

In our experience, conformal prostatic brachytherapy results in an acute edematous response of 15-35% swelling which resolves with a half life of 1-2 weeks. By analyzing the dosimetry of an idealized edematous implant we obtained parameters useful in estimating the improvement in coverage of the prostate by the minimal peripheral dose (mPD) when the CT based post planning is performed shortly after the implant procedure. An implant for a prostate archetype was planned using modified uniform loading to give 99.7% coverage of the planning volume at the mPD with both I-125 and Pd-103 seeds. This plan was artificially expanded to volumes 12%, 24%, and 36% of the original to simulate edema, with the expansion 1.8 times as great in the superior-inferior direction as in the transverse direction, similar to what we have observed in actual implants. For edema resolution half lives of 5, 10, 15, or 20 days, dose volume histograms (DVH's) for the various expanded volumes were weighted for the appropriate fraction of the integrated isotope dose curve and combined into a summary DVH. With I-125 implants, in the worst case of 36% volume increase and a 20 day half life for resolution, the combined (DVH) of the prostate volume resulted in 96% coverage at the mPD. Due to the 17d half life of Pd-103 and its more rapid attenuation with distance, however, Pd-103 implants experiencing extensive edema and slow resolution may achieve only 76% coverage at the mPD.