

AbstractID: 11474 Title: Treatment plan comparison generated by volumetric arc modulation with helical tomotherapy and conventional IMRT for prostate cancer patients.

Purpose: To compare the treatment plans generated by volumetric arc modulation with helical tomotherapy and conventional IMRT for prostate cancer patients.

Method and Materials: This study was performed on 5 prostate patients originally planned using Tomotherapy Hi-Art™ treatment planning system (TPS). To make the study comprehensive and to evaluate all the degrees of freedom available with volumetric modulation arc therapy (VMAT), six plans were generated other than the tomotherapy plan. These were conventional 7 fields IMRT, full and partial arc, each with constant and variable dose rate and full arc with constant dose rate having gantry spacing of 4 degrees. The VMAT and IMRT plans were developed using Philips Medical Systems Pinnacle³ TPS. The IMRT objectives were selected on the basis of standard protocols followed in the clinic. PTV coverage was prioritized so that the organs at risk (OAR) sparing can be compared uniformly.

Results: The study shows that for prostate cases, VMAT can generate plans equivalent to conventional IMRT and Tomotherapy plans. However, conventional IMRT outperforms the rotational TPS when it comes to OAR sparing. VMAT treatment time typically takes about 1/5th the treatment time of a regular IMRT or Tomotherapy plan with equivalent target coverage and organ sparing. While comparing the plans within VMAT, better rectal wall sparing was achieved with either partial arc (with both constant and variable dose rate) or full arc with variable dose rate compared to full arc with constant dose rate.

Conclusion: In this study we have found that in prostate, we can achieve plans comparable to Tomotherapy plans. Total treatment time is very crucial for Radiotherapy due to issues related to interfraction and intrafraction motion. Treatment time taken for VMAT is very less when compared to conventional IMRT and tomotherapy treatment times with same PTV coverage and comparable amount for OAR sparing.