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## Management of pregnancy-associated breast cancer: A case series and review of multidisciplinary treatment approaches

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### Abstract

**Background:** Pregnancy-associated breast cancer (PABC) refers to breast cancer identified either during gestation or within the first year following childbirth. Managing PABC presents distinct clinical complexities, as it necessitates a careful balance between effective maternal therapy and ensuring fetal safety.

**Purpose:** This case series seeks to detail the clinical characteristics, diagnostic procedures, and treatment approaches utilized in managing PABC.

**Method:** We report multiple cases involving pregnant women diagnosed with breast cancer at different stages of gestation. Information was gathered regarding clinical presentation, gestational age at diagnosis, types and timing of treatment interventions (such as surgery and chemotherapy), as well as maternal and fetal outcomes.

**Results:** The cases underscore the critical role of early detection and a multidisciplinary team approach. Treatment strategies were tailored according to gestational age and cancer stage. Chemotherapy was generally administered without significant complications during the second and third trimesters, and surgical procedures were planned to prioritize both maternal and fetal health.

**Conclusion:** Effective management of PABC demands close coordination between oncology and obstetrics teams. With appropriate planning and individualized care, it is possible to treat breast cancer during pregnancy without substantially endangering fetal health.

**Keywords:** Cancer Management; Case Series; Pregnancy-associated Breast Cancer.

### INTRODUCTION

Pregnancy-Associated Breast Cancer (PABC) is characterized as breast cancer diagnosed during gestation, within one year postpartum, or while breastfeeding (Amant, Loibl, Neven, & Van Calsteren, 2012). Although its occurrence is relatively uncommon affecting approximately 1 in every 3,000 to 10,000 pregnancies—it remains the most frequently diagnosed malignancy during pregnancy (Ong, Mullen, & Harvey, 2020; Tan, Alcantara, Sultana, Loh, Go, & Wong, 2023; Mumtaz, Otey, Afridi, & Khout, 2024). The global trend of delayed motherhood has contributed to an increase in PABC incidence. Diagnosing PABC poses significant clinical difficulties due to physiological changes in the breast during pregnancy and

lactation, which often obscure early signs and delay diagnosis, resulting in more advanced disease at presentation (Bray, Ferlay, Soerjomataram, Siegel, Torre, & Jemal, 2018). Managing PABC requires a multidisciplinary team approach that balances optimal cancer therapy for the mother with safety considerations for the fetus. This case series discusses three patients diagnosed with PABC at different gestational stages, examining their clinical presentations, treatment strategies including surgery and chemotherapy and maternal and neonatal outcomes. The primary aim of this study is to assess how closely clinical management aligns with internationally recognized treatment guidelines in real-world practice.

## RESEARCH METHOD

This study utilized a case series design to systematically describe and analyze the clinical presentation, therapeutic management, and outcomes of patients diagnosed with pregnancy-associated breast cancer (PABC). Eligible participants included women who were diagnosed with breast cancer either during pregnancy, within one year postpartum, or while breastfeeding, and who received medical care at a tertiary healthcare facility between insert year range, e.g., 2020–2024. Clinical and demographic data were retrospectively extracted from patient medical records. These data included age at diagnosis, gestational age at the time of cancer detection, tumor pathology and characteristics, cancer staging, treatment modalities (such as surgery, chemotherapy, and radiation therapy), and both maternal and neonatal clinical outcomes. Each individual case was assessed for adherence to internationally recognized guidelines, such as those from the European Society for Medical Oncology (ESMO) (Loibl, Schmidt, Gentilini, Kaufman, Kuhl, Denkert, & Amant, 2015), the American Society of Clinical Oncology (ASCO) (Amant, von Minckwitz, Han, Bontenbal, Ring, Giemerk, & Loibl, 2013), and relevant national clinical protocols in place during the diagnosis period. The management of PABC was conducted through a multidisciplinary approach, involving close coordination between oncologists, obstetricians, radiologists, neonatologists, and other specialists as necessary, which is strongly recommended in current best-practice frameworks (Loibl, Schmidt, Gentilini, Kaufman, Kuhl, Denkert, & Amant, 2015; Amant, Loibl, Neven, & Van Calsteren, 2012). This study received ethical clearance from the institutional review board of [insert institution name], and strict measures were taken to protect patient confidentiality throughout the research process. Data were analyzed descriptively, emphasizing clinical trajectories, decision-making in treatment planning, and the outcomes observed in both mothers and their newborns.

## RESEARCH RESULTS

### Case 1

The first case concerns a 27-year-old female patient who initially presented with a progressively enlarging mass in her right breast, which had developed during her first pregnancy approximately one year prior. Postpartum, she underwent a right-sided mastectomy three months after delivery, and histopathological examination revealed a phyllodes tumor, a rare fibroepithelial breast neoplasm (Telli, Horst, Guardino, Dirbas, & Carlson, 2007). Unfortunately, she did not return for follow-up care and received no additional oncologic treatment or surveillance following surgery. During her second pregnancy, at approximately 33–34 weeks of gestation, the patient was admitted to our facility with complaints of significant dyspnea and a recurrent mass in the right breast. Imaging studies and clinical evaluation confirmed a recurrent malignant phyllodes tumor, with evidence of pleural effusion and a strong suspicion of pulmonary metastases, consistent with the tumor's known potential for aggressive behavior and hematogenous spread. Her obstetric status was recorded as Gravida 2, Para 1, Abortus 0, Living 1 (G2P1A0L1) at the time of admission.

Given the life-threatening nature of her condition, she was promptly transferred to the intensive care unit (ICU) for stabilization and supportive management. A multidisciplinary team comprising oncologists, obstetricians, and critical care specialists convened to determine the optimal therapeutic strategy. Considering the advanced stage of pregnancy and the urgent need for systemic therapy, it was determined that delivery should be expedited to facilitate oncologic intervention.

The patient subsequently underwent a cesarean section, during which a bilateral salpingo-oophorectomy was also performed due to intraoperative findings suggestive of tumor spread. A live male infant was delivered, weighing 2,050 grams, with no immediate neonatal complications.

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Despite surgical and supportive efforts, the patient's respiratory condition continued to decline, attributed to worsening malignant pleural effusion and progressive metastatic disease. Tragically, she passed away three days postoperatively due to complications arising from her advanced malignancy. This case illustrates the aggressive clinical course

that recurrent malignant phyllodes tumors can take during pregnancy and underscores the importance of continued surveillance following initial treatment, as well as early multidisciplinary coordination when managing PABC with complex oncologic needs (Telli, Horst, Guardino, Dirbas, & Carlson, 2007; Amant, Loibl, Neven, & Van Calsteren, 2012).



## Case 2

The second case involved a 37 year old pregnant woman who was admitted to our tertiary care center at approximately 32 to 33 weeks of gestation, presenting with a progressively enlarging right breast mass that had been growing over the preceding seven months. On admission, laboratory evaluation revealed moderate anemia, which necessitated blood transfusion to stabilize the patient's clinical status before further diagnostic procedures and therapeutic interventions could be undertaken. Subsequent clinical assessment by both oncologists and surgical specialists revealed findings consistent with stage IIIB breast cancer, indicating locally advanced disease with extensive skin and chest wall involvement (Loibl et al., 2015). Imaging studies raised suspicion for vertebral metastases, a serious complication that is occasionally observed in advanced breast cancer (Amant et al., 2012). Given the complexity and severity of the disease, a multidisciplinary tumor board meeting was convened to develop an individualized and gestation-appropriate management strategy.

The agreed-upon plan involved performing a core needle biopsy to obtain a histopathological diagnosis and confirm tumor subtype and staging. This step is critical in guiding further therapeutic decision-making, especially in pregnancy-associated breast cancer (PABC), where systemic treatments must be tailored to balance maternal benefit and fetal safety (Amant et al., 2013). In parallel, the pregnancy was to be monitored closely, with the goal of allowing the fetus to reach full term, contingent on both maternal and fetal well-being. However, four weeks later around 36 to 37 weeks of gestation the patient returned with severe lower back pain, which clinical evaluation attributed to progression of vertebral metastatic disease. Given the patient's deteriorating condition, and after carefully weighing the risks and benefits, the medical team elected to proceed with both a core biopsy and termination of pregnancy via cesarean section, accompanied by a salpingo-oophorectomy to evaluate possible ovarian metastasis, which can occur in advanced cases (Lee, Roberts, & Vinh-Hung, 2017).

A live male infant weighing 2,000 grams was delivered successfully, with no immediate neonatal complications. Following delivery and the completion of the puerperium period, the patient was initiated on neoadjuvant chemotherapy. This approach aims to reduce tumor burden and manage metastatic spread prior to any potential surgical intervention or further systemic therapy (Loibl et al., 2015). This case underscores the importance of timely diagnosis, multidisciplinary planning, and flexible treatment strategies in managing advanced-stage PABC, particularly in settings involving metastasis and late gestational age.

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### Case 3

The third case concerns a 35-year-old pregnant woman who was admitted to our facility at 33 to 34 weeks of gestation and diagnosed with stage IIIA breast cancer. Her clinical journey began earlier in her pregnancy, at approximately 14 weeks of gestation, when she initially presented to the oncology clinic and was diagnosed with invasive breast carcinoma. Following diagnosis, a multidisciplinary team conference was convened, involving oncologists, obstetricians, and neonatologists, to evaluate her clinical condition and formulate an evidence-based treatment strategy that would prioritize both maternal health and fetal safety, in alignment with international recommendations for managing pregnancy-associated breast cancer (Amant et al., 2012; Loibl et al., 2015).

Considering the advanced stage of her disease, and recognizing that systemic therapy during pregnancy carries potential fetal risks including miscarriage, intrauterine growth restriction (IUGR), and teratogenic effects the medical team proceeded with initiating anthracycline-based chemotherapy, as it is considered relatively safe when administered during the second and third trimesters (Cardonick & Lacobucci, 2010; Loibl et al., 2015). The first cycle of chemotherapy was administered at approximately 17 to 18 weeks of gestation, followed by a second cycle a month later. During this phase, the patient required blood transfusion due to chemotherapy-induced

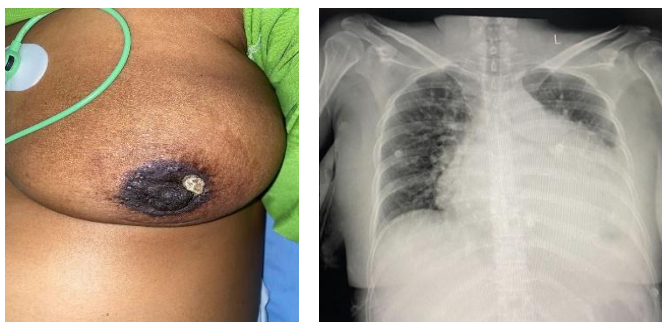
anemia, a common hematologic side effect. Unfortunately, following the third chemotherapy cycle, the patient developed pericardial effusion at 26 weeks of gestation, a rare but serious complication potentially associated with metastatic spread or drug toxicity. Concurrent ultrasound monitoring revealed signs of fetal growth restriction, raising concerns about placental insufficiency or chemotherapy-induced impairment of fetal development. At 33 to 34 weeks, the patient experienced preterm premature rupture of membranes (PPROM), necessitating an emergency cesarean section. During the same procedure, a salpingo-oophorectomy was performed, both for staging purposes and to manage any suspected gynecologic involvement of malignancy. The outcome was the delivery of a live infant weighing 1,500 grams. Neonatal evaluation revealed no congenital anomalies or structural malformations, and the infant was managed in the neonatal intensive care unit (NICU) for prematurity related care. This case highlights the complexity of treating breast cancer during pregnancy, particularly when chemotherapy is initiated in the second trimester. Despite the maternal complications and fetal growth concerns, a multidisciplinary and individualized approach enabled a favorable neonatal outcome, consistent with current clinical guidance on managing PABC.

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## DISCUSSION

This report presents three clinical cases of breast cancer diagnosed during pregnancy. In all three instances, the primary presenting symptom was the presence of a palpable breast mass, which aligns with existing literature indicating that most pregnancy-associated breast cancer (PABC) cases are initially identified through physical examination (Amant et al., 2012). However, the physiological changes associated with pregnancy and lactation such as increased breast density and nodularity can obscure clinical findings, making palpation less reliable and often contributing to delayed diagnosis. Consequently, PABC is frequently diagnosed at more advanced stages than breast cancer in non-pregnant women (Loibl et al., 2015; Zagouri, Psaltopoulou, Dimitrakakis, Bartsch, & Dimopoulos, 2013). Despite these diagnostic challenges, the evaluation process for suspected breast cancer during pregnancy should follow protocols similar to those used in non-pregnant patients. Imaging modalities such as ultrasound and MRI without contrast are considered safe and effective during pregnancy, and biopsy remains essential for histological confirmation.

Once a diagnosis is established, prompt initiation of treatment is crucial to improve maternal prognosis. In each of the three cases presented, treatment decisions were made by a multidisciplinary team comprising surgical oncologists, medical oncologists, radiation oncologists, and obstetricians. Management plans were developed in accordance with international clinical guidelines, such as those from the ESMO and ASCO, and were tailored to each patient's gestational age and cancer stage (Amant et al., 2012; Cardonick et al., 2010). Surgical treatment, including both mastectomy and breast-conserving surgery (BCS), is generally considered

safe throughout all trimesters of pregnancy. However, breast reconstruction procedures are typically deferred until after delivery due to increased surgical time and risk (Loibl et al., 2015). Of the three patients in this series, only one received chemotherapy during pregnancy, reflecting the complexity and individualized nature of treatment planning.

Chemotherapy plays a central role in the management of PABC and may be administered in either a neoadjuvant or adjuvant setting. While standard chemotherapy regimens can be used, timing is critical: treatment should not be initiated during the first trimester, as this period coincides with fetal organogenesis and carries the highest risk for teratogenicity and miscarriage (Cardonick & Iacobucci, 2004). Delaying chemotherapy until after delivery is discouraged, as it may negatively impact maternal survival (Loibl et al., 2015).

Chemotherapy administered during the second and third trimesters is generally considered safe for the fetus but is associated with potential complications such as intrauterine growth restriction (IUGR), preterm birth, low birth weight, and transient neonatal cytopenias (Amant et al., 2015). Some studies have observed that neonates exposed to chemotherapy in utero tend to have lower birth weights and higher rates of neonatal complications, though these are largely attributed to prematurity rather than direct toxic effects of chemotherapy (Vandenbroucke, Verheecke, Fumagalli, Lok, & Amant, 2017). In our case series, the one patient who received chemotherapy during pregnancy delivered a premature infant exhibiting signs of IUGR, consistent with previously documented outcomes in similar clinical contexts.

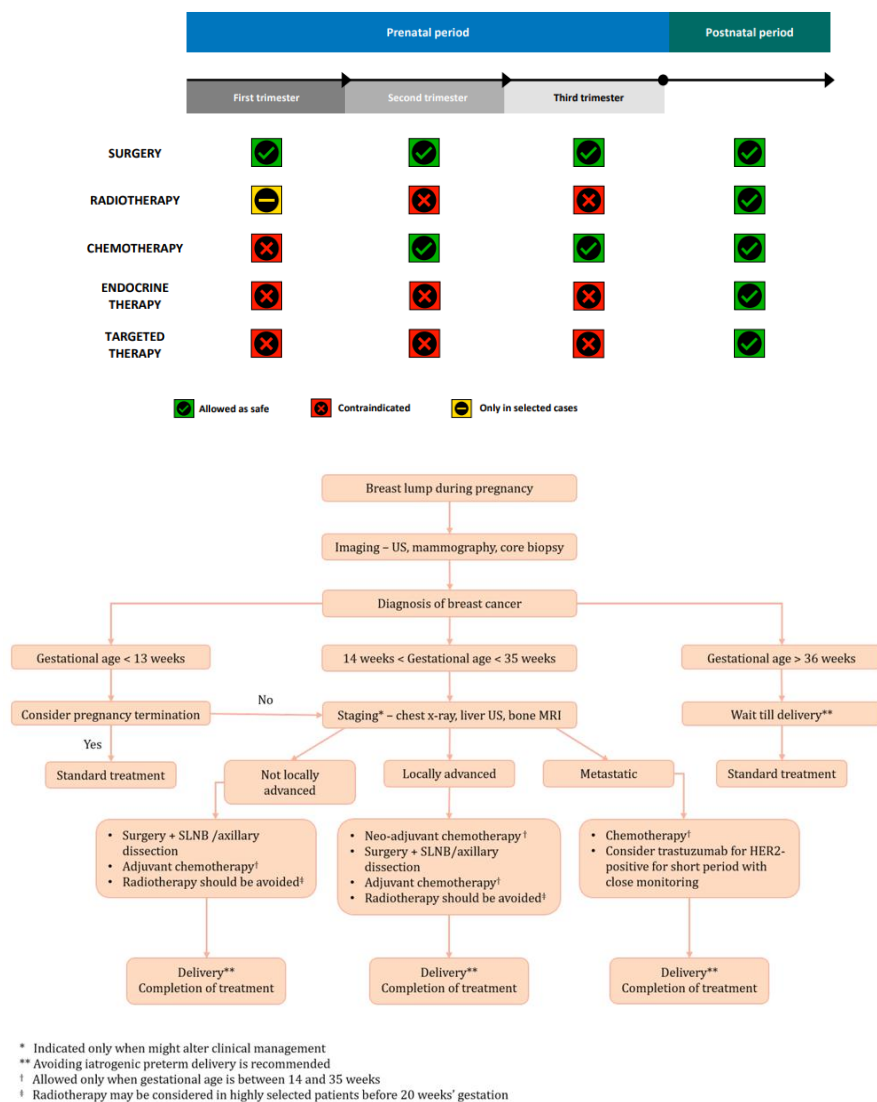
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## CONCLUSION

The incidence of breast cancer during pregnancy is increasing, and delayed diagnosis remains a common challenge. As such, incorporating routine breast examinations into prenatal care is essential for early detection. Findings from this case series suggest that chemotherapy can be administered safely during the second and third trimesters without significantly elevating the risk of peripartum complications or compromising immediate neonatal outcomes. Initiation of chemotherapy from the second trimester onward appears to be both feasible and effective for pregnant patients. Treatment

regimens should follow the same clinical protocols established for non-pregnant individuals, with necessary adaptations based on gestational age and cancer staging. Pregnancy-associated breast cancer (PABC) can be managed effectively through a combination of surgery, systemic therapy, and radiotherapy when guided by gestational considerations. Optimal outcomes for both mother and fetus require coordinated care from a multidisciplinary team.

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