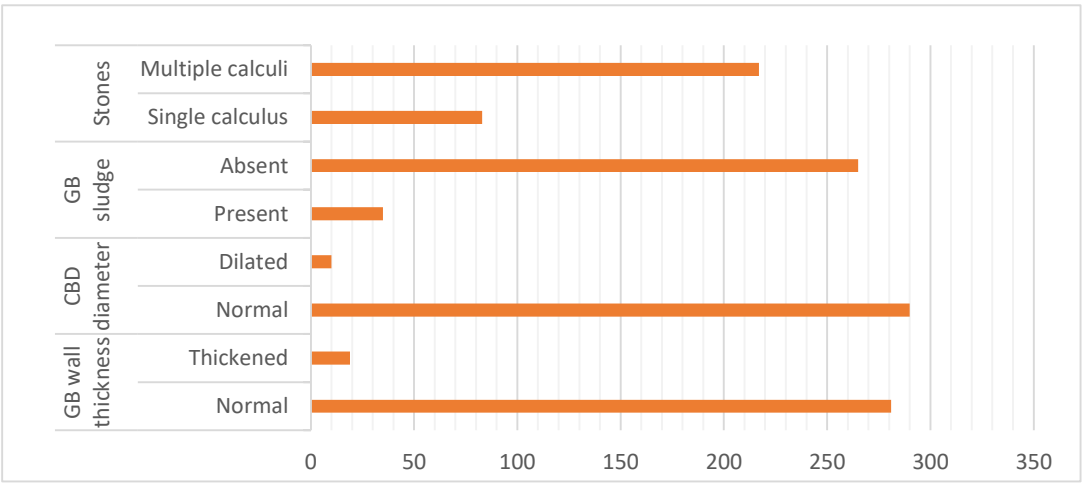


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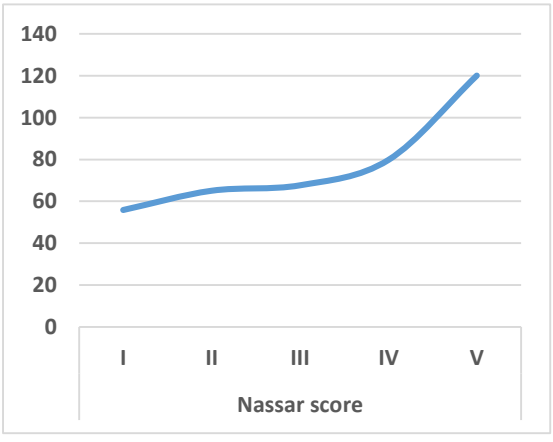
Table 3. Distribution of the mean duration of surgery with Nassar and Cuschieri scale

Scoring system	Score	Mean duration of surgery (in minutes)	p-value (ANOVA test)	Spearman's ranked correlation coefficient	p-value
Nassar	I	55.8±16.85	9.647×10^{-8}	0.30	1.714×10^{-7}
	II	65.0±22.17			
	III	67.6±21.53			
	IV	79.7±25.70			
	V	120.0±0.00			
Cuschieri	I	59.0±17.63	5.752×10^{-10}	0.30	1.032×10^{-7}
	II	64.6±21.07			
	III	82.0±27.53			
	IV	81.7±7.64			
Overall Mean		65.0±22.31			

Table 3 illustrates the distribution of patients based on the Nassar difficulty grading system. Similar to the Cuschieri classification, the majority of cases were clustered in the lower difficulty grades, with progressively fewer cases in higher grades.

Graph 9. Mean duration of surgery vs Nassar score



Graph 10. Mean duration of surgery vs Cuschieri score

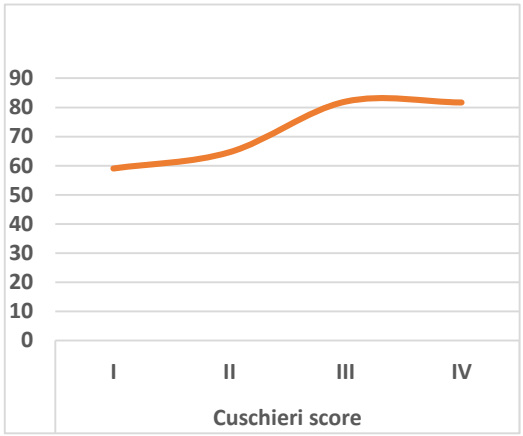


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Table 4. Relationship of Nassar and Cuschieri's difficulty scores

Correlation	Spearman coefficient	p-value
Nassar vs Cuschieri scores	0.70	2.546×10^{-4}

Table 4 shows the relationship between Cuschieri difficulty scores and the duration of laparoscopic cholecystectomy. It is evident that the mean duration of surgery increased with increasing difficulty scores, indicating a direct association between operative complexity and surgical time.

Graph 11. Relationship of Nassar and Cuschieri's difficulty scores

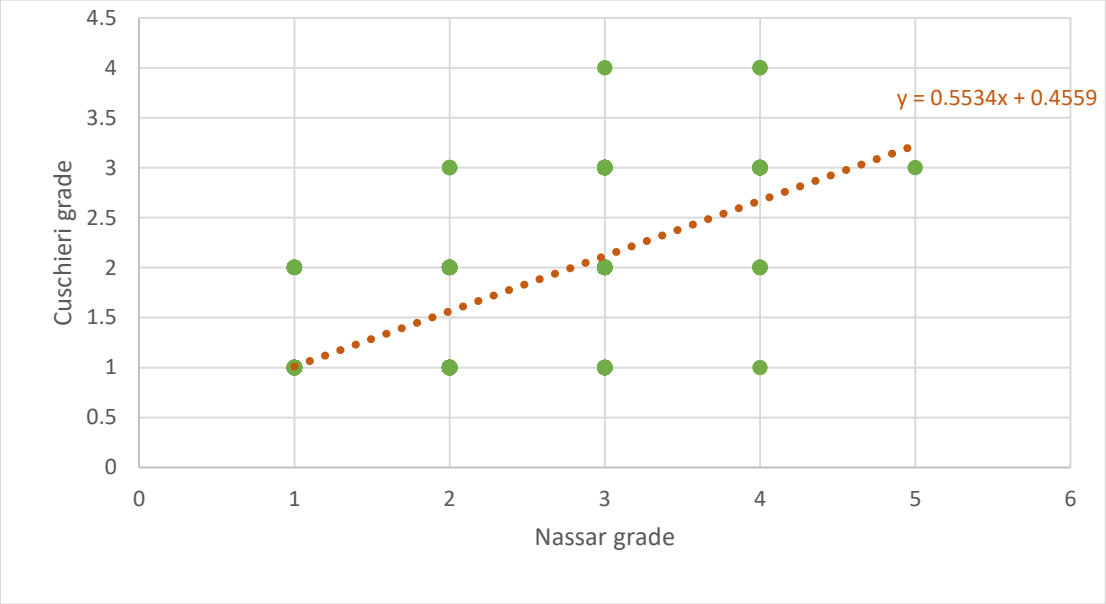

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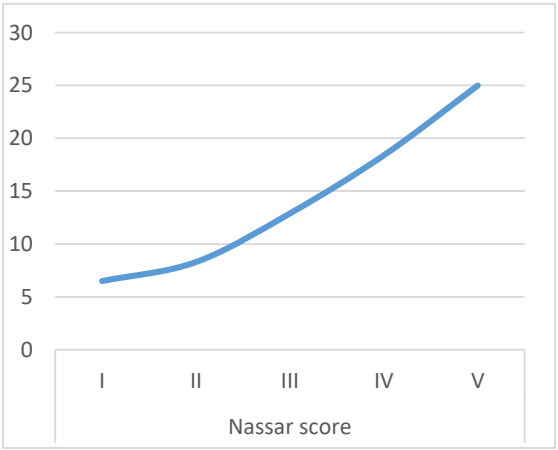
Table 5. Relationship of Nassar and Cuschieri difficulty scores with intraoperative blood loss

Table 5 presents the association between Nassar difficulty scores and operative duration. A clear trend of increasing surgical duration with greater difficulty grades was observed, suggesting that Nassar scoring is a reliable predictor of operative time.

Scoring system	Score	Mean Blood loss volume (mL) (Blood loss volume ± S.D)	p-value (ANOVA test)
Nassar	I	6.5±2.57	2.846×10^{-37}
	II	8.3±4.24	
	III	12.9±5.00	
	IV	18.4±6.02	
	V	25.0±0.00	
Cuschieri	I	7.4±3.75	1.937×10^{-33}
	II	10.9±5.20	
	III	17.5±5.03	
	IV	18.7±5.51	
Total		10.4±5.84	-

Graph 12. Mean blood loss volume (mL) vs Nassar score



Graph 13. Mean blood loss volume (mL) vs Cuschieri score

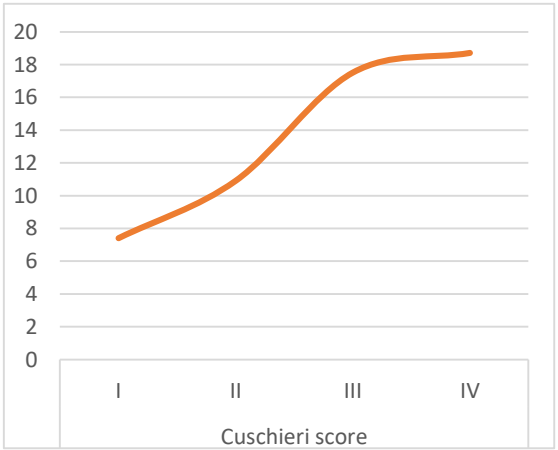


Table 6. Distribution of difficulty scores with intraoperative GB content spillage

Scoring system	Score	Gallbladder spillage		p-value [χ^2 test]
		Present	Absent	
Nassar	I	17	67	0.001
	II	23	67	

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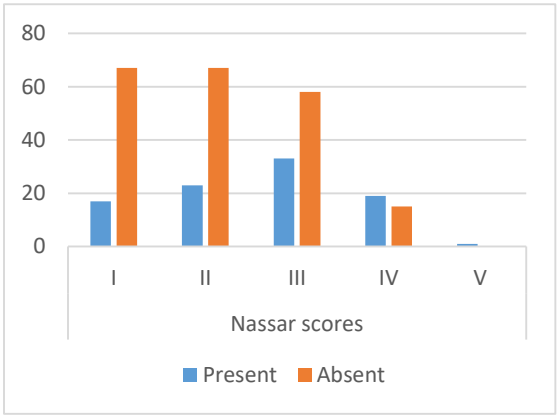
	III	33	58	
	IV	19	15	
	V	1	0	
Cuschieri	I	36	111	0.001
	II	26	71	
	III	28	25	
	IV	3	0	

Table 6 demonstrates the correlation between surgical difficulty scores and duration of surgery. Both Cuschieri and Nassar scores showed a positive correlation with operative duration, and the association was statistically significant ($p < 0.05$), indicating that higher difficulty scores are associated with longer operative times.

Graph 14. Nassar score vs GB content spillage



Graph 15. Cuschieri score vs GB content spillage

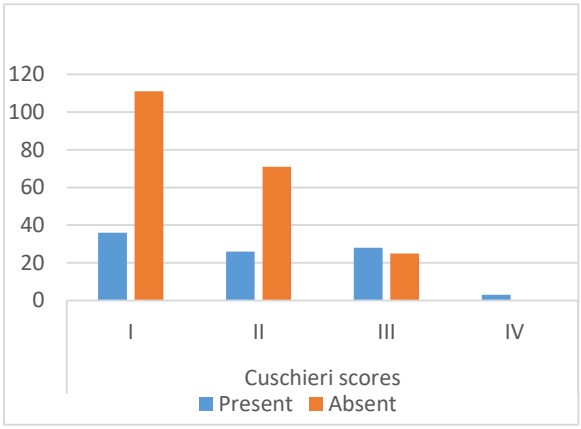


Table 7. Distribution of difficulty scores with Iatrogenic injuries

Scoring system	Score	Iatrogenic injuries		p-value [χ^2 test]
		Present	Absent	
Nassar	I	0	84	0.68
	II	0	90	
	III	1	90	
	IV	0	34	
	V	0	1	
Cuschieri	I	0	147	0.20
	II	0	97	
	III	1	52	
	IV	0	3	

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Discussion

The study demonstrates a statistically significant positive correlation between surgical difficulty scores and duration of surgery, supporting their usefulness in predicting operative complexity.

In this prospective observational study, 500 patients undergoing elective laparoscopic cholecystectomy between May 2023 and November 2024 had their operational outcomes and Cuschieri and Nassar difficulty scores assessed. Assessing their relationship to the length of operation was the main goal, with correlation with intraoperative data being one of the secondary goals. (2).

The participants' mean age was 41.1±12.17 years, and an increase in age was linked to longer operating times and greater difficulty scores, most likely as a result of adhesions, fibrosis, and chronic inflammation. Although there was a gender preponderance (male: female = 1:4.08), male patients tended to have more operating difficulty, which is in line with earlier research that attributes this to stronger gallbladder walls and severe inflammation. The most prevalent comorbidity was hypertension, which was followed by diabetes mellitus and hypothyroidism. (6).

Operative length showed a substantial positive connection with both the Nassar and Cuschieri difficulty scores. Longer procedures were linked to higher grades in both systems, indicating a greater level of technical complexity. However, the Nassar score seems to be better at assessing surgical difficulty when operative time was taken into account as an objective criterion. The two scoring systems also showed a strong connection, indicating that both are trustworthy instruments for intraoperative evaluation, while the Nassar system might offer more thorough operational insights. (7).

Increased intraoperative blood loss was substantially correlated with higher difficulty scores, most likely as a result of acute inflammation, thick adhesions, and deformed anatomy. (8). Gallbladder content spills were also more common in higher grades, albeit there was some discrepancy between the results from the two scoring systems. There was just one instance of bile duct damage, and there was no correlation between iatrogenic injury and difficulty scores. (9). The study backs up the usefulness of both scoring systems overall, with the Nassar scale showing higher prediction value for operative complexity and length.

Conclusion

In conclusion, longer operating times for laparoscopic cholecystectomy are substantially correlated with higher surgical difficulty scores, which indicate more intraoperative difficulties and technical complexity. There is a strong and comparable capacity to evaluate surgical difficulty across the Nassar and Cuschieri scoring systems, and there is a considerable correlation between them. However, the Nassar difficulty score seems to be better in predicting surgical complexity when operative duration is utilized as an objective standard for comparison. As a result, even if both scoring systems are trustworthy instruments for intraoperative evaluation, the Nassar score might be more useful in predicting the length of the procedure and its general difficulty.

Generalizability.

The findings can be generalized to similar tertiary care surgical settings, although variations may occur depending on surgeon expertise and patient factors.

Limitations of the study.

The study was conducted in a single center and may not reflect wider populations. Variations in surgeon experience and lack of long-term follow-up are additional limitations.

Recommendation

By strengthening patient safety frameworks, maximizing healthcare resource usage, increasing training stratification, and improving operational planning, the incorporation of Cuschieri and Nassar difficulty scores into standard laparoscopic cholecystectomy practice has significant translational potential. Standardized risk-adjusted surgical performance indicators can be developed using their predictive value for operative duration.

Acknowledgment:

The authors acknowledge the surgical team and hospital staff for their support.

List of abbreviations:

GB	Gall bladder
LC	Laparoscopic cholecystectomy
ANOVA	Analysis of variance
ML	Mili litre
SD	Standard deviation
BMI	Body mass index

Source of funding:

Conflict of interest

Author has declared no conflict of interest.

Author contributions:

All authors equally contributed

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