

Impact of IGRT on correct set-up of patients with prostate cancer: experience of our center

Impatto dell'IGRT sul corretto posizionamento dei pazienti con carcinoma prostatico: esperienza del nostro centro

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Purpose: The purpose of this study is to quantify displacements in image-guided radiotherapy (IGRT) for prostate cancer patients and to evaluate the impact of IGRT on the quality of radiotherapy treatments in terms of rectal toxicities.

Methods and materials: From January to October 2017, 46 patients with prostate cancer were treated. All patients were planned with volumetric-modulated arc therapy (VMAT) technique, receiving hypofractionated radiotherapy for a total dose of 67.5 Gy in 25 fractions or conventionally fractionated radiotherapy for a total dose of 70-80 Gy in 35-40 fractions. Daily IGRT using cone-beam computed tomography (CBCT) was performed for all patients. Setup corrections were determined and corrected by means of registrations of CBCT images with the planning CT using online 3D fusion and for each session displacements were evaluated to analyze the setup errors.

Weekly clinical visits were made to all patients; rectal toxicities were evaluated according to CTCAE scales and compared with a group of prostate cancer patients treated with intensity modulated radiotherapy without daily CBCT.

Results: Significant differences in setup displacements were found for each treatment session. The range of displacements in the three space directions was calculated for each patient, as showed in figure, and the average of all ranges was 1.6 cm in vertical direction, 1.3 cm in lateral direction and 1.4 cm in longitudinal direction. Symptomatic grade 1 (G1) rectal toxicity was found in 17% of daily IGRT patients and in 49% of no-daily IGRT patients; asymptomatic G1 rectal toxicity was found in 79% and 47% of IGRT and no-daily IGRT patients, respectively.

Conclusion: Daily CBCT allows real-time verification and correction of set-up and organ-motion errors and improves treatment quality by reducing rectal toxicity. More cases and a longer follow-up are needed to confirm the preliminary results of this study.

