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## 2117

### Facility and Individual-Level Factors Contribute to Racial Disparities in Heart Dose Among Breast Radiotherapy Patients



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**Purpose/Objective(s):** Racial disparities in breast cancer presentation (stage/subtype), baseline cardiac risk, and access to care highlight the need to quantify and address predictors of racial variation in heart dose among women who receive radiotherapy (RT). We sought to explore factors that contribute to heart dose, including intrinsic patient factors and facility level factors.

**Materials/Methods:** We queried a statewide consortium database to examine racial differences in mean heart dose among women treated with whole breast RT at 25 institutions. We generated separate models of heart dose based on disease laterality and receipt of conventional (CWBI) versus accelerated whole breast irradiation (AWBI). We included demographic, disease, and treatment characteristics expected to affect heart dose, as well as facility type. We created a model with only patient-level characteristics followed by a multi-level model to account for clustering within facilities.

**Results:** Among 9042 women in the analytic sample, estimated mean heart doses (Gy) were: 1.74 for left-sided AWBI, 1.60 for left-sided CWBI, 0.61 for right-sided AWBI and 0.66 for right-sided CWBI. On patient-level multivariable analysis, race was an independent predictor of higher heart dose for women with left-sided disease: Black patients receiving ABWI or CWBI and Asian patients receiving AWBI had higher heart doses than White women. Higher heart dose was also associated with separation, breast volume, inclusion of internal mammary nodes, use of intensity modulated RT, supine positioning, dose to 50% of the breast volume, treatment at an academic center, decreasing obesity, decreasing comorbidities, absence of deep inhalation breath hold, and earlier treatment year. Multilevel modeling revealed that 22-30% of the variability in heart dose was attributed to patient clustering within facilities. Multilevel models suggest that heart dose is elevated for Black and most Asian (v. White) patients, with average increase between 3-13% and 6-22%, respectively, and statistically significant ( $p < 0.02$ ) depending upon laterality and fractionation. Multilevel modeling uncovered disparities for Black and Asian right-sided AWBI patients that were not observed in patient-level models.

**Conclusion:** Mean heart doses were higher for Black and Asian women in this sample, even when accounting for relevant patient-level factors. Accounting for treatment facility decreased, but did not eliminate this disparity for left-sided disease and uncovered disparities for right-sided disease. These findings suggest that disparities in heart dose may be influenced by patient factors and the facilities at which women obtain care. Further research is needed to clarify whether disparities for Black and Asian women are due to unmeasured, unmodifiable anatomic or clinical factors versus modifiable individual or system-level factors.

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## 2118

### Hybrid-VMAT for Post-Operative Breast Cancer Including Regional Lymph Nodes: The Advantage of Dosimetric Data and Safety of Toxicities



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**Purpose/Objective(s):** To improve the homogeneity and conformity of the irradiation dose for post-operative breast cancer including regional lymph nodes, we planned the Hybrid VMAT which was combined conventional tangential field mainly for chest wall and VMAT mainly for supraclavicular area and marginal zone. In this study, we investigate the comparison of dosimetric impact between traditional 3DCRT and Hybrid VMAT, and also observed toxicities following Hybrid VMAT irradiation.

**Materials/Methods:** Seventy patients indicated for Hybrid VMAT irradiation between October 2016 and December 2017 were eligible. Target delineation was referred clinical data and RTOG breast cancer atlas. Prescribed dose was 50Gy/25 fractions. For the dosimetric impact, traditional 3DCRT and Hybrid VMAT plans were compared in each patient with respect to following parameters: homogeneity index (HI) and conformity index (CI) of PTV, and irradiation dose to OAR (lung and heart). The toxicities such as dermatitis, esophagitis, pneumonitis, and lymphatic edema were followed up regularly using CTCv4.0.

**Results:** The characteristic of 70 patients were 35 patients of left side and 35 patients of right side, and 19 patients of post breast-conserving surgery and 51 patients of post mastectomy. The median follow up was 319 days. For the dosimetric impact, the HI and CI of PTV were significantly improved in Hybrid VMAT plan compared with in traditional 3DCRT plan (HI:  $0.15 \pm 0.07$  in Hybrid VMAT vs.  $0.41 \pm 0.19$  in 3DCRT,  $p < 0.001$ , CI:  $1.61 \pm 0.44$  in Hybrid VMAT vs.  $2.10 \pm 0.56$  in 3DCRT,  $p < 0.001$ ). The mean irradiated ipsilateral lung dose was not difference in both plans ( $12.0 \pm 2.4$  Gy in Hybrid VMAT vs.  $11.8 \pm 2.8$  Gy in 3DCRT,  $p < 0.533$ ). The mean irradiated contralateral lung dose was very low in both plans ( $1.3 \pm 0.6$  Gy in Hybrid VMAT vs.  $0.3 \pm 0.2$  Gy in 3DCRT,  $p < 0.001$ ). The mean irradiated heart dose for only left side patients was almost the same in both plans ( $28.0 \pm 15.0$  Gy in Hybrid VMAT vs.  $28.0 \pm 15.1$  Gy in 3DCRT,  $p < 0.01$ ). For the toxicity, Grade 1-2 acute dermatitis and esophagitis occurred in 39 patients (56%) and 11 patients (16%), respectively. There were no patients who were occurred  $\geq$  Grade 3 acute toxicity,  $\geq$  Grade 2 pneumonitis and  $\geq$  Grade 2 lymphedema during following up.

**Conclusion:** Hybrid VMAT for post-operative breast cancer including regional lymph nodes was reasonable technique which was able to improve the homogeneity and conformity of the irradiation dose to PTV while keeping the irradiation dose to OAR. In addition, Hybrid VMAT was proved to be safe technique in the evaluation of the toxicity.

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## 2119

### Factors Associated with Patient-Reported and Physician-Assessed Acute Toxicity after Hypofractionated Breast Radiotherapy, a Report from a Large Multi-Center Cohort Study



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**Purpose/Objective(s):** In 2018 ASTRO published an update to the 2011 evidence-based guideline for the use of hypofractionated whole breast irradiation (HF-WBI), increasing the patient populations for whom expert consensus supports the use of HF-WBI. While individualized decision making is encouraged, this updated guideline has been expanded to support HF-WBI for patients <50 years, receipt of chemotherapy, larger separation distance, and a diagnosis of DCIS. For some of these indications, however, only moderate data exist. Thus, we now assess patient and physician reported toxicity data in a large prospective registry for populations not well represented on the trials and in whom there is less experience with this approach.

**Materials/Methods:** Prospective data were evaluated from 2,083 patients receiving HF-WBI plus boost, treated between 1/1/2016 – 8/31/2018 at 24 academic and community centers participating in a statewide consortium. A composite toxicity endpoint was defined as occurrence of self-reported (4-10 modified brief pain inventory) or physician-assessed moderate or severe breast pain (CTCAE v. 4.0 grade 2-3) when patient report absent, and/or physician-assessed presence of moist desquamation. Logistic regression models were constructed isolating the effect of specific criteria from the 2011 HF-WBI guidelines, specifically age <50 years, separation distance >25cm, chemotherapy use, and DCIS. This was further adjusted for patient BMI, breast volume, race, comorbidity, smoking status, and IMRT.

**Results:** Mean age was 62 years, mean separation was 22cm. Twenty-two percent of patients were treated for DCIS with the remaining 78% treated for invasive cancer; 17% of patients received chemotherapy. Of the 2,083 patients, 376 patients had more than one 2011 guideline discordance (for ex. <50 years with chemotherapy), therefore 1707 patients were included in this analysis. On multivariable analysis, patients age < 50 years were estimated to be 82% more likely to experience toxicity than older patients (OR=1.82, 95% CI: 1.11-2.97, p=0.02). While unadjusted difference on univariate analysis showed increased toxicity with separation > 25 cm, multivariable analysis revealed no significant difference in toxicity for separation > 25 cm (p=0.25), DCIS (p=0.6753), or treatment following chemotherapy p=0.10).

**Conclusion:** Young breast cancer patients may be at increased risk of acute toxicity compared with other patients when receiving HF-WBI. Additional work is needed to determine why patients <50 years, who were notably underrepresented in the prospective trials establishing the safety and efficacy of HF-WBI, may experience increased breast pain and dermatitis. Work is underway in our group to determine if this same increased risk is appreciated for patients <50 years receiving conventionally fractionated radiotherapy.

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## 2120

### Breast Cancer Patient-Reported Quality of Life Outcomes Following Radiation Therapy



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**Purpose/Objective(s):** As cure rates for breast cancer improve, there has been increasing emphasis on quality of life and cosmesis following breast cancer treatment. Breast local therapy is rapidly evolving, with new strategies for reconstruction, differences in surgical approaches to nodal assessment, and shorter radiation fractionation schemes. We recently implemented the BREAST-Q<sup>1</sup> questionnaire as part of our routine assessment of our breast cancer patients in our clinic and sought to assess the impact of changes in local therapy on patient reported outcomes.

**Materials/Methods:** A total of 281 patients at a single institution were prospectively enrolled for patient-reported outcomes research. This study was approved by our institutional IRB. Electronically collected data was performed using the Vision Tree platform. Patients were given BREAST-Q questionnaires prior to radiation, one month post treatment, 6 months post treatment, and then annually for up to 5 years. Patient data was collected on age, race, mastectomy vs lumpectomy, sentinel vs axillary dissection, stage, hormone status, lymphedema, smoking use, reconstruction type, BMI, chemotherapy, and radiation dose. Statistical analysis was used to assess correlation between patient and tumor characteristics with BREAST-Q scores. Emphasis was placed on the following quality of life endpoints: acceptance of body image, breast pain, arm pain, and range of motion.

**Results:** Median age was 57, range 28-89. Fifty three patients underwent post mastectomy radiation and 228 were treated with breast conservation. 14% of patients were African American. In mastectomy patients, there was significantly higher unacceptable body appearance for white versus black patients (17% vs 0%, p=0.001). In lumpectomy patients, there was significantly higher breast pain in black as compared to white patients (17% vs 4%, p=0.03). There was no significant correlation between patient's perceptions of attractiveness, arm pain, breast pain, or range of motion in regards to use of hypofractionation, sentinel node biopsy vs axillary node dissection, premenopausal status, use of chemotherapy, laterality, or immediate reconstruction.

**Conclusion:** Counter to our hypothesis, changes in local therapy were not significantly correlated with improved BREAST-Q scores in our patient population. Interestingly, race had a significant association with outcomes of pain and appearance. Further study is warranted to verify these findings, as racial differences in patient reported outcomes may impact choice of local treatment for these patients.

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## 2121

### Breast Conservation and Hypofractionation in Women with Hereditary Breast Cancer



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