

# Dermatofibroma mimicking malignancy on integrated F-18 fluorodeoxyglucose PET-CT

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## ABSTRACT

A 31-year-old female with a history of ovarian cancer underwent an F-18 fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET-CT) scan. The PET-CT demonstrated focal nodular uptake in the subcutaneous tissue of the back adjacent to the paraspinal muscles. Color Doppler ultrasonography examination demonstrated a vascular solid mass. The patient underwent biopsy followed by excision. The pathologic diagnosis was dermatofibroma. Although benign, dermatofibromas can have intense FDG uptake.

*Key words:* • dermatofibroma • positron-emission tomography • computed tomography • fluorodeoxyglucose F18

**D**ermatofibroma (DF) is a common benign skin tumor of unknown etiology that usually appears as a slowly growing nodule in the dermis or subcutaneous tissue (1). It preferentially involves the lower extremities of women, and is usually asymptomatic. Excision of the tumor is not recommended unless there is diagnostic uncertainty. F-18 fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET-CT) is a rapidly evolving imaging technique in oncology; however, it is not cancer-specific. In addition to physiologic uptake, FDG may also accumulate in benign processes (2). We report a case of intense FDG uptake on PET-CT within a pathologically proven dermatofibroma in the subcutaneous tissue adjacent to the left paraspinal muscles in a patient with a history of ovarian cancer.

## Case report

A 31-year-old female with a history of ovarian cancer treated by surgery and chemotherapy had a slightly elevated serum CA-125, and was referred for a whole-body PET-CT scan for the detection of recurrent disease. PET-CT was performed using a combined PET-CT system (Discovery LS, GE Healthcare). The patient was scanned from the base of the skull through the upper-thigh following the administration of iodinated oral contrast material and after intravenous injection of 15 mCi of FDG. PET-CT demonstrated a solid nodule approximately 1 cm in diameter with intense FDG uptake in the subcutaneous tissue of the back adjacent to the left paraspinal muscles (Fig. 1). The maximum standard uptake value (SUVmax) of the lesion was 10.0. Gray scale ultrasonography and color Doppler imaging of the lesion revealed a well-circumscribed homogeneous hypoechoic subcutaneous mass with a single vascular pole in the hilum without definite branches (Fig. 2). Excisional surgical biopsy was performed. Microscopic examination of the lesion showed compact, uniform, slender spindle-shaped cells, consistent with a diagnosis of dermatofibroma. There was no nuclear atypia, and no mitotic figures were noted (Fig. 3).

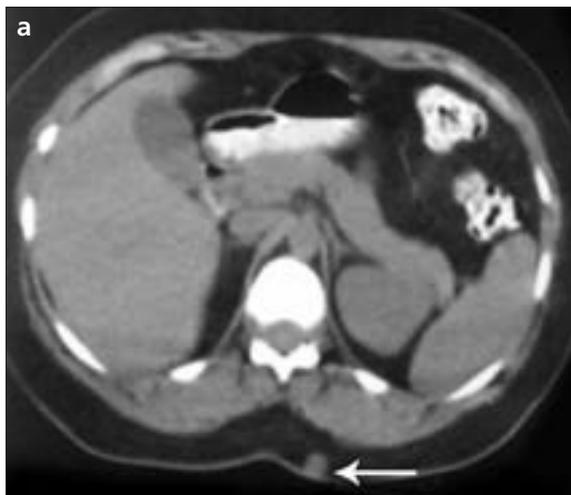
## Discussion

PET using FDG has been shown to be a very sensitive diagnostic imaging modality to stage cancer, restage tumor recurrence, and monitor cancer therapy. However, FDG is not cancer-specific. The integration of CT into PET has increased the specificity. Nevertheless, there are many physiologic and benign conditions that may result in high accumulation of FDG, and may mimic malignancy (2–4).

Dermatofibroma or benign fibrous histiocytoma is a benign reactive proliferation of fibroblasts in the skin, the etiology of which is unclear. It usually arises in the dermis, although a subcutaneous location is not uncommon. The majority of cases present as a solitary,

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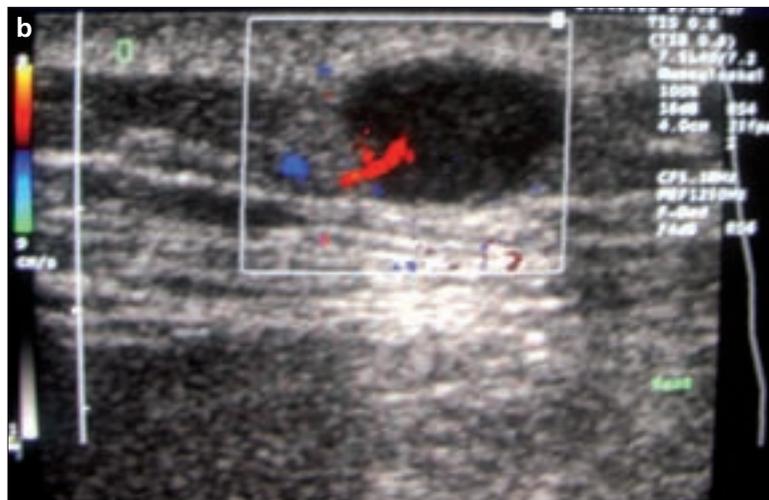
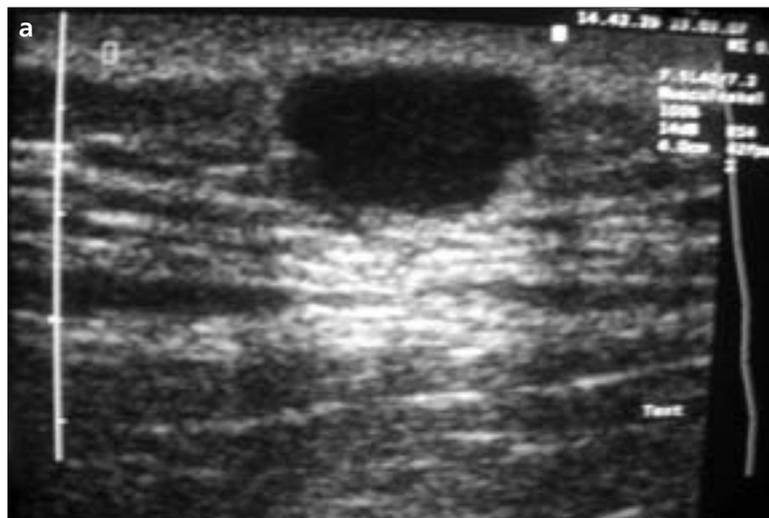
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**Figure 1. a–c.** Transverse CT image (a), PET image (b) and fused PET-CT image (c) demonstrate a subcutaneous nodular mass adjacent to the left paraspinal muscles with an intense FDG uptake (arrow, a).

0.5- to 1-cm cutaneous nodule in females. Dermatofibromas may also be seen as multiple nodules in any cutaneous site. Since dermatofibroma is a benign lesion, intense FDG uptake is an unexpected finding on PET-CT studies.

On biopsy, dermatofibromas demonstrate acanthosis and basal hyperpigmentation of the epidermis, hyperplasia of single sebaceous glands above the dermal portion of the tumor, and basaloid epidermal proliferation. Whorling fascicles of proliferating

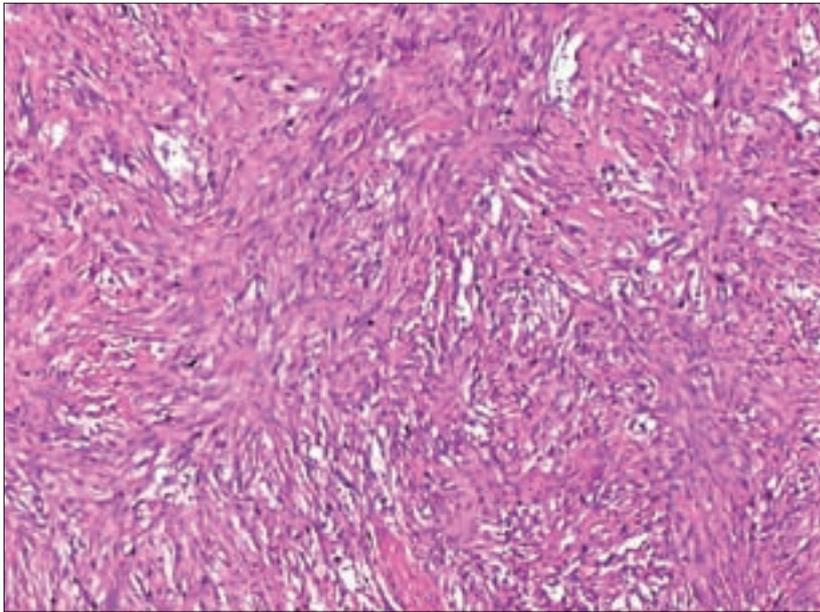


**Figure 2. a, b.** Gray scale (a) and color Doppler (b) sonographic images reveal a well-circumscribed, homogeneous hypoechoic mass with a single vascular pole in the hilum without definite branches.

spindle cells with excessive collagen deposition are characteristic. At the periphery, the spindle cells characteristically wrap around normal collagen bundles (1, 5).

The differential diagnosis of intense FDG uptake in a nodule of the skin and subcutaneous tissue includes a wide variety of primary and metastatic tumors, and infectious granulomatous lesions.

In this patient with a history of primary ovarian cancer, FDG uptake in a dermatofibroma resulted in a false-positive PET-CT scan interpretation, suggesting metastasis. To our knowledge, there is only one case report of a dermatofibroma with increased FDG uptake on PET scan (6), but our case is the first demonstration of this entity on integrated FDG PET-CT with its SUVmax. In our case, the SUVmax was 10.0 g/ml, a very high value, usually reported only in ma-



**Figure 3.** Digital photomicrograph of the tumor composed of compact, uniform, slender spindle-shaped cells (original magnification, x100; hematoxylin-eosin stain).

ligniant conditions such as cutaneous or subcutaneous melanoma, lymphoma, and metastases (7–9). Because the imaging studies failed to demonstrate the benign nature of this lesion, excisional biopsy was needed for the final diagnosis. Therefore, when evaluating PET-CT for staging in oncology patients, dermatofibromas should be considered as

a possible cause of increased uptake of FDG in subcutaneous tissue.

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