

AbstractID: 14079 Title: Measurement of dose to pacemakers and other implantable medical devices

Purpose: Radiotherapy can adversely impair the function of implantable devices such as pacemakers and implantable cardioverter-defibrillators. Tolerable dose limits are manufacturer dependent, complicating protocol standardization for radiotherapy clinics. This study evaluates the feasibility of using a simple patient dosimeter to estimate the dose received by subcutaneous implanted devices that fall inside of or adjacent to radiation therapy fields.

Method and Materials: The OneDose™ is a pre-calibrated *in-vivo* dosimeter typically used directly in radiation therapy fields. For this study, dosimeters were irradiated on the surface of a Virtual Water™ phantom using 6MV 10 x 10 fields at positions on the central axis to 15 cm off-axis. Half of the dosimeters were covered with bolus as recommended by the manufacturer. Dosimeter responses were compared to a pinpoint chamber directly underneath at d_{max} depth.

Results: Dosimeters gave good precision in all situations. Dosimeters in the treatment field and under bolus reported dose in good agreement to the ion chamber, while those adjacent to the field slightly under-reported dose. Further studies were performed using the ion chamber placed on the phantom surface under sections of Virtual Water machined to mimic the bolus shape. These studies confirmed that less dose is deposited at this position than at 1.5 cm depth below. Without bolus, in-field dosimeters reported low as expected, due to lack of buildup. Those adjacent to the field read high by ~2cGy, likely due to electron contamination reaching the sensor. More work is planned to better understand this result.

Conclusion: OneDose can estimate dose to shallow depths lateral of photon beam fields with a small correction factor. Dosimeters should be covered with bolus to provide buildup for any direct radiation they may encounter.

Conflict of Interest (only if applicable): One author is employed by Sixel Technologies.