

AbstractID: 8380 Title: VMAT compared to 3D-RT and Step and Shoot IMRT for Anal Cancer Pelvis Treatment

Introduction:

The shielding of organs at risk (OAR) like testis, small bowel and bladder increases the complexity of a treatment for anal cancer. The new rotation therapy volumetric intensity modulated arc therapy (VMAT) may have the potential to reduce the treatment time while producing a comparable dose distribution as the intensity modulated radiation therapy (IMRT).

Materials and Methods:

CT datasets of 8 patients with anal cancer from our department formed the basis of this study. The routinely applied refined 3D-Treatment Plan (Masterplan, Theranostic) was compared to a 9 beam step and shoot IMRT (Corvus 6.3, Nomos) and a VMAT plan with 2 rotations generated with ERGO++ 1.6 by Elekta. All three treatment planning systems used the identical CT datasets and the same OAR's. To compare these three techniques, the dose volume histograms (DVH) of PTV and OAR's as well as the total treatment time (TTT) were used. The homogeneity index (HI) and the conformity index (CI) calculated as suggested by the RTOG guidelines were analysed.

Results:

VMAT provided the best PTV coverage as indicated by the following metrics (isodose as percentage of prescription dose (PD) encompassing 95% of the PTV / percentage of tissue outside the PTV encompassed by 95% of PD). For 3D-RT the mean values were (94.7±0.6% / 5.4±1.5%), for IMRT (89.8±1% / 0.7±2.6%) and for VMAT (93.7±1% / 2.9±1.3%). The mean CI and HI over all 8 patients was (2.00±0.17, 1.06±0.01) for 3D-RT, for IMRT (1.56±0.16, 1.15±0.02) and for VMAT (1.71±0.13, 1.09±0.03). The TTT for 3D-RT (220 seconds) was much shorter than for IMRT (557 seconds). The estimated TTT of the VMAT technique is 180 seconds.

Conclusion:

The new VMAT technique provides excellent treatment planes with highest conformity and homogeneity. The short treatment delivery time together with low primary monitor units is the most important advantage.