

AbstractID: 7700 Title: Accuracy of Varian Eclipse Dynamic Conformal Arc Dose Calculation

Purpose: Dynamic conformal arc (DCA) treatments, in which the aperture is continuously modified to conform to the beams-eye-view of the target as the gantry rotates, are potentially the fastest and most efficient method of delivering a conformal treatment, while still achieving results comparable to IMRT. DCA could make stereotactic body radiation therapy (SBRT) more practical and cost-effective. The purpose of this study is to demonstrate the accuracy of the DCA algorithm of the Varian Eclipse radiation treatment planning system (RTPS).

Method and Materials: DCA plans were made for patients who had already received SBRT for Stage I NSCLC or IMRT for prostate cancer. The accuracy of the dose calculation was tested by two methods: The plan was mapped onto a cylindrical plastic phantom, the dose distribution in the phantom was calculated using the same monitor units. Then an ionization chamber was placed in the center of the phantom, the phantom was set up with the chamber at isocenter and the treatment was performed. In the second method, a DCA plan was mapped to a two-dimensional (2D) ionization chamber array, with the plane of the array at isocenter. The dose distribution was calculated in the plane of the array. This phantom was also set up with the isocenter in the center of the chamber array and the treatment was performed.

Results:

The point doses measured with an ionization chamber in a cylindrical phantom agreed within $\pm 2\%$ with those predicted by the Eclipse RTPS. The gamma factor for the comparison between the measured and calculated doses in the plane of the 2D chamber array was less than 1 for 95% of the pixels.

Conclusion:

Our results indicate that the Eclipse DCA can accurately predict dose distributions.

Conflict of Interest (only if applicable):

Research sponsored by Varian Medical Systems.