

AbstractID: 3660 Title: Clinical Implementation of an in-vivo dosimetry system in conjunction with the RadCalc™ program

Purpose: To present the clinical implementation of an in-vivo dosimetry system in conjunction with the RadCalc™ monitor unit calculation program.

Method and Materials: A wireless PC-based in-vivo dosimetry system (rf-IVD, Sun Nuclear Corporation, Melbourne, FL) was acquired with n-type QED diodes for in-vivo dosimetry for photon and electron treatment verification. A series of acceptance tests to assess reliability of this system for in-vivo dosimetry applications were performed. These included post-irradiation signal stability, dose linearity and angular dependence. As a first step, the system was implemented on a Varian 600C 6 MV beam. Calibration measurements were performed in conjunction with an ADCL calibrated PTW N2333 Farmer-type ion chamber in a solid water phantom. The chamber was placed at d_{max} (1.5 cm) and the diode was placed at the surface of the phantom. Correction factors were determined for tray, wedges, field size and source to surface distance (SSD). The SSD correction factors were obtained for a range of distances (80-120 cm). Field size correction factors were obtained for a range of field sizes (4 x 4 - 30 x 30 cm²). The RadCalc™ software allows a simple interface to enter the collected data and computes the expected diode reading for each treatment field.

Results: Preliminary results indicate that the agreement between expected and measured readings is within $\pm 5\%$.

Conclusion: In-vivo dosimetry system based on surface measurements using diodes can be effectively implemented in conjunction with the RadCalc™ program, facilitating implementation of this quality assurance tool. Specific action levels have been set for agreement between planned dose and dose determined using diodes for different treatment sites. Future work will include commissioning of the in-vivo dosimetry system in conjunction with RadCalc™ for IMRT and electron beam treatment verification.