

AbstractID: 1384 Title: Comparing a Novel Approach for Treating Choroidal Melanoma with Low-Energy Intensity-Modulated X-rays Against I-125 Eye Plaques

A small x-ray unit has been developed with the mechanical ability to move in three-dimensions to direct a small beam of intensity-modulated x-rays to a tumor in an eye phantom. This x-ray system will be used to reduce the dose delivered to the optic nerve region as compared to the current Collaborative Ocular Melanoma Study (COMS) plaque system using I-125 seeds. In many cases with the eye-plaque system, the optic nerve is directly irradiated by one or more seeds in the plaque. Direct irradiation of the optic nerve leads to the gradual loss of vision. This x-ray system is controlled such that the primary beam is never directed at the optic nerve region, and only scattered radiation can reach the optic nerve region. The system operates in the same fashion as megavoltage IMRT. The unit operates at 90 kVp to yield the same approximate effective photon energy as used in the COMS eye-plaque method. The x-ray system is being tested on phantoms simulating the human eye and face, with regions simulating tumors in the eye. Doses are being measured for simulated tumor and optic nerve regions in eye phantoms for both the x-ray system and the COMS eye-plaque method. A Monte Carlo program has been developed to compare doses between the COMS eye-plaque method and the x-ray system for various size tumors and tumor locations. Results show a dose reduction to the optic nerve region ranging from 5-50% depending upon the tumor location and size.