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Breast-Predominant Non-Hodgkin Lymphoma Presenting as Infective Mastitis: A Rare Case

Dilek Kuzukiran Kocatas*[a], Hulya Ozden Terzi[a], Burcu Oksuz[a], Cilem Bayindir Dicle[a], Irem Sahin[b], Nermin Damla Okay[c], Dilek Kazanci[a]

[a]*Department of Intensive Care, Ankara Bilkent City Hospital, Ankara, Turkey*

[b]*Department of Internal Medicine, Ankara Bilkent City Hospital, Ankara, Turkey*

[c]*Department of General Surgery, Ankara Bilkent City Hospital, Ankara, Turkey*

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ABSTRACT

Background: Primary breast non-Hodgkin lymphoma is an extremely rare malignancy, accounting for only 0.1% to 0.5% of all breast cancers and 1.7% to 2.2% of extranodal lymphomas. Although it has traditionally been defined by the absence of systemic involvement at the time of diagnosis, this strict criterion has been increasingly challenged, as some patients initially present with breast lesions and concurrent systemic disease. In such cases, the term "breast-predominant lymphoma" has been proposed as a more accurate and clinically relevant descriptor. The disease typically manifests as a palpable mass and closely mimics breast carcinoma, making accurate differentiation essential for appropriate management.

Case Presentation: We present the case of a 52-year-old woman admitted to the intensive care unit (ICU) with sepsis and an infected breast mass. Laboratory findings revealed hypercalcemia and elevated inflammatory markers. Emergency hemodialysis, empirical antibiotics, and palliative mastectomy were performed. Positron emission tomography–computed tomography (PET-CT) imaging revealed both nodal and extensive extranodal disease. Histopathology confirmed high-grade B-cell lymphoma with *BCL2* and *MYC* rearrangements. No bone marrow involvement was detected. This case was classified as breast-predominant non-Hodgkin lymphoma.

Conclusion: This case highlights the importance of a multidisciplinary approach and the role of advanced diagnostics in the management of this rare disease.

INTRODUCTION

Primary non-Hodgkin lymphoma of the breast (PNHBL) is a rare malignancy, accounting for 0.1% to 0.5% of all breast cancers and 1.7% to 2.2% of extranodal non-Hodgkin lymphomas.[1–3] This disease belongs to a heterogeneous group of tumors originating from the lymphoid system and typically presents as a palpable breast mass. The term "breast lymphoma" specifically refers to primary breast lymphomas in patients with no prior history of lymphoma.[1] Wiseman and Liao[4], in 1972, proposed four diagnostic criteria for PNHBL: histopathological confirmation; direct infiltration of breast tissue by lymphoma; absence of prior or synchronous extramammary disease; and involvement of ipsilateral lymph nodes only.[4] According to World Health Organization (WHO) and Surveillance, Epidemiology, and End Results (SEER)–based

***Address for correspondence:**
Dilek Kuzukiran Kocatas,
Department of Intensive Care, Ankara Bilkent City Hospital, Ankara, Turkey
email: drdilek06@hotmail.com

criteria, primary breast lymphoma is defined as a lymphoma confined to the breast, with or without ipsilateral axillary lymph node involvement, but without systemic dissemination.[5] However, in cases demonstrating widespread extranodal involvement at diagnosis, the term "breast-predominant lymphoma" has been proposed as a more accurate descriptor.[6] We present a rare case of a patient admitted to the intensive care unit (ICU) for sepsis with an extensive, infectious-appearing mass involving the entire right breast.

CASE PRESENTATION

A 52-year-old woman who worked as a tourist guide, with no known comorbidities or regular medication use, was brought to the emergency department after being found unconscious at home. Upon initial evaluation in the emergency department, her vital signs were stable, and her Glasgow Coma Scale (GCS) score was 10 to 11. Physical examination revealed an infected, necrotic mass, approximately 23 × 17 cm, occupying the entire right breast, with purulent, foul-smelling discharge (Figure 1). Laboratory findings are summarized in Table 1.

Figure 1. Clinical Appearance of the Right Breast on Admission. Extensive necrosis, ulceration, and purulent discharge are evident, mimicking infectious mastitis.

Emergency hemodialysis reduced her serum calcium level to 14.8 mg/dL. She was admitted to the ICU with a preliminary diagnosis of sepsis. A second hemodialysis session further reduced her calcium level to 13.6 mg/dL. Empirical antibiotic therapy with piperacillin-tazobactam and teicoplanin was initiated. For sepsis source control, a palliative mastectomy was performed by the breast and endocrine surgery team. Postoperatively, due to persistent infection and insufficient soft tissue coverage, the wound was managed with compression dressings, as demonstrated in Figure 2. During subsequent follow-up, the patient did not require further dialysis.

Table 1. Laboratory Findings of the Patient

Parameter	Result	Reference range
Urea, mg/dL	96	19–49
Creatinine, mg/dL	1.29	0.5–1.1
GFR, mL/min/1.73 m^2	48	48
AST, U/L	67	<35
ALT, U/L	56	<50
LDH, U/L	608	120–246
Calcium, mg/dL	20.7	8.7–10.4
Sodium, mmol/L	148	132–146
Potassium, mmol/L	3.1	3.5–5.5
Procalcitonin, ng/mL	0.64	<0.16
WBC, × 10^9/L	12.56	3.9–10.2
Neutrophils, %	79	42–77
Hemoglobin, g/dL	10.4	12.0–15.6
Platelet, × 10^9/L	265	150–400
CRP, mg/L	135	0–5

ALT, alanine aminotransferase; AST, aspartate aminotransferase; CRP, C-reactive protein; GFR, glomerular filtration rate; LDH, lactate dehydrogenase; WBC, white blood cell.

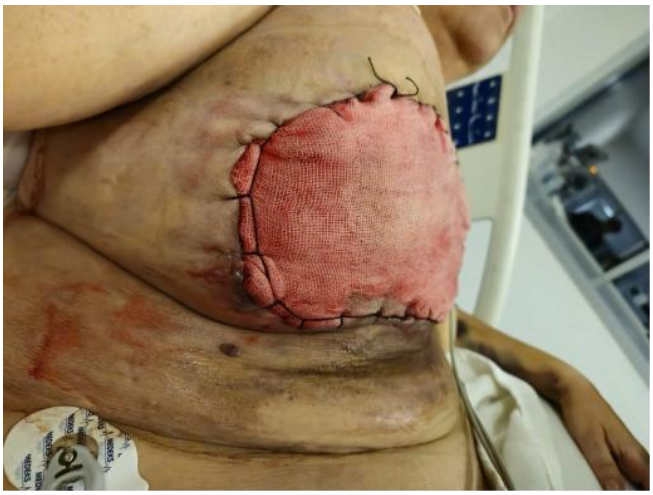

Figure 2. Postoperative Image of the Right Breast. The image shows the surgical site managed with compression dressings due to infection and insufficient skin coverage. The area exhibits persistent inflammation and partial wound dehiscence.

Positron emission tomography–computed tomography (PET-CT) revealed several notable findings: a giant mass occupying the right

hemithorax; fluorodeoxyglucose-avid (FDG-avid) lymph nodes in the left axillary and right femoral regions; FDG uptake in the right adrenal gland and the lower half of the right kidney; and a large mass in the left para-aortic region with intense FDG uptake in the left adnexal area.

Histopathologic examination of the mastectomy specimen confirmed features consistent with high-grade B-cell lymphoma. The differential diagnosis included diffuse large B-cell lymphoma, not otherwise specified (non–germinal center phenotype), and high-grade B-cell lymphoma with concurrent *BCL2* and *MYC* rearrangements (double-hit lymphoma). Fluorescence in situ hybridization (FISH) analysis was conducted to assess *BCL2*, *BCL6*, and *MYC* gene rearrangements. An addendum report noted the concurrent rearrangement of the *MYC* and *BCL6* genes, suggestive of a highly aggressive lymphoma. Bone marrow biopsy was performed, with no evidence of marrow infiltration. The patient demonstrated both nodal and extensive extranodal involvement, meeting the criteria for stage IV disease according to the Lugano staging system. Throughout her ICU stay, the patient's antibiotic regimen was continued, and her clinical and laboratory parameters remained stable. On the eighth day of admission, she was transferred to the general ward for further hematologic evaluation and initiation of systemic chemotherapy with an R-CHOP (rituximab, cyclophosphamide, doxorubicin hydrochloride [hydroxydaunorubicin], vincristine sulfate [Oncovin], and prednisone) regimen.

DISCUSSION

While lymphomas represent a significant proportion of hematologic cancers, primary breast lymphoma (PBL) remains exceptionally uncommon. This malignancy constitutes only 0.1% to 0.5% of all breast cancers and approximately 1.7% to 2.2% of extranodal lymphomas. Recent diagnostic advances have led to increased detection rates, with peak incidence observed among women in their sixth decade of life. Notably, male cases of PBL are particularly scarce in the clinical literature.[3]

PBL is diagnostically characterized by malignant lymphoid infiltration of mammary tissue in patients demonstrating no evidence of prior or coexisting non-Hodgkin lymphoma in extramammary locations. Ipsilateral axillary lymph node involvement may also be present.[8] There are two principal subtypes of primary breast lymphoma. The bilateral diffuse type typically occurs in young women, often in association with pregnancy or childbirth, and may involve the central nervous system (CNS), ovaries, and gastrointestinal tract, although lymph node involvement may be absent. In contrast, the unilateral type generally presents in older women and does not demonstrate extramammary involvement.[4] Because our patient presented with widespread extranodal involvement at the time of diagnosis, her condition was classified as breast-predominant lymphoma.[6]

Imaging modalities play a pivotal role in the diagnosis of PBL. Ultrasonography typically demonstrates a hypoechoic mass with microlobulated margins and increased vascularity.[8] Mammography commonly reveals a noncalcified, solitary, well-circumscribed mass accompanied by lymphadenopathy, while occasional findings may include skin thickening and increased parenchymal density.[8] Magnetic resonance imaging (MRI) is particularly valuable for detecting multicentric lesions. Given the clinical and radiological similarities between PBL and breast carcinoma, precise differentiation is essential to ensure appropriate treatment, as therapeutic approaches differ significantly. Histopathological examination, immunohistochemistry (IHC), and flow cytometry are crucial tools in establishing an accurate diagnosis.[11]

Histological grade plays a crucial role in guiding treatment strategies. In low-grade cases, local therapy alone may be sufficient, as there is no conclusive evidence supporting the necessity of chemotherapy. However, intermediate- and high-grade lymphomas generally demonstrate a better response to chemotherapy.[12] Although mastectomy has historically been a mainstay in the treatment of PBL, multiple studies have found it to be largely ineffective.[10,13,14] Currently, radiotherapy and chemotherapy are the preferred initial treatments pending a definitive histologic diagnosis.[12] In our case, diagnosis was established following mastectomy.

CONCLUSION

Primary breast non-Hodgkin lymphoma is a rare malignancy that predominantly affects women. Its clinical and radiological resemblance to breast carcinoma increases the risk of misdiagnosis and inappropriate treatment. In cases exhibiting systemic dissemination at the time of diagnosis, the condition is more accurately referred to as breast-predominant lymphoma, highlighting the critical importance of differential diagnosis. Therapeutic options commonly include chemotherapy, radiotherapy, and, in selected cases, mastectomy. A multidisciplinary approach is essential to ensure accurate diagnosis and optimal management of this uncommon clinical entity.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest related to this case report.

ETHICAL CONSIDERATIONS

Informed consent was obtained from the patient for the publication of this case report, including any accompanying images and data.

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DATA AVAILABILITY

All data generated or analyzed during this study are included in this published article. Further details are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

DKK: Data Curation; DKK: Writing – Original Draft; HOT, BO, CBD, IS, NDO, DK: Investigation; DK: Supervision; DKK, HOT, BO, CBD, IS, NDO, DK: Writing – Review & Editing.

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