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Characteristics of elastofibroma dorsi on PET/CT imaging with ^{18}F-FDG☆

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ABSTRACT

Purpose: To assess the characteristics of 18F-FDG uptake in elastofibroma dorsi (EFD).
Methods: Seventeen patients with EFD were retrospectively studied.
Results: The mean±S.D. of SUV was 2.29±0.60 (range, 1.2–4.3), and the uptake were Grade 0 in 6, Grade 1 in 12, Grade 2 in 7, and Grade 3 in 1. There is no correlation between lesion volume, SUVmax, and computer tomography value. All EFD lesions showed soft tissue density with low or moderate diffused and homogeneous uptake of 18F-FDG.
Conclusions: Mild and moderate uptake of 18F-FDG is frequently observed in EFD, which should be known to avoid making wrong diagnosis.

1. Introduction

^{18}F-FDG positron emission tomography (PET)/computer tomography (CT) has been widely used for diagnosis, staging and restaging, therapeutic response monitoring of various cancers. But ^{18}F-FDG is not a cancer-specific imaging agent; it also can be uptaken by some benign lesions, which results in false positive in oncologic patients.

Elastofibroma dorsi (EFD) is a relatively rare soft-tissue pseudotumor that originated from mesenchymal tissue. It was first reported by Jarri and Saxen in 1961 [1] with four cases. EFD is easily diagnosed by CT and/or MRI on the basis of imaging characteristics. There were only a small number of reports about EFD on ^{18}F-FDG PET/CT [2–7].

The objective of this study is to access the characteristics of EFD on ^{18}F-FDG PET/CT in order to avoid image misinterpretation.

2. Material and methods

2.1. Patients

A sample of convenience was selected to include all patients who were scanned between July 1, 2012 and December 31, 2013. EFD shows a number of radiological imaging characteristics with conventional modalities such as CT and MRI, and most cases can be diagnosed on the basis of these typical CT appearance described in the literature [8–10] with or without glucose hypermetabolism on PET. In our department, all the patients had given informed consent for ^{18}F-FDG PET/CT.

2.2. ^{18}F-FDG PET/CT imaging protocol

Patients fasted for at least 4 h, and their blood glucose levels were checked before the tracer injections. The ^{18}F-FDG PET/CT scans were obtained 60 min after the intravenous administration of 370-MBq ^{18}F-FDG, which was produced automatically by cyclotron and Explora FDG4 module (Siemens CTI RDS Eclips ST).

The whole-body ^{18}F-FDG PET/CT scans were performed immediately after urinating using a Siemens Biograph 16 PET/CT scanner. Noncontrast CT data were acquired for anatomical correlation and attenuation correction. The CT data were acquired from the skull base to the midthigh at the following settings: 120 kV, 50 mA, 5-mm slice thickness and 3-mm interval. Whole-body PET scans were performed for five to eight bed positions with 3 min of acquisition time per bed position. Both the PET and CT scanning were performed during quiet tidal breathing.

2.3. Image evaluation

MultiSeries Viewer software (Syngo, Siemens) was used for image review and manipulation. Visual and quantificational analyses were used. For visual analysis, a four-scale grading system was used: Grade 0 for no uptake, Grade 1 for faint uptake comparable to that of the liver, Grade 2 for intense uptake greater than that of the liver. For quantificational analysis, the maximum standardized uptake value (SUV) normalized to body weight was calculated automatically.

All ^{18}F-FDG PET/CT images were evaluated retrospectively in consensus by two experienced nuclear medicine physicians. A third nuclear

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medicine physician helped to interpret the imaging when a final consensus was needed.

2.4. Statistical analysis

Data were expressed as means±S.D. The correlations between lesion volume, SUVmax, and CT value were assessed by Pearson correlation coefficient test. Differences with *P* values less than .05 indicated as statistically significant. All statistical analyses were carried out using the Statistical Product and Service Solution Version 13.0 software program.

3. Results

There were 8256 ^{18}F-FDG PET/CT examinations performed for staging, restaging, therapeutic response monitoring, or prognostic prediction of known or suspected cancers. According to the reports of these examinations, 17 patients (16 females, 1 male) with EFD were retrospectively studied. The mean age was 75.17±9.07 years (range, 61 to 89 years). Tumor location: left side two cases; right side six cases; and both sides nine cases.

Among the 26 lesions, the mean±S.D. of SUV was 2.29±0.60 (range, 1.2–4.3), and the uptake were Grade 0 in 6, Grade 1 in 19, and Grade 2 in 1. The mean±S.D. of CT value for the EFD lesion was 42.0±12.6 (range, 10.8–67.8). The mean volume of the 26 lesions was 48.9±26.9 cm^3 (range, 21.5–127.3 cm^3). There is no correlation between lesion volume and SUVmax (r=0.120, P=.560), CT value and SUVmax (r=0.237, P=.244), CT value, and lesion volume (r=0.355, P=.094). Two of 17 patients complained periscapular swelling. All individual patient characteristics are available upon request.

In most of the patients (76.9%, 20/26), the EFD lesion was visible with low or moderate intensity uptake of ^{18}F-FDG at unilateral or bilateral pectoral level on frontal maximum intensity projections (MIPs) image. And on lateral MIP image, these lesions were seen at the posterior part of the chest. On the axial image of ^{18}F-FDG PET/CT, all these EFD lesions were typically placed in the inferior subscapular region, between the serratus anterior muscle, rhomboid muscle, and latissimus dorsi. The lesion showed soft tissue density that is similar to those of the adjacent muscular structures, with low or moderate diffused and mostly homogeneous uptake of ^{18}F-FDG (Fig. 1). In Cases 8, elastofibromas were also found at ischial tuberosity (Fig. 2).

4. Discussion

EFD is an uncommon, slow-growing, noncapsulated, benign, hyperplastic soft tissue psedotumor with no well-defined boundaries, which most commonly located in the infra- or periscapular area. In the 2002 World Health Organization soft tissue tumor classification, elastofibroma is classified as "benign fibroblast/myofibroblast tumor." It is characterized by proliferation of elastin fibers in a stroma of collagen and fatty connective tissue. In pathology, wavy, string beads, serrated and globular-shaped elastic fibers, and interspersed mature adipose cells were the diagnostic evidences for this disease, and elastic fiber staining was positive [11]. Radiological aspect of EFD has been documented with CT and MRI. But the number of literatures documenting its characteristics with ^{18}F-FDG PET/CT is scare [2–7].

EFD has some specific clinical features. It is mostly seen in the elderly people (usually observed between the fourth and the seventh decade of life) with an incidence higher in women than in men. In our study, the

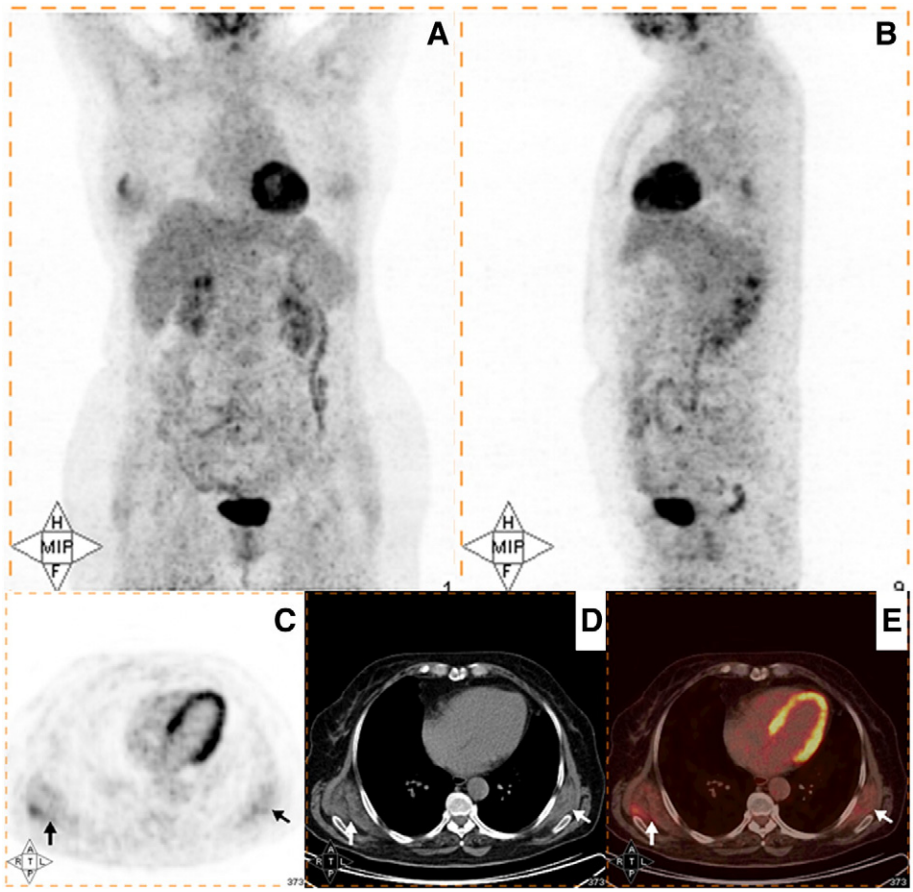

Fig. 1. An 83-year-old female patient with health examination. (A) A frontal MIP image of PET shows abnormal ^{18}F-FDG uptake in the bilateral posterolateral chest (arrows); (B) A lateral MIP image of PET shows abnormal ^{18}F-FDG uptake at the posterior part of the chest (arrows); (C) Axial PET image shows mild ^{18}F-FDG uptake in bilateral posterolateral chest (arrows); (D) Axial CT image shows crescent-shaped soft-tissue masses in both subscapular lesions (arrows); (E) On fused PET/CT image, area of mild hypermetabolism corresponds to the soft-tissue masses (arrows). SUVs were 2.8 in the right mass and 2.3 in the left.