

PET/CT Scan에서 발견된 유방 전이 림프종의 초음파 소견

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US Findings of Secondary Breast Lymphoma Detected by PET/CT

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Breast lymphomas, either manifesting as a primary extranodal disease or secondary involvement, are a rare form of malignancy. Breast lymphomas can be visualized as hypermetabolic lesions in ¹⁸F-fluorodeoxyglucose-positron emission tomography/computed tomography (¹⁸F-FDG PET/CT) scans. Here, we describe a case of a secondary breast lymphoma, detected with ¹⁸F-FDG PET/CT.

Key words : Secondary breast lymphoma; ¹⁸F-fluorodeoxyglucose-positron emission tomography/computed tomography; Ultrasonography

Introduction

A breast lymphoma is a rare malignancy and presents either as a primary or secondary extranodal disease [1]. The majority of patients diagnosed with primary breast lymphomas are reported to have intermediate-grade tumors, such as diffuse large B-cell lymphomas [2]. Fewer studies are reported about secondary breast lymphomas, which are even more rare than primary breast lymphomas with an reported incidence of 0.07% of all breast malignancies [1].

In this report, we represent a case of a secondary breast lymphoma, which was first detected during ¹⁸F-fluorodeoxyglucose-positron emission tomography/computed tomography (¹⁸F-FDG PET/CT) as an unexpected mass showing hypermetabolism, and then

found on ultrasonography (US).

Case Report

A 49-year-old woman had pain in the left buttock and leg for 6 months. She did not have any other medical history or symptoms in the breast. Computed tomography (CT) and magnetic resonance image (MRI) scans of the spine showed multiple enhancing lesions on the 5th lumbar vertebra, the sacrum, and the left iliac bone, and osteolytic lesions with soft tissue infiltration in the left sacrum, which suggested metastatic malignancy. For evaluation of the primary site of malignancy, she underwent ¹⁸F-FDG PET/CT. ¹⁸F-FDG PET/CT scans showed focal increased ¹⁸F-FDG uptake in multiple levels of vertebrae, the sacrum, and the pancreas. In addition, two lesions of

focal increased uptake were seen in the left breast (Fig. 1A and B). The standard uptake value (SUV) of focal increased uptake in the left breast lesions were 198.3 and 190.7.

On a routine mammogram performed for evaluation of the left breast lesion with increased uptake, there were no visible masses, abnormal parenchymal density, or calcifications (Fig. 1C). Ultrasonography

(US) showed two hypoechoic nodules with angular or indistinct margins in the left outer central and left lower outer quadrants, which were assessed as category 4b, intermediate suspicious findings (Fig. 1D and 1E; transverse and longitudinal images). The lesion size, morphology, and location of the masses on US were well correlated with those of increased uptakes on ^{18}F -FDG PET/CT.

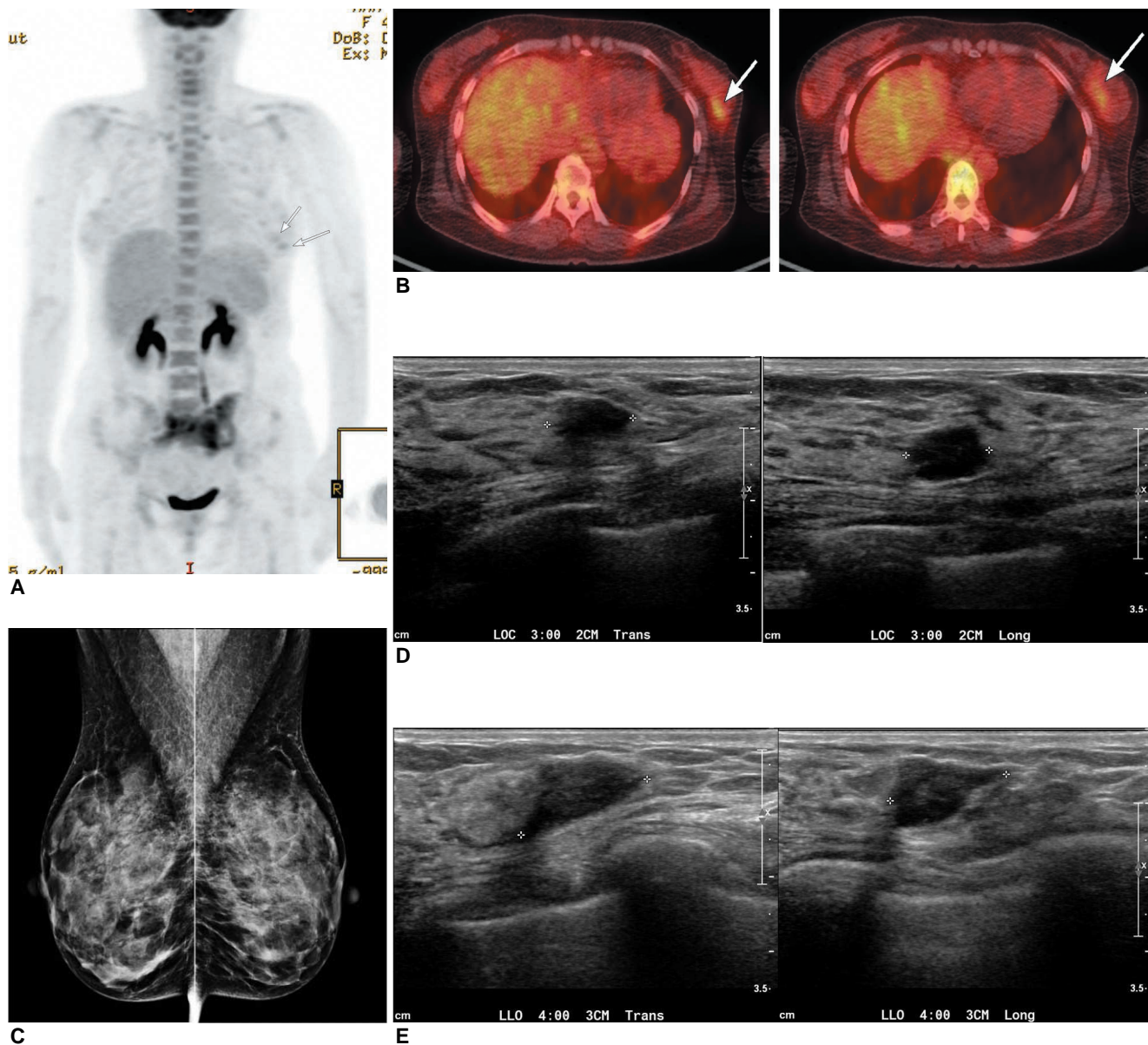


Fig. 1. Secondary B-cell lymphoblastic lymphoma of the breast in a 49-year-old woman.

A. PET-torso image shows focal increased ^{18}F -FDG uptakes in multiple levels of the vertebrae and sacrum.

B. Fusion image shows two lesions with increased uptakes in the left breast.

C. A mammography (mediolateral oblique view) does not show specific abnormalities in either breast.

D, E. Ultrasonography shows two hypoechoic nodules with angular and indistinct margins in the left outer central and left lower outer quadrants of the breast. They are assessed as intermediately suspicious for malignancy.

A US-guided 14-gauge core biopsy was performed on the suspicious nodule in the left lower outer quadrants. Biopsy specimens of the breast were evaluated microscopically and immunohistochemically, including with CD99 and cytokeratin. Microscopic examinations (Fig. 2A, hematoxylin and eosin $\times 200$) show extensive infiltration into the breast parenchyma by lymphoblasts with atypical round to oval-shaped nuclei. On immunohistochemical staining, specimens were positive for CD99, and negative for cytokeratin, suggestive of a B-cell lymphoblastic lymphoma (Fig. 2B, C). Also, a CT-guided biopsy on the sacral mass was performed. Immunohistochemical stains of the specimen from the sacrum were positive for TdT, CD99, CD10 and CD79a, and negative for CD3 and S-100. These findings are also suggestive of B-cell lymphoblastic

lymphoma.

Discussion

^{18}F -FDG PET/CT is a glucose analog for which many malignant tumors have an increased avidity, including breast cancer [3]. To date, ^{18}F -FDG PET/CT has been demonstrated to be the most efficient method to localize unknown primary tumors, with detection rates between 24% and 53% [4]. Although the diagnosis of primary cancer or the detection of recurrence is definite only via histopathologic criteria, ^{18}F -FDG PET/CT can accurately guide the tissue sampling and improve the yield [3].

In women without a history of breast cancer, the incidence of unexpected foci with hypermetabolic activity on ^{18}F -FDG PET/CT is reported to be

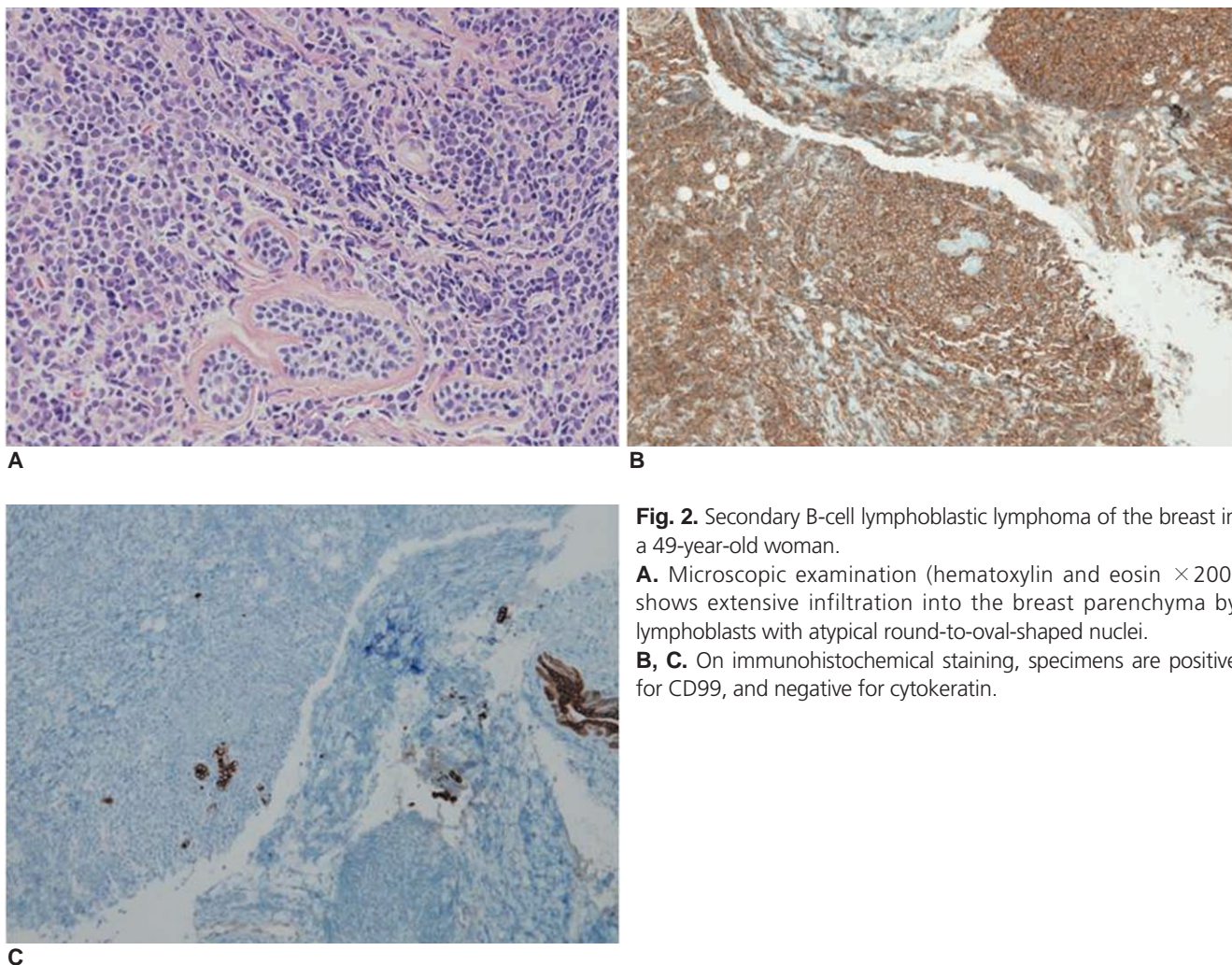


Fig. 2. Secondary B-cell lymphoblastic lymphoma of the breast in a 49-year-old woman.

A. Microscopic examination (hematoxylin and eosin $\times 200$) shows extensive infiltration into the breast parenchyma by lymphoblasts with atypical round-to-oval-shaped nuclei.

B, C. On immunohistochemical staining, specimens are positive for CD99, and negative for cytokeratin.

1.1~1.4%, and of these, 20.8% prove to be malignant tumors (breast cancer: 36% and metastasis: 67%) [5]. Because of this possibility, a biopsy should always be performed at the hypermetabolic lesion. However, ^{18}F -FDG PET/CT-guided biopsies are not yet routine procedures. So, US correlation is important for histologic confirmation as a guidance modality. The most common metastatic lesion detected on ^{18}F -FDG PET/CT is a malignant lymphoma [5]. Breast lymphomas, either as a manifestation of primary extranodal diseases, or as secondary involvement, are rare malignancies [1]. Malignant lymphomas of the breast are rare, mostly presenting as non-Hodgkin's lymphoma, which represent approximately 70–90% of all breast lymphomas [7]. A B-lymphoblastic lymphoma, as reported in our case, is a type of non-Hodgkin's lymphoma. The reported incidence of primary breast lymphomas ranges from 0.04% to 0.5% of all breast malignancies [6]. Secondary breast lymphomas are less well-studied in the literature than primary breast lymphomas because secondary breast lymphomas are so rare, with a reported incidence of 0.07% of all breast malignancies [2].

The radiologic features of breast lymphomas are non-specific, and the diagnosis cannot be made solely on the basis of radiological findings, since the mammographic and US features may be indistinguishable from those of other common breast malignancies. Mammography usually demonstrates a well-circumscribed mass with sharp or minimally irregular margins and no calcifications [8]. US features also vary, from well-defined to poorly defined, hypo- to hyperechoic masses with or without focal or diffuse involvement of the remaining breast [8]. Our case did not show abnormal findings on a mammogram. On US, hypoechoic nodules with angular or indistinct margins were observed. It has been demonstrated that no pathognomonic radiologic features exist for the

differential diagnosis between breast lymphoma and carcinoma. A distinction between lymphoma and carcinoma is important because these two malignancies differ in treatment. Treatment for lymphoma is chemotherapy, not surgery, which is conversely the standard treatment for breast carcinoma [1]. Therefore, histopathologic confirmation is essential.

요 약

원발성 혹은 전이성 유방 림프종은 드물게 보고 되는 유방의 악성 종양이다. 유방 림프종은 ^{18}F -FDG PET/CT에서 대사항진을 보인다. 본 증례는 ^{18}F -FDG PET/CT에서 발견된 유방의 전이 림프종의 예이다.

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