AbstractID: 8834 Title: Individual and Group Setup Margins with kV Imaging for Daily Patient Positioning

Purpose: Optimum treatment efficacy requires that setup uncertainties be determined for each institution and treatment site. Patient and site specific setup margins were derived and compared for laser alignment vs kV image-based localization. **Method and Materials:** Setup uncertainties and margins were established for fifty-five patients (head and neck: 7, abdomen: 12, pelvis: 20 and lung: 6) treated with external beam radiotherapy using the Varian OBI kV imager for daily target localization. At each treatment fraction two pairs of orthogonal kV images were acquired to assess 1) required shifts and 2) verify the patient position before treatment. **Results:** The group margins were calculated according to the Van Herk formalism with the intent to give 99% of the prescribed dose to 99% of the patient population. With laser alignment an average margin of 10.6 mm in each direction is required for all treatment sites whereas kV imaging alignment reduces this average margin to 2.6 mm. Optimal patient-specific margins were calculated retrospectively and range from 3.2-12.7 mm, 2.8-8.8 mm, 4.8-8.7 and 3.6-8.4 mm for laser alignment and 1.2-2.8 mm, 1.2-3.2mm, 1.2-2.9 mm and 1.8-3.5 mm with kV imaging for pelvis, head and neck, abdomen and lung patients respectively. **Conclusion:** The amplitude of the 99%-99% margin (2.6 mm) is small enough to be incorporated into routine clinical practice for this institution. The benefits of daily kV imaging can thus be described in terms of increased target coverage for a larger fraction of patients. For patients set up with kV imaging the range of the individual setup margins is small enough that the group setup margin can be considered adequate for each individual patient. This alleviates the need to derive patient-specific setup margins during treatment when organ motion is limited. **Conflict of Interest:** This research was funded in part by Varian Medical Systems.