

Secondary Breast Lymphoma: A Case Report and Review of Literature

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Abstract

Case Report

Hematological malignancies rarely affect the breast, and the majority of those that do are lymphomas. Breast lymphomatous engagement can be categorized into primary and secondary forms, both of which often exhibit imaging characteristics that resemble those seen in primary breast carcinoma. This similarity complicates the process of making a prospective diagnosis of breast lymphoma. We present a case of a 77-year-old female patient, without specific medical history, who presented with an ulcerated mass on the right leg accompanied by diffuse cutaneous nodules and bilateral breast nodules, that has been progressing for the past 3 months. A mammography and a breast ultrasonography were performed. A core needle biopsy of the one of the breast nodules was excuted and the diagnosis of diffuse large B-cell lymphoma has been established.

Keywords: Breast lymphoma, mammography, breast ultrasonography.

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INTRODUCTION

Breast is an uncommon extra-nodal site of involvement by lymphoma, apparently due to the small amount of lymphoid tissue in this organ [1]. Lymphomatous presence in the breast can be categorized as primary or secondary. Primary breast lymphoma affects the breast lymphoid tissue without prior identification of extramammary lymphoma or widespread disease. Secondary breast lymphoma, constituting 17% of breast metastatic cases, is the most prevalent metastasis to the breast [2].

Despite numerous previous studies focusing on the imaging characteristics of breast lymphoma, the results are commonly nonspecific and often presented as a list that was insufficient to guide clinical practice. Consequently, clinicians may misinterpret the imaging

findings related to this condition, and consequently miss its significance.

It is noteworthy that, unlike breast carcinoma, a breast lymphoma does not require surgical excision. To prevent unnecessary interventions, it is imperative for clinicians and radiologists to know the characteristic imaging features of breast lymphoma.

CASE REPORT

A 77 years-old woman with no relevant medical or surgical history and no family history of breast cancer, presented with an ulcerated mass on the right leg evolving over the past 3 months, associated with diffuse cutaneous nodules (Fig 1) and bilateral breast nodules. No history of fever, night sweats, or chills was noted.



Figure 1: a) Ulcerated mass on the right leg; b) Diffuse cutaneous nodules

A mammography was performed and identified bilateral circumscribed masses with various shapes and sizes, and the largest one is visible in the superoexternal quadrant (Fig 2).

Breast ultrasound (US) was performed demonstrating multiple masses with similar ultrasound characteristics, of which the largest (left supero-external

quadrant) is illustrated in Figure 3. It shows an oval heterogeneous hypoechoic mass, surrounded by a hyperechoic halo with onion peel like rims, posterior acoustic enhancement and discrete vascularity in the color Doppler flow. US-guided left breast biopsy was performed and demonstrated diffuse large B-cell lymphoma.

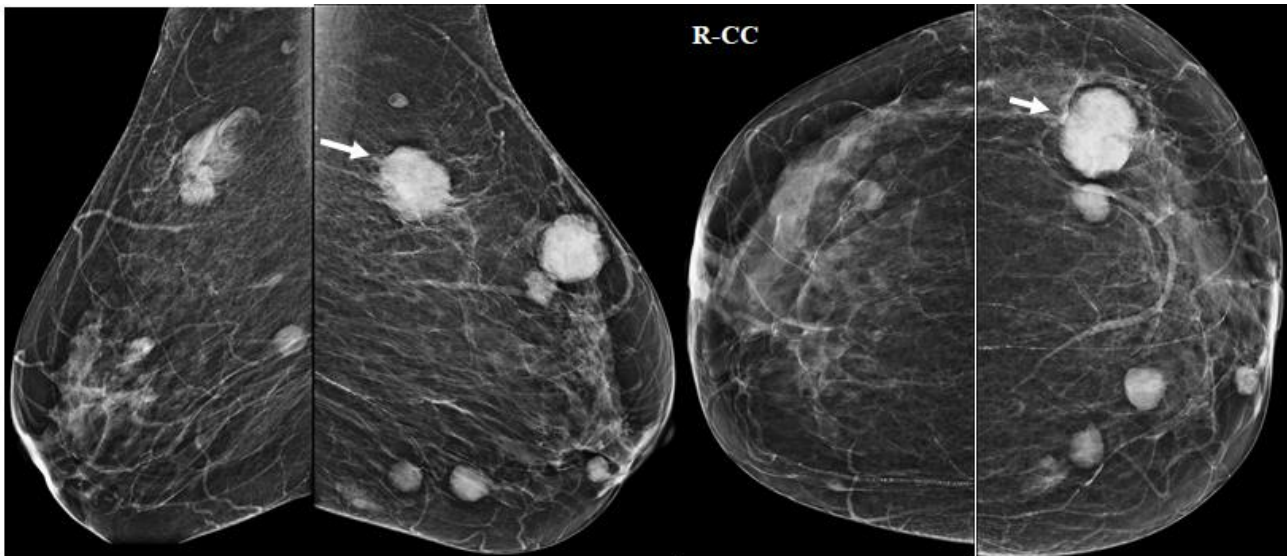


Figure 2: Both craniocaudal (CC) and mediolateral oblique (MLO) mammograms demonstrate bilateral circumscribed masses and the largest one is visible in the superoexternal quadrant (white arrows)

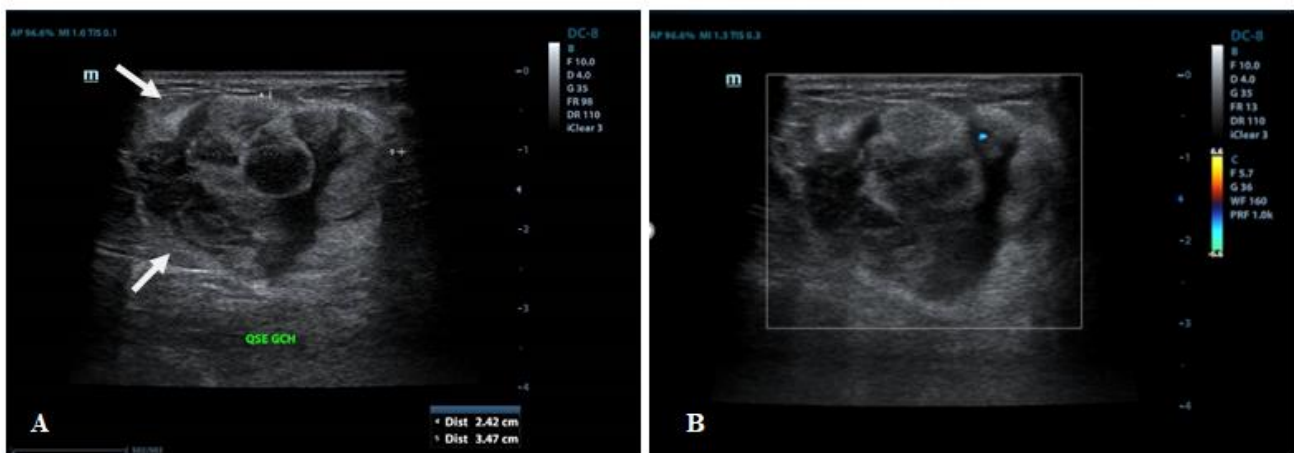


Figure 3: Targeted gray-scale US image (A) of the left supero-external quadrant mass shows an oval heterogeneous hypoechoic mass, with macrolobulated contours, surrounded by a hyperechoic halo with onion peel like rims (white arrows), posterior acoustic enhancement and discrete vascularity in the color Doppler flow (B)

The patient underwent a thoraco-abdomino-pelvic CT scan (Fig 4) as an initial staging assessment before her chemotherapy session, revealing multiple

breast, cutaneous and peritoneal nodules, along with a left medio-basal mediastino-pulmonary mass.

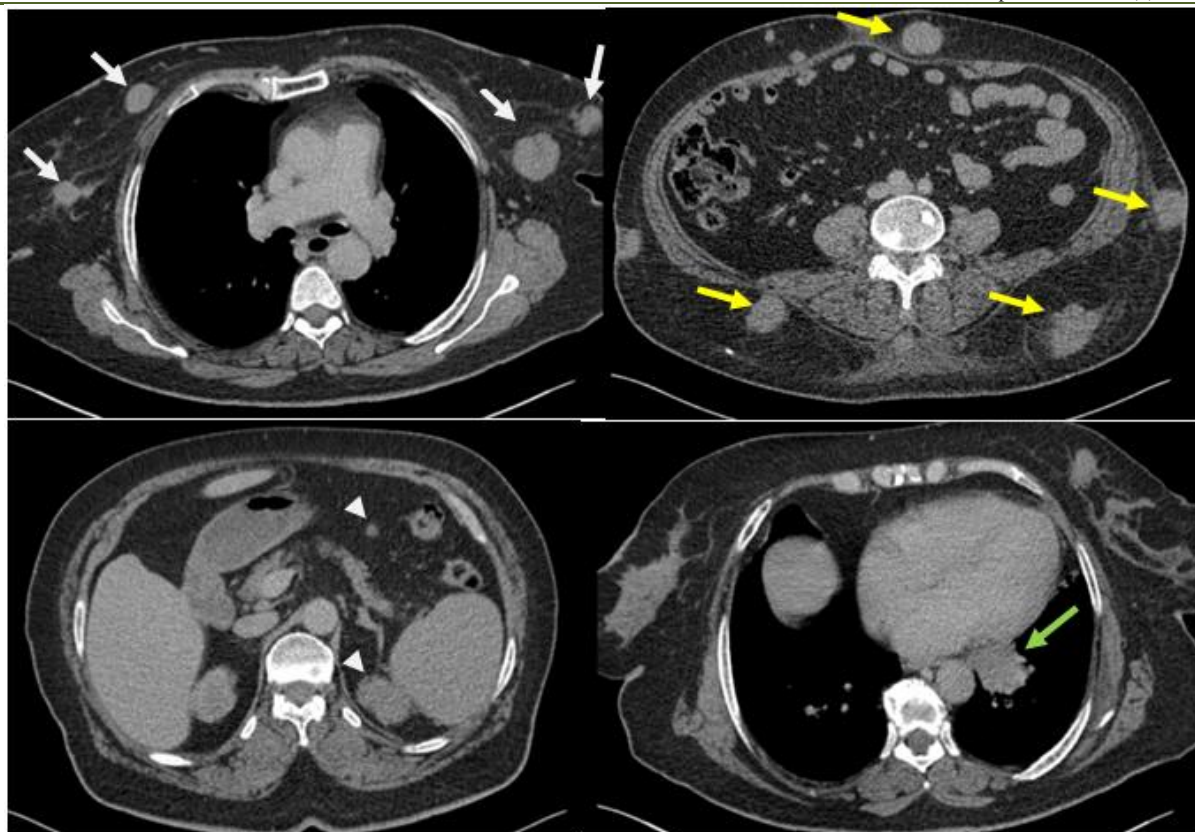


Figure 4: Thoraco-abdomino-pelvic CT scan demonstrate multiple breast (white arrows), cutaneous (yellow arrows), retro and intraperitoneal nodules (arrow heads), along with a left medio-basal mediastino-pulmonary mass (green arrow)

DISCUSSION

Both primary (PBL) and secondary (SBL) lymphomas of the breast represent uncommon conditions with an estimated incidence as low as 0.04%– 0.7% of all mammary malignancies [1]. The infrequent occurrence of breast lymphoma is likely attributed to the paucity of lymphoid tissue in the breast.

Secondary breast lymphoma (SBL) presents at a slightly advanced age compared to primary breast lymphoma (PBL), typically with a median age ranging between 60 and 70 years [3-5]. Similar to PBL, diffuse large B-cell lymphoma (DLBCL) constitutes the most prevalent metastatic lymphoma involving the breast. As previously reported, it's the histological type found in our patient.

Breast lymphomas are both posing diagnostic challenges due to their nonspecific imaging features. Additionally, there is an overlap in the imaging phenotype between PBL and SBL, as well as with other breast malignancies.

- **Shared Imaging Features of primary and secondary breast lymphoma:**

At mammography, breast lymphomas typically present as a solitary mass in the majority of cases [6]. The predominant shape is oval or round [7]. Lesion

margins are nonspecific, often circumscribed, and indistinct; spiculated margins are rare. The most common appearance is a hyperdense pattern [6-8]. Asymmetries are an uncommon imaging feature, seen in 20% of cases [6]. Mammographically apparent skin thickening and lymphedema are rarely identified [6]. Calcifications are almost always absent [1, 6-9].

Breast lymphoma is visualized as a mass on ultrasound. Its ultrasound features are generally nonspecific, with the possibility of an oval or irregular shape, circumscribed to indistinct margins, and hypoechoic or mixed internal echogenicity. Typically, these masses exhibit a parallel axis [6, 7]. Additional features that may be observed include posterior acoustic enhancement and an echogenic rim [7-10], and lymphomas tend to demonstrate hypervascularity on Doppler ultrasound.

On magnetic resonance imaging (MRI), breast lymphoma is visualized as a mass. Frequently, MR images of lymphomas exhibit nonspecific features similar to those observed in breast adenocarcinoma [6, 7, 11]. MRI findings typically favor a round or oval mass (or masses), areas of hypointensity or isointensity on T1-weighted imaging, and areas of hyperintensity on T2-weighted imaging. Enhancement may be either homogeneous or heterogeneous, demonstrating a type II

kinetic curve (slow or rapid enhancement with a plateau in the delayed phase) or, less commonly, a type III curve (rapid enhancement with washout in the delayed phase). Skin thickening, more perceptible on MRI than on mammography, may be linked to diffuse infiltration and has been documented in both primary breast lymphoma (PBL) and secondary breast lymphoma (SBL) [11].

- **Imaging Features Favoring a secondary breast lymphoma (SBL) Diagnosis over a primary breast lymphoma (PBL):**

Similar to the imaging and diagnostic considerations for primary breast lymphoma (PBL), no distinct imaging features significantly differentiate secondary breast lymphoma (SBL) from PBL without clinical context. When the patient has a known extramammary lymphoma, imaging features that may indicate SBL include the presence of multiple masses (multifocal, multicentric, or bilateral) on mammography and ultrasound, with or without axillary lymphadenopathy, or an inflammatory-like appearance, such as trabecular and skin thickening without a mass [6]. In a case series, multiple masses on mammography were identified in 56.2% of patients with SBL and in 8.3% of patients with PBL [12]. The masses in SBL tend to be smaller than those in PBL. Mammographically, the imaging features of SBL are similar to those of PBL, with an oval shape and circumscribed or indistinct margins being more common. While margins and shape on ultrasound vary in SBL and overlap with PBL and other breast malignancies, an oval or round shape and circumscribed margins are indicative of an SBL diagnosis. SBL typically appears hypoechoic on ultrasound, although studies have also shown that SBL has mixed echogenicity more frequently than PBL [13]. In cases of suspected lymphoma, the presence of skin thickening along with a diffuse increase in parenchymal density suggests a diagnosis of SBL over PBL [12, 13].

- **Differentiating a breast lymphoma Diagnosis from other breast malignancies:**

Distinguishing breast lymphoma from various malignant breast diseases based on clinical and radiological findings poses challenges. Nonetheless, it is crucial to differentiate breast lymphoma from other malignancies such as invasive breast carcinoma, inflammatory breast carcinoma, or metastasis to ensure appropriate treatment selection. The diagnostic approach for breast lymphoma depends on the presence or absence of known systemic lymphoma. If a patient is already diagnosed with systemic lymphoma, any changes in the breasts should prompt consideration of lymphomatous involvement [14]. However, in cases where lymphoma is not initially suspected, it is typically included as one possibility in the differential diagnosis.

The primary symptom of breast malignancy is often a painless palpable lump. Local pain, edema, or subcutaneous or skin nodules are common in lymphoma, particularly the T-cell type, whereas nipple retraction or

discharge is extremely rare [15, 16]. Radiologically, characteristic features found in more common breast carcinomas, such as calcifications, spiculations, or architectural distortion, are notably absent in lymphoma [17, 18]. Inflammatory breast carcinoma presents as breast edema with a mass on imaging, typically of irregular shape and with indistinct margins or spiculated characteristics, which differ somewhat from those observed in breast lymphoma.

Breast metastasis presents either as a localized lesion or diffuse infiltration [14]. The localized manifestation appears as a well-defined oval or round mass, while the diffuse infiltration is characterized by breast edema accompanied by dilated dermal lymphatics on breast imaging. These findings closely resemble those observed in breast lymphoma. Currently, there are no definitive criteria to reliably differentiate breast lymphoma from metastasis. However, a significant aspect in the diagnostic process is the patient's medical history, particularly the presence of known metastasis or lymphoma in another organ, which is crucial in discerning the nature of a breast lesion.

- **Differentiating a breast lymphoma Diagnosis from inflammatory diseases:**

Distinguishing breast lymphoma from inflammatory diseases is challenging, particularly in patients presenting with a painful breast lump, erythema, or skin thickening [19, 20]. Inflammatory breast diseases encompass conditions such as infectious mastitis, abscess, or idiopathic granulomatous lobular mastitis. Both breast lymphoma and inflammatory diseases often exhibit unilateral breast edema, potentially with associated masses, as revealed by mammography and ultrasound. However, distinct differences in echo patterns of masses and associated findings exist between lymphoma and inflammation. In the latter, masses may present as complicated cysts with movable echoes or sedimentations, or as complex cysts with both cystic and solid contents, exhibiting hypoechoic characteristics [20]. Additionally, inflammatory diseases may involve dilated ducts or fistulous tracts to the skin [20]. Conversely, a complex cyst is exceedingly rare in breast lymphoma, and dilated ducts or fistulas are not associated with it.

CONCLUSION

A precise histological diagnosis of breast lymphoma is essential to prevent unnecessary surgical interventions. To that end, it is important to first suspect the presence of malignant lymphoma. Although it is difficult to make the diagnosis based on image findings alone, it is necessary to convey to pathologists that breast lymphoma is one of the differential diagnoses. This case is presented with the intent that others may benefit from our experience and avoid encountering similar challenges in the future.

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