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## Breast Cancer Mimic: Cutaneous B-Cell Lymphoma Presenting as an Isolated Breast Mass

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### Key Words

Primary cutaneous B-cell lymphoma · Breast mass · Lymphoma

### Abstract

**Background:** Primary cutaneous B-cell lymphoma typically localizes to the skin, and dissemination to internal organs is rare. Lymphomatous involvement of the breasts is also rare. We describe the clinical and radiological findings of an unusual case of primary cutaneous B-cell lymphoma presenting as an isolated breast mass without associated skin changes. **Case Presentation:** The patient was a 55-year-old Caucasian female who initially presented with cutaneous B-cell lymphoma around her eyes and forehead with recurrence involving the skin between her breasts. Three years after terminating treatment due to a lack of symptoms, she presented for an annual screening mammogram that found a new mass in her upper inner right breast without imaging signs of cutaneous extension. On physical examination, there were no corresponding skin findings. Due to the suspicious imaging features of the mass that caused concern for primary breast malignancy, she underwent a core biopsy which revealed cutaneous B-cell lymphoma. **Conclusion:** When evaluating patients with a systemic disease who present with findings atypical for that process, it is important to still consider the systemic disease as a potential etiology, particularly with lymphoma given its reputation as a great mimicker.

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## Background

Primary cutaneous B-cell lymphoma (pCBCL) typically localizes to the skin, and dissemination to internal organs is rare. Hodgkin's and non-Hodgkin's lymphomatous involvement of the breasts is also rare. We discuss the clinical and radiological findings of a case of CBCL presenting as an isolated breast mass without associated skin changes, which has not been reported to date.

## Case Report

In 1993, a 36-year-old Caucasian female with a history of dyslipidemia, gastroesophageal reflux, and fibromyalgia presented to her dermatologist with redness around her eyes and forehead. Biopsy of this area demonstrated cutaneous marginal zone B-cell lymphoma (CMZL). She was treated with local radiation therapy and topical nitrogen mustard with control of symptoms for 2 years until it recurred locally. Low-dose radiation to the same area was repeated. She was also treated with Rituxan, Cytosan, Vincristine and Prednisone for 3 months but had a recurrence with new cutaneous lesions involving the skin between her breasts and on her back. She participated in a series of experimental clinical trials with partial response. Since 2009, she had not received any further treatment given the low-grade nature of the lymphoma and lack of symptoms.

## Imaging Findings

In 2012, the patient underwent a routine annual screening mammogram, which found a new 18-mm mass in the upper inner right breast at approximately 2 o'clock on a background of scattered fibroglandular tissue (fig. 1a). Given the patient's known history of CBCL, the primary care physician was asked to evaluate for skin findings in this area, of which there were none.

The right breast mass was further evaluated with diagnostic mammographic views with spot compression. These confirmed a partially circumscribed, partially obscured mass at 2 o'clock in the posterior third of the right breast. There were no suspicious microcalcifications, architectural distortion, or mammographic signs of skin changes. On physical examination, the breast imager confirmed that there were no associated cutaneous findings.

Targeted high-resolution ultrasound of the right breast at 2 o'clock showed a 13 × 15 × 6 mm ill-defined oval hypoechoic heterogeneous mass oriented parallel to the skin surface, with the center of the mass approximately 6–7 mm below the skin surface. There was no cutaneous extension seen on ultrasound (fig. 1b). The ill-defined and angulated margins of the mass caused concern for a primary breast carcinoma. Because this mass was new and demonstrated suspicious imaging features, the patient underwent ultrasound-guided biopsy. Pathology was consistent with CMZL (fig. 2).

A 2-[fluorine-18]fluoro-2-deoxy-D-glucose (18F-FDG) positron emission tomography (PET)/computed tomography (CT) scan was performed to evaluate for other lesions. A 16 × 12 mm mass in the upper inner right breast, anterior depth, was demonstrated to be metabolically active with a maximum standardized uptake value (SUVmax) of 3.1 g/ml (fig. 3). This represented the mammographic and sonographic correlate. The PET/CT also showed metabolically active left axillary, right inguinal and right iliac lymph nodes. There were no metabolically active right axillary lymph nodes or cutaneous lesions.

Due to the overall minimal disease on PET/CT, lack of B symptoms, and the low-grade nature of the lymphoma, the patient did not meet the criteria for additional treatment and is being followed up clinically.

## Discussion

### *Breast Lymphoma*

Hodgkin's and non-Hodgkin's lymphomatous involvement of the breast is extremely rare but represents the largest group of tumors that metastasize to the breast [1–5]. Approximately 0.15% of malignant mammary neoplasms are lymphomas and less than 0.5% of all malignant lymphomas primarily involve the breast [1–3, 6]. The small amount of lymphoid tissue in the breast accounts for the rarity of primary breast lymphoma.

Breast lymphomas most frequently manifest as an upper outer quadrant breast mass, in the typical location of intramammary lymph nodes. There may be skin changes, such as skin fixation, and cutaneous inflammatory changes, like skin thickening [1–3]. While breast cancers occur more frequently in the left breast [1, 2], unilateral primary and secondary breast lymphoma is predominantly right-sided [1, 2, 5, 6]. Mammary lymphomas also tend to be larger at diagnosis than primary breast malignancies [1].

The most common mammographic feature of breast lymphoma is a round or oval mass with indistinct or circumscribed margins. Less frequently, breast lymphomas present as global asymmetry on mammography. Breast lymphomas typically do not demonstrate microcalcifications or spiculated margins that are associated with primary breast carcinoma.

Sonographic features of breast lymphoma are nonspecific. They can present as a heterogeneously hypoechoic mass with indistinct margins, circumscribed hypoechoic mass, or diffuse nodular infiltration of the breast, which is more common in women with extensive involvement of both breasts. Breast lymphomas on ultrasound can demonstrate hypervascularity but do not demonstrate posterior acoustic shadowing associated with breast carcinoma [2, 3, 7, 8].

Magnetic resonance imaging of breast lymphoma demonstrates a hypointense or iso-intense mass on T1-weighted sequences and hyperintense mass on T2-weighted sequences. On post-contrast images, there is heterogeneous enhancement with rapid initial increase and washout kinetics on dynamic contrast-enhanced images [2].

PET/CT is the imaging modality of choice for staging and follow-up of patients with extranodal involvement for Hodgkin's lymphoma and most cases of non-Hodgkin's lymphoma. Imaging of tumor metabolism with 18F-FDG PET identifies sites of disease that may not be appreciable on CT. The intensity of FDG uptake characterizes tumor activity. Breast lymphomatous involvement is seen as increased FDG uptake [9].

### *Primary Cutaneous B-Cell Lymphoma*

pCBCLs are B-cell lymphomas that originate in the skin and present without extracutaneous disease. pCBCLs constitute approximately 25–29% of all primary cutaneous lymphomas in the United States, more commonly affecting men than women, with incidence increasing with age. pCBCL is almost exclusively a disease of non-Hispanic whites [10].

There are three types of pCBCL: primary CMZL (pCMZL), primary cutaneous follicle center lymphoma, and primary cutaneous diffuse large B-cell lymphoma, leg type. The two former subtypes are recognized as indolent lymphomas, while the latter has a more intermediate behavior [10, 11]. The following discussion will focus on pCMZL, which is the subtype of pCBCL in our patient. pCMZL has only recently been recognized as a distinct

clinical entity [12]. The tumor cells originate in the ‘marginal zone’ of the secondary lymphoid follicles in the skin [13].

Patients with pCMZL typically present with solitary or clustered reddish or red brown papules, nodules and plaques sometimes surrounded by an erythematous halo [14]. It has a predilection for the trunk and upper extremities. While it has frequent cutaneous relapses, it rarely causes extracutaneous dissemination [8, 10, 12]. pCMZL is associated with an excellent prognosis with 5-year survival rates ranging from 89 to 99% [4, 10, 12, 15].

pCMZL responds well to local radiotherapy or excision. Topical therapies such as corticosteroids, topical nitrogen mustard, cryotherapy, intralesional tramcinolone, and intralesional interferon are frequently used with success in pCMZL. Chlorambucil and intravenous or intralesional rituximab have also been used in patients with multifocal lesions untreatable by radiation therapy [10].

## Conclusions

We present an unusual case of CBCL manifesting as an isolated breast mass without associated skin changes. We are the first to describe its imaging features given that CBCL is typically followed clinically by physical exam. While Hodgkin’s lymphoma and non-Hodgkin’s lymphoma are known to be great mimickers of other diseases, CBCL is less known to present similarly to other maladies. Our case report is a reminder that when evaluating patients with a systemic disease who present with findings atypical for that process, the systemic disease should still be considered as a potential etiology, particularly with lymphoma.

## Disclosure Statement

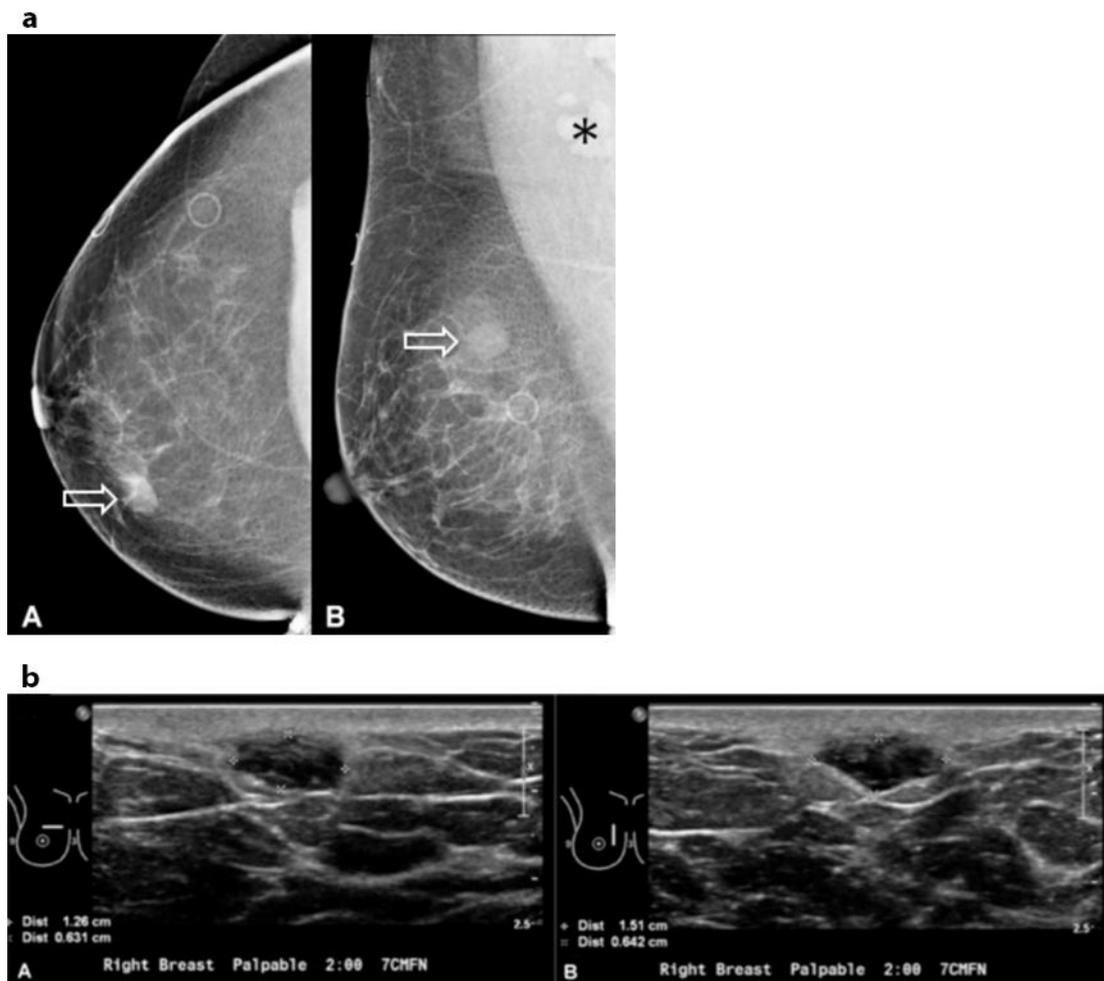
The authors declare that they have no competing interests.

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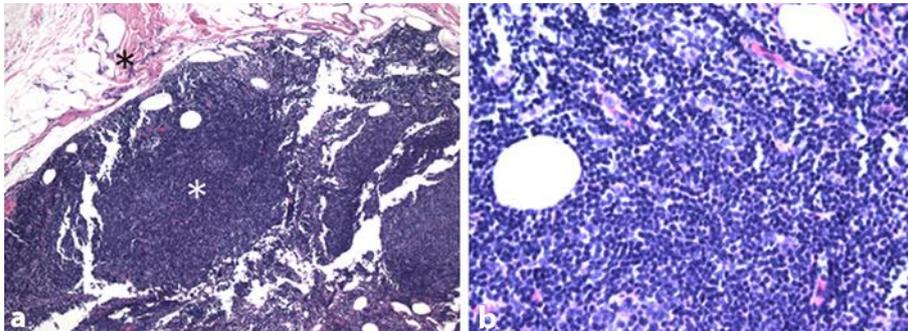
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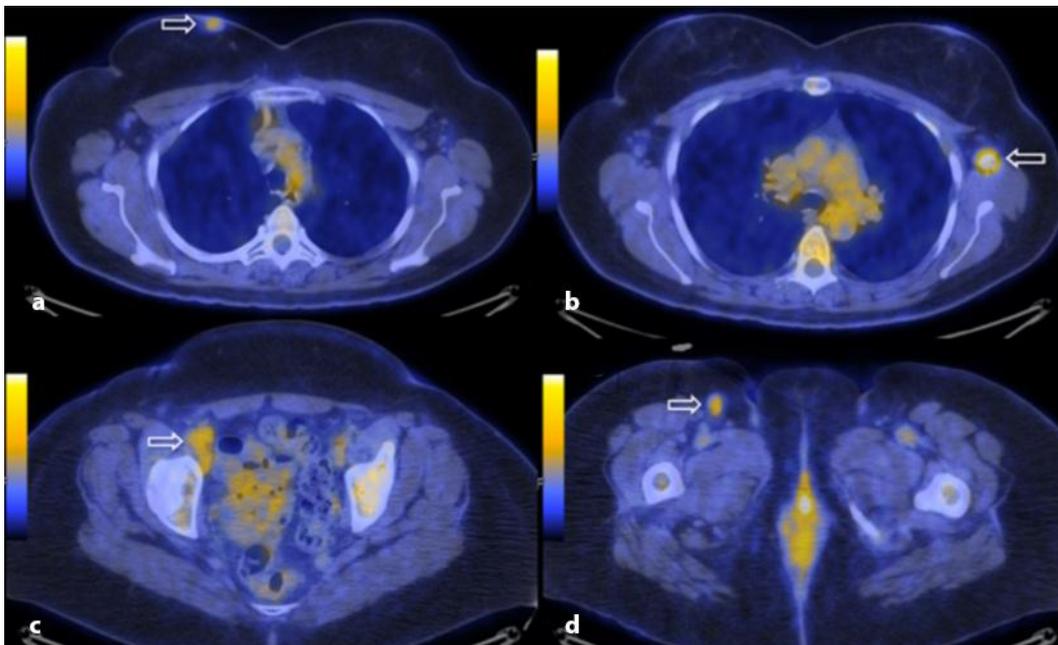


**Fig. 1.** **a** A 55-year-old female presented for a routine craniocaudal (**A**) and mediolateral oblique (**B**) screening mammogram, which found a new 18-mm mass (arrows) in the posterior third of the right breast at approximately 2 o'clock on a background of scattered fibroglandular tissue. There were no suspicious microcalcifications, architectural distortion or mammographic signs of skin changes. Note that there is no mole marker over the mass to indicate skin findings. Small, non-enlarged right axillary lymph nodes were present (asterisk). **b** The 55-year-old female presented for a high resolution targeted ultrasound of the right breast. A physical exam prior to the breast ultrasound found no skin changes in the upper inner right breast. Targeted ultrasound of the right breast in the transverse (**A**) and longitudinal (**B**) planes showed a heterogeneously hypoechoic 13 × 15 × 6 mm mass with ill-defined, angulated margins located approximately 6–7 mm below the skin surface. The mass did not extend to the skin surface on ultrasound. Because the margins of the mass caused concern for a breast malignancy, an ultrasound-guided biopsy was recommended.

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**Fig. 2.** Histopathologic features of CMZL. **a** Hematoxylin-eosin staining shows nodular to diffuse lymphocytic infiltrate (white asterisk) involving fibroadipose tissue (black asterisk). **b** The diffuse lymphocytic infiltrate is composed primarily of small mature-appearing lymphocytes.



**Fig. 3.** The 55-year-old female with CBCL, originally involving the face, presented for an FDG-PET/CT. **a** Fused PET/CT images showed a 16 × 12 mm mass in the upper inner right breast, anterior depth, with an SUVmax of 3.1 g/ml. There was no overlying skin thickening or hypermetabolic activity. **b** A hypermetabolic 16 × 24 mm left axillary lymph node was also present with an SUVmax of 8.1 g/ml. There were no hypermetabolic right axillary lymph nodes. **c** A hypermetabolic right external iliac lymph node was present, measuring 15 × 24 mm with an SUVmax of 3.9 g/ml. **d** Several right inguinal lymph nodes were also seen, the largest measuring 12 × 17 mm with an SUVmax of 3.7 g/ml.