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Case Report Open Access

Metastatic Breast Sarcoma in a Young Pregnant Woman-A Case Report and Review

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Abstract

Background: Breast cancer diagnosis and treatment during pregnancy is relatively rare, and breast sarcomas constitute a small, aggressive subset of breast malignancies. This paper describes a novel case of metastatic breast sarcoma diagnosed and treated during pregnancy. Surgery, chemotherapy, and radiation given at the right time remain a cornerstone of breast cancer treatment during pregnancy. Current evidence suggests minimal treatment effects on immediate and longer-term fetal outcomes. Maternal outcomes are also significantly improved with prompt diagnosis and treatment.

Case Report: This report describes the case of a 24-year-old female diagnosed with breast sarcoma metastasizing to the lungs, liver and the brain in pregnancy. She was 33 weeks of gestation at the time of diagnosis and had bilateral lung and liver metastasis at the time of presentation. Labor was induced at 34 weeks gestation. She had a spontaneous vaginal delivery without complications, and the infant weighed 5.07 pounds with an Apgar score of 8 and 9. Immediate treatment with Doxorubicin and Ifosfamide (Mesna was also given) was initiated after delivery. Her postpartum course was complicated by a collapsed lung, MRI did later reveal metastasis to the brain as well. Palliative chemotherapy was ultimately pursued.

Conclusion: This paper describes a novel case of metastatic breast sarcoma diagnosed during pregnancy, and reviews the current literature regarding sarcomas and breast cancer treatment in pregnancy. Sarcoma is a rare type of breast cancer, and presentation in this age group is very unusual. To the best of our knowledge, this is the first case report on breast sarcoma in pregnancy.

Keywords: Breast sarcoma; Chemotherapy; Pregnancy

Background

Breast cancer in pregnancy is rare, with an incidence of about 1 in 3,000 pregnancies, making up about 0.2% to 3.8% of total breast cancer cases [1,2]. Breast cancer is the most common cancer in pregnancy [2]. Women of childbearing age are younger, which contributes to the lower rates of breast cancer in this group. However, a breast cancer diagnosis in pregnancy is becoming increasingly common, likely due to an increase in breast cancer in the general population, as well as a cultural shift toward delayed childbearing [3].

Breast cancer during pregnancy is especially challenging as two lives-the mother and the fetus- must be considered. Its management involves complex medical, ethical, psychological, and social challenges for the patient, family, and caregiving team. For this reason, multidisciplinary management becomes especially important and should involve a Medical Oncologist, Obstetrician, Radiation Oncologist, Maternal-Fetal Medicine specialist, Breast Surgeon, and social worker, whenever feasible [4]. Because breast cancer in pregnancy, particularly Sarcoma, is relatively uncommon, management of this condition is not widely documented in the literature [5].

Breast cancer is divided into the following types based on histological origin: infiltrating ductal carcinoma, invasive lobular, mucinous, tubular, medullary, and papillary. Infiltrating ductal carcinoma is, in general, the most common type of breast cancer both in and out of pregnancy [2]. Breast sarcomas represent an aggressive and rare subset of connective tissue tumors that comprise approximately 1% of breast cancers [6]. Breast Sarcomas are rare with aggressive behavior and poor prognosis; they usually present in women between 40 and 50 years of age whereas angiosarcomas are reported to present in younger women and secondarily after radiation treatment for primary breast cancer. Sarcomas of the breast can grow up to 30 cm in size with a mean diameter of 3 cm. Tumor size is considered as one of the staging and prognostic factors, so the overall prognosis is better for patients with tumor size less than 5 cm in diameter [7]. Some of the known risk factors for sarcoma include prior radiation to breast tissue, exposure to immunosuppressive agents, arsenic or herbicides, as well as genetic conditions like Li-Fraumeni syndrome and neurofibromatosis type 1 [6].

Breast cancers diagnosed during pregnancy have a higher likelihood of presenting as Stage IV with poorer rates of survival at five years [2]. We present here a case report and review of metastatic breast sarcoma, diagnosed and treated during pregnancy. We also include a review of its implications and management options. To the best of our knowledge, this is the first case report on breast sarcoma in pregnancy.

Case Report

We present here the case of a 24-year-old Gravida 2, Para 1, Abortion 0, female who was diagnosed with advanced stage breast sarcoma metastasizing to the lungs, liver, and brain in pregnancy.

She primarily presented to a breast surgeon with a right-sided breast mass; the mass was about 4 cm × 5 cm in the right upper quadrant. A Breast sonogram and a core needle biopsy were performed which was revealed as atypical mesenchymal with osteoclast giant cells. A Preoperative CAT scan of the chest and abdomen was within the normal limits. No suspicious lesions were seen. She underwent right-sided mastectomy and was scheduled for chemotherapy.

The final surgical pathology report revealed pleomorphic sarcoma, undifferentiated with osteoclastic appearing giant cells. Pathology favored malignant phyllodes tumor. She was set up with an oncology clinic for treatment planning. However, the patient was lost to follow up and never received chemotherapy treatment. About ten months later, the patient presented to her obstetrician for prenatal care. Sonogram at her first visit revealed a 30-week gestation, with normal growth scan of the fetus. Her chest and breast exam were initially negative for any suspicious findings.

At 32 weeks gestation, the patient reported persistent cough, as well as, back pain for one month. Symptoms did not improve with outpatient antibiotic treatment, so she presented to the hospital. A CT Scan of the chest revealed multiple pulmonary masses of the lungs bilaterally (Figure 1).

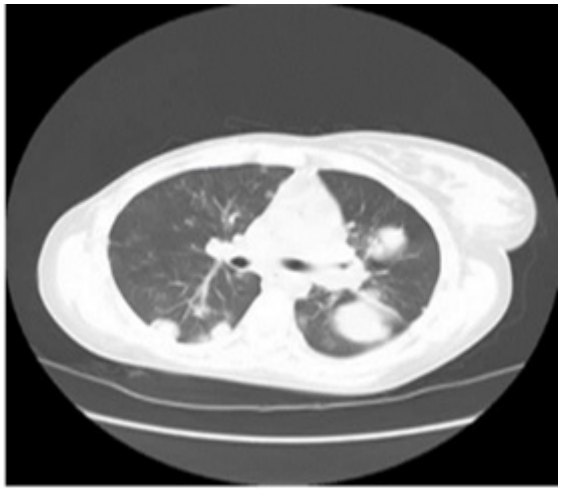

Figure 1: CT Scan- Axial sections of the thorax lung window showing multiple bilateral pulmonary metastases.

The largest lesion was located in the left upper lobe, with an AP diameter of 9.5 cm (Figure 2). She was immediately admitted to the hospital for further workup. A chest X-ray performed showed multiple masses of the lungs; they were round and present bilaterally. A comparison of CXR done just ten days prior at another facility showed rapid spread and worsening of lung lesions (Figures 3 and 4).

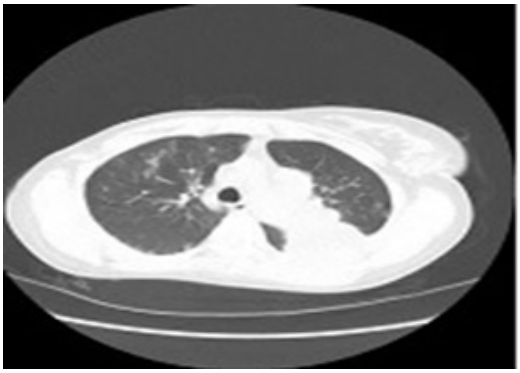

Figure 2: CT scan-Axial section of thorax showing large apical left lung mass.

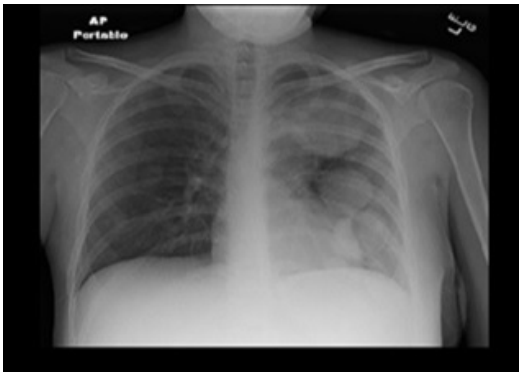

Figure 3: Initial X-ray in AP view taken at outside facility showing left apical lung mass.

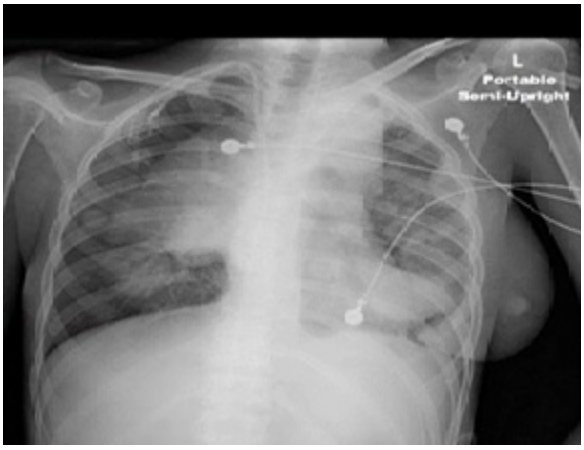

Figure 4: X-ray in AP view taken 2 weeks after Figure 3 shows the characteristic rapid progression of metastasis.

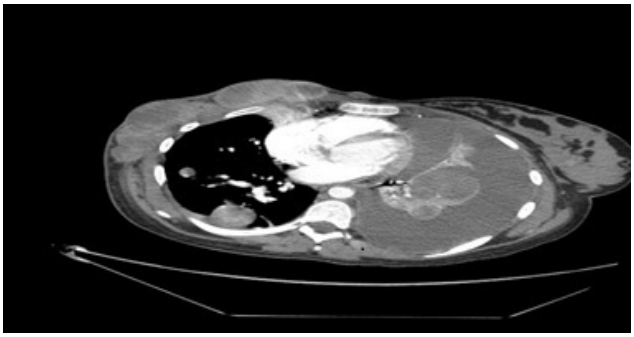

Figure 5: CT showing a left pulmonary artery with luminal narrowing and encased by the tumor. Moderate to large left-sided pleural effusion also evident.

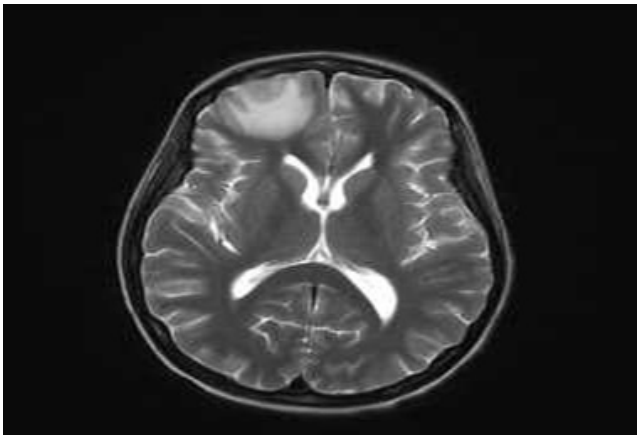

Figure 6: MRI, T2 weighted axial section of the brain at the level of ventricles showing right frontal lobe metastasis.

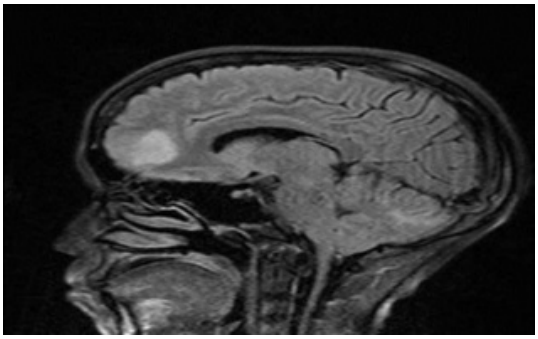

Figure 7: MRI of Sagittal section of brain showing frontal lobe metastasis.

Liver ultrasound showed 8.6 cm mass in the right lobe. A multidisciplinary team was brought on board to evaluate, including an obstetrician, oncologist, hospitalist, maternal-fetal medicine specialist, breast surgeon, anesthesiologist, and a palliative care team. IR-guided biopsy of the liver lesion came back as "poorly differentiated sarcoma of the breast." She was 33 weeks gestation at the time of diagnosis. She received 2 doses of steroids, and the decision was made to induce labor at 34 weeks gestation. She had a spontaneous vaginal delivery without complications. The infant weighed 5.07 pounds with the Apgar score was 8 and 9 at 5 and 10 minutes.

Following delivery, the patient started a chemotherapy regimen of Doxorubicin and Ifosfamide (Mesna was also given). Her postpartum course was complicated by rapid enlargement of the lung mass, causing compression of a pulmonary artery. This led to the collapse of the left lung, which required chest tube placement, intubation, and ICU admission. She slowly recovered from this complication. However, despite treatment, serial follow up of the lung mass revealed an increase in tumor size. MRI of the brain also revealed a 20 mm enhancing metastasis of the frontal cortex, as well as, bilateral cerebellar metastasis (Figures 5-7). At the time of writing, the multidisciplinary team had counseled the patient and her family; together they decided on hospice care and palliative chemotherapy.

Discussion

Breast Sarcomas represent a rare subset of connective tissue tumors that comprise approximately 1% of breast cancers. Sarcomas of the breast originate from interlobular mesenchyme of the connective tissue. The most common subtypes are Angiosarcoma, Fibrosarcoma, Myxofibrosarcoma, Undifferentiated Pleomorphic sarcoma, Hemangiopericytoma, and Osteosarcoma [8-10]. Angiosarcomas are mostly secondary to treatment with radiation for primary breast cancer and they constitute about fifty percent of secondary sarcomas [11].

Breast sarcomas are very aggressive and spread rapidly through the hematogenous spread and typically escape lymphatic involvement. Typical metastatic sites involve the nervous system, bones, liver and lungs [6]. A 5-year survival rate of breast sarcomas ranges from 14% to 91% [7,8]. Some of the worst prognostic factors of breast sarcoma include an angiosarcoma subtype, a diameter greater than 5 cm, high histological grade, positive margins, breast cancer diagnosed at a young age (20s or 30s), primary larger tumor, the absence of estrogen and progesterone receptors, the presence of HER2 protein, and the presence of BRCA1 or BRCA2 genes.

Some of the known risk factors for breast sarcoma include prior radiation to breast tissue, exposure to environmental factors such as arsenic, vinyl chloride, immunosuppressive agents, and some herbicides can increase the risk of breast sarcoma. Genetic conditions like Li-Fraumeni syndrome, familial adenomatous polyposis and neurofibromatosis type 1 [6] can also predispose women to develop breast sarcoma. Chronic lymphedema of the breast after breast cancer treatment can increase the risk of secondary breast sarcoma, especially angiosarcoma.

Breast mass workup in pregnancy differs somewhat from the non-pregnant female. Any palpable breast mass in a pregnant woman needs a thorough and timely evaluation to rule out malignancy. Decreased vigilance, both in the medical community and patient population, along with possible hormonal contributions, has likely contributed to the higher stage of breast cancer associated with pregnancy [12]. The ultrasound is preferred over mammogram [5], even for women over the age of 30 years. On sonogram, sarcomas generally present as a well-circumscribed mass with hypoechoic echotexture, indistinct margins, posterior acoustic shadowing, internal vascularization, and no calcifications.

A mammogram is less sensitive in the pregnant female; however, the risk of ionizing radiation is minimal [3], and mammography may be obtained in any trimester, as long as appropriate shielding of the fetus is accomplished [13,14]. A typical mammographic finding of breast sarcoma is a single, round, hyperdense mass with indistinct or circumscribed margins, they typically lack calcifications and spiculated margins (which are typical of other malignancies) [15].

In the third trimester, Magnetic Resonance Imaging (MRI) without contrast can be used as a third line option for diagnosis [13]. MRI will usually reveal a circumscribed mass, with irregular margins, a hypointense signal on T1-weighted imaging, a hyperintense signal on T2-weighted imaging, heterogeneous initial rapid enhancement, and washout or plateau curves in the late kinetic analysis [15].

Tissue sampling through biopsy can be obtained in any trimester and is needed for definitive diagnosis, prior to surgical intervention or chemotherapy.

Treatment of breast sarcoma

The treatment has to be initiated without delay and pregnancy should not postpone the diagnosis and treatment of breast sarcomas. Delays in the treatment can potentially compromise maternal and fetal survival, so prompt establishment of a proper treatment plan is essential for both mother and fetus outcomes. A multidisciplinary team approach is always required for the optimal management of such high-risk malignancies in pregnancy.

Surgery is the main treatment of choice for sarcomas of the breast. Radical mastectomy with lymphadenectomy followed by chemotherapy is the preferred treatment of choice. Radical mastectomy with lymph node dissection can be performed as early as in 1st trimester. A negative surgical margin of 3 cm has been proposed is the most important prognostic factors for recurrence and survival [7].

Chemotherapy and radiation

Adjuvant chemotherapy is a routine component of the treatment of breast sarcoma. Generally, Adriamycin and cyclophosphamide are the main agents used in the treatment and is given during the late second and third trimesters.

Considering that organogenesis takes place in the first trimester, chemotherapy is contraindicated due to a high risk of fetal malformations and spontaneous abortions [1]. However, chemotherapy treatment can be safely given to pregnant women during the second and third trimesters [16,17]. Taxane chemotherapeutic agents are also proven to be safe in pregnancy with no major effect on pregnancy and fetus, taxanes should not be excluded, if indicated, in pregnant patients with cancer [18]. Pregnant women with breast cancer who were treated with a combination of fluorouracil, doxorubicin, and cyclophosphamide chemotherapy during the second and third trimesters had no significant short-term complications for a majority of children. Longer follow-up of the children is needed to evaluate possible late side effects such as impaired cardiac function and fertility [18].

Radiation and hormone therapies can also be used but must be postponed until late third trimester or after delivery [5]. Although the consensus is lacking, radiotherapy is generally recommended for large or high-grade sarcomas [8]; however, radiotherapy should be avoided in pregnancy.

There are no significant adverse effects of breast cancer on pregnancy except preterm delivery [2] and there is no evidence that the breast cancer itself harms the fetus. However, treatments like chemotherapy or radiotherapy have risks.

Conclusion

Breast sarcomas are rare with aggressive behavior and poor prognosis; they are rarely seen in young pregnant women. They are very aggressive and rapidly growing, a 5-year survival rate of breast sarcomas ranges from 14% to 91%. The treatment has to be initiated without delay and pregnancy should not postpone the diagnosis and treatment of breast sarcomas.

Radical mastectomy with lymph node dissection followed by adjuvant chemotherapy given during the late second trimester and the third trimester is preferred. Radiation and hormone therapies can also be given but must be postponed until late third trimester or after delivery.

Chemotherapy is contraindicated in the first trimester of pregnancy due to a high risk of spontaneous abortion and fetal congenital malformations.

Finally, we conclude that survival rates of pregnant and non-pregnant breast cancer patients treated with chemotherapy seem similar when compared to a similar stage, and fetal short- and long-term outcomes are comparable in both groups.

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