

AbstractID: 11095 Title: A retrospective study of the variation in organ dose as a function of table shifts using Megavoltage cone-beam CT

Purpose: This study analyzes the variation in patient setup based upon daily megavoltage cone-beam CT (MVCBCT) prior to treatment. The variation in organ dose as a function of table shifts is quantified in order to understand the effect of systematic versus random setup error for head and neck (H&N) IMRT patients. **Methods and Materials:** Sixty patients with H&N cancer were imaged on a daily basis prior to treatment using MVCB CT imaging with the initial clinical setup based upon in-room lasers and mask marks. After imaging the patients were repositioned based upon registration of the MVCB CT to the original planning CT. The average shift, standard deviation and root mean square values were calculated based upon the daily shift values in the lateral (LAT), superior-inferior (LONG), and anterior-posterior (VERT) dimensions. The mean shift values were incorporated into the treatment planning system to recalculate the dosimetry for each patient, assuming the shifts were not performed on a daily basis. **Results:** Comprehensive tables were generated to evaluate the dose difference for each patient as a function of the CTV, spinal cord, and optic chiasm assuming the mean table shift values were not performed on a daily basis. The maximum and mean dose difference for the CTV, averaged across nine patients in the study group, was -4.0% (range of -9.5% to 0.5%) and -5.7% (range of -11.7% to 0.2%). The maximum and mean dose difference for the spinal cord was -3% (range of -12.4% to 13.6%) and -6.1% (range of -12.9% to 1.2%). **Conclusion:** The dosimetry difference is not trivial before and after table shifts based upon MVCB CT imaging. Further study is needed to quantify the effect on the delivered dose distribution as a function of systematic versus random setup error.