

Use of Nomogram vs. Pre-planning to Determine Seed Activities for Prostate Seed Implants

This study was undertaken to assess the use of a nomogram for isotope activity used for transperineal interstitial permanent brachytherapy (TPIPB). One thousand patients have been treated with TPIPB using a pre-implant volume study and the Memorial nomogram to determine the total activity and number of seeds required for each patient. TPIPB was performed using peripherally weighted seed placement with an interstitial gun. Six hundred post implant CT scans were evaluated. Calculations were made to assess the prostate volume receiving 100% of the prescribed dose (V100), the dose covering 90% of the volume (D90), the matched peripheral dose and the patient volume encompassed by 100% of the prescribed dose (Vg100). For Pd-103 implants the MPD is 152% (132-182%) (mean and range), Vg100 156% (112-181%), V100 92% (82-97%) and D90 108% (81-127%). For I-125 implants they are, 129% (121-136%), 147% (104-189%), 90% (77-99%) and 107% (83-137%). To obtain a desired implant with a Vg100 and MPD of 100% each, a reduction in the total activity calculated by the nomogram, of 50% (Pd-103) and 30% (I-125), is required. Manual pre-planning to obtain desired activities is performed on two patients with both Pd-103 and I-125, an average reduction of activities by 29% were achieved compared to the nomogram. In conclusion, use of Memorial nomogram for I-125 and Pd-103 over-estimates the total activity required, individualized pre-planning may obviate this over-estimation. Clinical data, mathematical analysis and computer modeling will be presented.