AbstractID: 13332 Title: Dosimetry for an Ophthalmic Applicator of P-32

Purpose: A ^{90}Sr/Y applicator has been used as a β-source for postoperative irradiation after pterygium excision. As an alternative to ^{90}Sr/Y irradiation, we proposed treatments with ^{32}P. This study aims to provide the dosimetry for this new applicator**. Method and Materials:** In order to optimize the design and materials of ^{32}P ophthalmic applicators, Monte Carlo simulations were performed. The absorbed dose at the surface of a sealed beta source is often measured by using an extrapolation ionization chamber. Radiochromic film (RCF) was used to measure depth dose distributions and dose profiles at various depths. A micro-MOSFET detector was used for depth dose measurements. **Results:** The absorbed dose rates to the reference point were 0.238 ± 0.012 cGy/s for an extrapolation ionization chamber, 0.280 ± 0.001 cGy/s for radiochromic films, and 0.257 ± 0.020 cGy/s for MOSFET. The axial depth dose rate was reduced into approximately 1/10 as ^{32}P betas penetrate every 2 mm depth. Measured data sets in depths of 1 mm to 3.5 mm agreed with Monte Carlo data. Due to non-uniform absorption of ^{32}P into an absorbent disk, the dose at the center of transaxial plane were 2%-4% less than the peak dose around the periphery. We confirmed no leakage of ^{32}P activities and negligible exposure rate around the hand grip of the applicator. **Conclusions:** The ^{32}P applicator can deliver uniform therapeutic doses to the surface of the conjunctiva, while sparing the lens better than ^{90}Sr/Y applicators. The doses at any points from the ^{32}P applicator can be calculated by using these measured data sets. The safety of ^{32}P applicator was confirmed. However, prior to the clinical application of every new applicator, safety, dose uniformity, and absorbed dose rate at the reference point should be carefully evaluated by the method developed in this study.