Burkitt's lymphoma of bilateral breasts in pregnancy combined with a huge abdominal mass and bone marrow invasion: A case report

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Case Report

Keywords: Burkitt's lymphoma, Breast neoplasms, pregnancy

Posted Date: January 23rd, 2024

DOI: https://doi.org/10.21203/rs.3.rs-3882074/v1

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Additional Declarations: No competing interests reported.
Abstract

Burkitt's lymphoma of the breast is a rare kind of malignancy, which usually occurs among women during pregnancy or breastfeeding. A rapid diffuse swelling of bilateral breasts is the most common mode of presentation. This article reports a rare case of Burkitt's lymphoma of the breast during pregnancy. The patient presented with diffuse enlargement of both breasts with skin erythema, and increased skin temperature, which brought difficulty in distinguishing it from inflammatory breast cancer and gestational mastitis. The rare clinical manifestations pose a challenge for early diagnosis, only by a series of imaging tests. Until the fine needle aspiration of breast revealed lymphoma cells and a subsequent bone marrow biopsy revealed a translocation of chromosome No.8 and No.14, the final diagnosis was ensured. Meanwhile, imaging examination indicated a huge retroperitoneal mass at a maximum diameter about 10 centimetre. It was significantly reduced together with breast lesion during the standardized chemotherapy. For a rapid progression and poor prognosis, an early diagnosis and prompt therapy are especially important for this very disease. This article provides a patient with an atypical presentation accompanied by a massive retroperitoneal neoplasm, to alert clinicians and help them learn more about this rare disease.

1. Background

Lymphoma of the breast is very rare, with a prevalence from 0.5–1% of breast malignancies and 2% of all extra-nodal lymphomas. Burkitt's breast lymphoma constitutes only about 10% of breast lymphomas and typically happens in pregnant or lactating women, which mostly presents as diffuse bilateral enlargement of breasts. We reported a pregnant woman with physical exam features resembling mastitis and inflammatory breast cancer, but diagnosed with Burkitt's breast lymphoma with a large abdominal mass and bone marrow infiltration. The clinical presentation was highly unusual, which brought a challenge to the diagnosis.

2. Case presentation

On May 5, 2023, a 30-year-old gravida at 25 3/7 weeks of gestation was admitted to our department for bilateral enlargement of breasts accompanied by pain. Physical examination disclosed diffusely enlarged, medium-indurated breasts without palpable focal mass. There were extensive erythema, elevated temperature of skin and increased blood vessels on bilateral breasts (Fig. 1). Palpable and matted lymph nodes were found in bilateral axilla and there was no other enlarged lymph nodes found in supra-clavicular, cervical or inguinal. The abdomen was distended, consistent with gestational changes and no limited mass on the abdominal wall were touched.

Ultrasound of breast showed markedly thickened glands and diffuse parenchymal disease without focal masses (Fig. 2). MRI of breast suggested symmetrically enlarged, dense glands with significant diffusion restriction. In addition, abdominal ultrasound (Fig. 3) suggested a 10.1*7.0*8.5 cm hypoechoic area in the
right lower abdomen, with irregular echogenicity and abundant blood flow signals. CT of brain and ultrasound of liver, kidney, pancreas, groin and neck were normal.

Upon further questioning, the patient complained of pain and swelling in both breasts a month ago. Constitutional symptoms including fever, chills, night sweats and weight loss were denied. Recent history of miscarriage or breastfeeding and family history of cancer were not mentioned. An ultrasound at local hospital showed no obvious abnormality, and the primary physician consider it a normal pregnancy reaction.

Then, a diagnostic cytological puncture of the right breast was performed, which revealed lymphoma cells (Fig. 4A). The patient underwent further bone marrow aspiration. Bone marrow cytology revealed a large population of mononuclear cells with dark blue cytoplasm rich in vacuoles (Fig. 4B). The fluorescence in situ hybridization (FISH) suggested a translocation of chromosome No.8 and No.14, and pathology was consistent with the features of Burkitt's lymphoma (BL) (Fig. 5).

Combining clinical presentation and inspection results, the patient was finally diagnosed with BL, stage b. Considering the highly aggressiveness of BL and the advanced stage, the doctors recommended a termination of pregnancy and immediate chemotherapy. The patient has now completed her first chemotherapy treatment. The breast and abdominal ultrasound currently showed no significant masses and tumor cells in bone marrow have disappeared.

3. Discussion

BL is a highly aggressive B-cell lymphoma that is common in adolescents but accounts for only 1–2% of adult non-Hodgkin's lymphomas. It is characterized by rapid progression and early hematogenous dissemination with a tendency to metastasize to the bone marrow and central nervous system. Disseminated BL can involve almost any organ, usually presenting as a rapidly growing abdominal mass. Bone marrow is involved in 30–50% of cases, while the involvement of breast is extremely rare, accounting for less than 6% of all breast lymphomas.

In addition, BLs during pregnancy have a greater tendency to involve the breast with an advanced stage, which may be related to pregnancy-associated immunodeficiencies or the high level of sex hormone stimulation. One study found that more than 50% of breast BL cases were associated with pregnancy or breastfeeding, and 61.5% of breast BLs in pregnancy were stage IV, which was significantly higher than in non-pregnant lymphoma patients.

In this presented case, the initial clinical manifestations and local breast ultrasound results were similar to normal hyperplasia during pregnancy, mostly accounting for the initial missed diagnosis. Besides, signs of the retroperitoneal mass are obscured by an enlarged abdomen in pregnancy, resulting in insufficient clinical evidence for malignancy. This suggests overlapping signs between pregnancy and
abdominal lymphoma may lead a delayed diagnosis. And this may also be another reason for an advanced stage of lymphoma in pregnancy at initial diagnosis.

The most common symptom of Burkitt's breast lymphoma is diffuse bilateral breast enlargement, and skin recession and erythema are uncommon. This patient uniform breast enlargement with large erythema is really unusual, which complicates the clinical diagnosis. Differential diagnosis includes mastitis and inflammatory breast cancer in patients with reddened breast skin. However, there is a lack of distinct mammographic or ultrasound features to distinguish breast lymphoma from breast carcinoma or benign breast lesions. The finding of a large mass on abdominal ultrasound in this case was suggestive and instructional in considering lymphoma, as inflammatory breast cancer and acute mastitis rarely involve the abdominal lymph nodes. In general, the final diagnosis of breast lymphoma heavily relied on biopsies. At present, systemic chemotherapy is the main treatment of breast lymphoma is. The long-term efficacy of surgery is minimal as this kind of malignancy is sensitive to both chemotherapy and radiotherapy. Meanwhile, the treatment of pregnant woman requires comprehensive consideration according to pregnancy status, tumor aggressiveness, and patient wishes. At one time, it was regarded that once the diagnosis of lymphoma in pregnancy was ensured, labor should be conducted immediately for cytotoxicity of chemical drugs to the fetus. However, no ample evidence prove that labor induction could improve prognosis. Also, studies have shown that the risk of congenital malformations associated with chemotherapy after mid-gestation is close to that of the general population. Therefore, with a close observation and monitoring of both patients and fetuses, continuation of the pregnancy into the middle or late stages of gestation is to be expected.

**Declarations**

**Ethics approval:**

Written informed consent was obtained from the individual for the publication of any potentially identifiable images included in this article.

**Availability of data and materials:**

The original contributions presented in the study are included in the article/ Supplementary Material. Further inquiries can be directed to the corresponding author.

**Competing interests:**

The authors declare that they have no competing interests.

**Founding:**

This study has no funding source.

**Authors' contributions:**
Yun Xia was responsible for the overall project progress, paper revision, and submission. Xingmin Yan was responsible for writing the paper, organized the image data, and analyzed the data. Shiqiang Liu was responsible for collecting clinicopathological data and revising the manuscript. All authors read and approved the final manuscript.

**Acknowledgements:**

None.

**References**


**Figures**
Figure 1

Appearance of both breasts. Both breasts showed diffuse enlargement with extensive erythema and increased vascularity.
Figure 2

Ultrasound images of the both breasts. Both breasts ultrasound showed markedly swollen and thickened glands, with no limited nodules. A) left breast ultrasound, gland thickness is 7.6cm; B) right breast ultrasound, gland thickness is 7.27cm;
Figure 3

An ultrasound of the abdomen. A hypoechoic mass measuring about 10.33*9.54 cm was seen in the patient’s right lower abdomen, with irregular echogenicity and abundant blood flow signals.
Figure 4

**Aspiration cytology findings of breast and bone marrow.** A) fine needle aspiration of the right breast (Giemsa stain; x100): a large number of malignant lymphocytes. B) bone marrow aspiration (Giemsa stain; x400): large groups of single nucleated cells with large cytosol, abundant dark-blue cytoplasm, rich in vacuoles. The arrow points to a lymphoma cell.

![Figure 4](image)

Figure 5

**Biopsy, immunohistochemistry and FISH results of bone marrow tissue.** A) The biopsy of bone marrow tissue tissue consistent with a diffuse large B cell lymphoma (H&E stain; x40). The arrow points to a B cell. B) The immunostain for CD20, a B-cell marker, is positive (immunoperoxidase stain; x200). In the inset, FISH results revealed that the IGH gene (labeled with a green probe) was fused to the CMYC gene (labeled with a red probe), suggesting the involvement of t(8;14).