Mastopathic-type fibroadenoma and ductal adenoma of the breast with false-positive fluorodeoxyglucose positron emission tomography

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Abstract Positron emission tomography (PET) with 18F-fluorodeoxyglucose (FDG) has been shown to be an effective and accurate diagnostic technique for breast cancer. However, benign breast lesions have also been reported to show a false-positive FDG uptake on PET. We present two cases of benign tumors that revealed FDG uptake on PET and were difficult to distinguish from breast cancer. A 46-year-old premenopausal woman noticed a mass in her right breast. Ultrasonography showed a hypoechoic mass with the size of 7.7 × 3.9 mm and an irregular shape in the right breast. PET demonstrated a focal accumulation of FDG with a maximum standardized uptake value (SUVmax) of 2.1. Excisional biopsy was performed, and ductal adenoma was diagnosed. In the second case, a 36-year-old premenopausal woman was pointed out as showing an abnormality in the left breast on screening mammography. Ultrasonography showed a hypoechoic mass of 1.5 × 1.2 cm in size in the left breast. The lesion was depicted as a mass with prominent enhancement on dynamic CT and a focal accumulation of FDG with SUV max of 3.5 on PET. It was diagnosed as fibroadenoma of mastopathic type histopathologically by excisional biopsy. The readers should be aware that these benign tumors may cause false-positive results on PET.

Key words Breast · Ductal adenoma · Fibroadenoma, mastopathic type · PET-FDG · False-positive

Introduction

Positron emission tomography (PET) with 18F-fluorodeoxyglucose (FDG), which basically reflects the glucose metabolism of cancer cells, has been shown to be an effective and accurate diagnostic technique for breast cancer. Avril et al. reported that primary breast cancer was identified visually with a sensitivity of 68%–94%, and a specificity of 84%–97% using FDG-PET for the diagnosis of primary breast cancer. On the other hand, benign pathological uptake of FDG can be confused with a malignant neoplasm. It has been reported that 18F-FDG uptake can be enhanced by inflammatory-induced changes such as tuberculosis, granulomatous disease, postoperative healing scars, and postradiation therapy. Benign breast lesions and tumors have also been reported to show up as false-positive cases on FDG-PET.1,3–6

Ductal adenoma of the breast is a benign lesion that can mimic carcinoma, as reported by Azzopardi and Salm.7 Ductal adenoma clinically, radiologically, and
macroscopically can simulate malignancy because of the firmness and irregularity of many lesions. A nodule of this type is largely sclerosed, with glandular structures persisting mainly in the central parts of the lesion; it shows a crenated outline, which imparts a floral appearance. Fibrous sclerosis sometimes results in distortion with apparent pseudo invasion of surrounding tissue.7

Fibroadenomas are common benign breast tumors, displaying proliferation of epithelial and stromal elements, of which the types are generally classified into intracanalicular, pericanalicular, organoid, and mastopathic based on the growth pattern. The mastopathic type, newly classified by Sakamoto,8 displaying epithelial hyperplasia, with solid and cribriform patterns resembling mastopathic change, is relatively uncommon. This distinct type of fibroadenoma has been receiving attention recently in pathological and imaging diagnosis because it mimics intraductal carcinoma.9 We herein report two cases of ductal adenoma and fibroadenoma of the mastopathic type showing FDG uptake, which can be confused with carcinoma on imaging and pathological studies.

Methods

A dedicated full-ring PET scanner (Allegro; Philips Medical Systems, Cleveland, OH, USA), consisting of germanium oxyorthosilicate detectors, was used for data acquisition. Before FDG injection, patients had fasted for 4 h to maintain serum glucose concentrations below 120 mg/dl. The blood glucose levels were 75 (case 1) and 82 (case 2) mg/dl, respectively. Patients were administered 5.46 mCi (case 1) and 5.28 mCi (case 2) of FDG via an antecubital vein.

Case reports

Case 1

A 46-year-old premenopausal woman noticed a mass in her right breast and presented to Kurume University Medical Center. Ultrasonography (US) showed a hypoechoic mass 7.7 × 3.9 mm in size; the periphery of the tumor was irregular (Fig. 1). Mammography could not detect a mass lesion. Dynamic computed tomography (CT) was performed, and malignancy could not be ruled out. Then, PET demonstrated a focal accumulation of FDG uptake within the right breast (Fig. 2). The measured maximum standardized uptake value (SUVmax) for the lesion was 2.1. Fine-needle aspiration (FNA) cytology was performed, but it was inadequate and inconclusive. Malignancy could not be ruled out by these examinations. Thus, we performed an excisional biopsy during surgery.

Macroscopically, the tumor was solid, and histologically it consisted of both epithelial and stromal elements with a thick fibrous capsule. It had heavily populated irregular, mildly dilated ducts with periductal fibrosis resembling partially sclerosing adenosis. Benign “infiltrating epitheliosis” was seen on the fibrous capsule. There were almost no inflammatory cells. Based on these findings, the tumor was diagnosed as ductal adenoma on frozen and paraffin sections (Fig. 3).