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Spectrum of Extramammary Malignant Neoplasms in the Breast With Radiologic-Pathologic Correlation

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Although primary breast cancer is the most common malignancy identified by breast imaging, extramammary malignancies may also rarely be encountered. These uncommon lesions may reflect primary neoplasms of nonmammary origin as well as secondary metastatic lesions, and include lymphoma, melanoma, neuroendocrine tumors, gastrointestinal tract malignancies, and angiosarcoma among other entities. Malignant extramammary breast lesions may be encountered during routine mammographic screening, identified during the diagnostic evaluation of a palpable breast abnormality, or may be detected incidentally during imaging of other organs of interest. As such, the radiologist should have familiarity with the appearance of these lesions. This article focuses on a review of several of the most common extramammary metastases to the breast, as well as a few lesions that may develop as either primary or secondary lesions.

Introduction

The incidence of extramammary metastatic lesions to the breast ranges from 0.5%-6.6%.[1-3] The most common lesions in order of descending frequency include lymphoma, melanoma, rhabdomyosarcoma, and lung and ovarian carcinoma.[1,2] Metastases may arise from either hematogenous or lymphangitic spread, each generally manifesting with different imaging features. Hematogenous spread often leads to a discrete circumscribed mass or masses without spiculations or microcalcifications.[4,5] On the other hand, lymphangitic spread often leads to more diffuse findings such as edema, increased trabeculation, and skin thickening.[4,5] Both types of dissemination may mimic benign entities, with hematogenously spread lesions mimicking benign cysts or fibroadenomas, and lymphangitic spread mimicking mastitis. Both types of dissemination may also mimic other malignant entities, with hematogenously spread lesions mimicking less ominous appearing subtypes of primary breast malignancy such as medullary, mucinous, or papillary carcinoma, whereas lymphangitic spread may appear identical to inflammatory breast carcinoma. Though microcalcifications are not frequently present in metastatic lesions, if present, they most commonly indicate an ovarian carcinoma, due to the presence of psammoma bodies (Fig 1).[2,5,6] Additionally, hepatocellular carcinoma, medullary thyroid carcinoma, or gastric carcinoma metastasis may also contain calcifications that may appear similar to malignant ductal microcalcifications.[5]

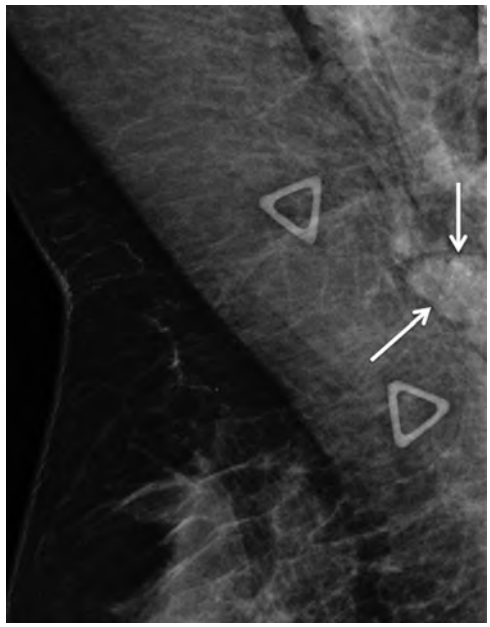

Fig. 1. (A) A female patient with a history of ovarian carcinoma presented for diagnostic mammogram for 2 palpable lesions in the right axilla. Magnified RMLO view demonstrates punctate microcalcifications within a partially imaged axillary node (arrows), which upon further workup revealed metastatic ovarian carcinoma. RMLO, right mediolateral oblique.

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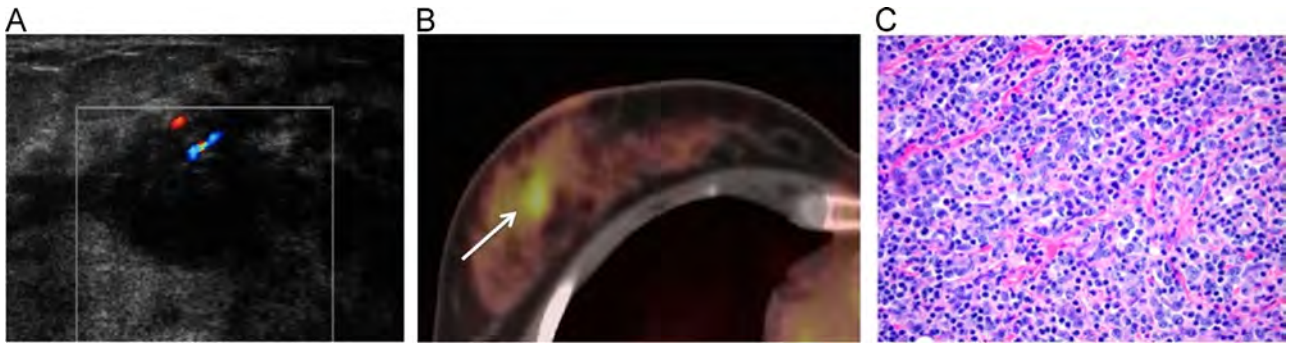

Fig. 2. (A) Diagnostic mammogram with spot compression views in a 38-year-old woman with a palpable lump within the right breast did not reveal a mammographic abnormality (not shown). Ultrasound imaging in the same patient reveals an oval, complex solid and cystic mass with microlobulated margins and mild internal vascularity. FNA revealed dense lymphoid infiltrate (not shown). (B) Subsequent Whole body FDG-PET/CT (select fused axial image shown) reveals a solitary area of abnormal FDG uptake within the right breast corresponding with the ultrasound abnormality (arrow). No additional areas of abnormal FDG localization were identified throughout the body. (C) Photomicrograph (hematoxylin and eosin stain, ×20) from a subsequent core biopsy specimen reveals a diffuse infiltrate of large, atypical lymphocytes with vesicular chromatin, and irregular nuclear contours, which were positive for CD20, CD10, BCL2, and BLC6 (not shown). Findings are consistent with diffuse large B-cell lymphoma. FNA, fine-needle aspiration; FDG, fluorodeoxyglucose; PET, positron emission tomography; CT, computed tomography. (Color version of figure is available online.)

Specific Subtypes of Extramammary Metastases

Breast Lymphoma

Breast lymphoma most often presents as secondary involvement due to disseminated disease. Lymphoma less commonly presents as a primary breast lymphoma, occurring in less than 0.5% of instances.[7] Clinically, both primary and secondary breast lymphomas frequently present as a palpable, painful mass within the upper outer quadrant, with axillary lymphadenopathy present in 30%-50% of cases.[7] The most common subtypes of breast lymphoma include diffuse large B-cell lymphoma, marginal-zone lymphoma (mucosa-associated lymphoid tissue lymphoma), and follicular lymphoma, all of which are of B-cell origin. Whereas diffuse large B-cell lymphoma and mucosa-associated lymphoid tissue lymphoma occur in both primary and secondary settings, follicular lymphoma occurs solely in the setting of disseminated disease.[8,9] T-cell lymphomas are much rarer, occurring in less than 10% of all cases.[8] At mammography breast lymphoma often appears as an indistinct mass or masses, and an irregular,

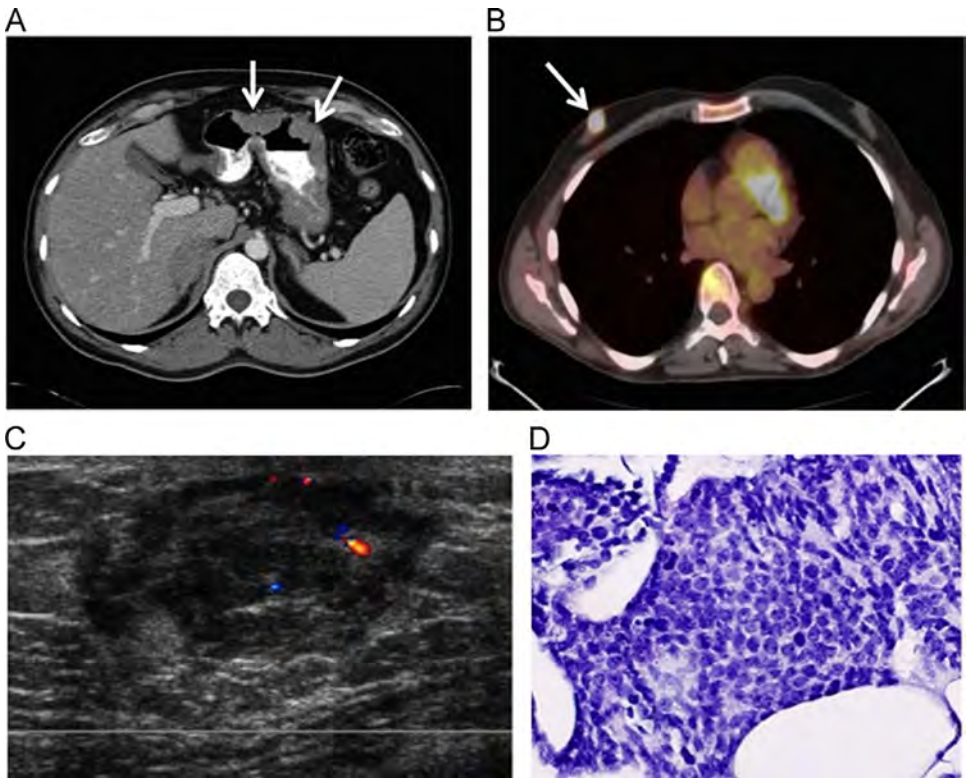

Fig. 3. (A) Axial CT in a 52-year-old male patient with long-standing GERD and epigastric pain depicts nodular masses within the gastric wall (arrows). Subsequent endoscopic biopsy revealed Burkitt's lymphoma. The patient underwent systemic chemotherapy with initial remission. (B) FDG-PET/CT for restaging 19 months later reveals area of abnormal FDG localization within the retroareolar right breast (arrow) (select axial fused PET/CT image shown). An additional area of abnormal FDG localization was noted within the left sacrum (not shown). (C) Targeted retroareolar ultrasound of the right breast reveals a correlating oval, parallel, and heterogeneous mass with indistinct margins and internal vascularity. (D) Photomicrograph (hematoxylin and eosin stain, ×40) from the subsequent right core needle biopsy of the mass reveals atypical, dense lymphoid infiltrate which was immunohistochemically positive for CD20, CD10, Pax5, and Ki67 within greater than 95% of cells. Findings are consistent with a high-grade B-cell lymphoma. GERD, gastroesophageal reflux; FDG, fluorodeoxyglucose; PET, positron emission tomography; CT, computed tomography. (Color version of figure is available online.)