Correspondence

Osteosarcoma of breast: A rare case of extraskeletal osteosarcoma

ABSTRACT
Primary osteogenic sarcomas of the breast are exceptionally uncommon. We describe such a case occurring in a 50 year-old woman who presented with a large painful mass in her left breast. Simple mastectomy of the left breast was performed. Microscopical and immunohistochemical findings established the diagnosis of primary osteogenic sarcoma. Similar to extremity osteosarcoma, adjuvant adriamycin and cisplatin based chemotherapy and external beam radiotherapy was given to the present case. She remained well 57 months later, without tumor recurrence. The current article made a literature search proving the rarity of this lesion type and discusses in detail the diagnostic implications and the treatment of this rare site tumor entity.

KEY WORDS: Breast osteogenic sarcoma, breast tumor, extraskeletal osteogenic sarcoma, soft tissue sarcoma

INTRODUCTION
Extraskeletal osteogenic sarcomas [OS] account for less than 1% of soft tissue sarcomas. Majority of the extraskeletal OS are located in soft tissue of the thigh. Primary OS of the breast are extremely rare. In all cases patients are clinically diagnosed as breast carcinoma and the true diagnosis of OS was established only after the histological examination of the breast tissue. The low number of published cases, the lack of clear guidelines for adjuvant therapy and the peculiarities of the histological picture justify the report of this case.

CASE REPORT
A 50 year old postmenopausal lady presented elsewhere with slow growing painless lump in left breast since last 12 months. But in last six months it has rapidly progressed to a large painful lump over the left breast. Fine needle aspiration of the breast lump showed malignant cells. She was diagnosed as carcinoma breast and was administered two cycles Cyclophosphamide, Adriamycin and 5-Fluorouracil based neoadjuvant chemotherapy (NACT) at that hospital. As there was no response of tumor to NACT she was referred to our institution for further management. Trucut biopsy was done which showed malignant cells with areas of hyalinization. Immunohistochemistry of the tumor tissue was positive for vimentin and osteopontin but negative for cytokeratin, CD34, bcl 2, estrogen, progesterone and Her2/ neu receptor. She received four cycles of adjuvant adriamycin and cisplatin based chemotherapy followed by 45 grays of external beam radiotherapy to chest wall. Now the patient is on regular follow-up and she is disease free since last four years and nine months.

DISCUSSION
Breast sarcomas are also relatively uncommon, representing less than 1% of all primary breast malignancies. Primary OS of the breast are exceptionally rare accounting for 12.5% of breast sarcomas. However, the actual incidence is difficult to determine, because some of the approximately 100 previously-reported cases included metaplastic carcinomas, osteogenic sarcomas arising in association with phylloides.
tumor and carcinosarcoma. Primary OS of the breast affects the middle and older aged women. Due to the rarity of patients with breast osteosarcoma, no etiological factors could be co-related. Of all patients only one had prior history of local irradiation.

Clinically they may appear as a mobile, hard, irregular lump over the breast with no skin involvement and axillary lymphadenopathy. An elevated serum alkaline phosphatase has been associated with large tumor size and this level usually declines following excision. Mammographically, these tumors often present as a well-circumscribed dense lesion within the breast parenchyma with focal or extensive coarse calcifications. Targeted sonography of the breast lump shows a hypoechoic mass with an echogenic centre, due to the presence of calcifications. Localization of 99mTc diphosphonate in extraskeletal OS is well-documented but is typically much less intense than skeletal OS. The postulated causes of 99mTc-diphosphonate uptake in extraskeletal OS are many and include tumor vascularity, inflammation, local pH factors, altered calcium metabolism, hormonal influences and cell wall damage. However, it is very difficult to diagnose breast OS either clinical or radiologically.

Histologically primary OS of breast is indistinguishable from conventional OS of bone. Based on the amount of osteoid and cartilage, considerable diversity in morphologic appearance has been reported with variants like fibroblastic, osteoblastic, osteoclastic (giant cell rich), and chondroblastic. Histological differentiation is important, since fibroblastic osteogenic sarcomas are associated with a better survival outcome than other pathological types.

The diagnosis of metaplastic breast carcinoma should also be excluded before primary breast osteosarcoma is diagnosed. This differentiation is of prime importance as the two entities have different histological behavior and require different treatment. Metaplastic breast carcinoma is a general term referring to a heterogeneous group of neoplasms characterized by an admixture of a carcinoma with areas of squamous, spindle, or heterologous mesenchymal differentiation. Immunohistochemistry plays a major role in differentiating OS from sarcomatoid or metaplastic carcinoma. Metaplastic carcinoma is immunoreactive for CK, whereas OS is non-reactive. The cells of OS also display negativity for EMA, ER, PR, and Her2, and are positive for vimentin; areas of cartilaginous differentiation show S100 positivity. Vascular endothelial growth factor expression was found in majority of patients with breast OS, carcinoma and malignant phyllodes thus not facilitating in the differentiation of the breast malignancies.

The optimal treatment should include complete surgical removal of the tumor with an adequate margin. Axillary clearance is not indicated if there is histopathological diagnosis of OS preoperatively. Sarcomatoid carcinomas and primary breast carcinomas, in contrast, require axillary staging. As adjuvant combination chemotherapy has proven beneficial impact on survival in osteogenic sarcoma of the bone. Combination chemotherapy and local radiotherapy have been proposed for breast osteosarcoma. Adjuvant radiotherapy is included to take care of the microscopic spread in adjacent area.

Unlike breast sarcomas and breast carcinomas, breast OS generally has a poorer outcome. They are highly aggressive with early recurrence and propensity for hematogenous spread, most frequently to lungs. The metastatic spread occurs in 40% of the cases. The 5-year survival rate of primary breast osteosarcoma patients is a dismal 38%. Tumor size is the most significant predictor of survival. The current case has not shown any evidence of local recurrence or metastasis at
a follow-up of fifty seven months after initial diagnosis and multimodality treatment.

CONCLUSION

Breast osteosarcoma is a rare malignancy in a rare site where a definitive diagnosis is established after a histology and immunochemistry staining of the specimen. To date, surgical excision with clear surgical margins remains the cornerstone of treatment. However, due to limited literature role of chemotherapy and local radiotherapy for control of tumor recurrences in patients with primary breast OS is still not established. A good oncologic outcome as seen in the present case can still be achieved by advocating an aggressive surgical approach with adjuvant chemoradiotherapy.

REFERENCES


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