

AbstractID: 4576 Title: Respiratory Gating in the Treatment of Liver Tumors

Purpose: To determine if respiratory gated radiotherapy is feasible for the treatment of liver tumors.

Method and Materials: The patient was a 70 year-old woman with metastatic liver cancer. We used the RPM system (Varian Medical Systems) to track the respiratory cycle of the patient and gate the beam at the end of the respiratory cycle. Three implanted gold fiducials were used for daily patient positioning with AP and Lateral electronic portal images. The fiducials were also used to verify the location of the tumor during treatment. Prior to the initial treatment, the patient underwent a mock treatment in which a series of portal images were taken to verify the respiratory cycle correlated with the position of the tumor at the end of expiration.

Results: The patient's mock treatment was successful, with nearly all fiducial locations lying within a sphere of 2.5 mm. Analysis of the data obtained over the course of treatment (~600 data points) showed that 95% of the fiducial locations stayed within a sphere of about 7 mm. The uncertainty due to set-up was ± 4.6 mm, while the precision in the gating window was ± 2.2 mm.

Conclusion: The location of the liver tumor was well reproduced throughout the course of treatment. Our results suggest that we can use respiration to successfully track the motion of a liver tumor and gate the beam at the end of the respiratory cycle.