AbstractID: 14092 Title: Effect of Mobile Seed Components on Dosimetry of Theragenic Model 200 Pd-103 seed source

Purpose: To investigate the influence of mobile internal source components of Theragenic Model 200 seed source on its dose rate distribution and TG-43 parameters. **Method and Materials :** By using BrachyDose Monte Carlo code, the geometry of Theragenic Model 200 seed source was modeled in five different configurations. In each configuration, internal components are located at different positions in order to take into account the effect of gravitational force on the seed geometry. Physical dimensions of seed components are identical in all seed models. Air kerma strenghts and dose per unit activitiy were determined separately for each seed design on a plane which is in a direction where dose variations are expected to be maximum. Calculated data were used to produce TG-43 parameters. **Results :** Comparison of TG-43 dosimetric parameters for each seed configuation showed that dose rate constant varies up to 11% due to the position of internal source elements. For radial dose fuction, there are significant differences increasing up to 40% at distances $0.1 \leq r < 0.5$ cm and for radial distances $r > 0.5$ discrepancies are negligible (i.e. about 1-2%). Anisotropy functions were calculated at radial distances of 0.25 , 0.5, 1.0 and 5.0 cm. It is observed that anisotropy function changes adruptly (up to 40%) for polar angels $\theta < 15^{o}$ and $\theta > 165^{o}$ at all radial distances. Differences are less than 5% for all other angles and decreases with increasing radial distance. **Conclusions:** The geometry variation effects investigated in this study are ignored in the TG-43 formalism. This work indicates that these effects may change absorbed dose values significantly at some points around the Theragenic Model 200 seed source.

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