

AbstractID: 8756 Title: X-ray transmission of vaginal cylinders for use with the Axxent[®] Electronic Brachytherapy System

Purpose: To characterize the x-ray transmission of vaginal cylinders designed to be compatible with the energy spectrum of an Axxent[®] Model S700 X-ray Source and evaluate the impact of environmental challenges on x-ray transmission stability. **Materials and Methods:** Vaginal cylinders are commonly used for irradiation of the vaginal wall following hysterectomy for treatment of early stage endometrial cancer. Typical vaginal cylinders for use with Ir-192 sources are fabricated from materials which have poor transmission characteristics for low energy x-rays such as those emitted by the Axxent Model S700 X-ray Source. New applicators with diameters of 20, 25, 30 and 35 mm have been designed using common medical-grade polymers to have 94±5% x-ray transmission with respect to water to be equivalent to the Axxent Breast Balloon Applicators. Typical performance tests of these polymers have not included the types of environmental challenges associated with normal vaginal cylinder use so a test protocol was performed to simulate 70 cycles of patient treatment. Each cycle consisted of x-ray transmission measurement then x-ray irradiation using a representative treatment plan for the given cylinder diameter, exposure to condom contact with lubricating gel followed by cleaning in Cidex OPA and steam sterilization in an autoclave. **Results:** X-ray transmission with respect to water was measured for a set of 20 applicators (five of each size) after completion of every 10 treatment cycles. The average initial transmission of the cylinders was 94.6% with 0.6% SD and after environmental exposure was 94.9% with 0.6% SD. Maximum differences from the average were +1.9% and -2.2%. **Conclusions:** X-ray transmission of a set of vaginal cylinders for use with the Axxent Electronic Brachytherapy System has been characterized during 70 cycles of simulated patient treatment and found to be constant to within ± 2%. **Conflict of Interest:** Research sponsored by Xoft, Inc.