

AbstractID: 11050 Title: Effect of Dose rate on gated IMRT Dose delivery

Purpose: To evaluate the effect of dose rate on IMRT dose delivery to gated, not-gated with moving target and non-moving target.

Method and Materials: A platform capable carrying a stack of 20cm thick of normal 30cm x 30cm phantom was used for the study. The phantom can have a 2cm range of motion. 8 rpm was used for measurements The Philips Gemini PET/CT imaging system was utilized for retrospectively gated (4D) CT simulation with the breadth rate detected through the Varian RPM system. 10 phase binning is done after data acquisition for reconstruction. Study was conducted on a Varian Trilogy, the phase range of 40%-60% was used for gated dose delivery. Single IMRT sliding window (SW) field and IMRT step-and-shot (SS) field plans with 6MV, dose rate 300, 400, 600, 1000 were planned. Ion chamber, film dosimetry with RIT software were used to measure the delivered dose in the isocenter and the dose distribution. The measurement was conducted with non-moving and moving target.

Results: Ion chamber measurements at isocenter indicate the dose delivered with dose rate from 300 to 1000 mu/min were within 2% comparing gated and non-gated. Using dose rate of 400 mu/min as a reference, delivery accuracy is within 1.5% for sliding window method and Step-Shoot method, both gated and non-gated. With the target in motion (in-out direction), the isocenter dose measured for gated delivery is within 1.5% for both Sliding Widow and Step Shoot Methods. The dose profiles measured with different dose rate fall on top of each other except at hot spots where the deviations show up to 3% deviation normalized to 400 dose rate data.

Conclusion: The measurement of gated and non-gated IMRT dose delivery with dose rate indicates that dose rate effect on the gated IMRT dose delivery is within clinical tolerance.