USEFULNESS OF RANDHAWA AND PUJAHARI SCORING SYSTEM FOR ASSESSMENT OF DIFFICULTY DURING LAPAROSCOPIC CHOLECYSTECTOMY PROCEDURE

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ABSTRACT

BACKGROUND

We wanted to evaluate the difficulties encountered during laparoscopic cholecystectomy.

METHODS

150 adult patients fulfilling the inclusion criteria of study, were enrolled. Using Preoperative predicting score of Randhawa et al. (2009). preoperative score of all the patients was calculated and 99 (66.0%) patients with pre-operative score of 0-5 were classified as Group I and considered Easy for surgery, rest 51 (34.0%) patients had pre-operative score 6-10 were classified as Group II and were considered Difficult for surgery. No patients had pre-operative score >10 as very difficult for surgery.

RESULTS

Age of patients ranged between 22-60 years and mean age was 39.62±11.24 years and majority of the patients (60.0%) were females and were found to be comparable among Easy (Group I) and Difficult (Group II) for surgery. The role of predictive risk factors on the final outcome has been assessed. We found that only previous history of hospitalization, BMI >27.5 kg/m^2, abdominal scar and pericholecystic collection were significant contributors in prediction of level of ease of surgery. Role of age, male gender, palpability and thickness of GB wall was not found to be significant.

CONCLUSIONS

This study validated the usefulness of Randhawa and Pujahari scoring system for assessment of difficulty during laparoscopic cholecystectomy and found it comparable to other existing scoring systems. Despite this, a compromised efficacy of different scoring systems to miss difficulty remains a question to be answered. Further studies to identify more variables that could be included to improvise the scoring systems are recommended.

KEY WORDS

Gallstones, Laparoscopy, Cholecystectomy

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BACKGROUND

Gallstone disease (GSD) is one of the major causes of morbidity and mortality all over the world. Its prevalence in India has been reported 18.8%.[1] In developed societies too, gallstones constitute a significant health problem, affects 10% to 15% of the adult population.[2] Cholecystectomy is done to remove the gallbladder in case of gallstones with acute or chronic cholecystitis and associated complications. first laparoscopic cholecystectomy (LC) was performed in 1985 by Prof. Dr. Erich Mühe of Germany after a time interval of about 100 years when Carl Langenbuch (1846-1901) of Germany performed the first cholecystectomy in 1882.[3] Laparoscopic cholecystectomy has clearly displaced open cholecystectomy in the management of simple biliary lithiasis and is a safe, efficient technique.

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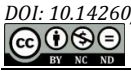

Conversion to open cholecystectomy is occasionally necessary to avoid or repair injury, delineate confusing anatomic relationships, or treat associated conditions. Conversion to open cholecystectomy has been associated with increased overall morbidity, surgical site and pulmonary infections, and longer hospital stays.[4,5] Laparoscopic cholecystectomy is considered to be difficult if adhesions at Calot's triangle are dense, gallbladder is contracted or fibrotic, previous history of upper abdominal surgery, gangrenous gallbladder, acutely inflamed gallbladder, empyema gallbladder including Mirizzi's syndrome, or associated cholecystogastric or cholecystoduodenal fistula.[6] The ability to accurately identify an individual patient's risk for conversion based on preoperative information can result in more meaningful and accurate preoperative counseling, improved operating room scheduling and efficiency, stratification of risks for technical difficulties,[7] and appropriate assignment of resident assistance, may improve patient's safety by minimizing time to conversion, and helps to identify patients in whom a planned open cholecystectomy is indicated. On an average, conversion to open cholecystectomy is required in 2% to 15% of patients undergoing laparoscopic cholecystectomy (Alponat et al., 1997; Sanabria et al., 1994).[5,6] It may be helpful to identify difficulties and complications in order to avoid the risk of conversion of a

laparoscopic cholecystectomy to open cholecystectomy beforehand (Sanabria et al., 1994).[6] Such prediction may allow a surgeon to take extra precautions to reduce intra-operative complications, and to convert from laparoscopic cholecystectomy to open cholecystectomy at an earlier stage.

Aims and Objectives

The aim of this study is to determine the predictive factors for difficult laparoscopic cholecystectomy and to evaluate the effectiveness of scoring system to predict difficult cholecystectomy.

METHODS

This prospective study was carried out after clearance from the Institutional Ethical Committee and an informed consent was obtained from all the patients. Sample size was calculated at Department of Social & Preventive Medicine, Era's Lucknow Medical College & Hospital on the basis of positive prediction value of scoring method using the formula:

$n = Z_{\alpha}^2 pq/l^2$

When p=75%, proportion of sensitivity.

q=100-p

Type I error a= 5%

Allocated even L= 7.5% for detecting result with 95% power of study.

Loss to follow-up= 20%

Then sample size comes out to be n=150

150 patients were enrolled for laparoscopic cholecystectomy for cholelithiasis by the following inclusion and exclusion criteria.

Inclusion Criteria

- Age 18-60 years
- Patients found to have Gall Stone Disease on Abdominal Ultrasonography planned for surgery

Exclusion Criteria

1. Common bile duct (CBD) calculus.
2. Dilated CBD.
3. Features of obstructive jaundice.
4. Deranged liver function tests.
5. Not willing for laparoscopic cholecystectomy.
6. Contraindication for Laparoscopic Cholecystectomy.

All the patients were evaluated on the basis of Randhawa & Pujahari, 2009 [8] Scoring system and then predicted the level of difficulty of surgery.

Scoring Factors	Score	Maximum Score
History		
Age (Years) <50 >50	 0 1	1
Sex Female Male	 0 1	1
Previous history of hospitalization No Yes	 0 4	4
Clinical		
BMI <25 25.1-27.5 >27.5	 0 1 2	2
Abdominal scar No Infraumbilical Supraumbilical	 0 1 2	2
Palpable gallbladder No Yes	 0 1	1
Sonography Findings		
Wall thickness Thin Thick >4 mm	 0 2	2
Pericholecystic collection No Yes	 0 1	1
Impacted stone No Yes	 0 1	1
Total Score: 15		

Table 1- Randhawa & Pujahari (2009) Scoring Method

Based upon the above scores for prediction of surgery, patients were divided in three groups: Easy: Score ≤5, Difficult: Score 6-10, Very difficult: Score >10. Intra operative findings such as time taken for the surgery, biliary/stone spillage, injury to duct/artery or conversion to open cholecystectomy were noted and assessment of level of ease experienced by the surgeon was evaluated based on following factors (Randhawa and Pujahari) 2009.[8]

Factors	Easy	Difficult	Very Difficult
Time taken (min)	<60	60-120	>120
Bile/stone spillage	–	+	+
Injury to duct/artery	–	+ duct only	+
Conversion to open cholecystectomy	–	–	+

Table 2- Randhawa and Pujahari (2009), Easy and Difficult Scoring Factors.

Assessment of level of ease of laparoscopic cholecystectomy procedure was done on the basis of above criteria. Post-operative events such as Drain out, Suture out, biliary leakage, surgical site infection or any other complications, histopathology reports were also recorded. Postoperative cases were followed up for any complications for up to 6 weeks.

Statistical Analysis

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean ± SD. The following statistical formulas were used-

1. Chi Square Test: To test relationship between categorical variables.
2. Student 't' Test: To test the significance of two means, the student 't' test was used.
3. Level of Significance: "p" is level of significance. $p > 0.05$ Not significant. $p < 0.05$ Significant.

RESULTS

A total of 150 patients of gall stone disease fulfilling the inclusion criteria were enrolled in study. Each patient was assessed for risk factors, age, gender, previous history of hospitalization, BMI, presence of supraumbilical/ infraumbilical scar, palpable gall bladder, gall bladder wall thickness, pericholecystic collection and impacted stone and preoperative scoring method to predict the difficulty/ ease of level for performing laparoscopic cholecystectomy. Out of 150 patients, 99 (66.0%) having pre-operative score 0-5 were classified as Group I defined as Easy laparoscopic cholecystectomy, 51 (34.0%) patients having score 6-10 were classified as Group II defined as Difficult. None of the patient had pre-operative score >10 defined as very difficult.

Age Group	Group I (n=99)		Group II (n=51)		Total (N=150)	
	No.	%	No.	%	No.	%
≤30 yrs.	29	29.29	10	19.61	39	26.00
31-40 yrs.	30	30.30	15	29.41	45	30.00
41-50 yrs.	20	20.20	20	39.22	40	26.67
51-60 yrs.	20	20.10	6	11.76	26	17.33

Table 3. Age Distribution of Study Population

Age of patients ranged between 22-60 years in both the groups. Difference in age of patients of above two groups was not found to be statistically significant.

Gender	Group I (n=99)		Group II (n=51)		Total (N=150)	
	No.	%	No.	%	No.	%
Female	60	60.61	30	58.82	90	60.00
Male	39	39.39	21	41.21	60	40.00
Male:Female	1:0.65		1:0.70		1:0.67	
	χ^2=0.045(df=1); p=0.833					

Table 4. Comparison of Gender

Though proportion of males was higher among Group II (41.21%) as compared to Group I (39.39%) but this difference was not found to be statistically significant. All the patients enrolled in the study presented with complaints of abdominal pain.

	Group I (n=99)		Group II (n=51)		Total (N=150)		Statistical Significance	
	No.	%	No.	%	No.	%	χ^2	p
Pallor	2	2.02	1	1.96	3	2.00	0.001	0.980
Abdominal scar	2	2.02	34	66.67	36	24.00	77.122	<0.001
Tenderness	5	5.05	5	9.80	10	6.67	1.222	0.269
Palpable GB	10	10.10	7	13.73	17	11.33	0.440	0.507

Table 5. Comparison of Clinical Findings

Of these presenting symptoms, difference was found to be statistically significant between the above two groups for incidence of abdominal scar (p<0.001).

	Group I (n=99)		Group II (n=51)		Total (N=150)		Statistical Significance	
	No.	%	No.	%	No.	%	χ^2	p
Calculi								
Single, large	29	29.29	20	39.22	49	32.67	1.507	0.220
Small, multiple	70	70.71	31	60.78	101	67.33		
GB Wall								
Normal	85	85.86	34	66.67	119	79.33	7.562	0.006
Thickened	14	14.14	17	33.33	31	20.67		
CBD								
Dilated	3	3.03	0	0.00	3	2.00	1.672	0.433
Mild dilated	11	11.11	5	9.80	16	10.67		
Normal	85	85.86	46	90.20	131	87.33		
Pericholecystic collection								
Present	7	7.07	9	17.65	16	10.67	3.951	0.047
IHBRD								
Absent	93	93.94	48	94.11	141	94.00	0.570	0.903
Present	6	6.06	3	5.88	9	0.60		

Table 6. Comparison of USG Findings

There was no statistical difference between two groups on ultrasonographic finding, number of calculi, GB wall thickness, CBD dilatation, IHBRD and pericholecystic fluid collection.

Variable	Group I (n=99)		Group II (n=51)		Student 't' test	
	Mean	SD	Mean	SD	't'	'p'
Hb	10.75	2.05	10.78	1.98	-0.068	0.946
S. Bilirubin	0.59	0.32	0.66	0.34	-1.194	0.234
SGPT	49.15	5.08	50.08	3.92	-1.139	0.256
SGOT	34.76	4.11	34.04	3.85	1.036	0.302
PT	12.61	1.48	12.25	1.48	1.374	0.171

Table 7. Comparison of Biochemical/Haematological Variables among Study Population

Above biochemical/haematological variables of Group I and Group II were found to be comparable.

	Group I (n=99)		Group II (n=51)		Total (N=150)		χ^2	p
	No.	%	No.	%	No.	%		
BMI								
≤25	14	14.14	2	3.92	16	16.67	7.095	0.029
25.1-27.5	32	32.32	11	21.57	43	28.67		
>27.5	53	53.53	38	74.51	91	60.67		
Previous Hospitalization								
No h/o hospitalization	95	95.95	2	3.92	97	64.67	124.791	<0.001
H/o hospitalization	4	4.04	49	96.08	53	35.33		

Table 8. Comparison of BMI and History of Previous Hospitalization

Proportion of patients with BMI >27.5 kg/m² was significantly higher in Group II (74.51%) as compared to Group I (53.53%).

	Group I (n=99)		Group II (n=51)		Total (N=150)		χ^2	p
	No.	%	No.	%	No.	%		
Duration of surgery								
<60 min	87	87.87	8	15.69	95	63.33	76.972	<0.001
60-120 min	12	12.12	37	72.55	49	32.67		
>120 min	0	0.00	6	11.76	6	4.00		
Adhesions								
No adhesions	82	82.83	11	21.57	93	62.00	53.712	<0.001
Flimsy adhesion	15	15.15	34	66.67	49	32.67		
Dense adhesions	2	2.02	6	11.76	8	5.33		
Difficult Calot's dissection	9	9.09	8	15.69	17	11.33	1.457	0.227
Bile spillage	7	7.07	12	23.53	19	12.67	8.243	0.004
Cystic artery injury	0	0.00	0	0.00	0	0.00	–	–
CBD Injury	0	0.00	0	0.00	0	0.00	–	–

Table 9. Comparison of Intraoperative Events

In terms of difference in duration of surgery, adhesions, bile spillage among two groups were found to be highly significant statistically. Out of 150 cases enrolled in the study only 6 (4.00%) of cases converted into open surgery. Proportion of conversion to open surgery was higher among Group II (11.76%) as compared to Group I (0.00%). Difference in conversion rate to open surgery among patients of above two groups was found lto be statistically significant.

	Group I (n=99)		Group II (n=51)		Total (N=150)		Statistical Significance	
	No.	%	No.	%	No.	%	χ^2	'p'
Drain Out								
POD1	52	52.53	31	60.78	83	55.33	3.443	0.328
POD2	36	36.36	16	31.37	52	34.67		
POD3	3	3.03	3	5.88	6	4.00		
POD4	8	8.08	1	1.96	9	6.00		
Suture Out								
POD7	68	68.69	36	70.59	104	69.33	2.770	0.428
POD8	20	20.20	12	23.53	32	21.33		
POD9	6	6.06	3	5.88	9	6.00		
POD12	5	5.05	0	0.00	5	3.33		
SSI								
Absent	94	94.95	51	100.00	145	96.67	2.665	0.103
Present	5	5.05	0	0.00	5	3.33		

Table 10. Comparison of Post-operative Events

Difference in post-operative events i.e. Drain out, suture out among cases of Group I and Group II was not found to be statistically significant. Incidence of SSI was 3.33% (n=5) among overall study population. SSI was observed in none of the cases of Group II.

HPE Finding	Group I (n=99)		Group II (n=51)		Total (N=150)	
	No.	%	No.	%	No.	%
Acute on chronic cholecystitis	4	4.04	3	5.88	7	4.67
Chronic cholecystitis	95	95.96	48	94.12	143	95.33
	χ^2=0.257(df=1); p=0.612					

Table 11. Comparison of Histopathological Findings

Histopathological findings of patients of above two groups were not found statistically significant. Surgical outcome was assessed on the basis of criteria proposed by Randhawa & Pujahari (2009), excluding the criteria of injury to duct/artery as none of the patients enrolled in the study had experienced duct/artery injury.

Surgical Outcome	Group I (n=99)		Group II (n=51)		Total (N=150)	
	No.	%	No.	%	No.	%
Easy	87	87.87	10	19.61	97	64.67
Difficult	12	12.12	35	68.63	47	31.33
Very Difficult	0	0.00	6	11.76	6	4.00
	χ^2=70.208(df=2); p<0.001					

Table 12. Comparison of Surgical Outcome

Despite low preoperative score of 0-5 (Group I) among 99 patients, the operating surgeon experienced difficulties that were graded as difficult in 12 (12.12%) patients. Similarly, for predictive score of 6-10 (Group II), 6 (11.76%) patients were graded as very difficult to operate, 10 (19.61%) were Easy to operate and rest 35 (68.63%) patients were difficult to operate.

Predictive Risk Factors	Total (n=144)	Easy (n=97)		Difficult (n=47)		statistical significance	
		No.	%	No.	%	χ^2	p
Age >50 years	25	19	19.59	6	12.77	1.027	0.311
Male gender	58	34	35.05	24	51.06	3.375	0.066
Prev. history of Hospitalization	47	14	14.43	33	70.21	44.804	<0.001
BMI (kg/m²)							
<25	16	14	14.43	2	4.26	6.501	0.039
25.1-27.5	41	31	31.96	10	21.28		
>27.5	87	52	53.61	35	74.47		
Abdominal scar	30	9	9.28	21	44.68	24.059	<0.001

Palpable GB	17	8	8.25	9	19.15	3.614	0.057
Thick GB Wall	30	17	17.53	13	27.66	1.971	0.160
Pericholecystic collection	16	7	7.22	9	19.15	4.564	0.033

Table 13. Association of Easy and Difficult Outcome with Risk Factors

The table above shows the comparison between predictive risk factors with the final outcome. Surgical outcome was Easy in 97 cases and difficult in 47 cases. Very difficult 6 cases were excluded.

Predictive Risk Factors	Total (n=150)	Easy/Difficult (n=144)		Very Difficult (n=6)		Statistical Significance	
		No.	%	No.	%	χ^2	p
Age >50 years	26	25	17.36	1	16.67	0.002	0.965
Male gender	60	58	40.28	2	33.33	0.116	0.734
H/o Hospitalization	53	47	32.64	6	100.00	11.439	0.001
BMI (kg/m²)							
<25	16	16	11.11	0	0.00	0.751	0.687
25.1-27.5	43	41	28.47	2	33.33		
>27.5	91	87	60.42	4	66.67		
Abdominal scar	36	30	20.83	6	100.00	15.689	<0.001
Palpable GB	17	17	11.81	0	0.00	0.056	0.813
Thick GB Wall	31	30	20.83	1	16.67	0.000	1.000
Pericholecystic collection	16	16	11.11	0	0.00	0.036	0.850

Table 14. Role of Risk Factors in Prediction of Very Difficult Outcome

Out of 8 factors for prediction of Very difficult surgery, only 2 i.e. hospital stay and Abdominal scar were found significant contributing factors in predicting the outcome of surgery.

DISCUSSION

Cholecystectomy can be performed either through open procedure or through laparoscopic procedure. However, laparoscopic cholecystectomy is often criticized as in few patients- conversion to open cholecystectomy, increased risk of bile duct injury or injury to the adjoining viscera and its high cost. Radhawa and Pujahari[8] came up with a systematic scoring system to predict the level of difficulty in laparoscopic cholecystectomy. This scoring system takes into account the demographic factors like age, gender, hospitalization history, clinical factors like BMI, presence of abdominal scar, palpability of gall bladder and sonographic features like wall thickness, pericholecystic collection and impacted stone as the predictors of difficulty. In present study, we also made an attempt to predict the difficulty level in laparoscopic cholecystectomy procedures included in our study and also studied the effectiveness of the scoring system proposed by Randhawa and Pujahari.[8] For this purpose, a total of 150 patients scheduled to undergo laparoscopic cholecystectomy procedure were enrolled in the study. Age of patients ranged from 22 to 60 years with mean age of 39.62 ± 11.24 years. The sampled population was dominated by females (60%). Yolet al.[9] showed proportion of females to be 50.5% and mean age as 39.2%. Randhawa et al.[8] in their study had 64.9% females and reported the mean age of patients as 44.37 years. The findings in general suggest a predominance of females and middle age group as the representative age domain. In present study, a total of 36 (24%) patients had abdominal scar and except for 16 (12.67%) patients, all the patients had BMI>25 kg/m². History of previous hospitalization was positive in 35.33% patients, a total of 11.33% patients had palpable gall bladder. Thickened wall was seen in 31 (20.67%) patients and pericholecystic collection in 16 (10.67%) cases. None of the cases had impacted stone. Correspondingly, the difficulty level was assessed as easy in 99 (66%) cases and difficult in 51 (33%) cases. None of the cases were defined as very difficult. Compared to present study, Randhawa and Pujhari [8] in their study found 78.1% of their cases as easy and only 21.2% as difficult. Using a different scoring system based on ultrasonographic features only Lal et al.[10] found 71.23% of their cases as easy and remaining 28.77% as difficult. Chand et al.[11] There was a significant association between predicted difficulty and duration of surgery, presence of adhesions during surgery, bile spillage and conversion to surgery. Thus, validating the usefulness of scoring system for these outcomes. The scoring system did not show any association with post-operative complications and outcomes. Thus, implying that the scoring system was meant exclusively for prediction of intraoperative events and difficulties only. Neither Randhawa and Pujahri[8] nor Gupta et al.[12] who developed and validated the scoring system used in present study reported the usefulness of post-operative outcomes and events as the outcomes to be predicted by the scoring system. In present study, no significant association between histopathological findings and predicted difficulty was observed. No such association has been reported in previous studies too. In this study, during surgery, a total of 97 (64.67%) procedures were found easy, 47 (31.33%) were difficult and 6 (4%) were found very difficult. On validating the observed difficulty, we found that out of 97 cases found easy – a total of 87 (89.7%) were predicted as easy while 10 (10.3%) were predicted as difficult. Out of 47 procedures found difficult, 35 (74.5%) were predicted to be difficult while 12 (25.5%) were predicted to be easy. All the cases found very difficult were predicted as difficult during prediction. Similar to present study, Gupta et al.[12] reported that out of 141 cases found to be easy, a total of 135 (95.7%) were predicted as easy, out of 57 cases found to be difficult, a total of 42 (73.7%) and all the 12 cases found to be very difficult were predicted to be difficult. An evaluation of all these scoring systems showed that very difficult cases are often missed by these scoring systems. The proportion of missed cases (very difficult) was 4.5% in present study as compared to 4.4% in the study of Randhawa and Pujahari[8] and 5.7% in the study of Gupta et al.[12] Incidentally, in all the series none of the cases were predicted to be very difficult, thus raising the question mark over the criteria used for differentiation. In the present study association of presence of abdominal scar had been found to be a significant factor in predicting difficult outcome of surgery and was similar to findings of Agarwal et al (2015) and contrary to that of study by Acharya and Adhikari, 2012[13] who did not find any association of difficulty level with presence of abdominal scar. In present study, we made an attempt to determine the performance of the scoring system with difficulty (merging difficult and very difficult) as the outcome it was found 77.8% sensitive and 87.9% specific. An overview of predictive efficacy of the scoring system used in present study and previous studies is as follows:

Sl. No.	Author (Year)	Sample Size	Sensitivity	Specificity	PPV	NPV	Accuracy
1.	Randhawa and Pujahari (2009)[8]	228	68.8%	96.3%	88%	88.8%	88.6%
2.	Gupta et al. (2013)[12]	210	78.3%	95.7%	90%	90%	90.0%

3.	Acharya and Adhikari (2012)[13] #	114	71.4%	97.2%	93.8%	85.4%	87.7%
4.	Present study (2018)	150	77.8%	87.9%	74.5%	89.7%	84.7%

An Overview of Predictive Efficacy of Randhawa and Pujahari[8] Scoring System for Prediction of Difficulty*

*After merging the final outcome of very difficult and difficult
#Used a slightly modified scoring system with criteria for age changed to >60 years and inclusion of TLC>10,000 as an indicator of difficulty.

This shows that the scoring system lacked equivalent sensitivity and specificity. The role of predictive risk factors on final outcome had been assessed in the present study. We found that only previous history of hospitalization, BMI >27.5 kg/m^2, abdominal scar and pericholecystic collection were significant contributors in prediction of level of ease of surgery. Role of age, male gender, palpability and thickness GB wall was not found to be significant. BMI >27.5 kg/m^2 had been found to be associated with difficulty in surgery which had been supported by Hutchinson et al. (1994),[14] Nachnani & Supe (2005)[15] and Bouarfa et al. (2011).[16] Association of pericholecystic collection in prediction of difficulty in laparoscopic cholecystectomy has been found in the present study. Study done by Nidoniet al. 2015[17] also supported this finding. The question now arises as to why do these predictive scoring systems fail? One of the obvious reasons is that difficulty during a surgical procedure is a multifactorial issue and to identify and assign integer values to different factors is quite difficult. Moreover, most of the times the difficulty is assessed in terms of patient characteristics, however, one must understand that the difficulty during the operative procedure is an interaction of patient, surgeon and the facilities available.

CONCLUSIONS

The overall diagnostic accuracy of preoperative predicting score was found to be 84.7%. In our set up previous history of hospitalization, BMI >27.5 kg/m^2, abdominal scar and pericholecystic collection were found to be significantly contributing in predicting the outcome of surgery. In prediction of very difficult cases, only hospital stay and abdominal scar were found to be significantly contributing in predicting the outcome of surgery. The present study validated the usefulness of Randhawa and Pujahari scoring system for assessment of difficulty during laparoscopic cholecystectomy procedure and found it to be comparable to other existing scoring systems. Despite this, a compromised efficacy of different scoring systems to miss difficulty remains a question to be answered. Further studies to identify more variables that could be included to improvise the scoring systems are recommended. Moreover, one must also understand that skill acquisition to tackle the difficulties is one of the most important parts of learning in medical field. The difficulties should be identified, solved and the technique should be improvised through new techniques, new instrumentations and acquisition of newer skills. It seems that different scoring systems tend to use relaxed criteria for assessment of difficulty that needs to be modified. Further studies for evolution of newer scoring systems are recommended is future.

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