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Aggressive Clinical Course of Dermatofibrosarcoma protuberans: ^{18}F-FDG PET-CT predictive of Tumor Biology

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Running title: **Tumor Biology with FDG-PET/CT in Dermatofibrosarcoma**

Abstract:

Assessment of tumor biology is an added aspect of molecular imaging with 18F-FDG PET/CT, which scores over the conventional anatomical imaging in malignancies. An unusual and aggressive case of Dermatofibrosarcoma Protuberans (DFSP) with fatal disease course is presented. In the present case, the high grade 18F-FDG uptake in the DFSP lesions was predictive of an aggressive disease course in this otherwise indolent behaving entity. The aggressive clinical course was unabated by tyrosine kinase inhibitor imatinib mesylate and the patient showed poor response to this therapy.

Introduction

Over the recent years, 18F-FDG uptake in the malignant lesions has been described as a potentially useful parameter for depiction of tumor biology and heterogeneity in a number of malignancies (1,2,3). While the potential of this aspect of 18F-FDG PET/CT imaging has been postulated and published in multiple studies, its employment in routine clinics continues to evolve. We herein discuss one such case in a relatively indolent malignancy, where high 18F-FDG uptake was commensurate with the metastatic potential and a relatively aggressive disease course was observed in the patient.

The Case

The patient was a 63 year old male, diagnosed with left lumbar DFSP and had been operated 2 times previously for local recurrence, the last one was undertaken around 1 year back. In view of the recurrences, he had received radiotherapy locally. Recently he presented with left axillary mass for which he was considered for 18F-FDG-PET/CT for assessing whole body disease status. The 18F-FDG-PET/CT (Fig 1a and 1b) demonstrated multiple 18F-FDG avid well defined lesions in bilateral lung parenchyma (largest in the left lower lobe measuring 4.2 x 2.8 cm and maximum standardized uptake value or SUVmax of 14.38). Also noted was a large well-defined soft tissue mass in left axilla (measuring 4.9 x 4.1 cm and SUVmax 13.31), subcutaneous nodule in right anterior abdomen (measuring 2 x 2 cm and SUVmax 5.82) and sclerotic lesion in right iliac bone (SUVmax 7.40). All the aforementioned features showed high 18F-FDG uptake in the diseased sites (Fig 1a and 1b). The patient was started on Tyrosine kinase inhibitor Imatinib mesylate, an agent approved for unresectable/metastatic DFSP. An early treatment monitoring PET-CT was planned, the patient, however showed a rapid deterioration and died of the disease around 1 month after the initiation of therapy.

Discussion

Dermatofibrosarcoma protuberans (DFSP) is usually a slow growing tumor that usually behaves in a benign fashion; though can recur locally, it rarely metastasizes (incidence less than 5%) (4,5). We herein illustrate the 18F-FDG-PET/CT imaging features in an aggressively behaving DFSP, where the high grade 18F-FDG uptake in the DFSP lesions were correctly predictive of future aggressive disease course in this disease entity with relatively good prognosis.

Depiction of tumor biology is an added aspect of 18F-FDG-PET/CT imaging (1,2,3), which scores over conventional anatomical imaging; in the present case this was appropriately illustrated by the high grade 18F-FDG uptake in the DFSP lesions, which otherwise are known for their indolent disease course. There have been a couple of reports (6,7) on the role of 18F-FDG-PET/CT in detecting distant metastasis in this relatively slow growing tumor, highlighting a relatively rare but possible occurrence in the setting of DFSP. Two reports (8,9) illustrating its possible role in monitoring treatment response to imatinib mesylate has been also described. However, there has been no specific literature on its role in predicting aggressive biology in a subset characterized by high 18F-FDG uptake at the diseased sites. Predicting tumor biology is an important added advantage of 18F-FDG PET-CT imaging that has the potential to form the basis of personalized medicine in oncology.

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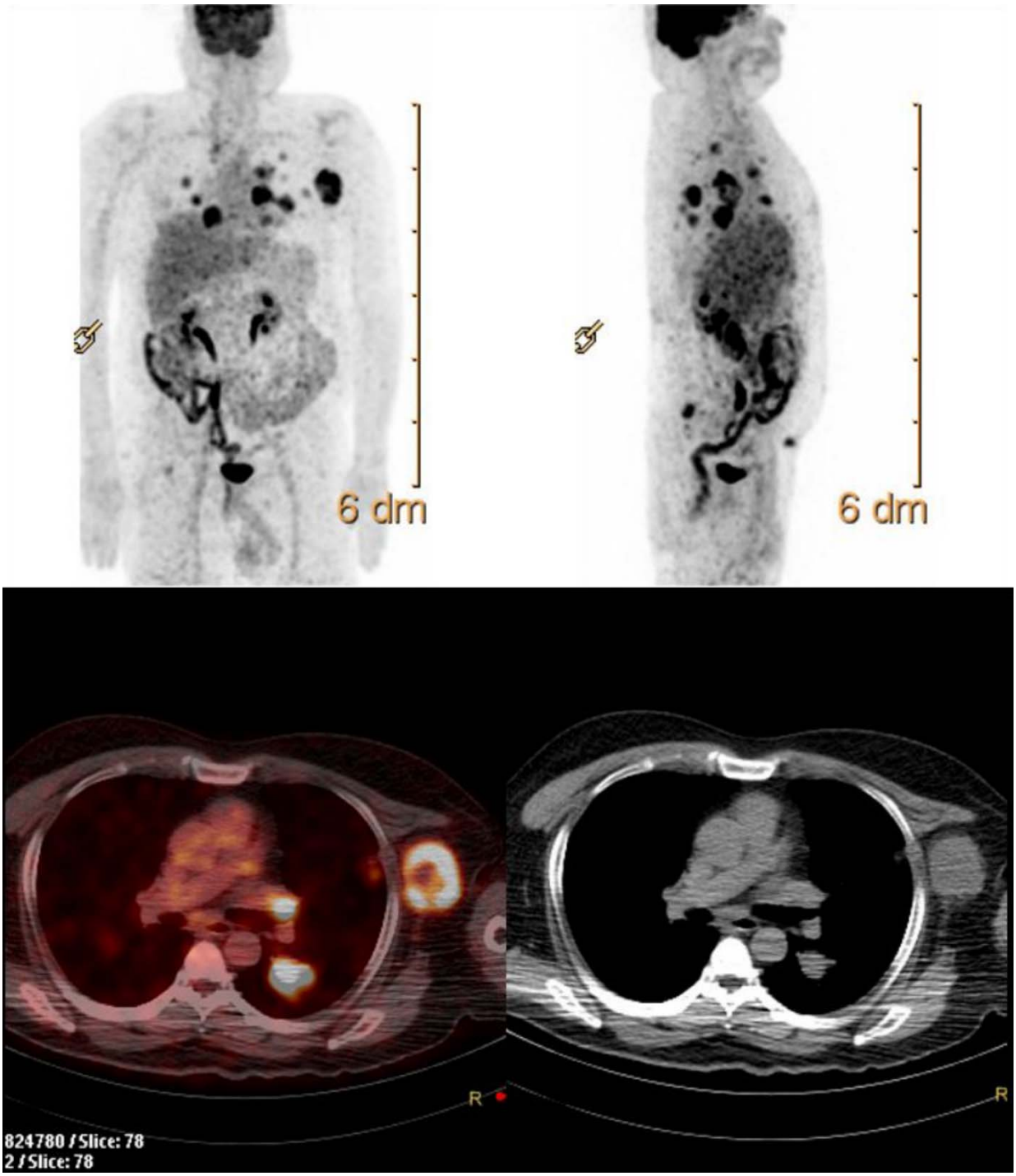
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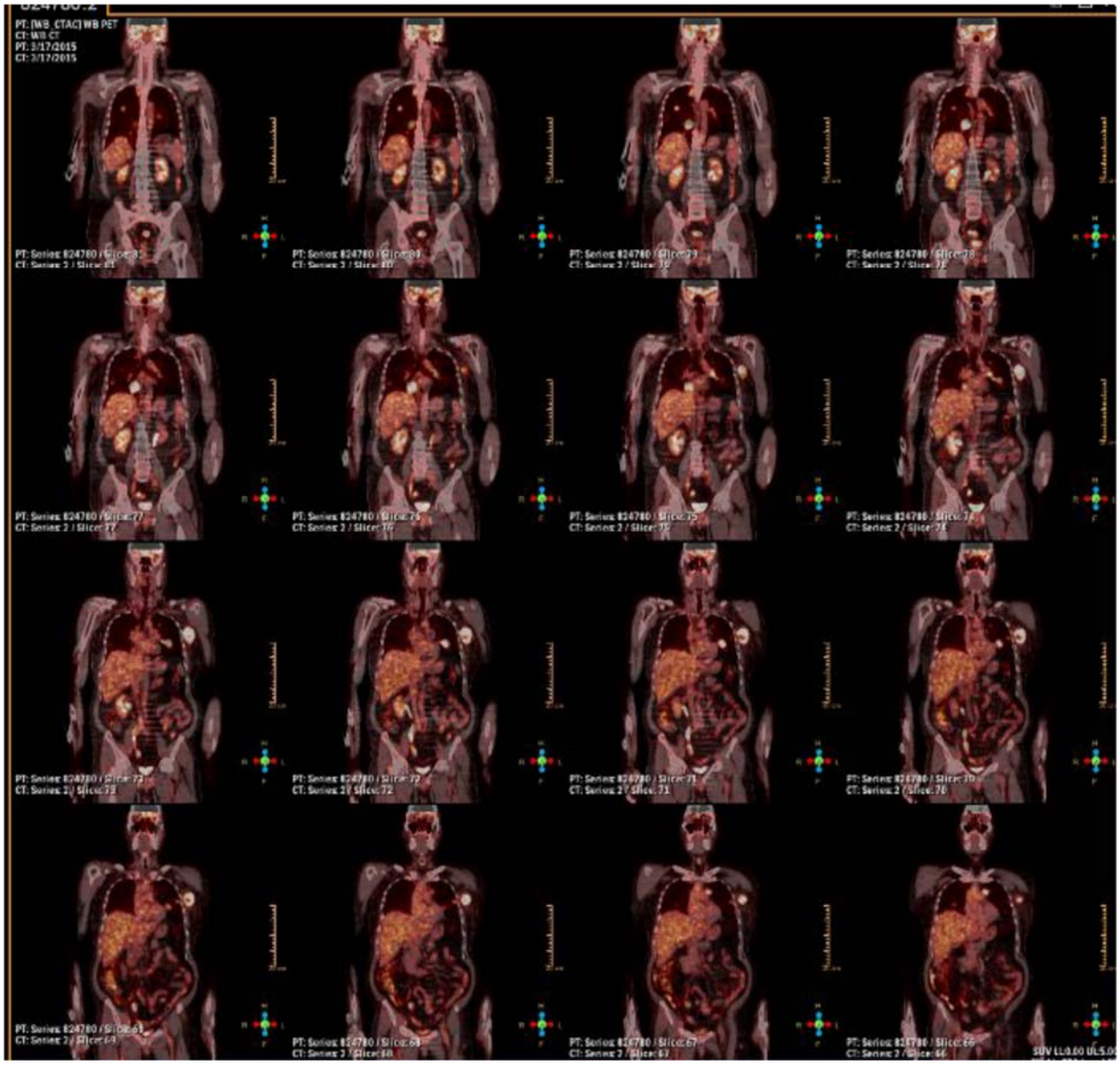

Fig 1a and 1b: 18F-FDG-PET/CT (MIP and multiple coronals) showing multiple 18F-FDG avid well defined lesions in bilateral lung parenchyma (largest in the left lower lobe measuring 4.2 x 2.8 cm and SUVmax of 14.38), soft tissue mass in left axilla (SUVmax 13.31), subcutaneous nodule in right anterior abdomen (SUVmax 5.82) and sclerotic lesion in right iliac bone (SUVmax 7.40).