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Five day Accelerated Partial Breast Irradiation (APBI) using Stereotactic Body Irradiation Therapy (SBRT) in stage 0-II breast cancer: A preliminary report of 69 cases

Background: Randomized trials in Stage 0-II breast cancer with 10 year follow-up have proven that Accelerated Partial Breast Irradiation (APBI) given via radiation implant in 5 days is equivalent to Whole Breast Radiation Therapy (WBRT) in 6 weeks in regard to tumor local recurrence (LR). However, implants are invasive and complications, including infection and soft tissue necrosis requiring possible mastectomy have been significant. Recently APBI using non-invasive Intensity Modulated Radiation Therapy (IMRT) in 5 days was shown to be equivalent to WBRT in 6 weeks with 5 year follow-up, with respect to LR. APBI IMRT was superior in regard to side effects, and cosmesis.

Objectives: In the randomized clinical trial of APBI IMRT, the Clinical Target Volume (CTV) was defined by the injection of individual fiducial markers bordering the surgical cavity. We have used the simpler less labor intensive Biozorb fiducial system to localize the CTV for SBRT.

Materials and Methods: Between 2017 and 2019, 69 patients underwent SBRT targeted to Biozorb defined CTV. Eligible patients were older than age 40, had tumor sizes < 3 cm, negative surgical margins, and negative node dissections. SBRT dose was 30 Gy given in 5 fractions. The Planning Target Volume (PTV) ranged from 27 to 355 cc with a median of 80 cc. PTV = CTV + 1-2 cm.

Results: Follow-up ranged from 1-18 months with a median of 9 months. LR has been 0% (0/69). There were no skin reactions. Cosmetic results were rated excellent in 100% (69/69) of cases.

Conclusions: Non-invasive APBI with SBRT given over 5 days targeted to Biozorb has resulted in LR, complications, and cosmetic results which compare favorably to invasive APBI given via implant. At last follow-up, there have been no LR, skin reactions, or complications. Cosmesis has been excellent in 100% of patients.

Biography

Rufus Mark graduated from Yale University with Phi Beta Kappa and Summa Cum Laude honors. He went on to graduate from UCLA Medical School and then Residency in Radiation Oncology also at UCLA. He has extensive clinical experience in: High Dose Rate (HDR) Radiation Implants of the Prostate, Breast, Cervix, and Lung; Stereotactic Body Radiation Therapy (SBRT) of the Lung, Prostate, Breast and Liver; Stereotactic Radiosurgery (SRS) for Trigeminal Neuralgia, Parkinson's Disease, and multiple brain tumors; and Intensity Modulated Radiation Therapy (IMRT) of all sites. He has made more than 250 presentations of papers/abstracts at peer reviewed meetings including ASTRO, ESTRO, ACRO, ARS, ABS, and RSNA. He was unanimously voted the best lecturer and clinical instructor by the Baylor Scott and White Residents in 2017-2018. He is currently Medical Director of Radiation Oncology at the Baylor Scott and White Medical Center in Waxahachie TX.

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Quantification of immune cells in breast cancer microenvironment in relation to NPI and molecular subtyping

Background: Breast cancer is the most common malignancy in females across the globe. Since breast tumour microenvironment is bathed with a range of immune infiltrates, it is a potential, but largely unfathomed, candidate for immunotherapy. However, exact mechanistic links between immune infiltrates and breast carcinogenesis are largely unclear. Moreover, leukocyte densities at various stages of breast tumourigenesis are largely understudied. In this study, we have investigated immune cell densities of leukocytes in breast cancer and correlated these with known prognostic factors.

Objective: To investigate the microenvironment of breast cancer and enumerate the number and type of cells and analyze their correlation with NPI and molecular sub-typing.

Methodology: A total of 208 tissues were analyzed (104 cases and 104 controls). Breast cancer tissues were classified using conventional histological sub-typing, molecular sub-typing (using α-ER, α-PgR and α-Her-2 antibodies) and NPI scoring. Quantification of immune cells/mm2 was performed using H&E (for neutrophils), special stains (Giemsa for macrophages and Toluidine blue for mast cells), α-CD3 antibodies (T-lymphocytes) and α-CD20 antibodies (B-lymphocytes). Data were entered and analyzed using SPSS version 16. Correlation of immune cell densities with prognostic indices was investigated using t-test and Fisher's exact test. A p-value of <0.05 was considered as significant.

Results: Our data demonstrate significantly increased infiltration of T-lymphocytes (p-value= 1.43×10-26), B-lymphocytes (p-value= 2.13×10-17), neutrophils (p-value = 4.53×10-08) and mast cell (p-value=1.20×10-10), in breast cancer tissue compared to controls. Moreover we demonstrate a significant association (p-value = 0.009) between tumour infiltrating CD3 T-lymphocytes and molecular sub-types of breast cancer i.e. luminal; A, B, Her2 overexpression and triple negative/basal like. Importantly, we report increased T-lymphocytes infiltration in worst prognostic groups i.e. Triple negative and luminal B. Our data also demonstrates that there is no significant association (p-value = >0.05) between NPI scoring and breast cancer associated immune cells (T-lymphocytes, B-lymphocytes, neutrophils, macrophages and mast cells)

Conclusion: We reported the conventional breast tumour classification system, based primarily on grading and NPI scores, is used routinely and has several advantages, is considerably limited in terms of identifying patients' prognosis and therapeutic options/outcomes. The increased infiltration of neutrophils, mast cells, T and B lymphocytes in breast tumour microenvironment compared to the controls and specially increase in worst prognostic groups i.e. triple negative/basal like and luminal B tumours is suggestive of their crucial role in breast tumourigenesis.

Biography

Bushra Sikander has completed M.Phil. (Histopathology) from Dow University of Health & Sciences and MBBS from Dow Medical College (2004-2009). Currently she is working as Assistant Professor at the very same University. Her topic of interest are Breast Cancer, Cancer Immunology. For her work, she has been honored with many academic professional certificates.

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