AbstractID: 7111 Title: A Comparison of a Point Based Tool with an Image Overlay Tool for Fiducial Based Setup

Purpose:

To compare interactive image overlay tools for fiducial based setup with a point based system.

Method and Materials:

A single implanted fiducial was used for localization. Gated kVp images were acquired for daily setup; if a shift was made, a 2nd set of images were acquired subsequent to the shift. Shifts were determined using both a commercial software package designed for point matching (ISOLOC, CIVCO, Kalona, IA) and also by dragging the projection of the fiducial contour over the image of the fiducial using tools integrated into the treatment delivery console(4DTC, Varian, Palo Alto, CA). Data was collected for 29 shifts on 15 different days.

Results:

The mean magnitude of the initial shifts were 1.5, 5.7, and 1.5 mm and the means of the differences between the shifts were 0.2, 1.1 and 0.8 mm in the lateral, cranial-caudal, and AP directions respectively. On many days there was a discrepancy of 1-2 mm between the AP and lateral gated kVp X-rays. The interactive tools allowed the user to compromise between the two projections, while the automatic system forced a compromise. The interactive tools also displayed a projection of the tumor allowing validation of the position of the fiducial with respect to the bulk tumor. The interactive tools were quicker to use and automatically applied the shifts; these tools are somewhat limited by the accuracy of the contouring of the fiducials.

Conclusion

Both the interactive tools and the automatic system are practical for daily setup of patients with fiducials, but the integration into the console, the speed of localization, and most importantly the ability to correlate the fiducials with radioopaque anatomy make the interactive tools superior.