SETUP DISCREPANCY BETWEEN CONE-BEAM COMPUTED TOMOGRAPHY AND EXACTRAC X-RAY SYSTEM FOR PROSTATE IMAGE-GUIDED RADIOTHERAPY

A. Viola[1], A. Tripoli[2], V. Valenti [2], S. Illari[1], V. A. Marchese[2], G. Ferini[2].
1. Radioterapia, Fondazione Istituto Oncologico del Mediterraneo (IOM); 2. Radioterapia, REM. 1.2. Viagrande, CT (I)

AIMS: Intensity-modulated radiotherapy (IMRT) has become a mainstay for the treatment of prostate cancer because IMRT techniques allow for dose escalation while minimizing toxicity to surrounding organs. With recently innovations more accurate image-guided systems using direct visualization of the prostate have been developed. The aim of this study was to evaluate the setup discrepancy measured with two image-guided radiotherapy (IGRT) techniques, ExacTrac X-Ray 6 degree-of-freedom (6D) and kilo-voltage cone-beam computed tomography (CBCT). The first device employs an X-Ray imaging system that verifies the target position using bone anatomy. CBCT imaging allows positioning verification using not only bone anatomy but also soft tissues.

METHODS: Setup data were collected on a Novalis-TrueBeam STx treatment unit for 57 patients with prostate cancer. Prescription doses ranged from 67.5 to 80 Gy in 25 to 40 fractions. All patients were initially positioned at the isocenter, setup corrections were determined using registrations of ExacTrac X-Ray images with the corresponding digitally reconstructed radiographs using the ExacTrac 6D fusion software. After correction through the 6D robotic couch, the residual setup errors were determined by means of registrations of CBCT images with the planning CT using online 3D fusion software, and for each session, displacements were evaluated to compare the setup differences between ExacTrac system and CBCT.

RESULTS: A modest difference in residual setup errors was found between CBCT and ExacTrac X-Ray system. The average residual error differences were 1.11 ± 1.01 mm, 1.10 ± 0.97 mm and 1.07 ± 1.39 mm in the lateral, longitudinal and vertical directions, respectively. The root-mean-square (RMS) of the differences were less than 1.66 mm for translations and 0.9 degrees for rotations.

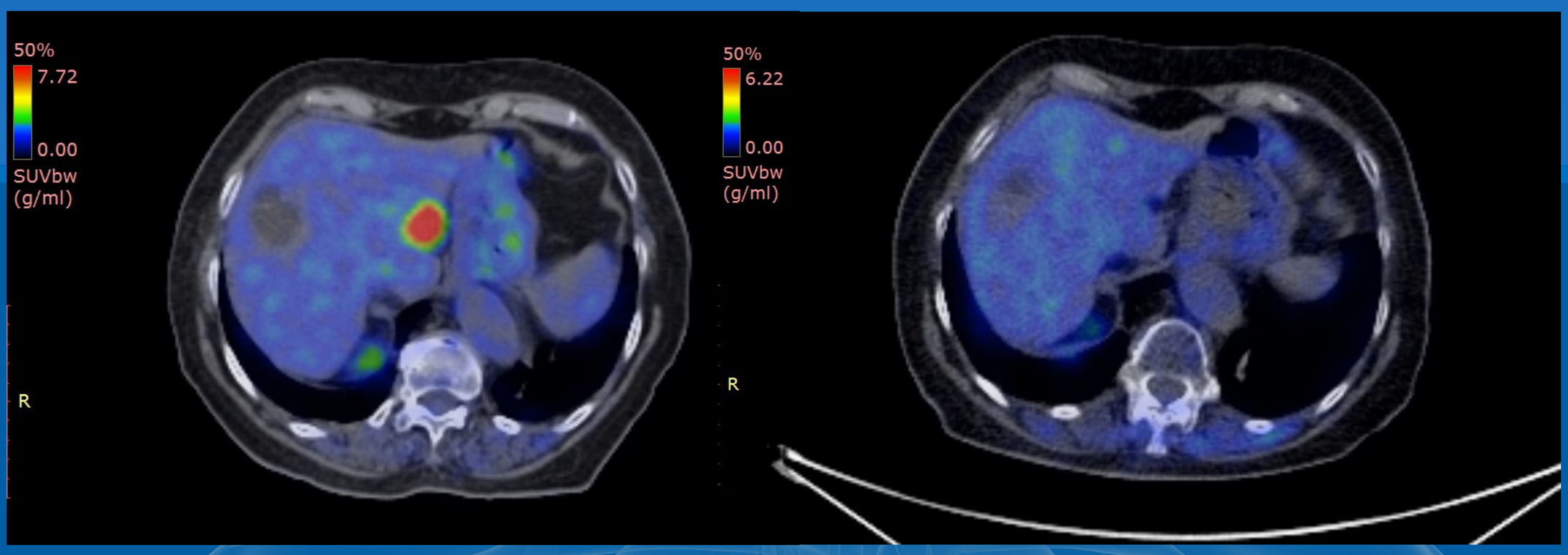
CONCLUSIONS: We found a good agreement in the setup accuracy between ExacTrac X-Ray system and CBCT. Both IGRT systems achieved reasonably low residual errors after initial correction, but ExacTrac offers additional benefits such as the capability to quantify all rotational errors, fastest automated positioning in 6D and smaller doses; on the other hand, CBCT, sometimes seems preferable to ExacTrac for the capability to appreciate soft tissues. Further clinical investigations are needed to determine whether ExacTrac X-Ray system is a good alternative or a complement to CBCT for prostate cancer patients.

FONDAZIONE IOM Istituto Oncologico del Mediterraneo
rem radioterapia
gruppo samed
Associazione Italiana Radioterapia e Oncologia clinica
XXXI CONGRESSO NAZIONALE AIRO
Bologna 15-17 Ottobre 2021

Liver oligometastases treated by stereotactic body radiation therapy: a retrospective single center analysis .

A. Viola [1], A. Tripoli [2], V. Valenti [2], S. Illari [1], V. A. Marchese [2], G. Ferini [2]
1. Radioterapia, Fondazione Istituto Oncologico del Mediterraneo (IOM); 2. Radioterapia, REM.
1.2. Viagrande, CT (I)

AIMS: Liver is one of the most common sites for metastatic spread. Approximately 30–40% of all patients with solid tumors develop liver metastases during the natural course of the disease. Surgical resection represents the standard of care with a 5-year survival rate of up to 30−60% when unique syn- or meta-chronous site of tumor disease. However, only 10–20% of these patients are amenable to resection due to comorbidities, unfavorable liver involvement, uncontrolled primary tumor or extrahepatic progression. Different techniques of minimally invasive therapies for liver metastases have been used in patients ineligible for surgery, including radiofrequency ablation (RFA), microwave ablation, transarterial chemo embolization (TACE) and cryotherapy.
The role of stereotactic body radiation therapy (SBRT) in the management of liver metastasis is increasing, using ablative doses with the goal of local control (LC) and survival improvement. The aim of this study is to evaluate our preliminary results regarding LC, progression free survival (PFS), overall survival (OS) and toxicities in patients with liver metastases treated with this technique.



METHODS: We conducted a retrospective analysis of 19 patients with a total of 27 lesions treated with Varian TrueBeam Novalis STx linear accelerator using a 10 MV Flattening Filter Free beam at our Institute from April 2017 to April 2020. Tumor response was evalueted according to RECIST and/or PERCIST criteria. LC, PFS and OS were estimated using the Kaplan -Meier method. Median follow-up period was 8 months (range, 1-25 months).
RESULTS: Median age at the time of SBRT was 70 years (range, 51–82 years), 9 patients were male and 10 female. Three patients only had multiple lesions. The median tumour volume pre-SBRT was 19.51 cm3 (range, 5.32-149.95 cm3). The mean prescription dose was 48 Gy (range, 36-60 Gy) in 3-5 fractions. Two patients (10.5%) developed a local recurrence, 8 (42.1%) showed stable disease, 5 (26.3%) partial response and 4 (21.1%) complete response. Median OS following SBRT was 10 months (range 1–27 months). The 1-, and 2-years actuarial survival rates following SBRT were 62 and 39% respectively. The 1- and 2-years actuarial PFS rates were 47 and 23% respectively.
No acute or late grade 3 or 4 toxicity was observed.

CONCLUSIONS: Our data suggest that SBRT is a safe and effective treatment option for patients with liver metastases. Further randomized trials are required to compare with other local therapies.

Fondazione IOM Istituto Oncologico del Mediterraneo
rem radioterapia
gruppo samed
Associazione Italiana Radioterapia e Oncologia clinica
XXXI CONGRESSO NAZIONALE AIRO
Bologna 15-17 Ottobre 2021