

AbstractID: 13655 Title: Population Dose Volume Histograms: An Institutional Analysis of an Uniform Sample of IMRT Plans for Prostate Treatments

Purpose: Evaluate an Institutional sample of prostate IMRT results, constructing a Population based Dose Volume Histogram (DVHp) to compare with literature and use it as an internal benchmark for plan approval and quality assurance. Finally, seek for relations between dosimetric plan results with anatomic variables to create predictive parameters. **Method and Materials:** Retrospective analysis of 40 patients that received the following treatment: IMRT with 5 beams (60Gy to the prostate and 54Gy to the seminal vesicles SV) + 3DCRT boost with 3 beams (20Gy to the prostate), 10mm isotropical PTV margins. Technical details: Step-and-Shoot, 18MV beam energy, Siemens KonRad treatment planning system, 10mm MLC leaf width. Structures analyzed: bladder, rectum, femur heads, penile bulb, PTV80Gy (prostate+ margin), PTV54Gy (prostate +SV +margin). Main DVH points for each structure were used to build the DVHp. **Results:** For Bladder, the V80Gy was 11±7%. The V75Gy, V70Gy, V65Gy, were, respectively, 17±11%, 21±14%, 23±16% for bladder and 13±3%, 18±4%, 22±5% for rectum and its V60Gy was 28±6%. The Dmax, was 86±1Gy for bladder, 85±1Gy for rectum, and 50±4Gy for femur. For penile bulb, the average dose was 44±9Gy. For targets, the D95%, Average Dose, Dmin and Dmax were, respectively 79.4±0.6Gy, 83.9±0.8Gy, 71±4Gy and 88±1Gy for the PTV80Gy and 64±6Gy, 80±2Gy, 53±5Gy and 88±1Gy for PTV54Gy (which includes the PTV80Gy). The rectum doses have weak correlation with its volume ($r=-0.29\pm0.02$), but a moderate to strong correlation with its PTV overlap ($r=0.71\pm0.05$) – more than 20% Rectum-PTV overlap means 66% chance of violating the V75Gy<15% constraint. The bladder doses have a moderate correlation with its volume ($r=-0.62\pm0.04$) and a strong correlation with its PTV overlap ($r=0.80\pm0.01$). **Conclusion:** In general, the DVHp meets literature recommendations regarding prescription and dose limits. This analysis allows evaluating future plans based on Institutional acceptance criteria, more detailed and restrictive than literature.