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Case Report
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Early Detection of Interstitial Lung Disease in Asymptomatic Patients with 2-[^{18}F]FDG PET/CT

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Abstract

Pulmonary involvement is a common manifestation of Dermatomyositis (DM), the most frequent histologic pattern being Interstitial Lung Disease (ILD) which is a major contributor to morbidity and mortality in these patients. Therefore, this disease should be investigated and it is essential to perform Pulmonary Function Tests (PFTs) and High-Resolution Computed Tomography (HRCT) early in the course of the disease to make a definitive diagnosis. Nowadays, 2-deoxy-2-[^{18}F]Fluoro-D-Glucose Positron Emission Tomography/Computed Tomography (2-[^{18}F]FDG PET/CT) can be a useful tool for patients diagnosed with DM since, in addition to observing the state of inflammatory myopathy and detecting possible associated malignant tumors, it allows early identification of ILD, before structural changes occur. We present the case of a 45-year-old patient with a diagnosis of DM, who requested 2-[^{18}F]FDG PET/CT to rule out possible occult neoplasia, showing pathological uptake of moderate intensity and peripheral predominance in the posterior segments of both lower lobes that coincides with a very discrete increase in pulmonary interstitial density, which translates as an active inflammatory pathology, to rule out ILD. Given the findings on 2-[^{18}F]FDG PET/CT, it was decided to perform a HRCT showing pulmonary interstitial involvement with reticular pattern and ground glass, predominantly peripheral and basal, suggest ILD. PFTs showed a progressive drop in KCO (71%), so, in view of these findings, ILD was diagnosed and immunosuppressive treatment was prescribed. A control CT was performed showing improvement of the interstitial involvement. Currently the patient is clinically asymptomatic, without PFR alteration (KCO 75%) and ILD radiology stability. In conclusion 2-[^{18}F]FDG PET/CT can help in the early diagnosis, clinical course and treatment of ILD in patients with DM.

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Introduction

Dermatomyositis (DM) is included within the idiopathic inflammatory myopathies or idiopathic myositis which are characterized as a heterogeneous group of muscle diseases of unknown etiology that cause progressive onset of muscle weakness, inflammation and may cause systemic involvement.

Pulmonary involvement appears to be a common manifestation, the most frequent histological pattern being Interstitial Lung Disease (ILD). About 35% to 40% of patients will develop ILD throughout the course of their disease [1]. ILD is known to be an important contributor to morbidity and mortality in these patients, with a 5-year survival rate of 50% [2]. Therefore, due to the important effect that ILD has on mortality in patients with DM, this disease should be investigated, and it is essential to perform Pulmonary Function Tests (PFTs) at the beginning of the course of the disease, since they usually show reduced lung volumes, impaired gas transfer and hipoxemia, however, these tests may vary significantly as muscle strength improves with treatment, and High-Resolution Computed Tomography (HRCT) is necessary to make a definitive diagnosis [3].

Nowadays, 2-deoxy-2-[^{18}F]Fluoro-D-Glucose Positron Emission Tomography/Computed Tomography (2-[^{18}F]FDG PET/CT) can be a useful tool for patients diagnosed with DM, since, in addition to observing the state of inflammatory myopathy and detecting possible associated malignant tumors, it allows ILD to be identified early, before structural changes occur. In ILD, an increase in macrophages, lymphocytes and the release of cytokines such as TNF-α and IL-2 has been described, which causes an increase in glycemic metabolism that, using ^{18}F-FDG as a radiotracer, can be detected by PET/CT, obtaining early information on this pathology which is relatively frequent and which negatively influences the prognosis of these patients [4,5].

Case Presentation

We present the case of a 45-year-old female patient with a diagnosis of DM, who attended a consultation for disease control. She did not refer respiratory symptoms. On physical examination basal saturation of 98%, without alteration when exploring the cardiopulmonary system. Laboratory tests within the normal range. Positive Antinuclear Antibodies (ANA). Chest X-ray without alterations. 2-[^{18}F]FDG PET/CT (July/2019) was requested to rule out possible occult neoplasm, showing pathological uptake of moderate intensity and peripheral predominance in the posterior segments of both lower lobes, coinciding with a very discrete increase in pulmonary interstitial density, which translates as an active inflammatory pathology, to rule out ILD (Figure 1).

Given the findings present on 2-[^{18}F]FDG PET/CT, it was decided to perform a HRCT (August/2019) of the chest and PFTs. HRCT showed pulmonary interstitial involvement with reticular pattern and ground glass, predominantly peripheral and basal, suggest ILD (Figure 1). PFTs showed a progressive drop in KCO (71%), so, in view of these findings, ILD was diagnosed and immunosuppressive treatment was prescribed. A control CT was performed (October/2020) showing improvement of the interstitial involvement. Currently the patient is clinically asymptomatic, with no alteration of PFTs (KCO 75%) and stable ILD radiology (Figure 1).

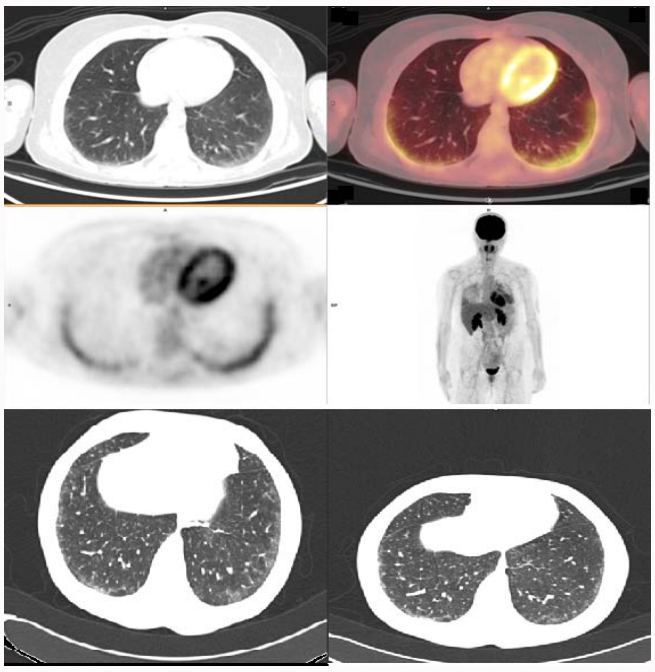

Figure 1: (A) 2-[^{18}F]FDG PET/CT (July/2019) shows pathological uptake of moderate intensity in the posterior segments of both lower lobes that coincide with a very discrete interstitial pulmonary involvement of peripheral and basal predominance, suggestive of pathology active inflammatory, to rule out PID. (B) HRCT (august/2019) of the chest showed interstitial lung involvement with a reticular pattern and ground glass, predominantly peripheral and basal, suggestive of ILD.
(C) Control CT (October/2020) showed improvement in the predominantly peripheral and basal interstitial lung involvement.

Discussion

ILD occurs frequently in DM and is an important cause of mortality, being its early diagnosis paramount. However, early changes of asymptomatic ILD are difficult to detect.

Interestingly, PET/CT showed a moderate increase in 2-[^{18}F] FDG uptake in the periphery of the lung bases, before the detection of altered PFTs, suggesting active inflammatory disease. In addition, it was evidenced that once the HRCT was performed, the location of the increased uptake in [^{18}F]FDG PET/CT coincided with the location of the interstitial lung involvement seen in HRCT.

There is evidence in the literature that 2-[^{18}F]FDG PET/CT can aid in the early diagnosis of ILD prior to detection by HRCT [5] coinciding with the location of interstitial lung involvement [6]. Furthermore, it indicates that increased metabolic activity suggests active disease and its changes suggest response to treatment, thus reflecting the degree of disease activity [7,8].

Conclusion

2-[^{18}F]FDG PET/CT can help in the early diagnosis, clinical course and treatment of ILD in patients with DM.

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