AbstractID: 11608 Title: Kilovoltage Stereotactic Radiosurgery for Age Related Macula Degeneration: Assessment of Patient Effective Dose and Patient Specific Tissue Doses

Purpose: Age-related macula degeneration (AMD) is a leading cause of vision loss in the United States. Radiation therapy was initially explored as a treatment option in the 1990's, but has since been abandoned in favor of intraocular drug injections. Interest continues for *stereotactic radiosurgery (SRS)*, an option that provides a noninvasive treatment for the wet form of AMD.
Method and Materials: Two adult heads, male and female, were computationally modeled with Rhinoceros 4.0 using CT slice segmentation scaled to ICRP Publication 89 reference values. The head phantoms were voxelized and a three-beam photon treatment (100 kVp) was modeled using the MCNPX radiation transport code to evaluate tissue dose and effective dose. Treatment was also simulated using the reference heads with changeable optic nerve positions based on individual patient variability seen in a head CT scan review.
Results: A cumulative dose of 24 Gy to the macula (8 Gy per beam) yielded an effective dose of 0.28 mSv. The maximum doses to the most extreme patient specific optic nerve positions were evaluated using Dose Volume Histograms and found to be below the thresholds for serious complications, as were other reference tissues.
Conclusion: The results of this study show that SRS is a safe option considering effective dose and tissue toxicity for a reference individual. Patient specific models will be created from the CT review and treatment will be modeled using MCNPX to establish certainty that this is a safe treatment option for all individuals considering other patient specific variations in anatomy.

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