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Case Report

Radiation Therapy for Breast Cancer: Re-Treatment

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ABSTRACT

Radiation therapy is an established form of therapy for breast cancer, often applied in an adjuvant setting delivered in a post-operative environment to volumes including the breast, surgical cavity, and regional lymph nodes when appropriate. Historically, radiation therapy has not been considered an option for care when the patient recurs with the disease despite being treated with radiation therapy in the adjuvant setting. However, there can be clinical circumstances that require a different approach to the care including comprehensive re-treatment with radiation therapy in highly selected situations. This paper reviewed two patients with clinical circumstances requiring consideration for re-treatment with radiation therapy and were successfully re-treated with an acceptable outcome.

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Introduction

Radiation therapy is considered an important component for the care of patients with breast cancer. Radiation oncologists now play an important role in comprehensive breast clinics and see patients for care in both the definitive and palliative setting. Often, in the uncommon situation where a patient suffers local recurrence after radiation therapy, mastectomy is considered standard of care. As more patients survive their primary cancer, there are times alternative strategies need to be considered for patient management. With an increasing number of cancer survivors, the oncology community prepares to manage patients with less common clinical circumstances as society ages and medical comorbidities influence medical decisions. Although not standard of care, there are clinical circumstances that require consideration for re-treatment of patients with recurrent breast cancer with radiation therapy. Although re-treating a chest wall recurrence post-mastectomy to a limited volume is often achieved without demonstrable sequelae, re-treatment of intact breast patients is less common. In this paper, we present two patients re-treated with radiation therapy to intact breast.

Methods and Materials

Patient 1

Patient 1 is a 92-year-old female initially treated to the left breast with traditional radiation therapy for a T1C N0 ER/PR positive, HER 2 Neu negative breast cancer at the age of 70 in 2000. In 2019, the patient developed ductal carcinoma of the left breast treated with surgery, radiation therapy, and Tamoxifen. She received 4500 cGy to the left breast with a boost to the surgical cavity to 6100 cGy. In 2001 on Tamoxifen, she developed a T1C invasive carcinoma of the right breast treated with surgery and radiation therapy. Hormone therapy was adjusted and maintained for 5 years. In 2018 at the age of 89, she developed 2 lesions in the left breast measuring 1.9 cm and 1.5 cm, respectively, in the upper central and lateral aspect of the left breast. There was a close deep margin that could not be further excised without risk. Medical oncology colleagues were willing to consider HER 2 Neu directed therapy without taxane due to her age and medical comorbidities. After review of her previous treatment and evaluation of dermal/soft tissue integrity and vascularity, decision was made to move forward with radiation therapy to the breast with dose painting to the

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surgical cavity. 4500 cGy was delivered to the breast in 180 cGy fractions with 5000 cGy to both surgical cavities. An additional 1600 cGy was delivered to both cavities as there was a positive margin with a total dose of 6600 cGy to the primary site of concern. Treatment in 2018 was delivered with daily image guidance with IMRT for cardio-pulmonary avoidance.

Patient 2

Patient 2 is a 73-year-old female who was treated with post-operative radiation therapy for ductal carcinoma *in situ* of the upper outer quadrant of the left breast in 1998. She received 4500 cGy to the left breast and a 1600 cGy boost to the surgical cavity bring to total dose to 6100 cGy. In 2019, the patient developed a T2 (3.6 cm) grade 2 ductal carcinoma of the left breast in the upper inner left breast with a positive axillary lymph

node. The lesions were excised with a close margin, and the lymph node was removed both with limited anaesthesia as the patient had developed cardiac comorbidities, including ventricular arrhythmia which precluded more rigorous surgery/anaesthesia. The tumor was ER/PR positive, HER 2 Neu negative and the decision was made to move forward with comprehensive radiation therapy including full regional therapy, as the primary lesion was medial with a positive axillary node. There was no attempt to generate conformal avoidance of the previous site of DCIS due to the positive node. The patient received 4500 cGy in 180 cGy fractions to peripheral breast tissue and regional areas of concern. The surgical cavity received 5000 cGy in 200 cGy fractions with dose painting with an additional 1440 cGy to the surgical cavity as a boost to bring the total dose of the surgical cavity to 6440 cGy. Her current therapy was delivered with image guidance and intensity modulation.

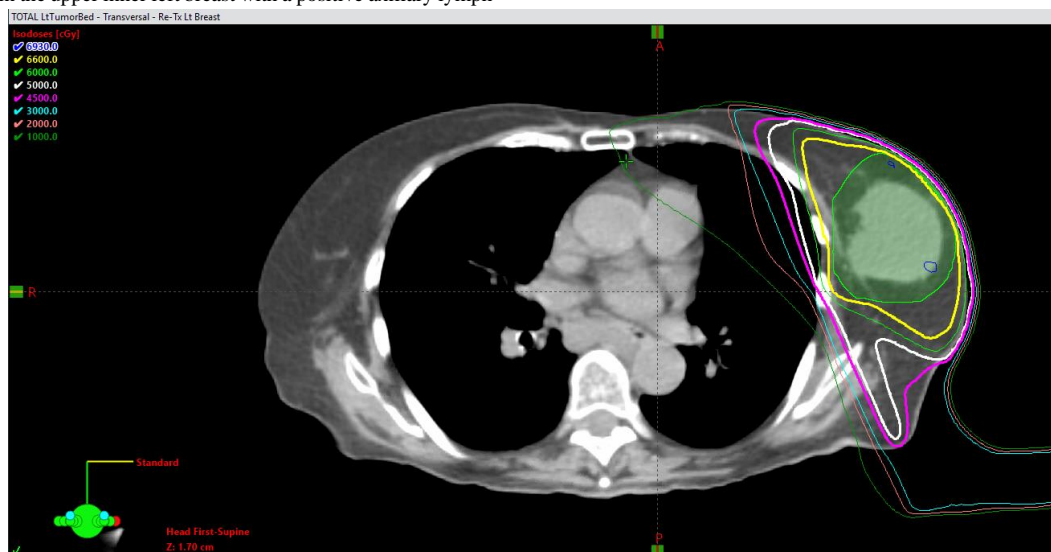


Figure 1: CT of patient 1 with dose painting treatment plan of the left breast.



Figure 2: CT of patient 2 with dose painting treatment plan of the left breast and axillary lymph node.

Results

Both patients remain well and tolerated re-treatment well without interruption. Skin erythema was modest in both patients and was treated

with conservative measures. Post therapy, both are managed with physical therapy and massage therapy to address both dermal and interstitial edema of soft tissues of the breast. Figure 1 represents the plan of patient 1 and (Figure 2) represents the plan of patient 2.

Discussion

Supplemental radiation therapy to previously treated tissues is historically not encouraged as standard of care, however moving forward, the question will become more frequently addressed as primary oncology management improves and patients survive their initial malignancy. As society ages, medical comorbidities will influence decisions on patient care and accordingly, secondary options may become more commonplace and medical history may preclude and override what is perceived as standard management [1-9]. Consideration of supplemental therapy to date has centered on accelerated fractionation and partial volume therapy. Both of these patients required supplemental care parallel to their initial therapy, which separates these patients from previous publications with a focus on re-treatment.

In consideration of supplemental radiation therapy for breast cancer care, the importance of soft tissue management cannot be overstated. The potential increase in both dermal and interstitial edema can negatively influence the outcome, especially if secondary infection occurs. Maintenance of physical and massage therapy has had a strong impact on the outcome and has minimized pain and discomfort that could be imposed by supplemental care. It is also interesting to report that both interstitial and dermal edema are reversible in part, however, due diligence and commitment to rehabilitation is important for a reasonable functional outcome. It is also crucial to optimize modern technology for patient care. In both situations, we were successful in decreasing areas of dose asymmetry with careful contouring and only contouring tissues thought to be at risk. In breast cancer care, the dose will be displayed both medial and lateral to what is contoured as you apply dose constraints to underlying tissue, including heart and lung. Therefore, it is important not to exaggerate contours beyond the confines of what the radiation oncologist intends to treat. Injury to tissues of limited self-renewal potential is of concern and optimizing therapy with intensity modulation is essential for patient care. In contouring breast tissue, it is important to contour breast tissue and not intentionally contouring to midline or the latissimus laterally as this will improve areas of dose asymmetry and decrease the volume of tissue receiving the increased dose.

In summary, re-treatment of breast cancer patients can be accomplished in selected patients who have limited options due to medical comorbidities. Attention to detail will optimize the applied radiation therapy planning strategy and post-therapy, physical therapy including tissue massage will optimize the outcome.

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