IMAGE

Incidental ^{18}F-fluorodeoxyglucose uptake in respiratory muscles in a patient with Hodgkin lymphoma

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A 60-year-old male patient diagnosed with Hodgkin lymphoma 2 years ago, treated with doxorubicin, bleomycin, vinblastine, and dacarbazine protocol with complete metabolic response on fluorodeoxyglucose Positron Emission Tomography and Computed Tomography. (FDG-PET/CT) at the end of chemotherapy.

^{18}F-FDG PET/CT was performed for suspicion of relapse and showed incidental marked ^{18}F-FDG uptake on the diaphragm, in the intercostal, and in the scalene muscles, representing excessive strain and work of virtually all respiratory muscles. The patient was not diabetic; he was fasting and had no history of insulin injection before the exam. No strenuous exercise was performed in the few days before undergoing PET/CT. Clinically, he presented with a progressive shortness of breath and paroxysmal nonproductive cough and had a slight inspiratory pull, especially visible in the supraclavicular area.

He was managed with bilateral pneumonia secondary to chemotherapy-induced immunosuppression. Differentials diagnosis were atypical pneumonia, disseminated Koch's disease, and progression of HL with lung involvement. High-resolution Chest CT showed extensive bilateralground-glasss opacifications with areas of alveolar infiltrates as well as some background reticulations (suggestive of fibrotic changes). Based on the clinical and chest CT findings, a diagnosis of probable pulmonary fibrosis secondary to Bleomycin was made.

Increased ^{18}F-FDG activity in skeletal muscle has been reported during excessive use of skeletal muscles, glucose metabolism is enhanced, leading to increased FDG uptake. Although malignant process has high affinity for ^{18}F-FDG, the physiological processes like talking chewing and hyperventilation may lead to diffuse increased uptake in the involved group of muscles.

Incidental marked ^{18}F-FDG uptake in accessory muscles of respiration has been previously reported in the literature in patients with chronic obstructive pulmonary disease, Lin et al. [1] described a case of a patient with

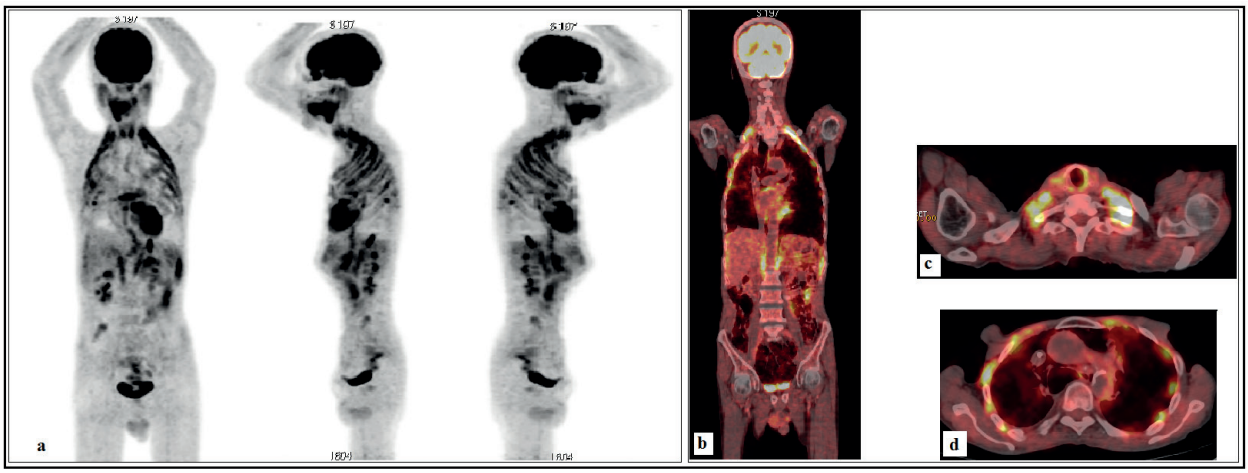

Figure 1. *FDG-PET/CT demonstrate hypermetabolic activity in accessory muscles of respiration, including the scalenes, intercostals, diaphragm and crura of the diaphragm.*
a: Whole-body maximum-intensity projection images in the anterior, right and left views.
b, c, d: Fused coronal and transaxial FDG-PET/CT images.

history of chronic obstructive pulmonary disease associated with small-cell lung cancer, excessive metabolic activity in thoracic muscles has also been shown in radiation pneumonitis, as on the case reported by Bural et al. [2] in a patient treated for pharyngeal wall cancer and who developed radiation fibrosis. In Hodgkin lymphoma, chemotherapy and radiotherapy can cause long-term toxicities like pulmonary fibrosis, especially if bleomycin is a part of standard chemotherapy [3].

The lack of specificity of FDG uptake in skeletal muscle may cause misinterpretation of FDG-PET scans**.** The FDG uptake on skeletal muscle is probably one of the most important aspects that leads to pitfalls in the evaluation of F-18 FDG PET scans [4].

Benzodiazepines have been successfully used before PET/CT imaging to relieve anxiety in claustrophobic patients and to relax skeletal muscles [5]. The Society of Nuclear Medicine and Molecular Imaging suggests that the administration of Lorazepam or Diazepam before the injection of ^{18}F-FDG may reduce uptake by skeletal muscle [6].

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Conflict of interest

The authors declare no conflict of interest.

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Consent to participate

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Consent of ethics

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Ethical approval

Not Applicable.