Brain metastases from breast cancer during pregnancy

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Abstract

Background: Brain metastasis during pregnancy is a rare occurrence. In particular, there have only been three prior cases regarding breast cancer metastasis. We report a patient with breast cancer metastasis to the brain during pregnancy and review the literature.

Case Description: The patient was a 35-year-old female with a history of breast cancer (estrogen receptor/progesterone receptor negative, human epidermal growth factor receptor 2/neu positive, status post-neoadjuvant docetaxel/carboplatin/trastuzumab/pertuzumab therapy, status post-bilateral mastectomies), and prior right frontal brain metastases (status post-resection, capecitabine/lapatinib/temozolomide therapy, and cyberknife treatment). Patient was found to be pregnant at 9 weeks’ gestation while on chemotherapy; the patient elected to continue with the pregnancy and chemotherapy was discontinued. At 14 weeks’ gestation, she returned with recurrent right frontal disease. She was taken for a craniotomy at 16 weeks’ gestation, which confirmed metastases. Six weeks later, patient returned with worsening headaches and fatigue, with more recurrent right frontal disease. She was started on decadron and chemotherapy (5-fluorouracil, adriamycin, and cyclophosphamide). Serial magnetic resonance imaging (MRI) demonstrated enlarging right frontal lesions. She underwent a craniotomy at 27 weeks’ gestation, and chemotherapy was discontinued promptly. Starting at 30 weeks’ gestation, she received whole brain radiation for 2 weeks. Subsequently, she delivered a baby girl via cesarean section at 32 weeks’ gestation. At 6 weeks follow-up, an MRI brain demonstrated no new intracranial disease, with stable postoperative findings.

Conclusion: There is a lack of guidelines and clinical consensus on medical and surgical treatment for breast cancer metastases in pregnant patients. Treatment usually varies based upon underlying tumor burden, location, gestational age of the fetus, and patient’s preference and symptomatology.

Key Words: Brain metastases, brain surgery, breast cancer

BACKGROUND

Brain metastasis during pregnancy is a rare occurrence. In particular, there have only been three prior cases regarding breast cancer metastasis. Not surprisingly, pregnancy complicates the management of brain metastases. We report a patient with breast cancer metastasis to the brain during pregnancy and review the literature.
CASE PRESENTATION

The patient was a 35-year-old female who had a history of breast cancer (invasive ductal carcinoma of the left breast, estrogen receptor (ER)/progesterone (PR) negative, human epidermal growth factor receptor 2 (HER2)/neu positive, status post-neoadjuvant docetaxel/carboplatin/trastuzumab/pertuzumab therapy (TCH-P therapy), status post-bilateral mastectomies and left axillary lymph node dissection), with a prior right frontal brain metastases (status post-gross total resection, capecitabine/lapatinib/temozolomide therapy (TTX therapy), and cyberknife treatment). Patient was found pregnant at 9 weeks’ gestation; despite potential complications with the fetus during TTX therapy, patient elected to continue with the pregnancy; TTX therapy was discontinued. At 14 weeks’ gestation, she returned with headaches. Imaging showed recurrent right frontal dural-based lesion with significant surrounding vasogenic edema [Figure 1]. Magnetic resonance imaging (MRI) of the spine was negative. She was taken for a craniotomy at 16 weeks’ gestation, which again confirmed metastatic adenocarcinoma.

Six weeks later, patient returned with worsening headaches and fatigue. CT head showed recurring disease in the right frontal lobe [Figure 2a]. She was started on decadron and chemotherapy (5-fluorouracil, adriamycin, and cyclophosphamide). Serial MRI demonstrated enlarging right frontal lesions [Figure 2b and c]. She underwent a craniotomy at 27 weeks’ gestation, and chemotherapy was discontinued promptly. Starting at 30 weeks’ gestation, she received whole brain radiation (10 fractions, each at 3000 cGy) for 2 weeks. Subsequently, she delivered a baby girl via cesarean section at 32 weeks’ gestation; at the same time, patient had an elective bilateral tubal ligation. Overall, her pregnancy was complicated by intrauterine growth restriction, with estimated gestation weight at 6th percentile. She was getting weekly biophysical profiles/umbilical arterial Doppler which had been reassuring; in addition, she had a normal fetal echocardiogram at 20 weeks’ gestation. At 6 weeks follow-up, an MRI brain demonstrated no new intracranial disease, with stable postoperative findings [Figure 3].

DISCUSSION

The literature is limited regarding intracranial neoplasms during pregnancy. The estimated incidence is 15 per 100,000.[5,7] Common lesions include primary tumors, typically gliomas, pituitary adenoma, and meningiomas.[5,12,15] Brain metastasis during pregnancy is rather rare, where choriocarcinoma is the most common pathology.[5,13] Overall, the management of intracranial neoplasms can be challenging. Patients may opt for less aggressive treatment or to postpone treatment in order to decrease risk to the fetus while others may opt to terminate the pregnancy and proceed with full therapy. Future fertility may also be compromised, which remains an important consideration. Management needs to be tailored for each patient with interdisciplinary cooperation. Breast cancer is the most common malignancy during pregnancy.[2] Of the reported cases, up to 3.8% exhibit metastatic disease.[9] Brain metastasis during pregnancy, however, has been rare and has only been reported in three other instances.[5,9,10] These are summarized in Table 1. Mandrawa et al.[8] reported the case of a 25-year-old female who underwent craniotomies...
The American College of Obstetrics and Gynecology endorses fetal ultrasound and Doppler before and after the procedure and states that known anesthesia has not been linked to teratogenic effects at any gestational age. Overall, pregnancy-associated breast cancer is more advanced and aggressive at diagnosis than breast cancer during non-pregnancy; on the other hand, patients who become pregnant after breast cancer do not appear to have worse outcomes than patients who do not become pregnant. Our patient is the fourth case of breast cancer metastases to the brain. She was able to undergo two craniotomies, at 16 weeks’ gestation and at 27 week’s gestation, without surgical complications. Her baby was delivered at 32 weeks’ gestation; though the patient exhibited low gestational weight, the patient exhibited no malformation.

CONCLUSION

There is a lack of guidelines and clinical consensus on medical and surgical treatment for breast cancer metastases in pregnant patients. Treatment usually varies based upon underlying tumor burden, location, gestational age of the fetus, and patient’s preference and symptomatology. In this patient, our treatment rationale was based upon prolonging the gestational age and attempted gross total-resection of the metastases.
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Conflicts of interest
There are no conflicts of interest.

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