for both radiotracers. **Results:** 18F-PSMA-1007 uptake in bladder lesions and regional lymph nodes progressively increased between 5, 90 minutes and 2 hours. A total of 11 lesions were identified in the 4 patients using 18F-PSMA-1007 and 9 using 18F-FDG. Two patients had undergone transurethral resection and had no active macroscopic lesions in the bladder. 18F-PSMA-1007 detected bladder lesions in the other 2 patients (SUVmax = 9.8 and 23.4), while FDG detected only 1 (SUVmax = 30.0), with the other lesion indistinguishable from radioactive urine, even after diuretic administration. Both tracers detected lymph node metastases in 3 patients (SUVmax = 4.1 to 15.8, and 9.5 to 18.3, respectively, for 18F-PSMA-1007 and 18F-FDG), and bone metastasis in 1 patient (SUVmax = 11.1 and 10.1 for 18F-PSMA-1007 and 18F-FDG, respectively). Two patients had pulmonary inflammatory/infectious processes that were FDG-avid but not 18F-PSMA-1007-avid. **Conclusion:** PET/CTs with 18F-FDG and 18F-PSMA-1007 appear to have similar sensitivities for MIBC lesions. Due to lower uptake in inflammatory processes, 18F-PSMA-1007 appears to have higher specificity and, due to significantly lower urinary excretion than 18F-FDG, may be more favorable for evaluating the primary bladder lesion. The significant uptake of 18F-PSMA-1007 in MIBC lesions raises the possibility of theranostic approach in selected patients.

Keywords: 18F-FDG PET/CT, bladder cancer, PSMA PET;.

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COMPARISON OF IBI AND PBI CALCULATED FOR 68GA-PSMA AND 18F-FDG IN MULTIPLE MYELOMA PATIENTS

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Introduction/Justification: The benefits of using 18F-FDG PET/CT for staging and managing treatment in patients with multiple myeloma (MM) are extensively documented. Recent studies indicate that 68Ga-PSMA PET/CT is also an excellent marker for MM lesions and may complement 18F-FDG due to the significant genetic heterogeneity observed in these patients' lesions. The involvement of bone tissue stands out as one of the most critical aspects of MM. To quantify this involvement, two quantitative parameters have recently been proposed: Percentage of Bone Involvement (PBI) and Intensity of Bone Involvement (IBI). **Objectives:** This study aims to compare PBI and IBI in 68Ga-PSMA and 18F-FDG PET/CT images for multiple myeloma patients. **Materials and Methods:** Fifteen patients were included in the study, 8 men (53.3%), with a mean age of 66.7 ± 10.7 years. The patients underwent 68Ga-PSMA and 18F-FDG PET/CT scans with a maximum interval of 8 days between images (median 4 days). The bone tissue was segmented in the images based on the Hounsfield scale of the CT image, followed by processing for closing of the volume of interest (VOI). Both PBI and IBI were calculated for the two radiotracers, with the liver SUV used as a reference for 18F-FDG and the left atrium as a reference for 68Ga-PSMA. Spearman's rank-order correlation assessed the relationship between PBI and IBI data. **Results:** On average, PBI values were higher for 68Ga-PSMA than for FDG, at 3.07% ± 2.5% and 1.96% ± 3.8%, respectively. The mean IBI values were similar for both radiotracers: 0.08 ± 0.13 for 18F-FDG and 0.08 ± 0.09 for 68Ga-PSMA. The median IBI calculated for 68Ga-PSMA was 0.05, higher than the 0.01 found for 18F-FDG. Despite the similarity in average values between 68Ga-PSMA and 18F-FDG, the maximum PBI and IBI values were found in different patients for both radiotracers. Additionally, the Spearman test did not indicate correlation between the variables: ($r = 0.39$; $p = 0.16$) for PBI and ($r = 0.41$; $p = 0.13$) for IBI. **Conclusion:** The average and maximum values of PBI and IBI for 68Ga-PSMA and 18F-FDG are close. However, no correlation was found between them, highlighting that the heterogeneous genetic profile of the disease results in different uptake patterns for both radiotracers.

Keywords: FDG, IBI, multiple myeloma, PSMA.

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18F-FLUORIDE PET/CT vs 18F-PSMA-1007 TO DETECT BONE METASTASES IN PROSTATE CANCER – A HEAD-TO-HEAD PROSPECTIVE COMPARISON

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Introduction/Justification: There have been no head-to-head prospective studies comparing the ability of 18F-Fluoride PET/CT and 18F-PSMA-1007 PET/CT to detect bone metastases due to prostate cancer. So, this study aims to investigate the capacity of 18F-PSMA-1007 to detect bone metastases compared to the reference standard (18F-Fluoride PET/CT) in PCa patients, considering mainly the presence or absence, number and biodistribution of lesions. **Objectives:** This prospective study aimed to compare the ability of 18F-PSMA-1007 PET/CT and 18F-Fluoride PET/CT to detect bone metastases. **Materials and Methods:** Twenty-eight patients with prostate cancer biochemical recurrence were submitted to both 18F-PSMA-1007 PET/CT and 18F-fluoride PET/CT studies. These two radiotracers evaluated the presence or absence, number of lesions, body and bone localization, lesion pattern, and probability of malignancy. **Results:** Twenty-eight patients with prostate cancer biochemical recurrence, mean age of 70.8 ± 8.7 years; Gleason score = 7.72 ± 1.23 and the mean total PSA = 50.2 ± 183.9 ng/mL were included. On a per-patient basis, considering that 18F-Fluoride PET/CT is the gold standard, the 18F-PSMA-1007 PET/CT presented a concordance rate of 96.43%, sensitivity (S) of 92.3%, specificity (E) of 100%, predictive positive value (PPV) of 100% and predictive negative value (PNV) of 93.80% on lesion detection. Evaluating the number of lesions, 18F-PSMA-1007 PET/CT determined a PPV of 91.8% and sensitivity of 86.5%. Bone localization in 18F-Fluoride and 18F-PSMA-1007 were predominant in the dorsal spine (34.62%/62.65%), ribs (32.69%/32.65%)and pelvis (9.62%/12.24%), respectively. Both studies had a concordant rate of 80.76% on rib evaluation, the most conflicting site of uptake between the methods in actual literature. **Conclusion:** 18F-PSMA-1007 has the same ability as 18F-Fluoride to detect PCa bone metastasis in biochemical recurrence, with concordance of 96,43% and 80,00% on a per-patient and per-lesion evaluation, respectively. Both studies demonstrated predominancy of sclerotic and medullar lesions, located preferentially on dorsal spine and ribs, being the last one concordant in 80,76% of studies.

Keywords: Bone metastasis, Fluoride PET/CT, Prostate cancer, PSMA PET/CT, 18F-PSMA-1007.

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COMPARISON OF PET/CT IMAGES WITH 18F-FDG AND 18F-PSMA-1007 IN MUSCULOSKELETAL TUMORS TO EVALUATE THE POTENTIAL OF THERANOSTICS APPROACH

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Introduction/Justification: Sarcomas are malignant tumors in the bone, cartilage, fat, muscles, and vessels. Sar- comas are highly heterogeneous due to the wide variety of histological subtypes and various ana- tomical locations, and thus, the diagnosis and management of these tumors are challenging. Beyond sarcomas, the musculoskeletal system is a frequent site of metastatic tumors and multiple myeloma with lesions that present difficult local control. Imaging exams such as MRI and 18F-FDG (FDG PET/CT) to assess the extent of these tumors play a crucial role in managing these patients. However, PET/CT imaging with 18F-PSMA-1007 (PSMA PET/CT) may be a more interesting diagnostic marker due to the potential Theranostics implications. **Objectives:** This study aimed to compare the performance of FDG PET/CT and PSMA PET/CT images in patients with advanced-stage unresectable recurrent and metastatic musculoskeletal tumors. **Materials and Methods:** Patients underwent FDG PET/CT and PSMA PET/CT imaging with a 24-hour interval be- tween studies. Two nuclear medicine physicians compared imaging findings. **Results:** Eight patients underwent FDG PET/CT and PSMA PET/CT images. In five patients, PSMA uptake was higher than FDG uptake. The highest PSMA uptake occurred in a giant cell recurrent sacral tumor of a 27-year-old male patient; the SUVs for PSMA and FDG were 100 and 16, respectively. A 58-year-old male patient with osteolytic metastasis from renal cell carcinoma in the right scapula presented PSMA uptake higher than FDG (SUVs = 40 and 11, respectively). A recurrent spin- dle cell neural tumor in the upper limb of a 69-year-old male presented PSMA uptake also higher than FDG (SUVs = 27 and 8, respectively). A myxofibrosarcoma mass in the distal right leg of a 61- year-old female presented higher PSMA uptake slightly higher than FDG uptake (SUVs = 18 and 10, respectively). Interestingly, two patients with chordomas had heterogeneous PSMA and FDG up- take. The PSMA PET/CT of a 65-year-old male patient presenting multiple metastases from chor- doma with soft tissue invasion showed uptake higher than FDG in all lesions; the highest SUV was a lesion in the right acetabulum: PSMA SUV = 32 and FDG SUV = 19. This patient presented PSMA-avid additional sites of metastases in mediastinal lymph nodes and the right hepatic lobe, while FDG uptake was minimal in these metastases. In contrast, an FDG PET/CT of a 54-year-old male with a large recurrent chordoma (30x24 cm mass) extending from the level of L4 to the proximal left thigh presented FDG uptake higher than PSMA uptake (SUVs = 31 and 9, respectively). Also, FDG uptake of two patients (52-year-old males) with desmoid tumors in the upper limb was higher than PSMA uptake, although uptake of both radiotracers was low: PSMA SUVs of 3 and 5, and FDG SUVs of 4 and 7. **Conclusion:** The study results show the potential advantage of using PSMA PET/CT and FDG PET/CT to provide additional