first, third and fourth treatment sessions. Heat with mobile insulator sheets was used during the second and fourth treatment sessions. The mobile insulator sheets comprised silicon rubber of 1.0 mm in thickness, which covered 75% of the surface of both the electrodes. The sheets were alternately arranged and moved in parallel at certain intervals. The intra-rectal temperature was measured using a four-point microthermocouple sensor during the heating. Several thermal parameters between the sessions with and without the mobile insulator sheets were evaluated.

**Results:** Ten patients with pelvic tumors (eight cases of prostate cancer, two cases of cervical cancer of the uterus) were eligible for the study. All 10 patients could receive the planned five HT sessions. A planned heating time of 50 minutes was completed in 15 (75%) of 20 HT sessions with mobile insulator sheets and in 25 (83%) of 30 HT sessions without them. A thermal parameter of the cumulative equivalent minutes at 43°C for the T90 (CEM43 °C T90) was 1.9 minutes during the HT sessions with mobile insulator sheets and 1.2 minutes during the HT sessions without them, and this difference was statistically significant (p<0.05). The median minimum intra-rectal temperature (Tmin) was 40.8°C during HT sessions with mobile insulator sheets and 40.6°C during HT sessions without them, which was also a significant difference (p<0.05).

**Conclusions:** This clinical prospective study demonstrated that the novel deep heating method using an 8 MHz radiofrequency-capacitive heating device with the mobile insulator sheets could improve the temperature increase of deep-seated tumors of the pelvis.
SBRT of bone metastases in oligometastatic patients: predictive factors of oncological outcomes

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Purpose/Objective: To evaluate the safety of Stereotactic Body Radiotherapy (SBRT) of bone metastases in oligometastatic disease and to investigate possible predictive factors of local control (LC), progression disease free survival (PDFS) and overall survival (OS).

Materials and Methods: Main eligibility criteria were number of metastatic sites ≤5, controlled primary tumor with no evidence of progression under systemic therapies, exclusion of surgery and no previous radiotherapy of the lesion of interest. Patients were classified into two categories: only bone (BOD) and outside bone oligometastatic disease (OBOD). SBRT was delivered only to bone lesions using two different schedules: 24Gy/1fraction or 27Gy/3 fractions.

Results: Between January 2010 and December 2013, 40 patients were enrolled in our study. The most frequent primary tumors were prostate (40%), breast (17.5%) and lung cancer (15%). Two patients experienced severe late toxicity (fracture of the treated site). LC was longer among ‘Responders’ than ‘Not responders’ lesions (94.2% and 91.2% versus 50% and 16.6% at 1 and 2 years, respectively) (p=0.004). The multivariate analysis of PDFS showed a significant correlation with PTV volume (p=0.003) and Oligometastatic Status (p=0.002). The multivariate analysis of OS, confirmed a statistical significant value of the Oligometastatic Status (p=0.002) whereas no correlation was proved for PTV volume (p=0.065).

Conclusions: SBRT of bone metastases is safe with a low incidence of severe toxicity. PET response has proven to be a strong predictive factor of LC whereas the BOD status and the small size of bone metastases might identify a subset of oligometastatic patients at better prognosis.

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Innovative QA methodology for true patient-specific Dose Volume Histograms (DVHs) measurements

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Purpose/Objective: The aim of this study is to present an innovative QA methodology for patient-specific plan verification through true measurements of DVHs and comparisons with the corresponding TPS-calculated DVHs.

Materials and Methods: 3D-printing technology and polymer gel dosimetry were combined in a unique way in order to construct a patient-specific QA phantom (patient-specific dosimetry phantom - PSDP). The selected patient planning-CT scans were used for the construction of a patient-specific 3D-printed model (external surface and bone structures). The 3D-printed model was subsequently filled with Vinyl-Pyrolysilone (VIPAR) polymer gel. The constructed PSDP was then treated as if it the real patient, i.e. ‘immobilization’, set-up, image guidance (e.g. CBCT) and irradiation were implemented on the phantom. The irradiated PSDP was then MRI-scanned (derivation of T2-maps). The T2-maps of the PSDP contain dosimetric information that was extracted by analyzing the polymer gel dosimetry data. These PSDP T2-maps that contain dosimetric information, were subsequently imported to the TPS and were registered/fused to the real patient planning-CT scans and RStructure dicom-RT data. This way, the PSDP measured dose pattern was spatially correlated with the real patient RStructure information, allowing the measurements of DVHs.

Results: True patient-specific DVHs measurements were implemented following the proposed methodology. DVHs measurements were directly compared with the corresponding TPS-calculated DVHs. The QA and evaluation of the validity of overall treatment chain, of the treatment outcome and patient safety was feasible.

Conclusions: True patient-specific DVHs can be measured for the first time and compared against the TPS-calculated corresponding DVHs, following the proposed methodology. Patient-specific treatment outcome and patient safety could...