SMART ARMOR - Improving Outcomes for Radiotherapy Breast Cancer Patients

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One in eight women will develop breast cancer in their lifetime. Radiotherapy treatment is recommended after initial surgery to substantially reduce the risk of site specific relapse. However, during treatment, the contralateral breast usually receives unwanted radiation dose as a detrimental side effect. The association between low dose peripheral ionizing radiation and the risk for secondary cancer has attracted interest specifically for long-term surviving patients. Significant concerns regarding oncogenesis and second cancer induction have been realised. The unwanted skin and subcutaneous radiation dose delivered to the contralateral breast was discovered to be mainly caused by electron contamination. Measurements showed that for a typical hybrid tangential treatment, up to 17 % of maximum applied dose was delivered if no shielding is used. This level is significantly higher than the International Radiation Oncology Group (RTOG) recommended maximum of 6%. This research has studied and invented a method to substantially reduce dose levels using copper scale maille armor which can be accurately positioned over a patient's contralateral breast during treatment. The SMART ARMOR is flexible and easily conforms around typical breast shapes. It also forms irregular shaped edges to match those outlined by typical tangential treatment fields. SMART ARMOR is non-toxic and could potentially be used directly on patients for treatment. Anthropomorphic clinical test irradiations have shown that SMART ARMOR is capable of reducing contralateral breast skin and subcutaneous dose by up to 75%, providing substantial improvements in treatment delivery and future outcomes for breast cancer patients.

Awards Won:

First Award of $5,000