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Adjuvant Stereotactic Body Radiation Therapy (ASBRT) for Early-Stage Breast Cancer: Symptomatic Fat Necrosis is Associated with Consecutive Daily Treatments

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Purpose/Objective(s): Outcomes following accelerated partial breast irradiation in select women with early-stage breast cancer are comparable to whole breast irradiation. ASBRT is an attractive treatment option, but mature toxicity outcomes are limited. Toxicity risk with SBRT has been associated with a consecutive daily schedule in other organs. In the present study, we explore the association of treatment schedule and fat necrosis.

Materials/Methods: Early-stage breast cancer patients (Stage 0 and I) were treated per an institutional protocol. A minimum of 4 gold fiducials were implanted around the lumpectomy cavity for target delineation and tracking. The clinical treatment volume (CTV) was defined as lumpectomy cavity with a uniform 0-10 mm expansion confined to breast tissue. The planning treatment volume (PTV), defined as the CTV with a 0-2 mm uniform expansion, was prescribed 30 Gy in 5 fractions. Breast examination and mammography were completed per routine institutional practice. A patient was deemed to have fat necrosis when breast examination identified a tumor bed mass with distinctive mammographic characteristics.

Results: Twenty women were treated over a 7-year period extending from September 2008 to September 2015 and followed for a minimum of 6 years. The median CTV expansion was 5 mm (range, 0-10), median PTV was 62.5 cm^3 (range 15-142), median PTV/breast volume ratio was 8.3% (range 4.1-25.6), median prescription isodose line was 83% (range 75-87) and median treatment duration was 7 days (range 5-13). Seven patients were treated on 5 consecutive days (i.e., Monday through Friday). At a median follow up of 8 years (range, 6-12 years), 5 women developed fat necrosis. All 4 symptomatic patients had been treated on consecutive days and the symptomatic fat necrosis was diagnosed at a median follow-up of 5.9 years (range, 4.8-7.4). Cox regression analysis identified consecutive daily treatments as a predictor of symptomatic fat necrosis (OR: 26.8, *p value*=0.05).

Conclusion: Our mature findings demonstrate an association between Monday through Friday treatment and symptomatic fat necrosis. Fortunately, our research also suggests that symptomatic fat necrosis is curtailed by merely extending the treatment duration beyond 5 days. Accordingly, we believe that the Fast-Forward trial investigators should reevaluate their current assertion that 26 Gy whole breast irradiation delivered in 5 consecutive daily fractions over 5 or 7 days is a new standard treatment option. Only the yet to be completed 10-year analysis of this large prospective study will ultimately determine if delivering 5 large consecutive daily adjuvant breast radiation treatments is associated with symptomatic fat necrosis and if adding 2 additional days to the treatment course effectively curtails this adverse side-effect.

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The Use of Breast Cup Immobilization in Radiation Therapy and Patient Reported Outcomes on Cosmesis and Pain

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Purpose/Objective(s): Breast cosmesis and pain are among the most reported outcomes in patients undergoing breast irradiation. There is variability in the degree of adverse reactions based on different patient specific characteristics. It has been found that women with large body habitus, African American race, and larger breast size tend to have an increased chance of experiencing worse toxicity from treatment. Attempts to improve cosmesis and pain have been highly explored. We explore here whether the use of a breast cup for treatment leads to worse cosmesis and pain when compared to those treated without a breast cup. This is an important topic as it is felt that the use of a breast cup would provide a significant dosimetric advantage (i.e., organ at risk dosing) during treatment. We now explore this treatment option through a retrospective analysis of patient reported outcomes experienced during and after completing post-operative radiation therapy to the breast.

Materials/Methods: 645 patients undergoing adjuvant breast irradiation were evaluated from 2011 through 2019. 79 patients were treated using a breast cup. Mean heart dose was analyzed and compared between the two treatment groups and was found to be comparable in each arm. Additionally, patient reported outcomes among the entire cohort were collected via survey documentation forms during treatment, at 1 month post treatment, and at 1 year after treatment. These results were collected using the Michigan Radiation Oncology Quality Consortium (MROQC) database as each patient was consented to enroll in MROQC prior to starting treatment. The outcomes of skin changes, lymphedema, and breast pain among the two treatment groups were then compared for statistically significant differences via a logistic regression analysis.

Results: Patients were evaluated at 3 time points; during treatment, 1-month post-treatment and at 1 year after treatment. Of the 79 patients treated with a breast cup, when compared to the no cup patients, grade 2 pruritus and grade 1 alteration in skin texture were not significantly different at any time point ($p > 0.05$). With regards to lymphedema, no statistically significant difference was seen between the two groups of patients outside of the 1 month after treatment survey time point; all p values greater than 0.05 except for the 1-month mark (p value 0.03). Lastly, breast pain survey remarks at the pre-specified time points failed to show a significant difference in the symptom between the two analyzed treatment groups ($p> 0.05$).

Conclusion: From our patient's perspective, the use of a breast cup during radiation therapy did not negatively impact breast cosmesis or pain when compared to patients treated without a cup. Breast cup use was also found to produce similar dosimetric coverage to the heart as non-cup patients, even in left sided breast cancers.

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Safety and Feasibility of Simultaneous Integrated Boost in Extreme 1-Week Hypofractionated Radiotherapy for Early Breast Cancer

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