Higher Breast Tumor Grades Could More Likely Benefit from Extended Adjuvant Endocrine Therapy

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Background

- Distant recurrence (DR) of breast cancer remains a significant clinical challenge in patients with hormone HR-positive (HR+)/HER-2(-)breast cancer.
- Determining an individual patient's risk of DR at 5years is important due to the comorbidities associated with endocrine therapies and high patient noncompliance from toxicities.
- The Breast Cancer Index (BCI) (Biotheranostics, Inc. A Hologic Company) is a gene-expression based biomarker utilized in node negative and node positive, early-stage HR+ breast cancer patients who may benefit from extended adjuvant endocrine therapy (AET) based on the tests' comprehensive predictive and prognostic evidence.
- BCI is the only genomic test recognized by NCCN (National Comprehensive Cancer Network) and ASCO (American Society of Clinical Oncology) for predicting which patients may benefit from extended AET >5 years.
- However, the association between BCI and clinicopathological factors remains unclear.

Objectives

We aimed to identify associations between predictive BCI scores of HR+ breast cancer patients with various clinicopathological factors.

Methods

- **Inclusion:** retrospectively identified HR+ breast cancer patients who had BCI testing from 2014-2025 at our institution
- **Exclusion:** breast cancer patients who are HR negative, BCI was not done in ER- and HER2+ patients.
- **Variables of interest:** age, tumor grade, race, node status, number of nodes involved, HER-2 status, and ER/PR staining intensity.
- BCI scores to predict recurrence were classified as "Yes" (likely to benefit from extended AET) or "No."
- Fisher's exact test was used to compare categorical variables between patients with positive and negative BCI test result. The Wilcoxon rank sum test was applied to compare ordinal variables. A p-value of <0.05 was statistically significant. All statistical analyses were performed with R software.

Table 1: Clinicopathologic Features by BCI Result

Variable	Total N=52(%)	No N=27(%)	Yes N=25(%)	p-value
BCI Score	5.8 (1.1-19.9)	3.9 (1.1-14)	8.6 (1.4-19.9)	0.0352[2]
Age Group				0.082[2]
<55 years	17 (33.3%)	12 (46.2%)	5 (20%)	
≥55 years	34 (66.7%)	14 (53.8%)	20 (80%)	
Missing	1	NA	NA	
Race				1[2]
White	51 (98.1%)	26 (96.3%)	25 (100%)	
Black	1 (1.9%)	1 (3.7%)	0 (0%)	
ER/PR status				0.167[2]
ER only	10 (19.2%)	3 (11.1%)	7 (28%)	
PR only	0 (0%)	0 (0%)	0 (0%)	
both ER and PR	42 (80.8%)	24 (88.9%)	18 (72%)	
Intensity of ER/PR stain				0.373[1]
Low	0 (0%)	0 (0%)	0 (0%)	
Low Moderate	2 (4.7%)	0 (0%)	2 (10%)	
Moderate High	24 (55.8%)	13 (56.5%)	11 (55%)	
High	17 (39.5%)	10 (43.5%)	7 (35%)	
Missing	9	NA	NA	
HER2 Status				0.341[2]
HER2 -ve	48 (92.3%)	26 (96.3%)	22 (88%)	
HER2 +ve	4 (7.7%)	1 (3.7%)	3 (12%)	
No.of nodes				
<3	14 (100%)	9 (100%)	5 (100%)	
>3	0 (0%)	0 (0%)	0 (0%)	
Missing	38	NA	NA	
Node status				0.227[2]
Node +ve	15 (28.8%)	10 (37%)	5 (20%)	
Node -ve	37 (71.2%)	17 (63%)	20 (80%)	
Tumor grade				0.0293[1]
1	15 (29.4%)	9 (33.3%)	6 (25%)	
2	23 (45.1%)	16 (59.3%)	7 (29.2%)	
3	13 (25.5%)	2 (7.4%)	11 (45.8%)	
Missing	1	NA	NA	

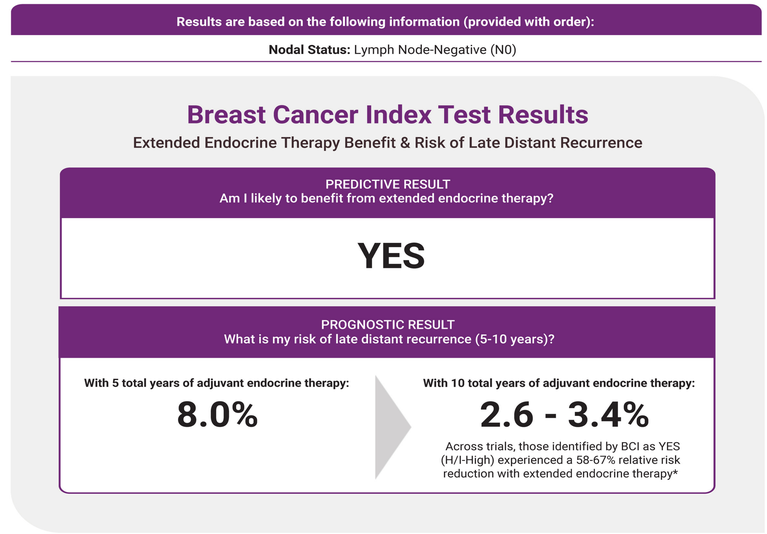
1: Wilcoxon Rank Sum test 2: Fisher's Exact test

Results

Study Population:
- N=52 patients
- Majority age was >55 years old
- Race/Ethnicity: 98.1% White

Clinicopathologic Characteristics:
- Median BCI (total): 5.8
- Median BCI with "Yes" Score: 8.6
- Median BCI with "No" Score: 3.9
- Majority of cohort had ER+/PR+ status
- Majority had moderately high to high intensity of ER/PR staining
- Most had HER2(-) breast cancer
- Most had <3 nodes
- Most BCI "Yes" score classifications had Grade 2-3 (75%) tumors vs. most BCI "No" score classifications had Grade 1-2 (92.6%) tumors

Figure: Example of BCI Report



As found on Breast Cancer Index main website (Biotheranostics, Inc. A Hologic Company)

Conclusions

- Higher tumor grades were more likely to have a predictive BCI score compared with lower tumor grades, indicating higher recurrence risk and/or more benefit from extended AET.
- Nodal status was not a statistically significant factor.
- Larger, multicenter studies with varied patient populations are needed to further validate these findings.