The Impact of Body Mass Index on the Prognostic Power of Circulating Tumor Cells and Pathologic Complete Response following Neoadjuvant Chemotherapy for Breast Cancer

Fayanjoo OM1, Hall CS2, Baudity JB3, Karhade M2, Valad L2, Kuerer HM1, DeSnyder SM1, Barcenas CH3, Lucci A1,2

1. Department of Breast Surgical Oncology, 2. Department of Surgical Oncology, 3. Department of Breast Medical Oncology
The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Methods
- This study included 113 Stage I-III breast cancer patients diagnosed between March 2005 and March 2015 who received NACT as part of a prospective trial on CTCs.
- CTC samples were collected via a peripheral blood draw following completion of NACT but prior to surgical resection. CTCs were identified via the CellSearch® method (Figure 1).
- Inclusion was limited to patients whose postoperative pathologic review definitively described pCR.
- Predicted event-free survival (EFS, i.e., no recurrence or death) was calculated using cox proportional hazards models examining the relationships between pCR, CTCs, and clinical variables including age, race/ethnicity, tumor biomarkers, grade, and size; menopausal status; type of antracycline and taxane received; axillary nodal status; and the presence of inflammatory breast cancer (IBC) or lymphovascular invasion (LVI).
- We report hazard ratios (HR) with 95% confidence intervals (CI) significant at 2-tailed p<0.05 and Harrell’s C indices, which indicate the ordinal predictive power of the models.

Results
- Of 113 patients, 93 (82%) had CTC values, 34 (30%) had pCR, and 50 (44%) were obese (BMI≥30). 91 (81%) had stage III disease, and 73 (65%) had inflammatory breast cancer (Table 1).
- In bivariate modeling, pCR was associated with increased likelihood of EFS (HR 0.07, CI 0.01-0.51, p<0.01, Figure 2) while presence of CTCs was associated with decreased likelihood of EFS (HR 3.88, CI 1.79-8.41, p<0.01, Figure 3) at 30-month follow-up.

Results (cont.)
- Among non-obese patients, the difference in predicted EFS between those with and without CTCs was significant (HR 6.41, CI 1.91-21.48, p<0.01), but there was no statistically significant difference observed between obese patients with and without CTCs (HR 2.52, CI 0.87-7.29, p=0.09, Figure 4).
- While not independently associated with EFS in our cohort, BMI may nevertheless be important in predicting prognosis in breast cancer patients following NACT.

Conclusions
- The significance of both CTCs and pCR as prognosticators in obese patients warrants further investigation.