AbstractID: 9149 Title: Comparison of head and neck localization with portal imaging and megavoltage cone-beam computed tomography

Purpose: To compare portal imaging (PI) and mega-voltage cone-beam CT (MV-CBCT) for head and neck (HN) cancer patient localization. **Method and Materials:** The treatment couch shifts were recorded for 30 HN cancer patients localized weekly using anterior-posterior and right-lateral portal images, and for 11 patients localized using MV-CBCT, either daily (n=4) or twice weekly (n=7). A total of 214 and 184 shifts were obtained for PI and MV-CBCT, respectively, in the left-right (LR), superior-inferior (SI) and anterior-posterior (AP) directions, along with the magnitude of the 3D shifts. The percentage of shifts that are equal to 0 in any direction, that is no treatment couch correction was applied in that direction, was also compared for the two techniques. **Results:** The average MV-CBCT and PI shifts were -0.9±3.9 and 0.0±2.2 mm, respectively, in the LR direction, -0.2±2.4 and -0.1±3.5 mm in the SI direction, -1.0±4.2 and -0.2±2.6 mm in the AP direction. The average 3D shifts were 5.2±3.6 mm and 2.2±4.3 mm for MV-CBCT and PI, respectively. The proportion of 0 mm shifts for MV-CBCT and PI was 55% and 88%, respectively, in the LR direction, 71% and 81% in the SI direction, 49% and 90% in the AP direction. **Conclusion:** The three-dimensional nature of the MV-CBCT localization method offers a greater ability to detect small shifts and helps reach a compromise between the 3 translational treatment couch shifts that can be applied and the 12 degrees of freedom corresponding to translational and rotational movements of the head and/or neck, independently. This greater accuracy of MV-CBCT allows to reduce CTV-to-PTV margins, therefore potentially improving the therapeutic ratio. Research partially supported by Siemens Medical Solutions.