

AbstractID:9485 Title :Evaluation of Organ Motion for Prostate IMRT Treatment Using 4DCT

Purpose: To investigate organ motion during IMRT prostate cancer treatment using 4DCT and evaluate its dosimetric impact. **Method and Materials:** Twenty-five prostate patients (9 prone and 16 supine) were evaluated. All patients underwent 4DCT simulation using Philips Brilliance AcQSim. The Bellows System was utilized to track respiratory organ motion. Patients' organ movements were measured using the "cine" mode developed by Philips Medical Imaging. Images were composed from 4D scan of each patient. Volumes of prostate, bladder and rectum were contoured using the conventional CT (CCT) and 4DCT, and their volumetric differences were compared. IMRT plans generated for each patient based on CCT were applied to the organ volumes contoured on the MIP images. Dosimetric impact of respiratory motion on the IMRT treatment of prostate cancer was evaluated. **Results:** All nine prone patients demonstrated significant organ movements in comparison with patients in supine position. Due to the motion of prostate, bladder and rectum the MIP based volumes were larger compared with those from CCT. From MIP images, volumes of prostate, rectum and bladder on average were 19%, 11% and 9%, respectively, larger than corresponding volumes from CCT. Applying IMRT plan to the enlarged volumes defined with MIP images, we found that the dose coverage for prostate (D95) were reduced by a median value of 3.3% (1.6% - 4.2%), and doses of rectum and bladder changed by median values of 4.3% (0.2% - 7.6%) and 0.4% (-13.2% - +12.9%), respectively, when compared with those obtained for the standard IMRT plans using CCT. **Conclusion:** Prostate patients treated prone experienced larger organ movements than those in a supine position. Overall dosimetric variations are significant. 4DCT is useful in defining the range of organ motion and its dosimetric impact on IMRT prostate treatment.