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¹⁴ 18F-FDG PET/MR multiparametric measurement of head and neck cancer patients underwent modern 3D based radiotherapy - preliminary results

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Abstracts

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($n = 4$) shows a better view of the lymph nodes and 7,7% ($n = 2$) a better view of the primary tumour and the lymph nodes. However, in 7,7% ($n = 2$) the nuclear medicine physician assesses the supine position as superior in lesion detection. **Conclusion:** Prone position PET/CT improves the visualization of the primary tumour and the number of detected axillary lymph nodes. Therefore, it is a valuable addition to standard supine PET/CT for locoregional assessment of breast cancer patients. **References:** S.C. Teixeira et al, Additional prone 18F-fdg pet/ct acquisition to improve the visualization of the primary tumour and regional lymph node metastases in stage ii /iii breast cancer. In: S.C. Teixeira; Breast cancer tailored staging using molecular imaging. University of Amsterdam; 2016: p. 43–59.

TEPS-79

The effect of image based motion correction on the HRRT scanner

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Aim/Introduction: The aim of this study is to uncover for how many patients it is necessary to use HRRT_users_software_1.2 for image based motion correction on the HRRT. The scanner has a high resoluability of 2.5 mm which can cause the smallest movement to affect the image quality. Most of the patients scanned on the HRRT are diagnosed with either Parkinson's disease (PD) or Alzheimer's disease (AD). Because of the side effects from those diseases it is difficult for the patients to lie completely still during the scan. **Materials and Methods:** To narrow down the data we have chosen to focus on patients from three different projects: Project1 involving PD patients and healthy individuals all experiencing REMsleep behavior disorder (RBD). The patients where scanned with ^{18}F -Dopafor 20 minutes. Project2 involving PD patients with or without RBD scanned for 90 minutes using ^{11}C -Mener. Project3 wanted to exam the effect of ketones in the brain. The patients where scanned for 120 minutes using ^{18}F -FDGfor the last 60 minutes. The data was collected during the period May 2014 to March 2019. To map the movement of the patients we analyze the data with a Motion QC program, which is a part of HRRT_users_software_1.2. To determine if the images should be motion corrected we calculate the RMS displacement and maximum displacement. If the results exceed the determined references, we will make an image based motion correction using the Motion Correct program from the HRRT_users_software_1.2. **Results:** Project 1 showed that none of the patients had moved so much that an image based motion correction was necessary. Project 2 showed the need for motion correction in close to 18 % of the scanned patients. In project 3 we saw an even higher range of movement during the scans. It showed that 41 % of the scans needed to be motion corrected. **Conclusion:** The longer the patients has to lie in the scanner the harder it gets to stay completely still. Therefore the use of image based motion correction is justified for the long scans. Because the image based motion correction is a further image processing and it puts the results further from

the original raw data, we recommend making the scans as short as possible. **References:** None.

TEPS-80

^{18}F -FDG PET/MR multiparametric measurement of head and neck cancer patients underwent modern 3D based radiotherapy - preliminary results

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Aim/Introduction: PET/MR imaging provides a unique opportunity to acquire structural, metabolic and functional data simultaneously. The purpose of this study was to assess the predictive value of multiparametric PET/MR imaging data in head and neck cancer patients treated with radiotherapy. **Materials and Methods:** Twenty patients with histopathologically proven head and neck squamous cell carcinoma (HNSCC) treated with modern 3D based radiotherapy in our institutions were enrolled in this retrospective survey. FDG PET/MR imaging was performed before and after the therapy for all the subjects. Pretreatment tumor SUV_{max}, SUL_{peak}, total lesion glycolysis (TLG), and metabolic tumor volume (MTV) PET parameters and diffusion-weighted MR based ADC_{mean} parameters were measured. According to the result of post-therapy imaging 2 patient subgroups were created: 1: patients achieving complete response (CR) and 2: subjects with post-treatment viable tumor tissue (Non-CR). Pretreatment imaging parameters were correlated with therapy response. Statistics included Spearman's correlation and Mann-Whitney U test using SPSS 25 software.

Results: After completion of radiotherapy, imaging showed complete response for 8 patients while metabolically active tumor tissue was observed in 12 cases. We were unable to find statistically significant difference between the pretreatment SUV_{max} ($p=0,135$), SUL_{peak} ($p=0,343$), TLG ($p=0,135$) and ADC_{mean} ($p=0,734$) values of CR and Non-CR patient groups, although pre-therapy MTV parameter proved to be significantly higher in Non-CR group ($p=0,007$). Between the evaluated pretreatment PET and MR parameters, a weak correlation was only observed for PET SUV_{max} and MR ADC_{mean} values ($r=-0,346$ $p=0,135$).

Conclusion: According to our preliminary results pretreatment PET SUV_{max}, SUL_{peak}, TLG and MR ADC_{mean} parameters were unable to predict therapeutic response, while MTV seems to be more

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