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**Temporal Stability of Percutaneously Implanted Coiled Wire Fiducial Markers for Liver IGRT**

**Valerie M. Gironda**, MD; Geoffrey Zhang, PhD; Mark Russell, MS; Vladimir Feygelman, PhD; Junsung Choi, MD; Sarah E. Hoffe, MD  
Moffitt Cancer Center/University of South Florida, Tampa, FL

**Background:** To measure the temporal stability of coiled-wire fiducial markers percutaneously implanted in the liver adjacent to primary or metastatic tumors for hypofractionated, image-guided radiation therapy (IGRT).

**Methods:** All cases with fiducial markers placed for partial liver radiation therapy with IGRT from February 1, 2006 - February 27, 2009, were included and 14 cases were evaluated. Placement of the markers was performed with computed tomography (CT) guidance by two interventional radiologists. The initial diagnostic CT done at the time of placement and the follow-up diagnostic CT done post-therapy were loaded into the GE advantage workstation for measurement of each fiducial at each time point. Two fiducials were used in each case. The fiducials were contoured by one radiation oncologist and the volumetric center of each contoured fiducial was recorded. The x (right-left), y (anterior-posterior) and z (superior-inferior) coordinates were recorded for the center position of the fiducial. Change in distance between each pair of fiducials was calculated between the two CT scans.

**Results:** Average migration was  $-1.3 \pm 4.2$  mm for x,  $-1.3 \pm 2.8$  mm for y, and  $2.1 \pm 4.0$  mm for z coordinates, overall migration of  $1.8 \pm 2.4$  mm (1 SD), and an average follow-up time of  $68.7 \pm 24.5$  days.

**Conclusion:** This study confirms the temporal stability of coiled wire fiducial markers percutaneously implanted adjacent to liver tumors, suggesting the feasibility of this technique for IGRT to guide delivery of high-dose partial liver radiation.