Detection of Isolated Diffuse Cutaneous and Subcutaneous Metastasis of Breast Cancer on FDG-PET/CT

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Abstract
Cutaneous metastasis from internal malignancies are rare with a reported incidence between 0.7% and 10%. The most common tumor that metastasizes to the skin is breast cancer. We present a 53-year-old woman with a history of bilateral breast cancer who underwent FDG-PET/CT for re-staging, which demonstrated isolated cutaneous and subcutaneous chest wall metastases. Histopathologic verification confirmed invasive ductal carcinoma invasion of the dermis and the lymphatic vessels.

Key words: Carcinoma ductal breast, fluorodeoxyglucose F-18, positron-emission tomography and computed tomography, metastasis

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Introduction
Cutaneous metastases from internal malignancies are rare with a reported incidence between 0.7% and 10% (1,2). Among all malignancies, the highest incidence of cutaneous metastasis is seen in advanced breast cancer (3,4). Cutaneous metastasis can occur either by lymphatic or hematogenous spread, and is most commonly seen in the head-neck regions and the trunk (3,5).

¹⁸F-fluoro-2-deoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) is useful in defining the extent of metastatic disease (6,7,8). Herein, we present isolated cutaneous and subcutaneous chest wall metastasis without other distant organ metastasis that were demonstrated with FDG-PET/CT.
Case Report

A 53 year-old woman with bilateral invasive ductal carcinoma of the breast has been treated by modified radical mastectomy-lymph node dissection and chemoradiotherapy. Two years later, she presented with cutaneous lesions. On inspection, clear, erythematous and sharply demarcated irregular lesions were visualized on the left anterior and posterior chest wall and left shoulder (Figure 1a). There were focal vesiculobullous plaques, and palpable small nodules scattered throughout the left anterior chest wall (Figure 1b). 18F-fluoro-2-deoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) (Siemens Biograph 6, Chicago, USA) imaging was applied for restaging, with the suspicion of metastasis from the previous carcinoma. After 7 hours of fasting, with a serum glucose level of 108 mg/dL, the patient was injected with 370 MBq (10 mCi) of F-18 FDG intravenously. Transaxial, sagittal, coronal FDG-PET (Figure 2a) and fused FDG-PET/CT (Figure 2b) images demonstrated mildly increased diffuse F-18 FDG uptake (the maximum standardized uptake value (SUVmax): 11.9) on the cutaneous thickening site and subcutaneous fatty tissues of the anterior, left and left posterior side of the chest wall without evidence of disseminated disease at other sites (Figure 2). Histopathologic evaluation verified invasive ductal carcinoma invasion of the dermis and the lymphatic vessels (Figure 3).

Literature Review and Discussion

Breast cancer remains the most common type of cancer in women (6). FDG-PET/CT is widely used for detecting local recurrence and local/distant lymph node or organ metastasis in patients with breast cancer. It is a highly sensitive and specific test for identifying distant metastasis especially in patients with breast cancer who had negative conventional imaging results for distant metastasis (6,7).

The most common sites of distant metastasis in breast cancer are bone, lung, liver and brain. Cutaneous metastasis is an unusual site. It can occur either via lymphatic or hematogenous spread, and is commonly seen in the head and neck regions, as well as the trunk and extremities (3,5,9,10). The most common site of metastasis is reported as the chest, which was involved in 28.4% of metastatic lesions (3,11).

Subcutaneous metastasis of certain malignant diseases such as gastric, colon, esophageal, lung, kidney, bladder and uterine cancer have been previously detected with PET/CT (12,13,14,15,16).

Diagnosis of cutaneous metastasis is based on clinical history, radiology images and histopathologic examination. FDG-PET/CT is an accurate modality in assessing recurrence of breast cancer, and in detecting distant metastasis. It
has higher sensitivity than other conventional methods in terms of detecting skin and soft tissue metastasis. It has a significant impact on the choice of treatment and management (8,10).

Isolated cutaneous-subcutaneous metastases from breast cancer detected with FDG-PET/CT have been rarely reported in the literature. FDG avid skin lesions in a case with breast cancer history should always raise suspicion of skin metastasis and should be evaluated further with histopathologic confirmation.

References