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Case Series

Pregnancy-associated breast cancer in a community hospital serving a diverse population: a case series

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ABSTRACT

Pregnancy-associated breast cancer (PABC), defined as breast cancer diagnosed during pregnancy or within the early postpartum period, is uncommon, and physiologic breast changes can delay diagnosis. We have found ten patients diagnosed with PABC between October 2012 and October 2024 at a community hospital in Queens, New York, serving an ethnically diverse population, in which four patients were diagnosed during pregnancy and six within two years postpartum. Patient ages ranged from 25 to 50 years, and all patients were Hispanic (n=7) or Black (n=3). Only four patients reported a palpable mass, and palpability was not documented in four others. Mammography with ultrasound was the most common imaging approach (n=5). Invasive ductal carcinoma was the predominant histology (n=7). Triple-negative disease occurred in three patients, and triple-positive disease occurred in five. Lymph node metastases were present in half of each group, and BRCA mutations were uncommon. Mastectomy was the most frequent surgery in both groups (75% of pregnant and 66.7% of postpartum patients). Radiation therapy was offered after delivery to most patients. Systemic therapy varied, including chemotherapy, immunotherapy, and hormonal therapy, alone or in combination. This small study suggests that PABC in Black and Hispanic women may present without a documented palpable mass and with aggressive tumor subtypes. Cases diagnosed during pregnancy and postpartum may vary in receptor status, BRCA status, and treatment course. However, maintaining a high index of suspicion, multidisciplinary care, and equitable access to screening, genetic testing, and treatment are essential to improving early detection and outcomes.

Keywords: Pregnancy-associated breast cancer, Breast cancer, Pregnancy, Postpartum breast cancer, Health disparities, Breast surgical oncology, Community hospital

INTRODUCTION

Pregnancy-associated breast cancer (PABC) is broadly defined as breast cancer diagnosed during pregnancy or within the early postpartum period. PABC has a low prevalence compared to benign breast neoplasms encountered during gestation and lactation, including lipoma, fibrocystic disease, milk retention cyst and lactating adenoma.[1] PABC is one of the most common malignancies encountered, with an incidence of approximately 1 in 3,000 pregnancies, with an average age between 32 and 38 years.[2] Physiological changes of pregnancy, such as increased glandular density,

nodularity and overall size, can obscure clinical and radiologic evaluation, leading to delayed diagnosis and advanced stages at presentation. Research from Western countries suggests that pregnancy is linked to poorer survival in breast cancer. Early and accurate identification of PABC is crucial, posing unique clinical challenges and implications for both maternal and fetal health, calling for heightened awareness and timely workup in pregnant women.[3] PABC can also exert a profound psychological impact, significant emotional distress expressed through anxiety, depression, and social isolation, compounding the complexity of treatment decision-making.[4] We present an observational analysis of pregnant patients diagnosed with breast cancer in a community hospital in New York City, NY that serves an ethnically diverse population, focusing on demographic distribution, diagnostic modalities, treatment approaches, and outcomes.

CASE SERIES

This is case series of pregnant patients diagnosed with breast cancer (PABC) between October 2012 to October 2024, using the EPIC electronic medical record system. Data collected included patient demographics, gestational age or postpartum month at diagnosis, diagnostic modality, histological findings, management strategies, and follow-up. A comparison was made between cases of breast cancer diagnosed during pregnancy and those diagnosed during the postpartum period.

A total of 10 patients were diagnosed with PABC, including 4 during pregnancy and 6 in the postpartum period of up to 2 years. Ages ranged from 25 to 50 years, with an even distribution between the 25–40 and 41–50 age groups. 75% of pregnant patients identified as Hispanic (n=3) and 25% identified as Black (n=1). In the post-partum group, 66.7% identified as Hispanic (n=4), and 33.3% identified as Black (n=2).

Among the pregnant patients, diagnoses occurred in the first trimester (n=2), second trimester (n=1), and third trimester (n=1). Post-partum patients were diagnosed between 7–9 months postpartum (n=2), 13–15 months postpartum (n=1), and 16–18 months postpartum (n=3) (Figure 1). At the time of presentation, 40% of patients (n=4) reported a palpable breast mass, 20% (n=2) had no palpable mass, and palpability status was not documented in the remaining 40% (n=4). Mammography combined with ultrasound was used in 50% of patients (n=5) and Mammography combined with both ultrasound and MRI in 20% of cases (n=2). Ultrasound alone and MRI alone were each used in 10% of patients (n=1) respectively). Imaging modality could not be confirmed in the remaining 10% of cases (n=1) due to incomplete documentation. In 33.3% of patients (n=3) stage was not documented, while 10% (n=1) presented with Stage IB disease, 10% (n=1) with Stage II, 20% (n=2) with Stage III, and 10% (n=1) with Stage IV disease. Receptor subtype analysis following biopsy identified triple-negative breast cancer in 33.3% of patients (n=3) and triple-positive disease in 50% (n=5). Invasive ductal carcinoma accounted for 70% of cases (n=7), followed by invasive lobular carcinoma in 10% (n=1).

The 75% of pregnant patients underwent mastectomy compared to 66.7% of postpartum patients. Lumpectomy with sentinel lymph node biopsy was performed in 25% of pregnant patients and 33.3% of postpartum patients. Combination chemotherapy and immunotherapy were administered to 25% of pregnant patients compared to 50% of postpartum patients. A triple regimen of chemotherapy, immunotherapy, and hormonal therapy was given to 25% of pregnant patients and 16.7% of postpartum patients. Hormonal therapy alone was prescribed for 25% of pregnant patients and 16.7% of postpartum patients. Chemotherapy alone was used in 25% of pregnant patients but not in postpartum patients. Radiation therapy was offered after delivery to 75% patients diagnosed during pregnancy, compared to 66.7% of postpartum patients (Figure 2).

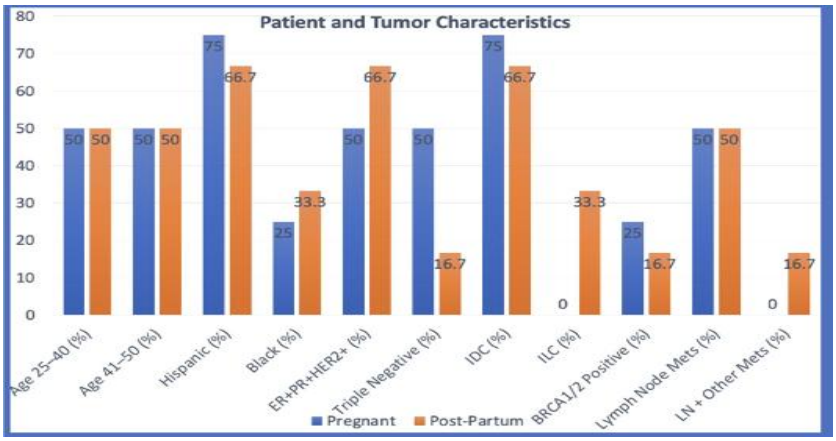

Table 1: Patient and tumor characteristics.

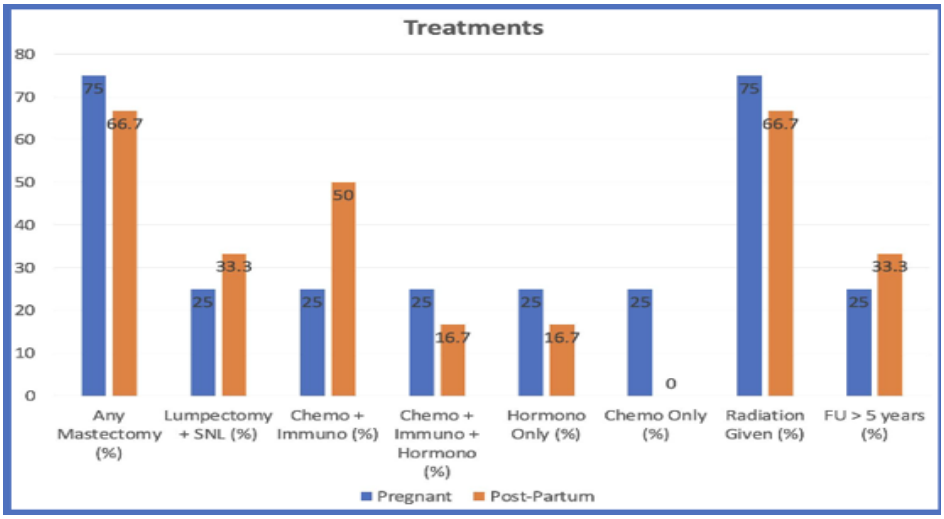

Figure 2: Treatment.

DISCUSSION

Pregnancy-associated breast cancer (PABC) is generally defined as breast cancer that occurs during pregnancy and lactation within the first two postpartum years. Some recent studies of PABC have even extended the postpartum period up to five years.[5] PABC has a low prevalence; the most common breast masses during gestation and lactation are lipoma, fibrocystic disease, milk retention cyst and lactating adenoma.[1] In a 10-year study conducted in New York City from 2009 to 2018, 46 of 2,202 women with breast cancer (2.1%) were identified as having PABC.[2] It occurs in approximately 1 in 3,000 to 10,000 pregnancies, with increasing incidence believed to be due to delayed pregnancies and decreasing age at onset of breast cancer.[6] Breast cancer is still one of the most common malignancies encountered during pregnancy, currently with an average age between 32 to 38 years.[2,7] Initial signs and symptoms masked by breast changes during pregnancy and lactation, safety concerns for both mother and fetus when considering diagnostic modalities, the aggressive disease nature and psychological considerations make the diagnosis and management of PABC particularly difficult and outcomes are poorer.[6]

The prevalence of PABC varies across countries and regions. Ethnicity considerations have been outlined, but differences may also reflect lifestyle patterns and access to effective screening programs. Understanding these variations is important when interpreting breast cancer trends and planning prevention and early detection strategies.[8] Asians and Hispanics are considered to have a low to moderate risk of breast cancer compared to Whites and African-Americans. Irrespective of ethnicity, women during their first pregnancy have substantially higher mean levels of alpha-fetoprotein, human chorionic gonadotropin, estradiol, and prolactin compared to women who previously had at least one full-term pregnancy. Data suggest that circulating pregnancy hormone levels may explain some of the ethnic differences in breast cancer risk.[9] Our cohort consisted entirely of Black and Hispanic patients. Breast cancer can occur in the very young pregnant patient as well.[10]

Multiple studies were conducted to investigate various factors that may influence PABC, but exact correlations remain poorly defined, and may include the unique hormonal environment of pregnancy, higher parity, patient demographics, and tumor and clinical characteristics.[11] Gestational length and birth weight of the first-born child were identified as risk factors confirmed by a large cohort study of 83,000 women, specifically, very preterm delivery (26–31 weeks) and higher birthweight (≥4,500 g).[12] A family history of breast cancer is also a strong predictor of PABC, particularly when the cancer is diagnosed two or more years postpartum.

Breastfeeding is likely the only potentially modifiable factor that can reduce the risk of breast cancer in women. Targeted efforts to promote breastfeeding could help mitigate the adverse effects of higher parity among premenopausal African American women.[13] However, Sly et al. reported that less than 40% of Black and White women indicated knowledge of that effect, while 64.7% of Hispanic women were aware of the association.[14]

Genomic profiling of PABC reveals mutations in key oncogenes, cell cycle regulators, tumor suppressor genes, DNA-repair genes and immune regulators. These mutations are associated with aggressive clinical features, such as higher tumor grade, tumor size, lymph node involvement, and poorer prognosis, highlighting the need for early detection and individualized treatment 4. One study comparing PABC and non-PABC populations showed statistically different findings in the PABC patients: Luminal B (38.4%,) Triple negative breast cancer (TNBC) 30.1%, Human Epidermal Growth Factor Receptor 2 (HER-2) overexpression 15.8%, and only

10.8% Luminal A. In the non-PABC patients, Luminal B 20.1%, TNBC 17.4%, and HER-2 overexpression 8.0%, Luminal A 50.9%, ($p<0.001$). In our study, receptor subtype analysis identified triple-negative breast cancer in 33.3% of postpartum patients (n=3) and 16.7% of pregnant patients. triple-positive disease in 50% of pregnant patients (n=5), and 66.7% of postpartum women. Histologically, invasive ductal carcinoma predominated (75% pregnant, 66.7% postpartum). Invasive lobular carcinoma was found only in postpartum women. Lymph node metastases were found in 50% of each of the cohorts. Previous studies have shown that PABC diagnosed in the postpartum period is more frequently associated with BRCA1/2 mutations, but in our cohort, the vast majority were BRCA negative, with only 25% of pregnant and 16.7% of postpartum patients with an identified mutation.[1]

Clinically, PABC frequently presents with a palpable mass and is often diagnosed at advanced stages, likely due to physiologic breast changes during pregnancy that obscure early detection.[2] In our study, only 40% of patients (n=4) reported a self-discovered palpable breast mass, 20% (n=2) reported no palpable mass and palpability status was not documented in the remaining 40% (n=4).

Other symptoms can include bloody or purulent nipple discharge, skin thickening, and lymph node involvement.[6] Diagnosis delays are attributed to the engorged, edematous appearance of the breast due to physiologic changes and a lack of awareness among physicians.[15] In our cohort, 2 pregnant patients were diagnosed in the first trimester, 1 in the second trimester (n=1) and 1 during the third trimester (n=1). Among the post-partum patients, diagnoses occurred between 7–9 months postpartum (n=2), 13–15 months postpartum (n=1), and 16–18 months postpartum (n=3) (Figure 1).

The choice of imaging is influenced by considerations about oncological treatment, as well as obstetrical and fetal care. Imaging and staging are preferably performed using breast ultrasound, with the typical irregular hypoechoic lesion with fluid component. Mammography is used less due to concerns for radiation exposure to the fetus and increased breast density, which can decrease the sensitivity.[6] Other ionizing radiation, including computed tomography (CT) and Positron Emission Tomography/ Computed Tomography (PET/CT), is usually avoided.[16] More recently, diffusion weighted imaging (DWI) and breast MRI are increasingly used.

Across our cohorts, mammography combined with ultrasound was used in 50% of patients (n=5). Multimodal imaging with mammography, ultrasound, and MRI was utilized in 20% of cases (n=2). Ultrasound alone and MRI alone were each used in 10% of patients (n=1, respectively). Imaging modality could not be confirmed in the remaining 10% of cases (n=1) due to incomplete documentation in the electronic medical record.

PABC treatment should follow non-PABC treatment, but with specific guidelines. Basic principles of treatment are that women should receive state-of-the-art oncological treatment without delay if possible and that the pregnancy should be maintained as long as possible. Treatment should be multidisciplinary and tailored to patient, tumor and pregnancy-related characteristics, as well as patient preferences. Initiating cancer treatment during pregnancy often decreases the risks of early delivery and prematurity. Fetal growth should be monitored, and long-term follow-up of the children is encouraged.[16] Treatment of PABC varies based on stage, hormone receptor, other biomarkers, and the patient's general health status. Breast cancer surgery is possible during all trimesters; however, chemotherapy should be reserved until after the first trimester. In our cohort, 75% of pregnant patients underwent mastectomy compared to 66.7% of postpartum patients. Lumpectomy with sentinel lymph node biopsy was performed in 25% of pregnant patients and 33.3% of postpartum patients. Breast cancer treatment, such as chemotherapy and anti-hormonal therapy, can negatively impact fertility by causing ovarian insufficiency or amenorrhea, making early fertility preservation counseling and multidisciplinary care essential for young patients desiring future pregnancies.[17] Breast cancer during pregnancy is less often hormone receptor-positive and more frequently triple-negative breast cancer compared to age-matched controls. Hormonal and radiation therapies should be delayed until after delivery.[18]

In our cohort, combination chemotherapy and immunotherapy were administered to 25% of pregnant patients and 50% of postpartum patients. A triple regimen of chemotherapy, immunotherapy, and hormonal therapy was given to 25% of pregnant patients and 16.7% of postpartum patients. Hormonal therapy alone was prescribed for 25% of pregnant patients and 16.7% of postpartum patients. Chemotherapy alone was used in 25% of pregnant patients but not in postpartum patients. Radiation therapy was offered after delivery to 75% patients diagnosed during pregnancy and 66.7% of postpartum patients (Figure 2). Recently, safe and pregnancy-appropriate exercise has been shown to help women with PABC by reducing fatigue, improving physical fitness, and supporting overall mental health and quality of life. Regular physical activity may therefore be a valuable part of PABC care.[18]

In terms of prognosis, PABC tends to be found at advanced stages, as physiological changes in pregnancy can often mask symptoms, but outcomes are similar to non-pregnant patients when matched for tumor characteristics.[19] Recent studies show that PABC is associated with the triple-negative breast cancer type around 30-40% of the time, indicating a more complex and advanced stage of the disease.[8] The variability in

survival outcomes in PABC suggests regional and ethnic influences on disease epidemiology.[3] In a Chinese study of 203 patients with PABC, the overall 3-year disease-free survival (DFS) rate was 80.3%. However, patients in the first-pregnancy group had a lower DFS (78.4%) compared to the non-first-pregnancy group (83.7%).[6,20] Disease characteristics, age at diagnosis, advanced cancer stage, parity and absence of surgical intervention negatively impact survival.[18] However, pregnancy is not an independent prognostic factor. This information can be useful when women with breast cancer are counseled and supported with the option of beginning treatment with pregnancy continuation.[21] Maintaining high levels of suspicion of PABC when pregnant women experience symptoms and promoting a diagnostic work-up are crucial to improve outcomes.

CONCLUSION

Pregnancy-associated breast cancer is diagnosed during pregnancy and the early postpartum period, but differences may exist in receptor status, BRCA mutation status, and treatment courses between subgroups. The physical and emotional well-being of pregnant patients should be balanced between treatment benefits and potential risks to the developing fetus and the young child. It is important to consider sociodemographic variables in PABC, as equitable access to care plays a significant role in influencing early detection, diagnostic approaches, genetic testing availability, treatment options, and ultimately, patient outcomes.

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