International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Gupta S et al. Int J Reprod Contracept Obstet Gynecol. 2025 Apr;14(4):1326-1329
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20250882

Case Report

Navigating dual challenges-breast cancer and pregnancy: a case report

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Received: 31 January 2025
Accepted: 04 March 2025

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ABSTRACT

Pregnancy-associated breast cancer (PABC) is a rare but challenging condition, affecting approximately 1 in 3000 pregnancies. It often presents with symptoms that overlap with common pregnancy changes, leading to delayed diagnosis. PABC is typically more aggressive, with higher rates of hormone receptor negativity and Her2 positivity. The mortality rate for PABC is 50% higher than for non-pregnancy-related breast cancer, making early detection and management crucial for both maternal and fetal outcomes. This case report aims to highlight the management complexities of PABC, emphasizing the importance of early diagnosis, prompt treatment, and coordinated multidisciplinary care to optimize outcomes. A 30-year-old woman, in her first pregnancy, presented with a palpable breast mass, initially believed to be a benign pregnancy-related change. However, further diagnostic evaluation revealed an advanced-stage invasive ductal carcinoma (IDC). Due to the aggressive nature of the tumor, neoadjuvant chemotherapy was promptly initiated. During treatment, the patient experienced spontaneous preterm labor. Despite this complication, both the mother and infant achieved favorable outcomes. The mother responded well to the chemotherapy, and the infant showed no significant complications, highlighting the critical importance of meticulous management in such complex cases. PABC requires prompt clinical evaluation and a multidisciplinary approach to treatment, balancing the needs of both mother and child. Neoadjuvant chemotherapy can be an effective option in managing advanced-stage disease, but careful monitoring is essential. This case underscores the importance of early detection and individualised treatment strategies in optimising outcomes for patients with PABC.

Keywords: Breast neoplasm, Neoadjuvant therapy, Chemotherapy, Pregnancy, Premature birth

INTRODUCTION

Pregnancy-associated breast cancer (PABC) delineates breast cancer occurrences during pregnancy or in the first postpartum year. This condition affects roughly 1 in 3000 pregnant women and stands as the second most prevalent malignancy encountered during pregnancy.[1] Typically, women diagnosed with PABC fall within the age bracket of 32 to 38 years. Alarmingly, only 6.5% of breast cancer incidents manifest in women aged under 40 years.[1] With an increasing trend of delayed childbearing and escalating breast cancer rates, a surge in PABC diagnoses is expected. PABC is associated with a mortality rate 50% higher than non-PABC. Breast cancer during pregnancy and lactation requires careful handling due to overlapping imaging appearances and physical changes caused by hormonal fluctuations. Additionally, psychological factors like fear and anxiety, especially amidst life changes, must be considered. Although breast cancer during this period is rare, delayed diagnosis is common due to lack of awareness, fear of X-ray exams like mammography, and denial of symptoms. Prompt clinical and radiological assessment, along with swift multidisciplinary management, are crucial for optimal outcomes. Nevertheless, due to the rarity of PABC coupled with its intricate nature, scant studies delve into optimal management and treatment strategies. Delayed diagnosis of pregnancy-associated breast cancer (PABC) is frequent

due to physiological changes and subtle symptoms masked by pregnancy.[2] PABC tends to exhibit particular aggressiveness, attributed to factors like young age at diagnosis, advanced tumour stage, and high prevalence of estrogen/progesterone receptor negativity and/or HER2 positivity.[2] Lymphovascular invasion and lymph node involvement are also more prevalent, leading to poorer clinical outcomes and higher mortality compared to nulliparous women.[3] Treatment may be limited or postponed to ensure fetal safety. Despite most patients lacking a family history of breast cancer, BRCA mutation carriers face elevated PABC risk.[4]

To address this gap, we present a case of PABC to elucidate and emphasize key recommendations about treatment modalities, obstetric care, delivery management, and cancer surveillance.

CASE REPORT

A 30-year-old woman, in her first pregnancy and currently at 6 months gestational age, presented with a right breast lump persisting for four weeks. The lump gradually increased in size without associated tenderness or skin changes. She had no family history of breast or ovarian cancer, and her menstrual cycles were regular until her last period six months prior. Menarche occurred at 12 years of age, and she had no history of contraceptive pill usage, addiction, or allergies.

Upon examination, she had a good performance status with a distended abdomen suggestive of a 24-week size gravid uterus. The right breast mass measured 6×6 cm and was firm and non-tender. Breast ultrasound revealed a highly suspicious mass for breast malignancy. Despite initial hesitation, at 26 weeks of fetal gestational age, she underwent a right breast core needle biopsy under local anaesthesia, revealing estrogen receptor-negative, progesterone receptor-negative, and human epidermal growth factor receptor 2 (HER2) negative invasive ductal carcinoma, clinically staged as T3N1Mx.

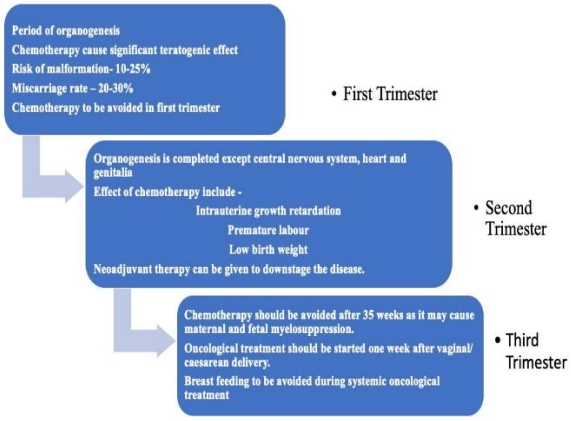

Figure 1: Impact of chemotherapeutic drugs on different trimester of pregnancy.

The case was discussed in a multidisciplinary tumour board meeting, and a treatment plan was formulated. Neoadjuvant chemotherapy with paclitaxel plus carboplatin (TP) every three weeks was initiated, along with strict fetal monitoring via serial ultrasonography. After two cycles of TP, she experienced spontaneous preterm labour at 32 weeks gestation, delivering a 1.5 kg girl. The infant was admitted to the neonatal intensive care unit due to prematurity, receiving dexamethasone and antibiotics due to sepsis detected in blood culture. The infant was discharged on day 6 of life, following an uncomplicated course.

Postoperatively, the patient recovered well and was discharged home in stable condition on postpartum day 3. In the postpartum period, she was scheduled for whole-body positron emission computerized tomography (PET-CT) for staging and metastatic workup. The treatment plan included two additional cycles of paclitaxel plus carboplatin, followed by four cycles of Adriamycin and cyclophosphamide, with breast conservative surgery or modified radical mastectomy planned after completion of neoadjuvant chemotherapy

Table 1: Describes the evaluation of breast cancer during pregnancy.

S. No.	Evaluation of breast cancer in pregnancy
1.	Ultrasound bilateral breast
2.	Chest radiograph with abdominal shield
3.	Liver ultrasound
4.	Non contrast magnetic resonance imaging to evaluate bone involvement

Table 2: Impact of chemotherapeutic drugs on fetus during pregnancy.

Drug	Safety	Fetal affection
Anthracyclines (Doxorubicin)	Recommended	Fetal cardiotoxicity
Taxanes (Paclitaxel)	Recommended	No adverse fetal effects
Cyclophosphamide	Not recommended	Frequent congenital malformations (Fetal growth restriction, severe bone marrow suppression)
Methotrexate	Strongly contraindicated	Abortifacient and the leading cause of chemotherapy-related birth defects.

Continued.

Drug	Safety	Fetal affection
Fluorouracil	Not recommended	bony aplasia and hypoplasia
Granulocyte colony-stimulating factor (G-CSF) and erythropoietin	Recommended and safe	Nil
Trastuzumab	Not recommended	Oligohyramnios
Hormonal agents (Tamoxifene)	Not recommended	Teratogenic to fetus

Table 3: Fetal surveillance during pregnancy.

S. no.	Obstetric recommendations
1.	Ultrasound obstetrics (Level II) for congenital anomaly
2.	Growth scans every 4 weekly
3.	Doppler ultrasonography if concerns of fetal growth restriction
4.	Delivery at term
5.	Send placenta for pathology

Table 4: Treatment options for pregnancy-associated breast cancer.

Modality	First trimester	Second trimester	Third trimester	Postnatal period
Surgery	Safe	Safe	Safe	Safe
Radiotherapy	Can be done after termination of pregnancy	Contraindicated	Contraindicated	Safe
Chemotherapy	Contraindicated	Recommended	Recommended	Safe
Endocrine therapy	Contraindicated	Contraindicated	Contraindicated	Safe
Targated therapy	Contraindicated	Contraindicated	Contraindicated	Safe

DISCUSSION

Breast cancers detected during pregnancy, along with those in patients under 40 years old, are typically identified through palpable masses,1 as in our case patient presents with a palpable lump. Therefore, it's crucial to conduct a thorough breast examination at the initial obstetric visit and encourage continued self-breast examination throughout pregnancy. The challenge lies in distinguishing concerning masses from normal pregnancy-related breast changes like engorgement.

When a suspicious mass is found, a breast ultrasound is essential for the characterization and identification of any worrisome features. Although over 80% of breast masses during pregnancy are benign, each requires comprehensive evaluation.[5]

Ultrasound has demonstrated 100% accuracy in detecting masses in pregnant patients.[6] If the mass appears fluid-filled, fine needle aspiration can provide fluid for cytology, with the pathologist duly informed due to the rapid cell division in pregnant breast tissue, which can mimic cancer cells.

For solid masses, mammography can be considered, although its sensitivity is reduced in young breast tissue due to increased parenchymal density. Due to heightened granularity and water content, mammography's sensitivity in detecting pregnancy-associated breast cancer is only around 78%.[4] In our case, we got an ultrasound bilateral breast, which was suggestive of a malignant lump in the right breast. Given the tendency for advanced-stage diagnoses in pregnant women with breast cancer, a thorough evaluation for possible metastasis is crucial. Common sites include the lungs, liver, and bones to be evaluated.

Chest radiographs with abdominal shielding can safely evaluate lung metastasis. Liver metastases can be accessed via ultrasound. However, due to potential harm to fetal skeletal development, bone metastasis evaluation during pregnancy is best done with non-contrast magnetic resonance imaging instead of radioactive bone scans (Table 1).

In women under 40, pregnancy-associated breast cancers (PABCs) often involve BRCA mutations, with genetic mutations accounting for 33% in their 20s and 22% in their 30s.[7] Therefore, genetic testing is recommended for all women under 40 diagnosed with breast cancer. During pregnancy, there's a noted increase in estrogen receptor-negative (ER-negative) breast cancer, potentially influenced by elevated estrogen levels interfering with binding assays.

Prompt breast cancer treatment initiation is vital, with delivery before treatment considered for near-term patients. Mastectomy is preferred over lumpectomy plus radiation due to fetal complications from radiation.[8] Breast-conserving surgery followed by post-delivery radiation is safe for near-term patients. Sentinel lymph node biopsies are safe during pregnancy. Adjuvant chemotherapy benefits high-risk patients but is avoided in the first trimester.[8] Most chemotherapy agents are safe in later trimesters, but caution is needed near delivery to prevent infant leukopenia (Figure 1).[9] Methotrexate, trastuzumab, and tamoxifen are contraindicated in pregnancy.[10] Granulocyte colony-stimulating factor and ondansetron are safe (Table 2), while corticosteroids carry minimal risk, particularly methylprednisolone and hydrocortisone.[11]

In-utero chemotherapy exposure poses risks such as growth restriction, preterm delivery, low birth weight, and transient leukopenia. Regular growth scans every 4 weeks are advised, with additional scans and testing for fetal well-being if growth restriction is detected (Table 3). Metastatic breast cancer in the fetus is rare, but placental examination post-delivery is recommended.[12] Children exposed to chemotherapy in utero show no adverse effects, as evidenced by a study of 84 children followed for over 18 years.[13] Breastfeeding during chemotherapy and hormonal therapy is not advised due to potential drug excretion in breast milk.

The prognosis for pregnancy-associated breast cancer (PABC) is poorer compared to non-pregnant breast cancer, likely due to factors such as advanced disease presentation and hormone receptor-negative status. Similarly, our patient also presents with triple-negative breast cancer, which has an aggressive clinical course. Premenopausal breast cancer patients should receive fertility preservation counselling and contraception advice. Hormonal therapies should generally be avoided, with intrauterine devices or barrier methods recommended. Waiting at least 2 years from remission before conceiving is advisable.

CONCLUSION

Pregnancy-associated breast cancer presents unique challenges requiring careful consideration of treatment options and potential impacts on fertility. Further research is needed to optimize management strategies and improve outcomes for affected women.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Gupta S, Kalwaniya DS. Navigating dual challenges-breast cancer and pregnancy: a case report. Int J Reprod Contracept Obstet Gynecol 2025;14:1326-9.