

AbstractID: 6835 Title: Assessing Prostate, Bladder and Rectal doses during Image Guided Prostate IMRT using Kilo Voltage Cone Beam CT.

Assessing Prostate, Bladder and Rectal doses during Image Guided Prostate IMRT using Kilo Voltage Cone Beam CT.

Purpose:

To evaluate dosimetric uncertainties due to interfraction organ variation during Image Guided IMRT using Elekta Synergy System. On board Kilovoltage Cone Beam CT scans were evaluated for prostate, bladder and rectal volume changes and planned dose was compared against the actual delivered dose. Clinical feasibility for an offline correction protocol for an adaptive process was investigated.

Methods & Materials:

We investigated for five patients the actual dose delivered to prostate, bladder and rectum by using the cone beam CT as the study set and recomputing dose from IMRT fields. In order to do achieve this one full volumetric Cone Beam CT study set was randomly chosen for each patient from each week and thus a total of 9 CT (Week 1 to Week 9) study sets were used for each patient to analyze the prostate, bladder and rectal volume changes and hence their impact on dosimetry. The contoured Cone Beam CT volumes were reviewed by the Radiation Oncologist for accuracy. The CBCT scans were fused with the KV CT scans and the dose was recomputed.

Results:

KV CBCT was shown to be useful in characterizing Prostate, Bladder and rectal volume changes. There was a large variation in bladder and rectal volumes and hence the constraints defined in RTOG-0126 protocol varied from week to week.

Conclusion:

The current work describes an adaptive process for Image Guided Prostate IMRT. Replanning will ultimately allow one to reoptimize the IMRT beams based on the dose variation from original plan. However at this point this process is prohibitively time consuming and for future implementation of adaptive radiotherapy or dose escalation this process needs to be automated with a deformable registration model.