

AbstractID: 1226 Title: An Evaluation of the Optimum Number of Fields, Beamlets and Intensity Levels in Intensity Modulated Radiation Therapy (IMRT) of Prostate Cancer

For intensity modulated radiation therapy (IMRT), the number of fields, segments per field and number of intensity levels used are related to the overall treatment time. These parameters are normally user-selected at the time of treatment planning. This study investigated the optimization of these parameters to produce adequate planning target volume (PTV) coverage and organ at risk (OAR) sparing while concomitantly minimizing the treatment time. Using Helax-TMS (version 6.1) inverse planning software, treatment plans were generated for a supine patient with a 50cm³ prostate volume and normal bladder and rectum geometry. The PTV included a uniform 1cm margin laterally and anteriorly from the prostate and a 0.5cm margin posteriorly. Treatment plans were generated using combinations of five, seven and nine fields, five, seven, ten and fifteen segments per field and five, seven, ten and fifteen intensity levels. All fields were equispaced and parallel opposed fields were not allowed. The dose-volume histogram (DVH) constraints used were, PTV (95% dose to 100% volume, 105% dose <5% volume and 110% <1% volume), rectum (50% dose <30% volume and 80% dose <20% volume), bladder (80% dose <20% volume) and femoral heads (50% dose <50% volume). All IMRT plans were compared to a forward planned six field plan using two lateral fields, two anterior oblique fields and two posterior oblique fields. DVH constraints for the PTV can be met in nearly all possible combinations. However for minimum OAR DVH, a seven field combination with more than seven segments and intensity levels is required.