AbstractID: 11701 Title: Comparison of RADPOS 4D in vivo dosimetry system with Phillips Bellows and Varian RPM systems

Purpose: To present the latest data on the newly-developed RADPOS 4D *in vivo* dosimetry system including comparisons with the Phillips Bellows and Varian RPM systems. **Methods and Materials:** A 4D Quasar phantom was set-up on the couch of a Phillips Brilliance CT scanner and set to move in a sinusoidal pattern with amplitude of 1 cm. The Phillips Bellows belt was secured around the moving translation stage and was used to record the motion of the stage. The same motion was also measured by a RADPOS detector. This procedure was repeated on the couch of a PET/CT scanner using the Varian RPM system. A RADPOS detector and the RPM optical block were placed on top of the phantom's translation stage and the motion was recorded by both systems. The feasibility of using the RAPDOS system for in vivo dosimetry during daily external beam radiation therapy is also being studied. **Results:** When used to measure simulated breathing motion on a 4D Quasar phantom, the RADPOS-measured displacements were on average within 0.13 and 0.05 mm of those recorded by the Phillips Bellows and Varian RPM systems, respectively. The correlation between the RADPOS displacements and those measured by the Bellows and RPM systems were 0.96 and 0.99, respectively. Initial results for clinical use in radiation therapy treatments show that the RADPOS system can be set-up quickly, requiring minimal additional time for each scheduled treatment fraction. **Conclusions:** In conclusion, the RADPOS system agrees well with currently accepted position monitoring systems and provides sufficient information to identify changes in the patients breathing pattern and other patient motion.

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