COMPARISON OF PET/CT IMAGES WITH 18 F-FDG AND 18 F-PSMA-1007 IN RELAPSED ADENOID CYSTIC CARCINOMA

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Introduction/Justification: Adenoid cystic carcinoma (ACC) is a tumor of the salivary glands, characterized by insidious growth, recurrences, and distant metastases. **Objectives:** This study aimed to describe the findings of PET/CT images performed with 18 F-FDG (FDG PET/CT) and 18 F-PSMA-1007 (PSMA PET/CT) in patients with relapsed ACC to verify whether any of these studies are more suitable for identifying local recurrence and distant metastases. **Materials and Methods:** Patients were submitted to restaging PET/CT studies with 18 F-FDG and 18 F- PSMA-1007 with a 24-hour interval between exams before treatment. Two nuclear medicine physicians compared imaging findings. **Results:** Patient 1. P.A.C., a 29-year-old female, was diagnosed with ACC of the parotid in 2016. She underwent total parotidectomy and RT. In 2021, a chest computed tomography (CT) identified lung nodules, and the patient underwent resection of the largest lesions. In 2024, the patient was submitted to restaging images with FDG PET/CT that were negative for metastases, but PSMA PET/CT images identified mild PSMA uptake in two pulmonary nodules (0.8 cm, SUV = 2.2; 0.9 cm, SUV = 3.4) suspicious for ACC metastases. The patient remains asymptomatic under supervised follow-up. Patient 2. L.C.O., a 49-year-old male with newly diagnosed ACC in the salivary gland, underwent tumor resection and RT in 2010. The patient recurred in lungs and skull and was submitted to resection of the lung nodules and total skull radiotherapy (RT). In 2022, the patient underwent RT to a metastasis in the 5th lumbar vertebrae. In 2023, FDG PET/CT revealed hypermetabolism in multiple pulmonary nodules (the largest measuring 1.8 cm, SUV = 13.4) and in the L5 vertebrae (SUV = 8.5), consistent with metastases. The PSMA PET/CT showed only mild PSMA uptake in the pulmonary nodules (the largest nodule had a SUV = 4.7) and similar PSMA uptake (as FDG) in L5 vertebrae (SUV = 8.7). The patient is currently asymptomatic. Patient 3. P.C.S., a 46- year-old male, was diagnosed with ACC in the parapharyngeal space and underwent surgical resection followed by RT in 2008. In 2022, a chest CT identified lung metastases, the largest nodule with 3.8 cm. In 2023, a FDG PET/CT demonstrated hypermetabolic lung nodule metastases (the largest measuring 3.0 and 3.8 cm; SUV = 12.3 and SUV = 6.1, respectively). The FDG PET/CT also demonstrated multiple liver nodules (the largest measuring 2.7 cm) without FDG uptake, suspicious for metastases. A PSMA PET/CT showed PSMA uptake in the same lung nodules, however incongruent when compared to FDG uptake: the two nodules measuring 3.0 and 3.8 cm had SUVs of 5.2 and 8.8, respectively). The patient currently reports dyspnea during moderate-intensity physical activity. **Conclusion:** The data show heterogeneity in FDG PET/CT and PSMA PET/CT findings in relapsed ACC. Combining both PET/CT radiotracers can provide additional information for monitoring patients. PSMA PET/CT has the advantage of the possibility of a theranostic approach. **Acknowledgements:** The study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Apoio ao Ensino e à Pesquisa do Estado de São Paulo (Cancer Theranostics Innovation Center, 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: Adenoid cystic carcinoma, FDG PET/CT scan, PSMA PET/CT scan.

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EVALUATION IN VITRO OF THE GOLD(I) COMPLEX WITH TRIPHENYLPHOSPHINE AND 4-DIMETHYLAAMINEPYRIDINE AS LIGANDS IN SKIN CANCER

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Introduction/Justification: Closely related to high UV exposure and comprising basal cell carcinoma, squamous cell carcinoma (SCC), and melanoma, skin cancer is the most prevalent tumor in the world. Cisplatin has been used for treatment of patients with skin squamous cell carcinoma (SSCC) with low response rate and pronounced adverse effects. Thus, the search for new chemotherapeutic agents for patients with SSCC or melanoma is required, and gold complexes have been explored as potential anticancer drugs. Targeting thioredoxin reductase or thiol-rich proteins, many gold complexes can induce cell death by reactive oxygen species. **Objectives:** Our study aimed to evaluate the in vitro anti-proliferative effects of a gold(I) complex with triphenylphosphine and 4-dimethylaminopyridine as ligand. **Materials and Methods:** The gold (I) complex was synthesized at the Department of Inorganic Chemistry, Institute of Chemistry, University of Campinas. Melanoma (UACC-62), squamous cell carcinoma of tongue (SCC4 and SCC15), and a non-tumoral cell line (HaCat, immortalized keratinocyte) were grown in complete medium

[RPMI-1640 (Gilco®) supplemented with 5% fetal bovine serum (Gilco®) and 1% penicillin:streptomycin mixture (1000 U/mL:1000 μg/mL, Vitrocell, Brasil)] at 37 °C and 5% CO2. Each cell line (100 μL/well, in 96-well plates, 4 - 6 x10^4 cel/ml) was exposed to the gold (I) complex (100 μL/well, 0.25 to 250 μg/mL, in triplicate) and incubated for 48 h. Doxorubicin (100 μL/well, 0.025 to 25 μg/mL, in triplicate) was used as a positive control. Before (T0) and after (T1) sample addition, cells were fixed with 50% trichloroacetic acid (TCA, 50 μL/well), and cell viability was determined using the sulforhodamine B protocol at 540 nm with a microplate reader spectrophotometer (VersaMax, Molecular Devices). The difference between T0 and T1 absorbance values represented 100% of cell growth, and the proliferation (%) of each cell line in the presence of each sample concentration was calculated accordingly. Effective concentration representing the sample concentration required to promote 50% growth inhibition (GI50) for each cell line was calculated by sigmoidal regression using Origin 8.0 software. **Results:** The gold(I) complex showed potent anti-proliferative effect against UACC-62 cells (GI50 < 0.25 μg mL-1) being less active against SCC15 (GI50 ≈ 2.5 μg mL-1) and SCC4 (GI50: 10.2 μg mL-1) cells. Moreover, the anti-proliferative effect of gold(I) complex showed a good selectivity being almost 10x less active against HaCaT cells (GI50 ≈ 2.5 μg mL-1) in comparison to melanoma cells. **Conclusion:** This data indicated gold(I) complex with triphenylphosphine and 4-dimethylaminopyridine as ligands as a promisor candidate for treatment of patients with melanoma. Further in vitro and in vivo evaluations is required to evaluate the mechanism of action and toxicity of the complex. **Acknowledgements:** The study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Apoio ao Ensino e à Pesquisa do Estado de São Paulo (FAPESP #2016/07729-4; #2023/09738-4; 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: Antiproliferative effect, Gold(I) complex, Melanoma, SSCC.

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COMPARISON OF 18 F-FDG AND 18 F-PSMA-1007 PET/CT IN ADVANCED LOCOREGIONAL SQUAMOUS CELL CARCINOMA OF HEAD AND NECK: PRELIMINARY RESULTS

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Introduction/Justification: Head and neck squamous cell carcinoma (HNSCC) is a health problem worldwide. Most patients with HNSCC have locally advanced disease, and progression or relapse of the tumor after treatment are common events. Imaging exams to assess the existence and/or extent of the tumor play a crucial role in managing these patients. 18 F-FDG and 18 F-PSMA-1007 are markers of glycolytic activity and neo angiogenesis, respectively. The PET/CT images performed with 18 F-FDG (FDG PET/CT) have unequivocal contribution in HNSCC, but the importance of the images with 18 F-PSMA- 1007 (PSMA PET/CT) in tumor is still unclear. **Objectives:** The aim of this study was to describe the findings of FDG PET/CT and PSMA PET/CT in patients with advanced locoregional HNSCC at diagnosis or relapse with the purpose of verifying whether any of these exams is more suitable for detecting the tumor. **Materials and Methods:** Patients with advanced locoregional HNSCC at diagnosis or relapse of HNSCC were enrolled in study. Patients who underwent surgical resection of the tumor or treatment with radio chemotherapy in the last six months were excluded from the study. All patients were submitted to FDG PET/CT and PSMA PET/CT with a 24-hour interval between exams. Two nuclear medicine physicians and one radiologist analyzed the images. Comparisons between groups were analyzed by t-test, and differences were significant when p-values were < 0.05. **Results:** Five patients (three patients at diagnosis and one relapsed patient) were analyzed by both PET/CT images. The median age of patients was 60 years old (variation: 52-75), four were males and 1 was female. Most patients were smokers/ex- smokers and/or drinkers/ex-drinkers, had good performance status (ECOG 0), and presented tumors at stage IV. The primary tumor was localized in oropharynx/larynx (with lymph node isease), and relapses were seen mainly in lungs, liver, and bone. The HNSCC lesions were typically characterized by FDG uptake, but most lesions also exhibited varying degrees of PSMA uptake. In primary tumors and lymph node disease, mean ± SD and median (min-max) values of SUV found with FDG PET/CT scan at 1 hour were 21.1 ± 7.6 and 21.0 (14.0-33.1) and 9.0 ± 6.1 and 7.2 (2.7-18.8), respectively. For PSMA PET/CT scan, mean ± SD and median (min-max) values of SUV at 1 hour in primary tumors and lymph nodal disease were 4.0 ± 1.0 and 3.7 (2.9-5.3) and 9.0 ± 6.1 and 7.2 (2.7-18.8), respectively. The values of FDG uptake were higher than values of PSMA uptake in both primary tumors ($p = 0.001$) and lymph nodes ($p = 0.02$). **Conclusion:** HNSCC lesions were better detected by PET/CT images with 18F-FDG than with 18 F-PSMA-1007. The uptake of both markers in most tumors indicates that glycolytic activity and neoangiogenesis occur in HNSCC, enabling a more personalized approach in patient management. Nevertheless, the current study's sample size was small to draw conclusive results. **Acknowledgements:** The study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Apoio ao Ensino e à Pesquisa do Estado de São Paulo (Cancer Theranostics Innovation Center, CancerThera, CEPID FAPESP #2021/10265-8), nd International Atomic