AbstractID: 9186 Title: 103Pd Ophthalmic Plaque Dose Rate Comparison of a COMS Dose Prescription Calculation and Explicit Monte Carlo Model

The dose rate calculated using a Monte Carlo model is compared to that calculated using a COMS (Collaborative Ocular Melanoma Study) treatment plan for ^{103}Pd seeds arranged in an ophthalmic plaque. Ophthalmic plaques embedded with ^{103}Pd seeds (TheraSeed® Model 200) were used to treat Age-related Macular Degeneration (ARMD)[1]. A high dose-rate ^{103}Pd applicator has been designed for potential use in the treatment of ARMD. To compare the dose delivered as calculated in the original study to the dose delivered by a different applicator, a detailed Monte Carlo model using MCNP4C was constructed for a specific treatment plan. The initial treatment planning was performed at the hospital using a COMS dose prescription calculation based on a point source approximation for each seed, using TG-43 dosimetric parameters and ignoring dose anisotropy and the attenuation effects of the gold shell and acrylic. The Monte Carlo model includes the gold plaque and acrylic insert embedded with five TheraSeed® Model 200 ^{103}Pd seeds. The dose comparison is made for a location at the center of the plaque 2-mm from the inner sclera surface. The COMS dose calculation has an approximately 13% variation from the dose rate calculated using a detailed Monte Carlo model. Modeling was also used to determine the net effects of the acrylic and gold plaque. The effects from these materials produced an approximately 5% variation in dose rate for this particular treatment plan. The authors are employees or consultants of Theragenics Corporation®..

[1] Emery and Szechter, Med Phys. 25:1491-1492, (1998).