AbstractID: 7581 Title: Stability of the Xoft Axxent® X-ray Source during Simulated APBI

Purpose: To evaluate the x-ray output stability of the Xoft Axxent® Electronic Brachytherapy System while delivering fractionated doses to a phantom. **Method and Materials:** A balloon applicator was inflated in a 4.4 cm diameter spherical simulated lumpectomy cavity within an acrylic "breast" on a supine female full-body phantom. Radiation treatments for 5 "patients" were delivered in 10 fractions BID for 5 days using one x-ray source per patient. Per the usual procedure, the air kerma strength for each source was measured prior to each fraction with a calibrated well chamber then dose delivery time was automatically adjusted to account for this source strength. During each fraction, exposure rate was monitored using a calibrated Victoreen Model 451B ion chamber survey meter positioned approximately 10 cm below the phantom. Readings were downloaded at 1 second intervals to a spreadsheet. These data were then analyzed for stability and reproducibility. **Results:** Fifty fractions were delivered during the five days of simulated treatment. Average treatment time for each fraction was 11 minutes so each source had cumulative operating time of approximately 120 minutes including turn-on and calibration time. Exposure rate measurements increased with decreased source-to-meter distance and with less intervening absorbing material. Exposure rates ranged from 0.1 to 0.55 R/h. The standard deviations from average exposure rates varied from 0.5% to 2.9% with an average over 50 fractions of 0.9%. **Conclusions:** The Axxent® Electronic Brachytherapy System performed well in five simulated APBI treatments. X-ray source output and system stability were demonstrated to be within 3% for all treatment fractions.

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