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Radiation-induced lymphocyte apoptosis as a predictor of radiosensitivity in breast cancer patients

Kathleen Meehan[1] and Nigel Crompton[2]
[1]Khawarizmi International College, UAE
[2]Cornerstone University, USA

Despite awareness campaigns, breast cancer remains the most common cancer in women and it is estimated that 1.6 million new breast cancer cases are diagnosed each year and around 500,000 deaths are reported annually. Breast cancer is also the most prevalent malignancy found in Arab populations. The average age at presentation of breast cancer in Arab women is a decade earlier than in European and US individuals and the most prevalent presentation is invasive ductal carcinoma with lymph node involvement reported in more than 70% of cases. Due to the larger tumor, aggressive surgical and radiotherapy is often required. Although radiation is widely used as a curative agent, it also poses the risk of serious damage to normal healthy tissue. Radiotherapy should maintain a relationship where cancer cell death exceeds cancer cell proliferation, which would successfully eliminate the cancer. Although radiation toxicity risks for populations of patients are generally known, the determination of an individual's normal tissue radiosensitivity is rarely possible before treatment. Therefore, oncologists currently stratify the radiation therapy dose according to clinical predictors. The Leukocyte Apoptosis Assay (LAA) has been developed to predict a patient's radiosensitivity, A recent multicenter trial of over 500 breast cancer patients has confirmed that the LAA assay significantly predicts the risk of late effects of radiation and has validated the assay as a rapid screening test prior to radiotherapy. To include this assay in routine clinical radiation oncology practice in the UAE, radiosensitivity data in the Emirati population will need to be determined. This study will focus on gamma (low-LET) radiation as this is the modality used for treatment of breast cancer. Radiosensitivity will be measured using flow cytometry after *in vitro* exposure of patient blood samples to 0 Gy (control), 2Gy and 8Gy of gamma radiation. An assay that determines individual radiosensitivity will have numerous applications in the clinic and would ensure a significant reduction of acute responses and prediction of normal tissue toxicity, thereby increasing the efficacy of radiotherapy.

Biography

Kathleen Meehan has completed her Master's degree in Genetics of Tuberculosis from Cape Peninsula University of Technology, South Africa and a Doctoral degree in Radiobiology where she studied a population of bats exposed to radiation. She became Associate Professor of Biomedical Technology and established a research track record with awards, funding, publications and presentations at national and international conferences.

kathleen.meehan@khawarizmi.com

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