

AbstractID: 12673 Title: A study on effect of inter-fractional anatomical changes on IMRT and RapidArc dose distribution for carcinoma of cervix uteri.

Purpose: To investigate the effect of internal anatomical changes on dose delivered by IMRT and RapidArc (RA) for the patients with carcinoma of uterine cervix using kV-CBCT.

Method and Materials: Five patients were taken for this study. In CT images, target (CTV minus nodes), PTV, bladder, rectum and femoral head were contoured. IMRT with seven fields of equal gantry spacing and dual arc RapidArc with gantry angles: 181-179 and 179-181 degree were done to deliver 50.4Gy to PTV in 28 fractions. Pre-fraction CBCT were acquired weekly and target and OAR's were delineated. The use of CBCT for dose calculation was validated prior to the study. From the CT plan, verification plans were created on CBCT images. The dose variation in target and OAR's between the CT and periodical CBCT (pCBCT) based IMRT and RA plans were analyzed.

Results: The mean (\pm SD) of pCBCT based IMRT plan's target $D_{98\%}$ and $D_{2\%}$ doses were $98.33\% \pm 0.92\%$ and $99.92\% \pm 1.28\%$ relative to CT based IMRT plan. Similarly for RA, it was $98.53\% \pm 0.78\%$ and $100.27\% \pm 1.03\%$ respectively. For rectum, the percentage difference between CT and pCBCT based IMRT plan's mean dose, $D_{2\%}$ and $D_{30\%}$ were 2.17%, 0.64% and 1.02% respectively. For RA, it was 2.30%, 0.72% and 0.70% respectively. For bladder, the percentage difference between CT and pCBCT based IMRT plan's mean and $D_{35\%}$ doses were 1.07% and 0.26%. For RA, it was 1.22%, and -0.04% respectively. For femoral head, the percentage difference between CT and pCBCT IMRT plan's $D_{2\%}$ dose is -0.46% and for RA, it was -0.35%.

Conclusion: Both IMRT and RA plans shows similar dose variation due to the anatomical changes over weeks. The dose variation in target was minimal. However the OAR doses show a substantial variability over weeks.