7 Bilateral Breast Implants Do Not Compromise the Delivery of Postmastectomy Radiation

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Purpose/Objective(s): To determine if the presence of bilateral implants, in addition to other anatomic and treatment-related variables, affect coverage of the target volume and dose delivered to heart and lung in patients receiving postmastectomy radiation (PMRT).

Materials/Methods: From 2004 to 2009, 307 women with locally advanced breast cancer underwent all components of the following treatment at our institution: mastectomy and immediate tissue expander (TE) placement, +/- exchange for a permanent implant (PI) prior to radiation therapy. of these, 197 patients had ipsilateral PMRT (50 Gy) with 2 tangential beams + SCV field and were eligible for the study. Patients were stratified by implant number: 51% unilateral (100) and 49% bilateral (97). The following structures were retrospectively delineated by clinicians blinded to actual treated volumes: CTV (defined as implant + chest wall + axillary +/- internal mammary nodes (IMN)), heart (H) and ipsilateral lung (L). Chest wall was contoured according to guidelines specified in the RTOG Breast Cancer Contouring Atlas. The following dosimetric parameters were obtained from individual patient dose-volume-histogram data: CTV D95%>98%, L-V20 Gy>30% and H-V25 Gy>5%. Univariate (UVA) and multivariate (MVA) analyses were used to determine the association of variables with these parameters. Examined variables included implant type (PI vs. TE), implant volume (<500 vs. >500 cc), IMNs treated, lung volume (<1200 vs. >1200) and tangent posterior separation (<24 vs. ≥24 cm).

Results: The two groups were similar in the distribution of implant type and volume, IMN treatment, and irradiated side. 81% had PMRT to PI, 19% to TE. 45% received right and 55% left-sided PMRT. IMNs were treated in 12% of patients. In the entire cohort, 90% had CTV D95%>98%, 27% L-V20 Gy>30% and 16% H-V25 Gy>5%. No significant factors were associated with CTV D95%<98% on UVA. For L-V20 Gy>30%, IMN treatment was significant on UVA ($p < 0.0001$) and remained so on MVA ($p < 0.0001$), but implant number was not ($p = 0.54$). For H-V25 Gy>5%, the following factors were significant on MVA: IMN treatment ($p = 0.02$), posterior separation >24 cm ($p = 0.02$) and lung volume >1200 cc ($p = 0.01$).

Conclusions: Contrary to common belief, the presence of bilateral implants neither compromises coverage of the target volume nor increases dose to the heart and lungs in patients receiving PMRT. Similarly, irradiation of PIs do not result in inferior dosimetric outcomes compared to TEs. The most important variable predictive for high lung and heart doses in patients with immediate breast reconstruction with implants, whether unilateral or bilateral, is treatment of the IMNs.

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8 QRRO 2007 Practice Survey Documents Dramatic Technical Changes in How Radiotherapy for Operable Breast Cancer is Delivered

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Purpose/Objective(s): The American College of Radiology (ACR), Quality Research in Radiation Oncology (QRRO) has surveyed US radiation facilities to evaluate the quality of breast cancer treatment in 2007 and to document integration of newer radiation methods since its last survey in 1999.

Materials/Methods: QRRO used a two-staged stratified random sample to perform a national survey of the treatment of operable breast cancer patients in 2007: this yielded 412 cases from 42 randomly selected institutions. Eligibility for surveyed cases: receipt of radiotherapy in 2007 for operable invasive breast cancer (stages I, II, or IIIA) treated with breast conservative surgery (CS) or mastectomy (M).

Results: of the 412 cases 52% were pathologically stage I, 25% Stage IIA, 9% Stage IIB, and 12%, Stage IIIA. Surgical treatment was CS in most (84%) and M for 16%. Sentinel node biopsy was performed for 72.6%, axillary node dissection (AND) in 46%. One hundred twenty patients had positive axillary (AX) nodes. Nodal status was N0 in 62%, N0 IHC+ 8.5%, N-1 mic 4%, N-1 16%, N-2 9.3%. Radiation (RT) delivered was partial breast irradiation (PBI) in 4.8%, whole breast alone 68%, whole breast and nodes 10.7%, and postmastectomy 16.0%. of those receiving nodal RT (102) the areas treated were SCL and AX apex in 84.3%, SCL and full AX 13.7%, separate AX field 29.4%, and IMN 26.5%. Treatment planning was based on CT scan for 97%. After CS, isodose planning method was central plane 1.5%, multiple axial planes 2.1%, 3DCRT 79.2%, IMRT 16%; and after M, central plane 0%, multiple axial planes 7.5%, 3DCRT 82%, IMRT 10.5%. Following CS, contoured CT volumes were present for lumpectomy CTV/PTV for 96%, Breast 92%, Lung 94%, and Heart 59.6%; with DVH being present for lumpectomy in 70%, breast 20%, lung 78% and heart 51%. Following M, CT volumes were present for chestwall 95%, Lung 95.5%, and Heart 63.6% ; with DVH present for chestwall in 21%, Lung 79% and Heart 48.5%. MLC was the most common form of beam modifiers used followed by physical (30%) then dynamic wedges (19%). For the 27 PBI cases, 10 were brachytherapy, 7 -3DCRT; 100% had a CT based plan and 78% a DVH present. Skin toxicity was assessed in weekly notes for 89%, dry desquamation documented for 38%, moist 13%, and breast pain for 40%. The rate for any desquamation for 3DCRT methods was 52%, IMRT 52%, and all other 71% ($p = 0.125$).

Conclusions: ACR QRRO documents dramatic change in the technical delivery of RT for breast cancer as of 2007 compared to its prior survey in 1999, when CT planning was used < 25% and conformal methods were uncommon. 3DCRT/IMRT methods are now predominant, contoured CT volumes typically present, yet less documentation of DVH for plan analysis. Further survey details about breast cancer RT in 2007 and how it varied by facility type will be presented.
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9 Brain Metastases from Breast Cancer: Recursive Partitioning Analysis of Prognostic Factors Including Molecular Subtypes and Treatment

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