Predictive Factors of High Risk Were Indirectly Compared in Node-negative Stage I-II Breast Cancer Patients Examined Oncotype Dx or EndoPredict: The BRAIN Study

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SAN ANTONIO BREAST CANCER SYMPOSIUM®
DECEMBER 10–13, 2024
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Background & Purpose

- Multigene assays (MGAs)
  - Used to discriminate high and low risk groups in estrogen receptor (ER)-positive/HER2-negative breast cancer patients.
  - Known to different characteristics.
- Direct comparison between MGAs in real world
  - Difficult because clinical guidelines recommended against using two or more MGAs in a patient simultaneously.
- Aim to,
  - Indirect comparison of clinicopathological characteristics and results of between Oncotype Dx (ODx) and EndoPredict (EP) .
  - to investigate characteristics of each assay.

Methods

- Pateints
  - A total of 1,782 node-negative stage I/II patients with ER-positive/HER2-negative breast cancer.
  - 1,537 (86.3%) patients performed ODx and 245 (13.7%) examined EP.
- Between 2013 and 2025.
- Retrospectively collected data.
- Definition of high risk
  - ODx: considering clinical risk and recurrence score.
  - EP: EPclin score
- Statistics
  - Logistic regression models : Comparison of clinicopathological characteristics and assay results
  - 1:1 propensity score matching (PSM): adjusting clinicopathological characteristics

Results

Table 1. Baseline Characteristics of between Oncotype Dx and EndoPredict before and after propensity score matching (PSM).

	Before PSM			After PSM		
	Oncotype Dx N=1,537	EndoPredict N=245	p-value	Oncotype Dx N=245	EndoPredict N=245	p-value
Age						
≤50	896 (58.3)	110 (44.9)	<0.001	111 (45.3)	110 (44.9)	0.928
>50	641 (41.7)	135 (55.1)		134 (54.7)	135 (55.1)	
BMI						
<23.0	846 (55.0)	117 (47.8)	0.038	117 (47.8)	117 (47.8)	>0.999
≥23.0	691 (45.0)	128 (52.2)		128 (52.2)	128 (52.2)	
Histology						
Ductal-NOS	1273 (82.8)	188 (76.7)	0.045	186 (75.9)	188 (76.7)	0.832
Mixed/Lobular/special	264 (17.2)	57 (23.3)		59 (24.1)	57 (23.3)	
Tumor stage						
pT1	1240 (80.7)	207 (84.5)	<0.001	207 (84.5)	207 (84.5)	>0.999
pT2-3	297 (19.3)	38 (15.5)		38 (15.5)	38 (15.5)	
Histologic grade						
I	456 (29.7)	109 (44.5)	<0.001	107 (43.7)	109 (44.5)	0.856
II/III	1081 (70.3)	136 (55.5)		138 (56.3)	136 (55.5)	
ER allred score						
3-6	193 (12.6)	25 (10.2)	0.297	22 (9.0)	25 (10.2)	0.645
7-8	1344 (87.4)	220 (89.8)		223 (91.0)	220 (89.8)	
PR allred score						
0-4	397 (25.8)	70 (28.6)	0.540	66 (26.9)	70 (28.6)	0.687
5-8	1140 (74.2)	175 (71.4)		179 (73.1)	175 (71.4)	
HER2						
0/1+	1111 (72.3)	188 (76.7)	0.309	188 (76.7)	188 (76.7)	>0.999
2+/ISH(-)	426 (27.7)	57 (23.3)		57 (23.3)	57 (23.3)	
Ki-67						
<20%	1113 (72.4)	195 (79.6)	0.018	194 (79.2)	195 (79.6)	0.911
≥20%	424 (27.6)	50 (20.4)		51 (20.8)	50 (20.4)	

Table 2. Crosstable Analysis of Risk Category by Multigene Assays after PMS.

	Oncotype Dx	EndoPredict	p-value
Risk category			
Low	192 (78.4)	185 (75.5)	**0.453**
High	53 (21.6)	60 (24.5)	

Table 3. Multivariate for High-risk Group in propensity score matched pateints

Variables	HR	p-value	95% CI
ODx vs. *EP*	**1.286**	**0.348**	**0.761 – 2.174**
>50 vs. ≤50	1.375	0.280	0.771 – 2.452
BMI <23 vs. **≥23.0**	0.425	0.004	0.238 – 0.760
Ductal vs. Mixed/Lobular/Special	0.445	0.025	0.219 – 0.903
T1 vs. **T2-3**	8.824	<0.001	4.344 – 17.926
HG I vs. **II-III**	4.177	<0.001	2.190 – 7.966
PR 5-8 vs. **0-4**	5.708	<0.001	3.119 – 10.448
Ki-67 <20% vs. **≥20%**	5.366	<0.001	2.882 – 9.990

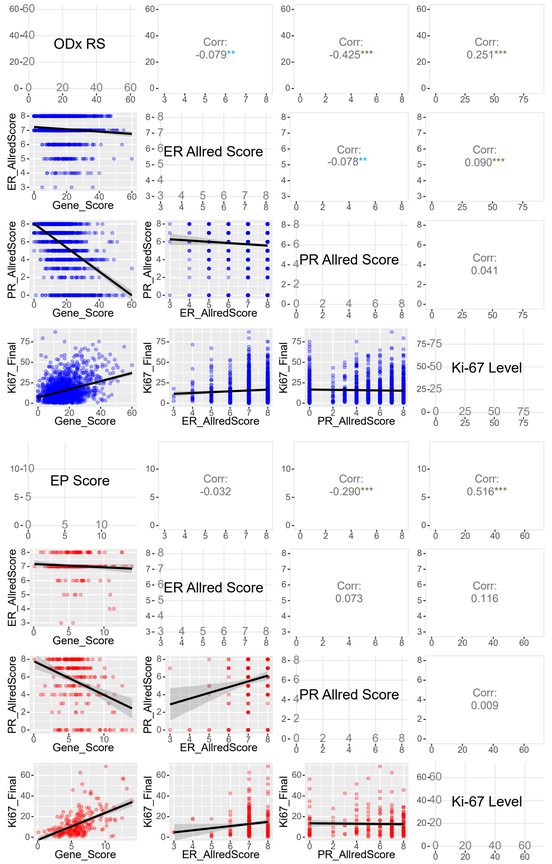


Figure 1. Correlation between Pathologic Variables and Genomic Risk Scores: ODx RS(blue) and Epclin (red).

- High risk of ODx and EP was 25.4% and 24.5%.
- Correlation analysis
  - ODx recurrence score was significantly associated with ER (Spearman's rho, -0.079) and PR (Spearman's rho, -0.425) Allred score negatively and with Ki-67 levels (Spearman's rho, 0.251) positively.
  - EP 12-gene molecular score was negatively associated with PR Allred score (Spearman's rho, -0.290) and positively related to Ki-67 values (Spearman's rho, 0.516).
- Subset analysis by each assay
  - Younger age, lower ER and PR Allred score, and HER2 2+ immunohistochemical score were major determinants of high risk in ODx patients.
  - Larger T2-3 stage, histologic grade II/III, and Ki-67 ≥20% were significant factors of high risk in EP cases.
- The multivariate analysis after PSM
  - BMI, T stage, histologic grade, low PR expression, and high Ki-67 were more strongly associated with high-risk classification than the type of MGA used.

Conclusion

- Each MGA showed different features of major determinants for high-risk group.
- ODx was strongly dependent on ER-related signatures and EP was significantly determined by proliferative features of histologic grade and Ki-67 levels.
- Primary physician and patient could select one among available MGAs based on understanding of its distinct characteristics.

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References

1. Sestak, I., et al., *Comparison of the performance of 6 prognostic signatures for estrogen receptor–positive breast cancer: a secondary analysis of a randomized clinical trial.* JAMA oncology, 2018. **4**(4): p. 545–553.
2. Vallon-Christersson, J., et al., *Cross comparison and prognostic assessment of breast cancer multigene signatures in a large population-based contemporary clinical series.* Scientific reports, 2019. **9**(1): p. 12184.
3. Brogna, M.R., et al., *Evaluation and Comparison of Prognostic Multigene Tests in Early-Stage Breast Cancer: Which Is the Most Effective? A Literature Review Exploring Clinical Utility to Enhance Therapeutic Management in Luminal Patients.* Molecular Carcinogenesis, 2025. **64**(5): p. 789–800.
4. Ross, J.S., et al., *Commercialized multigene predictors of clinical outcome for breast cancer.* The Oncologist, 2008. **13**(5): p. 477–493.

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