Breast cancer with a higher proportion of tumor cells staining positive for Her2 is more likely to have pathologic complete response (pCR) after neoadjuvant chemotherapy (NAC).

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INTRODUCTION

- Neoadjuvant chemotherapy (NAC)- systemic therapy prior to surgical intervention- is commonly employed in early-stage and locally advanced breast cancer to downgrade tumor size.
- Achievement of pathologic complete response (pCR; ypT0/is ypN0) following NAC is associated with favorable outcomes in patients with aggressive breast cancer subtypes such as HER2+.
- Prior reports have suggested high gene amplification on the fluorescence in situ hybridization (FISH) assay as a predictive marker for pCR.
- At many institutions, however, immunohistochemistry (IHC) testing is more readily available and FISH is only performed on equivocal IHC results.
- Given that IHC is often the first-line diagnostic tool for HER2 positivity, we sought to analyze the role of percent staining on the IHC assay (IHC%) as a predictor of pCR following anti-HER2 targeted NAC.

METHODS

- From a single health system database we queried:
  - Stage I-II HER2+ by IHC or FISH
  - Received NAC
- Treated in-facility
- IHC% from core-biopsy available

FIGURE 1 - Study schema and patient inclusion/exclusion.

RESULTS

| HER2 status | Total | pCR | neopTumor | IHC% | F
|-------------|-------|-----|----------|------|---
| All Patients Receiving pCR | 98,150 (98) | 62,215 (63) | 50,139 (51) | 50,066 (51) | 0.8
| HER2 status | High | 32 | 31.5 | 20 | 20.6 | 0.01
| Low | 66 | 24.4 | 46 | 42 | 0.07
| Intermediate | 15 | 20 | 16 | 16 | 0.2

DISCUSSION

During multivariate logistic regression analysis, percent IHC staining became the only predictor of pCR when assessed as a continuous (OR 1.016 P=0.02) or categorical variable (OR 2.39 P=0.07, trending).

Our results suggest clinical utility of IHC% as a potential biomarker in predicting the benefits of NAC in the treatment of breast cancer.

HYPOTHESIS

We propose that women with higher immunohistochemistry percentage (IHC%) staining for the HER2 receptor are more likely to have a pCR following NAC.

REFERENCES


TABLE 1: Pathologic complete response rates and characteristics of patients HER2+ treated with or without pertuzumab therapy. (The last row THYMPH is an exploratory analysis of a single center trial of patients receiving neoadjuvant trastuzumab plus pertuzumab vs. pertuzumab plus chemotherapy. Patients treated with or without pertuzumab are included.)

<table>
<thead>
<tr>
<th>HER2 Status</th>
<th>Pathologic Complete Response</th>
<th>Neoadjuvant Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Neoadjuvant</td>
<td>86 (64.4)</td>
</tr>
<tr>
<td>No</td>
<td>Neoadjuvant</td>
<td>28 (20)</td>
</tr>
<tr>
<td>Total</td>
<td>Neoadjuvant</td>
<td>114 (84.4)</td>
</tr>
</tbody>
</table>

Given our limited sample size, further investigation is warranted to elucidate the mechanisms underlying this observation.

FUTURE DIRECTIONS

- Given our limited sample size, further investigation is warranted to elucidate the mechanisms underlying this observation.

- Possible future research directions could include:
  - Comparing the utility of IHC% vs. FISH in predicting pCR
  - Evaluating the impact of patient and tumor characteristics on IHC% as a predictor of pCR
  - Investigating the role of IHC% in predicting survival outcomes following NAC