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Capsular Contracture after Radiation Therapy Following Mastectomy and Implant-Based Reconstruction

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Purpose/Objective(s): Radiation therapy (RT) is a known risk factor for capsular contracture (CC) in breast cancer patients undergoing mastectomy and implant-based reconstruction, and there is relatively little data in the literature exploring radiation related details associated with risk of CC. We hypothesize that radiation specific details may be associated with increased risk of CC.

Materials/Methods: From 2010-2017, 53 patients underwent RT following mastectomy with implant-based reconstruction for invasive cancer or local recurrence at a single institution. Patients were treated with photon therapy using opposed tangents (n=45) or VMAT (n=2); and proton therapy (n=6). Radiation boost (n=27), when delivered, consisted of electrons to the surgical scar. CC was diagnosed based on physical exam findings. Patient and radiation specific risks for CC were analyzed using chi-square test for frequency data and Wilcoxon rank-sum test for continuous data.

Results: Median follow-up was 17.6 months (range 0.03 − 79.5 months). CC occurred in 10 out of 53 (18.9%) patients. Surgical reconstruction was evenly split between stage I (50.9%) and stage II (49.1%) with no difference in risk of CC (p=0.18). The majority of patients received 50 Gy in 25 fractions (70%) to the whole breast. Radiation doses ranged from 40.05 Gy in 15 fractions to 56.7 Gy in 28 fractions. Body mass index (BMI) did not differ between patients with CC (median=23.7, range 19.2-30.57) compared to those without CC (median=24.1, range 17.1-39.0, p=0.55). Breast volume treated did not differ between patients with CC (median=885.1 cm^3, range 435.1-1798) compared to those without CC (median=773.9 cm^3, range 103.8-1423.2, p=0.57). All patients who developed CC in our population received a minimum 50 Gy in 25 fractions. Hypofractionation was used in 5 patients and none of them developed CC (p=0.57). CC occurred in 2 of 6 patients (33%) who received proton therapy compared to 8 of 47 (17%) who received photon therapy (p=0.31). Boost to the surgical scar was not associated with an increased risk of CC (p=0.72). CC occurred in 9 of 32 patients (28.1%) who received neoadjuvant chemotherapy compared to 1 of 21 (4.8%) patients who did not receive neoadjuvant chemotherapy (p=0.07).

Conclusion: Hypofractionation was not associated with a higher risk of CC compared to standard fractionation. BMI and volume of breast tissue treated were not associated with risk of CC either. Patients treated with neoadjuvant chemotherapy in addition to RT following mastectomy and implant-based reconstruction may be at increased risk for CC.

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Instruments for Determining Clinically Relevant Fatigue in Breast Cancer Patients during Radiotherapy

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Purpose/Objective(s): Cancer-related fatigue (CRF) is a common complaint among breast cancer patients receiving radiotherapy (RT). This study aimed to determine RT related changes in CRF using Multidimensional Fatigue Inventory-20 (MFI-20) and fatigue-intensity rating (FIR) instruments and to identify the optimal thresholds of MFI-20 scores best reflective of fatigue intensity.

Materials/Methods: Eighty-eight women with stage 0-III C breast cancer who undergone surgery with or without neoadjuvant or adjuvant chemotherapy followed by RT were included in the study. Patients with a history of major psychiatric disorder within the past year were excluded. MFI-20 and FIR tools were used for CRF assessment at three different time points: within the week prior to RT (pre-RT), last week of RT (during RT), and six weeks after RT completion (post-RT). To evaluate the change in the measurements obtained at different time points, the Repeated Measurements Analysis was applied. To evaluate the correlations between measurements, Spearman Rank Correlation Coefficient was used. A receiver operator characteristic curve analysis was performed to identify the optimal thresholds of MFI-20 scores corresponding to FIR scores $\geq$4 (moderate to severe fatigue) and FIR scores $\geq$7 (severe fatigue).

Results: FIR (p time= 0.002) and MFI-20 (p time< 0.001) scores were significantly changed over time. At pre-RT, during RT and post-RT analysis, MFI-20 and FIR scores have correlations (r=0.525, r=0.791 and r=0.716, respectively, p<0.001) and the most correlated MFI-20 subscale with FIR was general fatigue (r= 0.754, r= 0.603 and r= 0.821, respectively, p< 0.001). Optimal cut points of the MFI-20 total scores corresponding to FIR scores $\geq$4 was 43.5 at all-time points and corresponding to FIR score $\geq$7 were 53.5, 52.5, and 60.5, respectively at pre-RT, during RT and post-RT analysis.

Conclusion: This study showed that MFI-20 and FIR scores are highly correlated measures of fatigue among breast cancer patients treated with radiation. A cut point score of MFI-20 could be suggested as $\geq$ 43.5 for moderate to severe fatigue distinction and a cut point score of $\geq$ 52.5 as likely to be severe fatigue.

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Late Toxicity and Cosmesis in Women Receiving Hypofractionated Radiotherapy after Breast-Conserving Therapy and Oncoplastic Reconstruction

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Purpose/Objective(s): Hypofractionated (HF) radiotherapy (RT) is now recommended for the majority of women undergoing breast conserving surgery (BCS). Oncoplastic reconstruction (OR) combines BCS with plastic surgery techniques to allow for oncologic resection while preserving cosmesis. Cosmesis and toxicity for OR with conventionally fractionated (CF) RT is well established. While HFRT is now standard of care,