

AbstractID: 11368 Title: Sensitivity of a novel external x-ray treatment for age-related macular degeneration to variations in the position of the eye

Purpose: Age-related macular degeneration (AMD) is the leading cause of blindness of the elderly in the United States. A novel external beam treatment has been developed for the treatment of AMD that delivers a 16-Gy prescribed dose to the fovea (clinical target volume, CTV) using three overlapping low-energy x-ray fields while adequately sparing normal tissues in the eye and brain. The purpose of this study was to test the sensitivity of the successful delivery of the prescribed dose to the CTV and of the sparing of normal tissues to plausible variations in the position of the eye. **Method and Materials:** In the standard case, the axial length of the eye is 24 mm and the gaze is straight ahead. Using Monte Carlo simulations, we examined the overlap of the three beams on the posterior surface of concentric spheres with radii from 10 mm to 14 mm. In addition, we calculated absorbed dose in the CTV and structures at risk while varying varied the gaze angle by $\pm 5^\circ$ vertically and laterally and the displacement of the eye ± 1 mm in all orthogonal directions. **Results:** The three fields did not diverge for all radii tested. For variations in the position of the eye, the dose to the CTV was stable (<6% fluctuation), the maximum dose to the sclera was <20 Gy, the maximum dose to the optic disc was <0.7 Gy, and the mean doses to the optic nerve, lens, and cornea were <0.3 Gy. **Conclusion:** The results of this study provide strong evidence that variations in the position of the eye will not hinder the successful delivery of the prescribed dose to the CTV and the sparing of critical structures for this stereotactic radiosurgical treatment of AMD. **Conflict of Interest:** Research sponsored in part by Oraya Therapeutics, Inc.