Correlation of surgeon radiology assessment with laparoscopic disease site scoring in patients with advanced stage ovarian cancer

Nicole D. Fleming, Shannon N. Westin, Larissa Meyer, Alejandro Rauh-Hain, Aaron Shafer, Michaela Onstad, Lauren

Cobb, Michael Bevers, Jennifer Burzawa, Behrouz Zand, Bryan Fellman, Amir Jazaeri, Charles Levenback, Robert L.

Coleman, Pamela T. Soliman, Anil K. Sood

The University of Texas MD Anderson Cancer Center, Houston TX, USA

@nicoleflemingmd

ABSTRACT

- Optimal tumor reductive surgery (TRS) to no gross residual disease (R0) has been shown to have clear survival benefit compared to any visible residual disease¹⁻²
- Accurate assessment of initial tumor burden is paramount to predict ability to achieve R0 resection
- Pre-operative CT imaging has had variable sensitivity in determining which patients may be at risk for suboptimal primary resection³⁻⁶
- Laparoscopic scoring assessment by Fagotti algorithm has been shown to be a useful model to predict suboptimal primary TRS and improve R0 resection⁷⁻⁸

Primary Objective

- To determine correlation between surgeon radiology assessment and laparoscopic scoring in patients with newly diagnosed advanced stage ovarian cancer

Methods

- 14 Gynecologic oncology surgeons from a single institution performed a blinded review of radiology imaging from 20 patients with advanced ovarian cancer
- All patients previously underwent laparoscopic scoring assessment to determine primary resectability at TRS from April 2013 to December 2017
- Predictive index value (PIV) scores <8 were offered primary surgery and scores ≥8 were dispositioned to NACT
- Surgeons reviewed contrasted CT imaging reports and actual images from all patients in a blinded fashion and recorded PIV scores based on CT review
- Linear mixed models (LMM) were conducted to calculate the correlation between radiology and laparoscopic score for each surgeon and as a group
- Once the model was fit, the inter-class correlation (ICC) was 95% CI was calculated

Patients Undergoing Laparoscopic Scoring

	Patient Data (n=20)
Median PIV score	9 (0-14)
Median age (years)	65.5 (36-80)
Median BMI (kg/m2)	28.4 (21.1-41)
Median pre-op CA-125 (U/mL)	674 (61-12472)
Cancer Stage	
IIIC	17 (85%)
IVA	2 (10%)
IVB	1 (5%)
Residual disease at TRS	
R0	15 (79%)
<1 cm	1 (5%)
≥1 cm	3 (16%)

Summary Statistics of Surgeon Scores based on Agreement (PIV ≥8 or PIV <8)

	Did Not Agree	Agree
Faculty Rank		
Assistant	59 (49%)	61 (51%)
Associate	12 (30%)	28 (70%)
Professor	53 (44%)	67 (56%)
Surgeon		
1	5 (25%)	15 (75%)
2	7 (35%)	13 (65%)
3	11 (55%)	9 (45%)
4	8 (40%)	12 (60%)
5	13 (65%)	7 (35%)
6	13 (65%)	7 (35%)
7	8 (40%)	12 (60%)
8	8 (40%)	12 (60%)
9	8 (40%)	12 (60%)
10	7 (35%)	13 (65%)
11	10 (50%)	10 (50%)
12	8 (40%)	12 (60%)
13	6 (30%)	14 (70%)
14	12 (60%)	8 (40%)

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Scatter Plot of Scores by Surgeon

Linear Mixed Modeling Assessing Factors Associated with Agreement

	OR (95% CI)	P-value
Number of Scope and Score Procedures	1.00 (0.97-1.03)	0.87
Number of TRS Procedures	1.00 (0.98-1.01)	0.86
Faculty Rank (ref: Assistant Professor)		0.11
Associate Professor	2.26 (1.05-4.85)	
Professor	1.22 (0.74-2.03)	

Scatter Plot of Scores by Subscale

Probability of agreement: peritoneum 0.57 (95% CI 0.51-0.62), diaphragm 0.54 (95% CI 0.48-0.60), mesentery 0.51 (95% CI 0.45-0.57), omentum 0.61 (95% CI 0.55-0.67), bowel 0.54 (95% CI 0.44-0.64), stomach 0.71 (95% CI 0.65-0.76), and liver 0.36 (95% CI 0.31-0.42)

Table 8: Kappa inter-rater agreement statistics on radiology summary scores

Subscale	Kappa	95%LB	95% UB
Total Score	-0.017	-0.023	-0.005
Peritoneal	0.233	0.121	0.391
Diaphragm	0.039	-0.016	0.103
Mesenteric	0.056	0.009	0.133
Omental	0.098	0.030	0.193
Bowel	0.081	0.016	0.200
Stomach	0.115	-0.016	0.217
Liver	-0.003	-0.025	0.037

CONCLUSIONS

- The kappa inter-rater agreement was -0.017 (95% CI 0.023 to -0.005) indicating low inter-rater agreement between radiology review and actual laparoscopic score
- When using a cutoff of PIV of 8, the probability of agreement between radiology and actual laparoscopic score was 0.56 (95% CI 0.49-0.73)
- Number of laparoscopic cases, TRS cases, or faculty rank was not significantly associated with agreement.
- 44% of patients in our study may have been inadequately triaged by radiology review alone
- By subscale, the best agreement is seen when evaluating for stomach involvement, and the worst with liver involvement.
- Our study highlights the utility of laparoscopic scoring assessment to determine resectability over radiology assessment alone.

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