

AbstractID: 4350 Title: HDR Endorectal Brachytherapy: Quality Assurance

**Purpose:** Fractionated high-dose rate endorectal brachytherapy has been developed in our institution as a pre-operative down-staging modality. Since the treatment is fractionated (26 Gy/4) it is essential to reproduce the treatment planning dose distribution on a daily basis. In this paper we present the Quality Assurance (QA) steps developed to ensure patient based daily dose reproducibility.

**Method and Materials:** The applicator used has a cylindrical symmetry. In addition to the applicator auto-radiographs used for the catheter physical length determination, there are two additional steps that have to be performed in order to reproduce a treatment planning dose distribution on a daily basis. Another correction has to be performed on a daily basis for rotation of the catheter channels. For this purpose, we use uniquely coded “dummy” source inserts that show themselves on a daily radiograph. The applicator is rotated and radiograph repeated until perfect alignment is achieved.

**Results:** Since the applicator might not be placed to the same depth inside the rectal lumen, there is a shift along the catheter axis that has to be performed on a daily basis. The amount of shift is determined by comparison of a daily radiograph and treatment planning DRR.

**Conclusions:** Reproduction of the treatment planning dose distribution on a daily basis is crucial for the success of the fractionated 3D based brachytherapy treatments. Due to the cylindrical symmetry, two types of adjustments are necessary: applicator rotation and dose distribution shift along the applicator axis.