SURGICAL CHARACTERISTICS AND ASSOCIATED RISK FACTORS TO A COMPLEX LAPAROSCOPIC CHOLECYSTECTOMY USING THE PARKLAND GRADING SCALE IN EIGHT HOSPITALS IN MEXICO CITY

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Background: The laparoscopic cholecystectomy (LC) is one of the most performed elective (ELS) or emergency surgery (ES) around the world; however there are few validated classifications that evaluate the complexity of LC intraoperatively. The Parkland grading scale (PGS, Table 1) is a simple, easy and validated intraoperative classification that relies on the inflammatory or abnormal findings. The aim of the study is to evaluate the preoperative risk factors associated with a complex LC using the PGS and other surgical variables.

Methods: A retrospective, cross-sectional study was perform evaluating the patients and the videos of the LC from 8 different teaching hospitals of Mexico City from December of 2018 to January of 2020. Demographic and surgical variables were recorded (PGS, Doublet score DBS, total laparoscopic time (TT), time before the stapling of the cystic structures (TSS), estimated blood loss, ELS or ES) and transoperative complications or surgical scenarios (conversion to open surgery, subtotal cholecystectomy, use of drainage and recognized bile duct injury BDI). The evaluation of the PGS and the doublet score was performed by one Minimal invasive MI and one HPB surgeon; the complexity of the LC was evaluated by using the PGS, categorizing as a CLC a PGS > or = to 3, and a SLC a DBS of 5 or 6. Logistic regression for univariate and multivariate analysis, using backwards stepwise strategy for the creation of the model.

Results: 430 LC were analyzed; 356(82.79%) were women, 261(60.7%) were ELS and 169(39.3%) ES, the mean age was 44.06 years (SD±13.16). There were 231 non complex LC, nCLC, 53.72% and 199 CLC, 46.28%), with a mean PGS of 2.65 (SD±1.13), only 47(10.93%) SLC were founded, with a mean DBS of 1.72 (SD±1.85). The correlation coefficient between evaluators for the PGS was 0.892 and for the DBS was 0.872. The univariate analysis of the logistic regression for presenting a CLC, showed statistical significance in all the variables except on history of previous abdominal surgeries; the multivariate analysis produced a model that included male sex, age>45 years, type of Surgery, presence of comorbidities and history of pancreatitis, with an area under the ROC curve of 0.92.

Conclusion: The recognition of the associated risk factors to a CLC and the difficulty during the procedure can guide the surgeon to establish preoperative and bailout strategies during the procedure faster as recommended by the culture of safety in cholecystectomy avoiding complications like the BDI.

References
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Table 1. Demographic characteristics by groups (nCLC VS CLC)

	nCLC (n=231,53.72%)	CLC (n=199,46.28%)	p
Sex			
Female	212 (49.3%)	144 (33.49%)	<0.001
Male	19 (4.42%)	55 (12.79%)	
Age			
Mean (years)	39.01 (SD 12.38)(CI 37.4-40.61)	49.91 (SD 11.52)(CI 48.3-51.53)	<0.001
<45 years	152 (35.35%)	52 (12.09%)	<0.001
>45 years	79 (18.37%)	147 (34.19%)	
Prescence of Comorbities			
No	191 (44.42%)	86 (20%)	<0.001
Yes	40 (9.3%)	133 (26.28%)	
Previus episode of pancreatitis			
No	187 (43.49%)	134 (31.16%)	<0.001
Yes	44 (10.23%)	65 (15.12%)	
Previus abdominal surgeries			
No	171 (39.77%)	138 (32.09%)	0.551
Yes	60 (13.95%)	61 (14.19%)	

Abbreviations:
nCLC: Non complex Laparoscopic Cholecystectomy, CLC: Complex Laparoscopic Cholecystectomy, TLT: Total Laparoscopic Time, TCS: Time before clipping the structures, COS: Conversion to open surgery, EBL: Estimated Blood Loss, BDI: Bile Duct Injury, SD: Standard deviation, CI: Confidence Interval, OR: Odds Ratio

Table 2. Surgical variables by groups (nCLC VS CLC).

	nCLC (n=231,53.72%)	CLC (n=199,46.28%)	p
Type of surgery			
Elective	217 (50.47%)	44 (10.23%)	<0.001
Urgent	14 (3.26%)	155 (36.05%)	
Number of ports used			
3	142 (33.02%)	85 (19.77%)	<0.001
4	89 (20.7%)	114 (26.51%)	
TLT	43.13 (SD 17.46)(CI 40.87-45.40)	68.8 (SD 26.51)(CI 65.1-72.51)	<0.001
TCS	14.88 (SD 8.9)(CI 13.72-16.03)	27.69 (SD 15.1)(CI 25.5-29.8)	<0.001
Non Satisfactory	213 (49.53%)	170 (39.53%)	0.025
Satisfactory	18 (4.19%)	29.(6.74%)	
NonCOS	228 (53.02%)	101 (42.09%)	<0.001
COS	3 (0.7%)	18 (4.19%)	
No Drainage	103 (23.95%)	32 (7.44%)	<0.001
Use of Drainage	128 (29.77%)	167 (38.84%)	
EBL	103.39 (SD 69.75, 96-61-119,17)	258.09 (SD 260.22,139-376.55)	<0.001
Subtotal Cholecystectomy	0	7 (1.63%)	0.004
BDI	3 (0.7%)	6 (1.4%)	<0.001

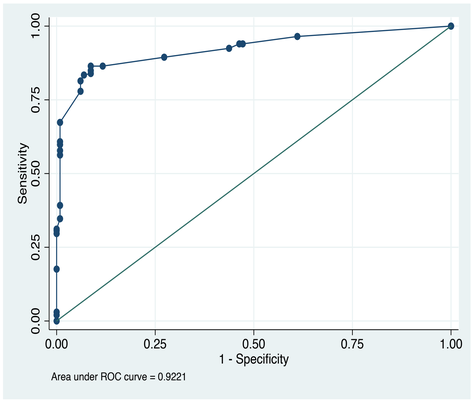


Table 3. Asociated factors to presenting a Complex Laparoscopic cholecysctectomy

	Univariate Analysis			Multivariate Analysis		
Factor	OR	CI 95%	p	OR	CI 95%	p
Demographic Variables						
Male	4.26	2.42-7.48	<0.001	4.49	1.93-10.39	<0.001
Age (by years)	1.07	1.05-1.09	<0.001			
Age >45 years	5.43	3.58-8.25	<0.001	2.53	1.13-5.66	0.023
Presence of comorbidities	6.27	4.03-9.75	<0.001	3.44	1.5-7.91	0.003
History of pancreatitis	2.06	.32-3.2	0.001	4.86	2.23-10.55	<0.001
Previous Surgeries	1.25	0.82-1.91	0.282			
Type of Surgery	54.6	28.91-103.11	<0.001	60.07	29.14-128.2	<0.001
Surgical outcomes						
EBL>100	7.01	4.58-10.71	<0.001	Area under ROC curve=0.9221		
TLT>60min	5.81	3.81-8.86	<0.001			
TCS>20min	7.61	4.92-11.78	<0.001			
COS	7.55	2.19-26.05	<0.001			
BDI	2.36	0.59-9.57	0.228			
Satisfactory Critical view of safety	2.01	1.08-3.75	0.027			