

AbstractID: 7093 Title: Acceptance testing, commissioning, and initial clinical experience with a commercial electronic brachytherapy system

**Purpose:**

The Axxent<sup>®</sup> Electronic Brachytherapy system (Xoft Inc.) employs a miniaturized high-dose-rate x-ray source located within an x-ray catheter. The 50 kV disposable x-ray source is used in conjunction with a balloon applicator to deliver partial breast irradiation to breast cancer patients following lumpectomy. We report on the acceptance, commissioning, and initial clinical experience with this system.

**Method and Materials:**

In addition to the manufacturer's prescribed acceptance tests, a study was performed to address concerns about the potential electrical leakage from the encapsulated tube to the surrounding patient tissues. A system was designed that simulates human body equivalent impedance to measure the electrical leakage. Commissioning was performed in the Plato treatment planning system (Nucletron) following the recommendations of TG-43. A study has been initiated comparing the dosimetric results for the Axxent<sup>®</sup> System (x-ray tube) with the MammoSite<sup>®</sup> Radiation Therapy System (Ir-192 HDR source). The study will compare target coverage and normal tissue sparing and determine the required skin bridge for each of these technologies. Our first clinical cases are expected in April 2007 and will involve ten fractions of 3.4Gy delivered twice daily over five days. A total dose of 34Gy will be prescribed 1cm from the surface of the balloon applicator.

**Results:**

Acceptance testing and commissioning of the electronic brachytherapy system has been completed. Leakage measurements were performed using a meter consisting of a commercial line powered digital voltmeter, modified with the resistor-capacitor network suggested by the IEC60601-1 electrical safety standard. The results showed no measurable leakage currents above the x-ray ambient noise levels. Initial results in a retrospective comparison demonstrated that it may be possible to improve skin sparing with Xoft through optimized dwell times at multiple dwell positions.

**Conclusion:**

An electronic brachytherapy system has been implemented in our clinic. Initial clinical results will be reported.