AbstractID: 8214 Title: Evaluation of Comparing Daily Ultrasound Images with a Reference Ultrasound Image for Prostate Localization

Purpose

To evaluate if acquiring an ultrasound image at the time of CT simulation for comparison with daily ultrasound images improves daily localization of prostates.

Method and Materials

Resonant Medical's® ultrasound localization system was installed and implemented in our clinic. The technique relies on acquiring a 3D ultrasound image at the time of CT simulation for daily comparison whereas other ultrasound localization techniques compare daily ultrasound images to the original CT image. Treatment planning is done on the CT. DRRs are also constructed from the CT, and fiducials implanted in the prostate are outlined on the DRRs. Each day a 3D ultrasound image was acquired and compared to the ultrasound that was acquired at the time of CT simulation. Daily, if the ultrasound image was approved by the physician, the couch was shifted to align the current prostate location with its location at the time of simulation. After the ultrasound, ports were taken as often as prescribed by the physician. The fiducial locations as seen in the ports were compared to their locations on the DRRs. Any necessary shifts were made to align the fiducials. Following the treatments, an analysis was made of the ultrasound localization as compared to the fiducial localization. 22 patients had 7 or more days in which both ultrasound and ports of fiducials were acquired and are included in this analysis.

Results

The measured average difference between the ultrasound localization and the localization based on ports of fiducials is 7.2 mm. This is comparable to what is reported in literature for other ultrasound localization techniques.

Conclusions

Using a 3D ultrasound image acquired at the time of CT simulation does not improve ultrasound localization accuracy as compared to techniques that compare daily ultrasound images to the simulation CT for localization.