

AbstractID: 13051 Title: Quality Assurance for small SRS photon field using LUCY Phantom on BrainLab iplan

Purpose: To use a high precision LUCY phantom designed specifically for stereotactic radiosurgery to perform comprehensive QA and determine which dosimeter to use for different cone sizes with the BrainLAB iPlan TPS. **Methods and Materials:** An image set was acquired in a Philips Big Bore CT simulator for the whole phantom and transferred to the BrainLAB iPlan TPS for contouring and planning. An SRS cone treatment plan was generated with the LUCY phantom as a patient. A treatment plan for the “patient” was generated using the same clinical approach as used for actual SRS patients. The LUCY patient plan was loaded and mapped onto the LUCY QA phantom with the iPlan Phantom Mapping software to create a QA plan. A PinPoint ionization chamber (0.016cm^3) and Gafchromic EDR2 film were employed for dose measurement. Film calibration was performed running a “step-wedge” calibration procedure. Films were stored overnight to allow for post exposure changes. An optical densitometer was used to read OD.

Results and Discussion: The range of percentage differences between calculated and measured doses for the ion chamber was 3.83% to 0.2% for cone sizes of 30mm down to 10mm. For the two smallest cones, 7.5 and 5.0 mm, the percentage difference was beyond clinical tolerance ($\geq 5\%$). All film dosimetry results were within clinical tolerance.

Discussion and Conclusion: The DQA for cone size of 30mm down to 10mm were verified with LUCY phantom using both the PinPoint ion chamber and EBT2 film. For cone sizes smaller than 10mm, the PinPoint ion chamber did not measure dose accurately because the ion chamber dimensions were of the same magnitude as the field size. Gafchromic EBT2 film was able to measure the dose for all cone sizes.