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Standard protocol compared to a novel protocol for ^{68}Ga-PSMA-PET/CT in patients with recurrent prostate cancer - which one is superior?

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Purpose / Introduction: Since the clinical introduction of PET-imaging with ^{68}Ga-PSMA-11, this diagnostic tool has spread worldwide and is regarded as a breakthrough in the diagnosis of recurrent prostate cancer (PC). According to its first described clinical set-up, ^{68}Ga-PSMA-11 PET/CT is conducted at 1h post injection (p.i.). However, further publications demonstrated that later imaging (e.g. at 3h p.i.) show the majority of PC lesions with higher contrast. In 2017, we conducted scans at 1h p.i.. However, in 2018, we changed our protocol to later imaging timing. The aim of this evaluation was to compare the standard protocol of ^{68}Ga-PSMA-11 PET/CT with a novel protocol described below. **Subjects & Methods:** We retrospectively compared two patient cohorts scanned with ^{68}Ga-PSMA-11 PET/CT in 2017 (n=94 patients) and 2018 (n=75 patients). In 2017, the scanning protocol was as follows: acquisition at 1h p.i. (targeted activity: 200 MBq) with 2 min per bed position, neither hydration nor forced diuresis. In 2018, the scans were conducted at 1.5h p.i. (also 2min per bed position and targeted activity of 200 MBq). In addition, the patients started to drink 1L of water at 0.5h p.i. and were injected with 20mg of furosemide at 1h p.i.. Rates of pathologic scans, maximum standardized uptake values (SUVmax) of tumor lesions (n=164 in 2017 and n=127 in 2018), average standardized uptake values (SUVmean) of urinary bladder as well as tumor contrast (SUVmax-tumor/SUVmean gluteal musculature) were measured in all patients. **Results:** Average tumor contrast was significantly (p=0.0451) higher in 2018 compared to 2017 (59.0 vs. 46.1). Average SUVmean of the urinary bladder was significantly (p<0.0001) lower in 2018 (SUVmean 7.6 ± 24.6) compared to 2017 (SUVmean 35.3 ± 7.6). Also the background activity was significantly (p<0.0001) lower in 2018. No relevant differences were detected for SUVmax of tumor and the rate of pathologic scans (2017: 80.9%; 2018: 80%; both numbers for PSA≤3.0 ng/ml). **Discussion / Conclusion:** Despite highly promising results of the novel protocol including significantly higher tumor contrast and lower urinary activity which enable the assessment of tumor lesions and local recurrent PC, respectively, no higher rate of PET-positive patients were observed in the relatively low patient cohorts. However, we expect that with increasing scan numbers, more tumor lesions and more pathologic scans will be detected in a few percent of patients referred to PSMA-PET/CT thereby changing their therapeutic procedure.

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SUVmax behavior in metformin-treated patients with pulmonary disease

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Purpose: the aim of this study was to evaluate the difference of SUVmax of the primary or secondary lung cancer in diabetic patients undergoing metformin therapy. In particular the SUVmax behavior between patients who assumed and those who stopped metformin 48h prior FDG PET examination was made. **Materials and methods:** from a monocentric database, 518 patients with primary or secondary pulmonary disease undergoing FDG PET/CT were collected. Seventy-four patients were affected by diabetes mellitus and 29 were under treatment with metformin. The value of SUVmax for the pulmonary lesion was calculated for each patients and thereafter compared in accordance with the assumption of metformin before PET examination. T-student year was used for comparing continuous variables. **Results:** Metformin was withdrawn 48h before the examination in 15/29 patients. The median age of patients was 72 years (range 52-85). The median level of sugar in the blood was 128 mg/dL (range 76-199) before the FDG injection. The median value of SUVmax was 4,48 (0-23,39). PET/CT was positive in 15 subjects. The value of SUVmax in patients who stopped metformin 48h prior PET was 5.75 ± 5.82 while in those who did not discontinue metformin, the value was 6.75 ± 7.94 (p = NS). The glycemic value and the value of the administered dose of FDG between the two groups was similar (127 ± 21 vs. 130 ± 35 mg/dL and 232 ± 52 vs. 219 ± 47 MBq, respectively in patients without and with metformin suspension; p = NS). **Conclusions:** our preliminary analysis shows that the metformin withdrawn for at least 48h prior PET scan does not alter the metabolic behavior of the lung lesions in cancer patients. Therefore, the anti-cancer activity of metformin would appear to be present even in the event of short suspensions.

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Diagnostic impact of Dual-Time-Point ^{18}F-FDG PET/CT in detection of liver metastasis

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Aim: to evaluate the utility of dual-time imaging with ^{18}FDG-PET/CT in the detection of liver metastasis by analysis of differences between standard and delayed acquisition. **Methods:** we evaluated 87 cancer pts who underwent, from Jan 2015 to Dec 2017 PET/CT performing the delayed acquisition. We compared the results of the whole-body scan (PET1) with the delayed scan (PET2) performed by two fields of view (FOV) of the abdomen. Both studies were evaluated qualitatively analysing standardized uptake value (SUV) of lesions. We divided the patients in according to the pathology. PET results were then confirmed by radiological/histological data when available, or follow up. **Results:** we study 87 pts (male 50) who underwent PET1 one hour after FDG injection and PET2 about a mean time of 60 minutes after PET1. Pts were clinically: 29 colorectal, 19 breast, 7 lung, 28 different type and 4 pts with 2 different tumours. At PET1 62/87 pts had one or more lesions for a total number of 106, 25/87 pts had no lesions at liver; at PET2 64/87 pts had one or more lesions for a total number of 122, 23/87 patients had no lesions at liver. Evaluating number of lesions, in 51/87 pts there were no differences between the two acquisition, in PET2 we found an increase in the number of liver lesions in 14/87 pts and a decrease in 10/87. Specifically, in 7 cases lesions disappeared