Purpose:

Post-prostatectomy patients may be treated with endorectal balloon (ERB) placed during the radiation therapy. The objectives of this study are to investigate geometrical variation of organs at risk (OAR) and CTVs (based on RTOG and EORTC guidelines) throughout the course of radiation therapy and their dosimetric impact.

Methods:

Six consecutive post-prostatectomy patients enrolled on a prospective IRB approved institutional study were analyzed. Patients underwent CT/MRI simulation and treatment with daily endorectal balloon (ERB). Six T2-MRI scans were performed during the treatment course. Bladder, rectum and two sets of CTVs according to the RTOG and EORTC guidelines were contoured by physician on each of the weekly MRI scans. The MRI scans were subsequently rigidly fused to the CT simulation images to simulate daily kV-kV patient alignment.

Results:

1. A consistent trend of decreasing bladder volume was found after the first week of treatment and therefore the V65Gy was found to increase after the second week of the treatment.

2. The rectal volume with ERB was found to be relatively consistent during the treatment course. Displacements of rectal contours were within 2mm in all directions. The V60Gy<20% (our institutional rectal constraint) varied on average less than 2%.

3. We found that the CTV volumes contoured per EORTC guideline exhibits a larger variation than those drawn according to the RTOG guidelines most likely due to the bladder exclusion imposed by it. While the average variation of RTOG based CTV volume was found within 5%, the variation of CTV-EORTC volumes was more then 10% (p = 0.06).

Conclusions:

In post-prostatectomy patients undergoing radiotherapy with daily ERB had a consistent decrease in the bladder volume during the treatment leading to increased bladder irradiation and changes in the CTV volumes predominantly when EORTC guideline were followed.