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Early changes in multiparametric imaging parameters during radiotherapy of squamous carcinoma

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highest AUC was dose, as the combined features had AUC of 0.735.

Conclusion

These findings show that PET radiomic and dosiomic variables are correlated with local control of NPC. The model incorporating radiomic features from imaging and dose can predict local control in this type of head and neck cancer.

PO-123 Early changes in multiparametric imaging parameters during radiotherapy of squamous carcinoma
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Purpose or Objective

In the absence of strong pre-treatment predictive assays for outcome of radiotherapy of squamous carcinoma (SCC) we investigated the possibility to identify response during the first week of radiotherapy. In such an early stage of treatment adaptations like intensification or the opposite, are still possible. The aim of this study was to establish if responses are present shortly after treatment start and if the response differs significantly between patients/tumours.

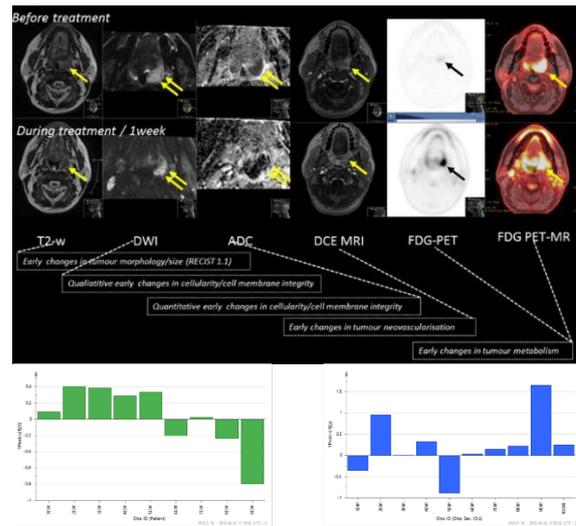
Material and Methods

Patients with SCC of the head and neck, cervix or anal canal were recruited in this early investigation. ¹⁸F-FDG-PET/MR studies were performed one week before start of radiotherapy or radio chemotherapy (baseline exam). On day 8 (7-9) of treatment, the procedure was repeated (treatment exam). The PET/MR investigations included functional MRI sequences, such as Echo Planar Diffusion weighted imaging (EPI-DWI) resulting in estimates for the apparent diffusion coefficient (ADC) and dynamic contrast enhanced MRI (DCE-MRI). From the PET studies Standard uptake values (SUV), both mean and maximum, were measured, as well as anatomical/distribution changes. The diagnostic images were reviewed for diagnostic evaluation according to "Response Evaluation Criteria in Solid Tumours" (RECIST 1.1) by two independent radiologists.

Multivariate statistical analysis of image data using OPLS-effect projections were used for individual effect analysis of early treatment changes.

Results

Twenty patients were recruited (10 head and neck cancers and 10 pelvic cancers). There were visible changes between baseline and treatment exams in many cases but none such that would reached the limit for response as defined by RECIST 1.1. One example showing visible changes and an overview of parameters in a case of tonsillar SCC is presented in (Fig1). The results of the OPLS-EP analyses show differences in the response between patients (Fig. 2).



Conclusion

The method combining functional MRI and PET for multimodal monitoring of treatment response indicates that tumour changes may occur as early as one week after start of treatment. This is supported by other observations in e.g. PET-studies and studies of labelling index before and after start of treatment. It is noteworthy that a number of response patterns can be detected and may thus have the potential to give individual information on tumour response.

The next step of this study is to correlate the findings to clinical outcome and to validate it in a larger cohort of patients. This part of the project is presently ongoing.

PO-124 Three-dimensional radiation dose of osteoradionecrosis in oropharyngeal cancer receiving IMRT

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Purpose or Objective

The advent of more conformal radiotherapy (RT) techniques such as IMRT carries the ability to limit dose to adjacent non-target structures. However, recent studies by our group and others reported no reduction in osteoradionecrosis (ORN) rates in oropharyngeal cancer (OPC) patients after IMRT in comparison to conventional radiotherapy techniques. Recent data by our group has demonstrated that a wide range of two-dimensional dose-volume parameters in the intermediate and high dose beam-path are associated with the development of ORN in patients with OPC treated with IMRT. Advanced ORN of the mandible is a debilitating condition and requires resection of the involved bone. To this end, we aim to further characterize the dosimetric correlated of advanced ORN by determining the three-dimensional (3-D) spatial dose distribution of the mandibular area of ORN.

Material and Methods

After institutional review board (IRB) approval, we identified patients with grade IV ORN requiring major surgery among patients with OPC treated with IMRT