AbstractID: 13882 Title: Clinical Implementation of Electronic Brachytherapy Skin Applicator in IORT Setting

Purpose: Commissioning of a skin applicator for a 50kVp electronic source for an expeditious IORT treatment **Method and Materials:** A single applicator cone (50mm diameter, 31.4mm SSD) was used with a 50kVp source to produce a circular field. The field was collimated using disposable cutouts (0.5mm lead equivalent) between 1cm x 1cm and 1cm x 4.9cm. Treatment margins were derived to ensure a 5% dose deviation, using GAFChromic film. Cutout factors, chamber stem effect, and the effect of imperfect Cone-Skin contact were investigated using a soft x-ray chamber. **Results:** Without the cutout, the treatment margin was found to be 0.9mm. Adding cutouts, the margin was 0.4mm for a 10mm field, and 2.1mm for a 45mm field. The stem effect was as high as 0.8% for elongated cutouts. A 10% dose rate decrease was measured 1mm away from the end cap. The cutout factors range was 3.7%. Physical abutment of two fields on the skin could increase dose up to 44%, while a 1mm gap/overlap caused -60%/+60% dose variations, respectively. **Conclusion:** In an IORT setting, it is necessary to provide proper cutout and treatment time as quickly as possible. Based on our measurements, a cutout can be produced on the fly in the OR by conservatively adding 2mm around the measured scar. It is not necessary to measure individual cutout factors, as the dose delivered using an averaged cutout factor should be within 5% of the measured value. Given the 10%/mm dose rate drop away from the applicator, it is imperative to position the lesion at a known and stable treatment position for maintaining contact between cutout and skin. When treating areas greater than 5cm, the overlap region could experience ~60% dose variations. Study partially supported by a Xoft, Inc. grant.