AbstractID: 10421 Title: Optimized dose distribution of Gammamed plus vaginal cylinders

Purpose: The aim of this study was to optimize dose distribution for Gammamed plus vaginal cylinders and the placement of dose optimization points was evaluated for its effect on optimized dose distributions.

Materials and methods: The HDR source travels through the central tandem, distal to proximal, stopping at dwell positions defined by step sizes. Two different dose optimization point models were used in this study namely, non apex (dose optimization points only on periphery) and apex (dose optimization points on periphery and along the curvature including the apex points). Thirteen dwell positions were used for the HDR dosimetry to obtain a 6 cm active length. Diameters of vaginal cylinders varied from 2.0 to 4.0 cm. Iterative optimization routine was utilized for all optimizations. The effects of various optimization routines (iterative, geometric, equal times) was studied for the 3.0 cm diameter vaginal cylinder. The effect of source travel step size on the optimized dose distributions for vaginal cylinders was also evaluated.

Results: For both non-apex and apex models of vaginal cylinders, doses for apex point and three dome points were higher for apex model compared to non-apex model. Mean doses to the optimization points for both the cylinder models and all the cylinder diameters were 6 Gy matching with the prescription dose of 6.00 Gy. Iterative optimization routine resulted in the highest dose to apex point and dome points. The mean dose for optimization point was 6.01 Gy for iterative optimization and was much higher than 5.74 Gy for geometric and equal times routines.

Conclusion: In our study best doses were obtained for the optimization points for 1 cm step size and iterative optimization routine for the apex model vaginal cylinder. Selection of dose optimization points for the derivation of optimized dose distributions for vaginal cylinders affects the dose distributions.