AbstractID: 13683 Title: Commissioning an anthropomorphic spine and lung phantom for remote quality assurance of spinal radiosurgery

Purpose: The RPC has developed a new phantom to ensure comparable and consistent radiation administration in spinal radiosurgery clinical trials. This study assesses the phantom's dosimetric utility. **Methods:** The 'spine phantom' is a water filled thorax with pertinent anatomy encountered in spinal radiosurgery: tumor, vertebral column, spinal canal, esophagus, heart, and lungs. The dose to the tumor volume is measured with axial and sagittal planes of radiochromic film and thermoluminescent dosimeters (TLD). The relative dose distribution is measured with the radiochromic film, and is calibrated to the absolute dose measured by the TLD. The dosimetric utility was assessed by administering a series of irradiations to the phantom. Three irradiations were administered: a four angle box plan, a seven angle conformal plan, and a nine angle IMRS plan. In each plan, at least 95% of the defined tumor volume received 8 Gy. The first two unmodulated plans were not clinically applicable; rather, they were used for dosimetric verification without intensity modulation. The third plan was tuned to the clinical specifications for organ tolerances delineated by the RTOG protocol 0631. The planned and administered doses were then registered via pinpricks, and compared using point dose measurements, dose profiles, isodose distributions, and gamma analyses. **Results:** The minimum number of pixels passing the gamma analyses was set at 95% at 5% dose difference and 3 mm distance to agreement, based on previous experience at the RPC. Each irradiation showed acceptable conformity in the qualitative assessments and exceeded the 95% passing rate at the 5% / 3mm criteria. **Conclusions:** Treatment planning and measurement in the new spinal phantom demonstrated acceptable conformality at the 5% / 3mm criteria, and the spine phantom should be a useful tool for the remote assessment of other institution's treatment planning and dose delivery regimen.