

AbstractID: 9230 Title: Xoft Axxent Electronic Brachytherapy System: A Clinical Implimentation Experience

Purpose: To clinically implement Xoft's Axxent electronic brachytherapy (EBT) system for partial breast irradiation and develop quality assurance standards.

Method and Materials: A Xoft Axxent controller unit was tested with a single EBT source tube. The source kVp was measured using diagnostic radiology equipment: *Rad Cal 90-10* kVp Meter and *Barracuda MPD*. The dose contribution from tube warm-up and the linearity of delivered dose were measured with Standard Imaging's *HDR 1000 Plus* well chamber and *MAX 4000* electrometer. The controller's timer reproducibility and accuracy were tested. An anthropomorphic breast phantom of in-house design simulated a clinical environment during radiation exposure surveys. Exposure measurements were collected using a *Rad Cal 90-10* pancake and *Victoreen 450 B* ionization chambers for various positions and shielding conditions. System interlocks and mechanical accuracy were also tested.

Results: Our tests demonstrated a standard deviation of 1.32% in linearity and 1.59% in constancy of measured Air Kerma Strength. The average difference between measured and expected kVp was 2.18%. The average dose resulting from source warm-up was found to be equivalent to 2.65 seconds of treatment time. Exposure levels ranged from 23 R/h (at the unshielded phantom's surface) to less than 0.3 mR/h (at 1 meter from the source with 1.5 mm Pb shielding). The timer was found to be both accurate and reproducible. Additional testing of interlocks successfully reproduced results observed during acceptance testing.

Conclusion: Our commissioning method accurately characterizes the typical performance of a Xoft Axxent EBT system. A policy of using mobile shielding equivalent to 1.5 mm Pb was established for our clinical procedures. While the radiation source is patient specific, the performance of the controller for a given source should be characterized as a necessary part of annual quality assurance.