This is the published version of a paper published in *Radiotherapy and Oncology*.

Citation for the original published paper (version of record):

Pilot study: Textural features of mpMRI for response assessment in prostate cancer patients
*Radiotherapy and Oncology*, 133: S1113-S1113
https://doi.org/10.1016/S0167-8140(19)32448-X

Access to the published version may require subscription.

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correlation between median dose to TBM and ABM (Pearson’s r = 0.78 between TBM and ABM(2)). In future works a clinical trial can be considered where one group is treated according to standard clinical practice and the other with an ABM sparing dose plan. This will reduce the correlation between TBM and ABM volumes, making it easier to evaluate the predictive power of FDG-PET-based models for HT.

EP-2028 Pilot study: Textural features of mpMRI for response assessment in prostate cancer patients

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Purpose or Objective

Multiparametric (mp)MRI is a well-established tool for response assessment in radiation oncology. In view of the upcoming analytical methodology of radiomics, the potential of Haralick textural features (TF) in the context of response assessment has so far not been fully explored. The aim of this study is thus to investigate the added value of Haralick textural features for response assessment in prostate cancer (Ca) radiotherapy.

Material and Methods

21 Ca patients were enrolled in this longitudinal prospective IRB approved response assessment study, consisting of mpMRI at four time points (TP): at baseline (BL), in week 2 of treatment (TP1), in week 4 of treatment (TP2) and 3 months after end of EBRT as follow up (FU). Inclusion criteria were biopsy proven primary PCs, external beam radiotherapy (EBRT) and no contraindications to MRI. mpMRI was performed on a 3T scanner (MAGNETOM® Trio Tim, Siemens). For TF analysis T2-weighted (T2w) and apparent diffusion coefficient (ADC) MRI data were used.

Data collection of seven patients could be completed so far. The preliminary results are based on these 7 full datasets. The tumour lesion was delineated by an experienced radiologist on the BL T2w image dataset. The lesion was propagated to the other TP via rigid registration of the T2w images. Manual adaptations were performed on both T2w and ADC images in cases of tumour shrinkage, image distortions or artefacts caused by air in the rectum or movement. Both image datasets were normalized. Mean T2w and ADC values were extracted. After histogram equalization, 20 grey level invariant Haralick TF [1] were calculated for each modality. Data handling, visualization, image registration, pre-processing and feature extraction were carried out using MICE Toolkit® (© 2018 NONPI Medical AB). All features were tested for significant changes between TP with a Student’s t test. Results

Mean T2w grey level did not change significantly between TP. In total, for five T2w and 13 ADC TF significant changes could be identified during or after EBRT. Significance levels of the corresponding TF and the mean ADC for p < 0.05 are presented in Table 1 for each pair of TP. For better comparability, the behaviour of mean ADC, T2w SumEntropy and ADC DifferenceEntropy is plotted in figure 1.

Nine ADC TF showed very early changes already in the second week of treatment (TP1). Three T2w features and two ADC features (SumAverage and Autocorrelation) differed significantly with respect to FU. Correlation to clinical outcome was not assessed in the scope of this preliminary analysis, but will be part of the final evaluation.

Conclusion

This pilot study demonstrated that T2w and ADC TF of PCs lesions change during EBRT. The results might suggest that some TF reflect very early response mechanisms while others could aid mid-term response assessment. These primary findings motivate further analysis of the remaining patient datasets.

EP-2029 Principal component analysis for quantitative and robust analysis of dynamic PET/MR imaging data

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### Table 1

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<th>T2w</th>
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<th>BL</th>
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<th>TP1</th>
<th>TP2</th>
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</table>

Table 1 Significant changes of T2w and ADC TFs for each pair of time points. Non-significant TF are not listed. p<0.01 is highlighted in bold.

### Figure 1

Behaviour of the patient-mean of ADC mean [x10⁻¹ mm²/s] and two TF through the treatment course. Significant changes: ADC mean; BL-T2w, BL-FU, TP1-T2w, TP1-FU; T2w SumEntropy; BL-FU, TP1-FU; ADC DifferenceEntropy; BL-TP1, BL-TP2

Bars represent one SD.

ADC mean [x10⁻¹ mm²/s]