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Breast Imaging

Synchronous breast cancer and alveolar rhabdomyosarcoma bone marrow metastases

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ABSTRACT

Alveolar rhabdomyosarcoma (RMS) is primarily a malignancy of childhood and adolescence. While RMS is rare in adults, the breast and the bone marrow are known but uncommon sites for metastatic disease. Bone marrow is also a known sanctuary site for metastatic breast cancer. We present the case of a woman with a remote history of breast cancer and RMS who developed anemia and thrombocytopenia of unknown etiology. Additional laboratory tests were negative for a cause; therefore, the decision was made to proceed with a bone marrow biopsy. The initial biopsy results were consistent with breast cancer metastasis. Subsequent diagnostic imaging of the breast led to biopsy of an enlarging morphologically benign breast mass, unexpectedly yielding alveolar RMS. This unanticipated diagnosis led to re-valuation of the bone marrow, this time showing synchronous metastases from breast carcinoma and alveolar RMS. Imaging findings of this patient, along with literature review of RMS imaging characteristics, will be reviewed.

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Introduction

Alveolar rhabdomyosarcoma (RMS) is primarily a malignancy of childhood and adolescence [1]. While RMS is rare in adults, the breast and the bone marrow are known but uncommon sites for metastatic disease [2]. Bone marrow is also a known sanctuary site for metastatic breast cancer [3]. We report a case of a woman with a history of stage III estrogen receptor± breast cancer and stage IV alveolar RMS, who presented with anemia and thrombocytopenia. She was found to have bone marrow involvement of both malignancies along with RMS metastatic to the breast. Although there are certain imaging features that may be associated with metastatic lesions within the breast, the characteristics are not specific [4]. Therefore, a high level of suspicion must be employed by the interpreting radiologist in such cases. Imaging findings of this patient, along with literature review of RMS imaging characteristics, will be reviewed.

Case report

A 66-year-old woman presented with left-sided epistaxis, excessive lacrimation, and a palpable left cervical mass. Magnetic resonance imaging showed a mass centered within the left ethmoid complex with extension to local structures, mediastinal and cervical lymphadenopathy, and a thoracic spine lesion (Fig. 1). Biopsy of the dominant mass revealed a high-grade RMS with morphologic features of alveolar subtype (Fig. 2). She completed 10 of 14 cycles of chemotherapy (stopped due to patient's preference) resulting in resolution of chest lymphadenopathy and a partial response of nasopharyngeal tumor. She additionally received radiation to the residual tumor in left neck lymph nodes. Interestingly, the patient also had a remote history of stage III breast cancer 16 years prior, which had been treated with a right mastectomy and axillary lymph node dissection, followed by chemotherapy, radiation therapy, 1 year of tamoxifen, and 4 years of anastrozole.

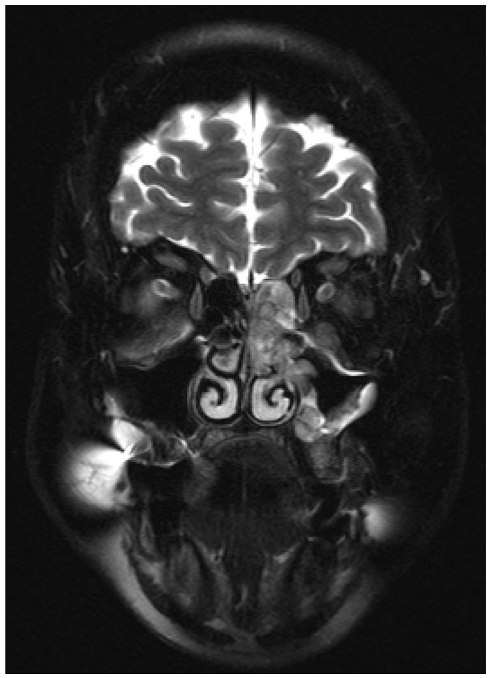

Fig. 1 – Contrast-enhanced T2-weighted magnetic resonance imaging image demonstrates a heterogeneously enhancing mass centered in the left nasal cavity with extension into the maxillary and ethmoid sinuses, biopsy-proven to be rhabdomyosarcoma.

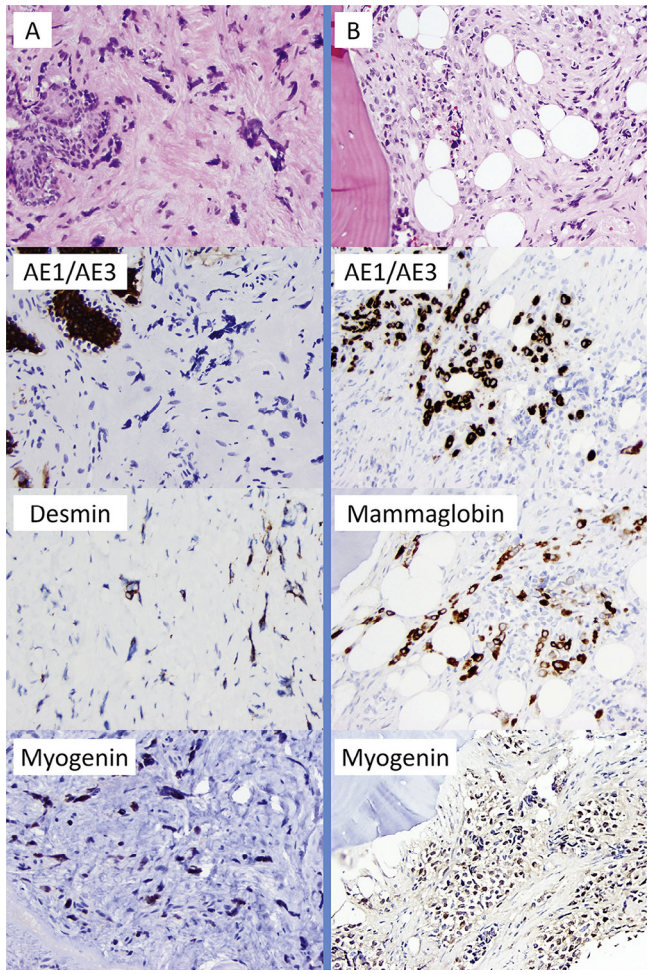

Fig. 2 – Pathology. Representative microscopic sections of the patient's left breast biopsy (column A) including a hematoxylin and eosin (H&E) stained section showing a benign breast duct on the left as well as an infiltrate of large atypical cells that are negative for epithelial marker AE1/AE3 and positive for muscle markers desmin and myogenin, consistent with metastatic rhabdomyosarcoma. The patient's H&E stained bone marrow biopsy (column B) shows a mixed infiltrate consisting of epithelioid cells with round nuclei that are positive for AE1/AE3 and breast marker mammaglobin, consistent with metastatic breast carcinoma, as well as a more atypical population that is morphologically similar to the tumor in the breast biopsy that is positive for myogenin, consistent with metastatic rhabdomyosarcoma.

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