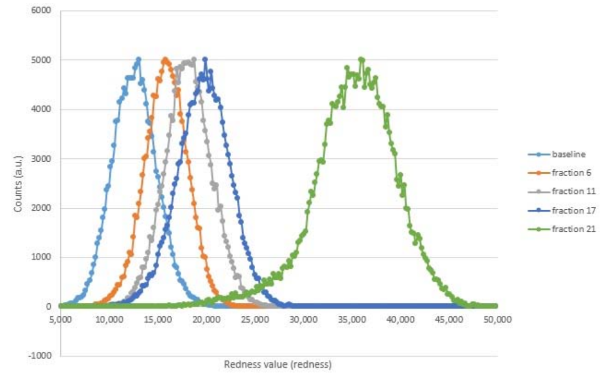

Conclusion: Digital reflex camera can be used for quantitatively evaluate skin reactions. Moreover, it should be used to predict acute skin toxicity since the first 2 weeks of treatment. Early detection of acute skin reactions should improve patients' quality of life. The proposed method seems to be sensitive to the radiotherapic technique (3D CRT vs Tomotherapy). The present results may be expanded by the study of the correlation with fractionation and other treatment parameters.

EP-1881

Diffusion MRI predicts radiotherapy response in brain metastases

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Purpose or Objective: Radiotherapy (RT) response is generally related to changes in gross tumor volume (GTV) manifesting months later. An earlier knowledge of the treatment response may influence treatment decision. In this prospective study we investigated the correlation of parameters derived from diffusion weighted MRI (DW-MRI) acquired during RT with later GTV change of brain metastases.

Material and Methods: Nineteen metastases (N=19) from eight patients, treated with whole-brain irradiation (30 Gy in ten fractions) were analyzed. Patients were scanned with a 1T MRI system to acquire DW- (b = 0,50,100,150,400,500,600,800 s/mm^2), T2*W-, T2W- and T1W scans, before start of RT (pre-RT), at the ninth/tenth fraction (end-RT) and two to three months after RT (follow-up). DW-MRI data were fitted using a bi-exponential two-compartment model to derive the perfusion fraction (*f*), pseudo diffusion (*D_p*) and the apparent diffusion coefficient (*ADC*). Regions of interest (ROI) were outlined by an experienced radiologist using both low b-value images (*b*=0 s/mm^2) and high b-value images (*b*=800 s/mm^2) for comparison. GTV change was determined using T1W images and Eclipse (Varian Medical Systems) freehand contouring tool.

Results: Three metastases showed total remission, fourteen showed partial response and two showed progression. Using the high b-value ROI fifteen out of seventeen metastases with total or partial response showed increased (or unchanged) *f* providing the highest specificity (least false positives). Using the low b-value ROI fourteen out of seventeen metastases with total or partial response showed markedly increased (or unchanged) *ADC* providing the highest specificity. In both cases progression of metastases was associated with decreased (or unchanged) *f* and *ADC*, respectively, i.e. no false negatives (Fig. 1).

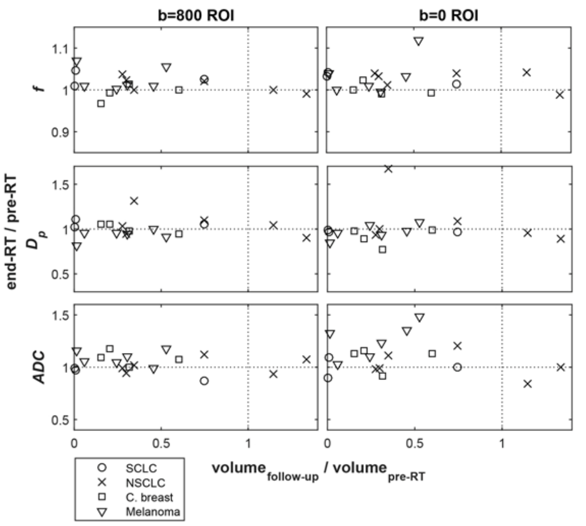

Fig. 1: Metastases are divided into primary disease and marked individually: Relative change in DW-MRI parameters (*f, D_p, ADC*) from pre-RT to end-RT, as a function of relative volume change between pre-RT and follow-up (T1W-MRI). With the *b*=800 ROI (first column), *f* has the highest specificity with no false negatives, and with the *b*=0 ROI, *ADC* has the highest specificity with no false negatives.

Conclusion: Data indicated that specific DW-MRI parameters (*f* and *ADC*) were capable of predicting RT response in brain metastases. This may become important in individualizing patients' prognoses and offering alternative (additional) treatments with less delay. (More data is available and currently being analyzed).

EP-1882

Brain connectivity changes in the presence of a glioblastoma

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Purpose or Objective: The aim of this study is to investigate brain connectivity of post-surgical tumor patient with resting-state fMRI and diffusion tractography (DTI). This is done to understand changes occurring due to the combined effect of tumor and surgery. Common resting state (RS) network called Default Mode (DMN) and white matter (WM) tracts connecting its regions were identified. The purpose was to study whether the functional connectivity reflects the underlying structural connectivity architecture.

Material and Methods: RS- (TR/TE=2.00s/30ms) and DTI-data (64-directions, 3T Philips Achieva) were acquired for one healthy subject and a glioblastoma patient. FSL was used for preprocessing and RS-network identification (MELODIC). DTI were corrected for eddy current distortion and BedpostX was run to generate the basis for probabilistic tractography using ProbtrackX. Masks derived for Prefrontal Cortex (PFC), Posterior Cingulate Cortex (PCC), Left and Right Angular Gyrus (L/RAG) from DMN were used to identify the connecting fibers. Combined masks from healthy and disrupted DMN regions were applied to identify all the possible connecting tracts. A plugin for MITK with CUDA rendering system supporting volume rendering of multiple datasets and tracts was developed to enhance our research and visualization.