

AbstractID: 11827 Title: Prostate volume contouring: delineation variations using CT versus combined CT + US for Image-Guided Radiotherapy

Purpose:

To verify if 3D-US may be helpful in the definition of prostate for external beam radiotherapy

Method and Materials:

The clinical study involved ten patients with localized prostate cancer receiving conformal radiation between January and April 2009. Patients underwent a planning CT scan and a pelvic MR scan Prior to each scan (and subsequently before each fraction of radiotherapy) patients were asked to evacuate their bowels, and to have a comfortably full bladder. Immediately after the CT scan for planning is done, a trans-abdominal 3D-US image (Clarity, Resonant Medical, Toronto, CA) is acquired with the patient in the exact same position. With the help of a ceiling-mounted tracking camera and 3D-ultrasound (3D-US) probe with active infrared sensors in the planning room, is possible to obtain an accurate spatial reconstruction of the ultrasound pixels in relation to the room's global coordinate system making feasible a simple superimposition between CT and US images . The MR scan was performed soon after the CT (1/2 hour) and the patient underwent CT and MRI in the planned treatment position with an indexed shaped knee rest and indexed ankle support A routine T2-weighted prostate pulse sequence with a TE of 90 ms and a slice thickness of 4 mm was used.

Results:

No significant variations among observers considering together all the modalities imaging are registered ($p=0.629$). Significant variations between the three modalities considering together all the observers are reported ($p=0.038$). No significant variations of dosimetric predictors were found ($p=0.965$).

Conclusion:

3D-US have been shown to correlate well with MR in reducing volume respect to the TC. Dose to OAR is not significantly reduced even if MRI imaging is considered. However 3D-US may be confirmed as a very good technique of imaging for prostate and thus for IGRT of prostate cancer.