to address clinical uncertainty about the presence of estrogen receptors. In 40% of the staging/restaging subgroup, 18F-fluoroestradiol contributed to the clinical reasoning. 18F-FES showed uptake in lymph nodes without hypermetabolism and was able to provide diagnostic specificity, either by raising suspicion in a finding initially taken as benign or by predicting false-positive metabolic findings due to the absence of estrogen receptors. Regarding the evaluation of hormone receptor expression status, 18F-fluoroestradiol has supported a proposed change in the tumoral immunohistochemistry of a lesion non-invasively. **Conclusion:** 18F-FES PET/CT appears to provide additional relevant information in breast cancer, but future studies should evaluate the method's impact on clinical management.

Keywords: 18F-FDG PET/CT, breast cancer, FES.

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COMPARISON OF 18F-FDG AND 18F-PSMA PET/CT IN PATIENTS WITH NON-SMALL CELL LUNG CANCER

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Introduction/Justification: Lung cancer remains a major global cause of mortality. While 18F-FDG PET/CT is widely utilized for detection, staging, and monitoring, detecting increased glucose metabolism in tumor cells, it lacks theranostic potential. The prostate-specific membrane antigen (PSMA) tracer, initially linked to prostate cancer, is also recognized as a marker of neoangiogenesis, accumulating in various neoplasms and showing promising theranostic capabilities. **Objectives:** This study aims to compare the uptake patterns of 18F-FDG and 18F-PSMA in primary and metastatic lesions of non-small cell lung cancer. **Materials and Methods:** Four male patients diagnosed with non-small cell lung cancer (including two adenocarcinomas, one squamous cell carcinoma, and one unspecified type), aged between 58 and 71 years, underwent PET/CT imaging. 18F-FDG PET/CT scans were performed 60 minutes after intravenous administration of 0.1 mCi/kg of 18F-FDG, while 18F-PSMA PET/CT scans were obtained 90 minutes after intravenous injection of 0.1 mCi/kg of 18F-PSMA. Imaging data were analyzed by two nuclear medicine physicians and one radiologist. The maximum standardized uptake value (SUVmax) of each lesion was measured for both radiotracers in the primary tumor, lymph nodes, and metastatic sites identified through visual analysis, considering values obtained above the cardiac blood pool measured in the left atrium. **Results:** A total of 100 lesions were detected, with 82 identified using 18F-FDG and 92 using 18F-PSMA. Eight lesions were exclusively detected by 18F-FDG, while 14 were only identified by 18F-PSMA. The median SUVmax of lesions in 18F-FDG and 18F-PSMA images was 5.3 (1.7 – 25.0) and 3.7 (0.7 - 12.4), respectively. Brain lesions were more readily identified on 18F-PSMA images, whereas liver lesions were more notable on 18F-FDG images due to the intense physiological uptake of 18F-FDG and 18F-PSMA in the brain and liver, respectively. **Conclusion:** Both 18F-FDG-PET/CT and 18F-PSMA-PET/CT have the ability to identify most lesions of non-small cell lung cancer. Although 18F-PSMA images detected a greater number of lesions, the uptake intensity is generally higher with 18F-FDG. These findings suggest that the two radiopharmaceuticals may have complementary roles in lung cancer by independently detecting lesions with higher glycolytic activity or greater neoangiogenesis, or both simultaneously, which could contribute to a more personalized approach in managing these patients. The results also suggest a possible theranostic approach in selected patients with high uptake of PSMA. Further investigations involving a larger patient cohort are essential to validate these findings.

Keywords: Lung cancer, PET/CT, PSMA-18F, PSMA-68Ga, Theranostic.

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COMPARISON OF 68GA-PSMA AND 18F-FDG-PET/CT IN THE ASSESSMENT OF DESMOID TUMORS

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Introduction/Justification: Recently, the tracer Prostate Specific Membrane Antigen (PSMA), which can be labeled with the radioisotopes 68Ga or 18F, has been commercially

introduced. Theoretically, as the name suggests, it is a substance specific to the membrane of prostate cells and prostate cancer. However, several studies have shown that it is also a marker of neoangiogenesis, leading to its uptake in various other neoplasms and benign diseases. **Objectives:** This study aims to evaluate the utility of radiolabeled PSMA in detecting desmoid tumors, comparing it to 18F-luorodeoxyglucose (FDG). **Materials and Methods:** Three participants with a confirmed diagnosis of desmoid tumor underwent PET/CT examinations with 18F-PSMA and 18F-FDG, with a maximum interval of 3 days between examinations. Images were visually compared lesion by lesion and the maximum standardized uptake value (SUV) was calculated for each lesion and each radiopharmaceutical. **Results:** All lesions presented uptake of both 68Ga-PSMA and 18F-FDG. In the first patient, 3 lesions were identified: a mass adjacent to the pancreas measuring 5.4 cm (FDG: SUV = 2.0) (PSMA: SUV = 8.2), a mass in the right iliac fossa measuring 7.7 cm (FDG: SUV = 3.8) (PSMA: SUV = 5.7), and another involving the duodenojejunal transition measuring 4.1 cm (FDG: SUV = 1.9) (PSMA: SUV = 3.7). In the second patient, a mass was identified adjacent to the head and uncinate process of the pancreas measuring 9.2 cm (FDG: SUV = 9.8) (PSMA: SUV = 6.1). In the third patient, an irregular retroperitoneal mass was identified at the level of the aortic bifurcation (FDG: SUV = 2.3) (PSMA: SUV = 2.4). **Conclusion:** Desmoid tumors can demonstrate uptake of both 68Ga-PSMA and 18F-FDG. The intensity of tracer uptake in the lesions is variable, with some showing greater uptake of FDG, others of PSMA, suggesting a potential complementary role for these radiotracers in desmoid tumors.

Keywords: Cancer, Desmoid tumor, PET/CT, PSMA-18F, PSMA-68Ga.

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INFLUENCE OF A CONVENTIONAL CHELATOR-MODIFIED ANTI-INTEGRIN PEPTIDE ON PROLIFERATION AND MIGRATION OF HEAD AND NECK CANCER CELLS

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Introduction/Justification: Head and neck squamous cell carcinoma (HNSCC) represents a serious health problem worldwide. Approximately 75% of patients with HNSCC have locally advanced disease at diagnosis, and the therapy for those cases involves chemoradiation or induction chemotherapy, in which cisplatin is included despite of its substantial side effects. FAPESP-founded "Cancer Innovation Center with Emphasis on Metals and Theranostics" (CancerThera) is dedicated to the development of new metallopharmaceuticals and radiopharmaceuticals for tumor diagnosis and treatment. Among these developments, an anti-integrin peptide modified by a conventional spacer (C6) and chelator (DOTA) was evaluated as a potential treatment of HNSCC. Overexpressed in HNC, integrins are transmembrane proteins that play essential roles in cell proliferation and migration. Therefore, integrin inhibition may be a potential targeted therapy for HNC patients. **Objectives:** The study aimed to evaluate the effects of the DOTA-C6-anti-integrin peptide on HNSCC cell lines proliferation and migration, as an initial step for HNSCC theranostic development. **Materials and Methods:** The anti-proliferative activity of the DOTA-C6-anti-integrin peptide (0.01nM - 100μM) was assessed against FaDu and SCC-25 cells by considering the cell amounts at baseline and 48h after exposure (two untreated control groups). All cells were fixed with 50% trichloroacetic acid and stained with sulforhodamine B. Spectrophotometric absorbance was performed at 540nm in a microplate reader. Cell migration was assessed in FaDu cells and FaDu cells treated with the DOTA-C6-anti-integrin peptide (1, 10, and 100μM) using the wound-healing assay. Wound cells were photographed immediately (0h) and after 16h, 24h, and 40h. Images were analyzed by the ImageJ software (National Institutes of Health). For statistical analysis, samples did assume normal distribution in Shapiro-Wilk's test, thus we used t test to compare the groups using SPSS 21 software (SPSS Incorporation). **Results:** At the tested concentration range, the DOTA-C6-anti-integrin peptide did not affect proliferation of FaDu or SCC-25 cells. In FaDu cells, the DOTA-C6-anti-integrin peptide significantly ($p < 0.05$) inhibited migration in comparison to untreated cells, independent on sample concentration (1, 10, and 100μM) or time exposure (16, 24, or 40 h). **Conclusion:** Despite the lack of anti-proliferative effect, the DOTA-C6-anti-integrin peptide inhibited migration in FaDu cells. As cell migration is an important process in HNSCC progression, our data present preliminary evidence that the DOTA-C6-anti-integrin may be used in development of theranostic agents for HNSCC. **Acknowledgements:** The study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNP #429463/2018-9), Fundação de Apoio ao Ensino e à Pesquisa do Estado de São Paulo (FAPESP #2023/09738-4, FAPESP #2023/012810-9, Cancer Theranostics Innovation Center, (CancerThera), CEPID FAPESP #2021/10265-8), and International Atomic Energy Agency (IAEA) technical cooperation projects for development of Latin American Countries (IAEA/TCLAC: EX-BRA6033-2401375).

Keywords: Cell migration, Head and neck cancer, Theranostic.

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