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FDG PET/CT AND PSMA PET/CT IN MUSCULOSKELETAL SOFT TISSUE SARCOMAS

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A B S T R A C T

Introduction/Justification: Soft tissue musculoskeletal sarcoma (STS) is a rare and varied class of mesenchymal-derived malignancies. Due to its histopathological heterogeneity and presence in different body locations, its diagnosis and treatment continue to present a significant medical challenge. In nuclear medicine, 18F-FDG PET/CT (FDG PET/CT) has been used to grade sarcomas, predict their prognosis, and assess therapy response. Although prostate-specific membrane antigen (PSMA) has been mainly used to detect prostate cancer metastases with PSMA PET/CT imaging and treat with 225Ac/177Lu-PSMA, this antigen has been shown to accumulate in non-prostatic tissues, including several types of sarcomas. **Objectives:** Evaluate the potential of PSMA PET/CT in diagnosing different types of STSs compared to FDG PET/CT, with the aim of expanding the clinical management of these patients and the potential of a Theranostics strategy with radiolabeled PSMA. **Materials and Methods:** Forty-four participants (20 females) with STS were prospectively enrolled and submitted to FDG PET/CT and PSMA PET/CT for primary staging, with a 48-hour interval between studies. SUVmax values were obtained in both studies of the primary STS lesion, locoregional lymph node metastases (LRLNs), distant lymph node metastases (DLNs), and bone metastases. SUVmax values among FDG PET/CT and PSMA PET/CT studies were normalized using the mediastinum SUVmax as a standard reference. The number of metastases detected by FDG PET/CT and PSMA PET/CT were also compared, as well as the absolute SUVmax values. **Results:** The absolute SUVmax values were higher on PSMA PET/CT compared to FDG PET/CT, respectively for the primary STS lesions (18.5 vs 12.8), for LRLNs (8.0 vs 4.5) and bone metastases (8.7 vs 3.2), while these values were similar for DLNs (3.0 vs 4.0). When the SUVmax values were normalized using the mediastinum as a reference the ratio comparing PSMA PET/CT to FDG PET/CT showed, respectively: 10.3 vs 5.3 for the primary STS; 4.7 vs 2.0 for LRLNs; 4.8 vs 2.9 for bone metastases; and 1.7 vs 1.7 for DLNs. PSMA PET/CT detected more LRLNs compared to FDG PET/CT (10 patients vs 7

patients, respectively) and more bone metastases (5 patients vs 3 patients). The detectability of DLNs was equal in both studies (7 patients). **Conclusion:** Our preliminary findings indicate that PSMA PET/CT is a potential diagnostic tool for staging sarcomas patients. Due to the high uptake in the primary STS lesions and metastases, there is a potential for a theranostics approach. This study received financial support from the São Paulo State Foundation for Teaching and Research Support (Cancer Theranostics Innovation Center, (CancerThera), CEPID FAPESP #2021/10265-8).

Keywords: 18 F-PSMA PET/CT, 18F-FDG PET/CT, Sarcoma, Theranostics.

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ACHADOS METABÓLICOS PÓS VACINAÇÃO PARA COVID-19 EM PET-CT COM 18F-FDG

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R E S U M O

Introdução/Justificativa: O processo de vacinação em massa contra a COVID-19 levou ao surgimento, nos exames de PET-CT com 18F-FDG, de hipermetabolismo glicolítico nos linfonodos de drenagem regional do sítio de injeção. Nesse contexto, em função da dificuldade de diferenciação diagnóstica desses achados reacionais com lesões secundárias linfonodais, podem ser solicitados exames complementares confirmatórios (como seguimento por Ultrassonografia ou Tomografia) ou iniciados tratamentos baseados em eventuais falsos positivos. Nesse sentido, estudos e revisões passaram a indicar o reagendamento de PET-CT com 18F-FDG para até 6 semanas após a imunização. O presente estudo se justifica pela necessidade de uma melhor caracterização de tais efeitos morfometabólicos da imunização contra o SARS-CoV-2, observados no PET-CT com 18F-FDG, o que pode otimizar a diferenciação de achados caracteristicamente reacionais de outras hipóteses. **Objetivos:** O presente estudo tem o propósito de descrever os padrões de imagem observados ao PET-CT com 18F-FDG associados à resposta inflamatória que surge após a vacinação, com diferentes tipos de imunizantes contra o SARS-CoV-2, bem como investigar a incidência de linfonodos de drenagem regional com hipermetabolismo glicolítico de natureza reacional relacionados, alterações de forma dos mesmos, além da duração e magnitude de tais alterações. **Materiais e Métodos:** Foram avaliados, retrospectivamente, os exames de PET-CT com 18F-FDG e prontuários eletrônicos de 87 pacientes vacinados contra COVID-19, no ano de 2021, na cidade do Rio de Janeiro, sobretudo os imunizantes ChAdOxCoV-19 (AstraZeneca – 36 pacientes) e Coronavac (Sinovac – 16 pacientes), quanto à forma do linfonodo de drenagem regional (normal x alterado), seus níveis metabólicos ao PET-CT, sua natureza (falso positivo para malignidade x reacional pós-vacina x normal) e a relação desses achados com o tempo desde a imunização, a idade e o tipo de