AbstractID: 9130 Title: CT Image-Guided Stereotactic Spine Radiotherapy: A Novel Paradigm for Achieving True Extracranial Stereotaxy

We report treatment setup data from a novel technique using CT image-guided stereotactic radiotherapy. A stereotactic body immobilization system and integrated LINAC/CT-on-rails unit were evaluated in the lead-in portion of a Phase I protocol for patients with paraspinal metastases. Immobilization consisted of a body cushion vacuum wrapped with a plastic sheet. Plan CT and immediately repeated CT were performed on the LINAC/CT-on-rails to assess respiratory-related vertebral body motion. Coplanar IMRT using 7 - 9 beams delivered 30 Gy in 5 fractions to the PTV while limiting spinal cord dose < 10 Gy. Pre-treatment CT was fused with the plan CT to determine the correct target isocenter by detecting any translational and rotational discrepancies compared to the plan CT. Based on 48 CT images (18 pretreatment, 15 treatments, and 15 post-treatment) from 3 patients, no respiratory associated vertebral-body motion was seen. Daily AP- and LAT- portal images coincided with plan AP- and LAT-DRR confirming the isocenter setup accuracy within 1 mm for 15 treatments. Immediate post-treatment CT scan verified findings from the portal images and absence of spine movement during the treatment. Ion-chamber measurement for the high dose region was within 2% of the planned dose for 3 patient treatment plans. Film dose measurement in an IMRT Q/A phantom of 90% to 30% isodose lines agreed with the plan. Preliminary data suggests that near simultaneous CT image verification can be used as a new platform technology for extra-cranial applications of stereotactic radiotherapy.