A Case Study on Primary Osteosarcoma of the Breast

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Abstract

Primary osteosarcomas of the breast are very rare neoplasias, accounting for less than 1% of breast carcinomas and 12.5% of breast sarcomas, with only 50 cases reported in the last 50 years. The mechanism of tumorigenesis is not clear, it's postulated that it is formed from totipotential cells of the stroma. It's also has been postulated that previous radiotherapy may induce formation of breast sarcoma like osteogenic sarcomas. We report a case of a 93 year old female with a history of left mucinous breast cancer treated with adjuvant chemotherapy and radiotherapy and breast conserving surgery. Five years later, another tumor emerged in the left breast which was diagnosed like osteosarcoma. This case study traces that osteosarcoma of the breast may occur in a patient with previous radiotherapy.

Keywords: Primary; Osteosarcoma; Breast

Introduction

Primary osteosarcomas of the breast are very rare neoplasias. It is a very aggressive neoplasm, with a high probability of recurrence and metastatic involvement, especially hematogenous. The mechanism of tumorigenesis is not clear, however it is postulated that it is formed from totipotential cells of the stroma. It also has been described that radiotherapy may induce formation of osteogenic sarcoma. We report radiological features of primary osteosarcoma of the breast.

Case Presentation

In this case report, we present the case of a 93-year-old woman with a history of left mucinous breast cancer treated with adjuvant chemotherapy and radiotherapy and breast-conserving surgery five years ago. At follow up appointment physical examination revealed a palpable left breast mass.

The follow up cranio-caudal and mediolateral oblique mammograms showed an asymmetric left breast density in the retroareolar region. Magnification mammogram of left breast showed round opacity with some amorphous calcifications (Figures 1 and 2).

The presence of a well-defined mass is confirmed by ultrasonography, which is hypoechoic with an intracystic solid mass. Blood flow is seen in the intracystic mass (Figure 3).

Computed tomography scan was performed for seeking metastasis which showed a circumscribed mass in the left breast with strong contrast enhancement and internal cystic change (Figure 4).

Figure 1: Follow up mammography 2016 showed postsurgical changes Follow up mammography 2017 showed an asymmetric breast density. Magnification mammogram showed round opacity with amorphous calcifications (arrow).

An ultrasound-guided core needle biopsy of the mass was performed, which result was inclusive.

Magnetic resonance did not perform because the surgical team decided to perform a left mastectomy and submit it for histopathological examination. A definitive diagnosis of osteosarcoma was made.

Figure 2: Follow up mammography 2016 showed postsurgical changes. Follow up mammography 2017 showed an asymmetric breast density. Increased breast density in the retroareolar region of left breast.

Figure 3: Ultrasound in the retroareolar region of the left breast shows a mass with circumscribed margins that contains an intracystic solid mass (arrow). Blood flow is seen in the intracystic mass.

Discussion

Extra-skeletal osteosarcomas are very rare neoplasias, accounting for less than 1% of breast carcinomas and 12.5% of breast sarcomas, with only 50 cases reported in the last 50 years [1]. It is a very aggressive neoplasm, with a high probability of recurrence and metastatic involvement, especially hematogenous. The mechanism of tumorigenesis is not clear, it is postulated that it is formed from totipotent cells of the stroma. It's also postulated that the tumor is preceded from a fibroadenoma or a phyllodes tumor. It also has been described in the literature that radiotherapy may induce formation of breast sarcoma like osteosarcoma [2].

The affected population is usually women over 60 years. The referred symptoms are pain and palpable hard mass without axillary adenopathies, which requires performing imaging studies [3].

Figure 4: Axial computed tomography of the chest (mediastinal window) after administration of contrast media material shows at level of the breasts a circumscribed mass in the left breast that contains an intracystic enhanced.

Mammography usually shows densities or circumscribed masses with prominent calcifications, sometimes it can be similar to fibroadenoma and sometimes they may have no calcifications. In our case the mass showed some little amorphous calcifications. Based on these assessments the differential diagnoses include: metaplastic carcinoma, Phyllodes tumor and carcinosarcoma.

The presence of a well-defined hypoechoic nodule with echogenic center and necrotic-cystic content is seen by ultrasonography [4]. However, it's difficult to reach the diagnosis of osteosarcoma with the clinical findings and the imaging tests, so the final diagnosis is made by histology and immunohistochemistry.

On magnetic resonance imaging the lesion is usually a heterogeneous well-circumscribed mass with areas of high signal intensity, suggesting necrosis and hemorrhage, and areas of low signal intensity related to bone-forming zones.

The histopathological report showed the presence of a lot of neoplastic osteoid. Immunohistochemical staining did not reveal any epithelial component (negative cytokeratin), however, vimentin immunoreactivity was detected. The mitotic index (ki67 40%) indicated high mitotic activity of the tumour. The diagnosis of extraskeletal osteosarcoma was confirmed.

The osteosarcomas are divided into three histological subtypes: fibroblastic, osteoblastic and osteoclastic, since fibroblastic has better prognosis [5]. The presence of bone in lesions is not diagnostic of osteosarcoma. Osteoid tissue has been reported in epithelial and mesenchymal neoplasms, benign and malignant, such as fibroadenoma, tumor, and metaplastic carcinomas [6].

Treatment includes complete tumor resection with normal tissue margins or a simple mastectomy. The use of radiotherapy and adjuvant chemotherapy is discussed, however it may have value in certain patients. Nonetheless there is no defined treatment strategy that prolongs long term survival.

Conclusion

Primary osteosarcoma of the breast is an osteogenic sarcoma and it is very rare neoplasia. Although imaging findings may be nonspecific and the definitive diagnosis is by histopathological analysis, however when an older patient has a breast lesion with calcifications and had history of previous radiotherapy, we can suggest this diagnosis among differential diagnoses.

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