



Breast Imaging

Lymphangitic spread of invasive lobular carcinoma to the contralateral breast

Zachariah Burns^a, Lena Omar^a, Lindsay Compton^a, Jody Hayes^a, Sunati Sahoo^b, Kanwal Merchant^{a,*}^a Department of Radiology, UT Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, TX 75390, United States of America^b Department of Pathology, UT Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, TX 75390, United States of America

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ABSTRACT

Breast cancer typically spreads primarily to regional lymph nodes and subsequently to distant sites via hematogenous routes. Occasionally metastasis can occur through lymphangitic spread, usually to the lungs, resulting in lymphangitic carcinomatosis. Lymphangitic spread of several malignancies have been reported at other sites in the body with varying degrees of clinical significance. In this case report, we describe a rare case of lymphangitic spread of invasive lobular carcinoma to the contralateral breast identified on imaging as significant background enhancement without a discrete suspicious mass.

1. Introduction

Breast cancer, excluding non-melanoma skin cancer, is the most common cancer in women worldwide with over 2 million cases diagnosed per year [1]. It is the second most common cause of cancer deaths in women in the United States and the most common cause of cancer death in women worldwide [1,2]. Typically, breast cancer initially spreads to regional lymph nodes with subsequent distant metastases to end organ sites, most commonly bone, liver and lungs. Different patterns of metastatic spread have been observed between invasive ductal carcinoma and invasive lobular carcinoma, the two most common types of breast cancer. Invasive lobular carcinoma has been reported to spread more commonly to the gastrointestinal tract, ovaries, peritoneum, and bone with invasive ductal carcinoma having a predilection more for the central nervous system, regional lymph nodes and the lungs [3]. Occasionally, breast cancer will undergo lymphangitic spread to the lungs, resulting in pulmonary lymphangitic carcinomatosis.

Lymphangitic carcinomatosis, sometimes called carcinomatous lymphangitis, refers to a pattern of metastasis characterized by spread of tumor emboli to lymphatic vessels of distant sites [4]. In most cases, lymphangitic carcinomatosis is seen in the lungs, and is most often due to breast, lung, colon, stomach, pancreatic, and prostate cancer. Pulmonary lymphangitic carcinomatosis is associated with late-stage metastatic disease and rapidly progressive dyspnea with a poor prognosis

[5]. However, other distant sites of lymphangitic metastasis have been reported, such as in the liver [6,7], bile ducts [8], kidney [9], skin [10–13], and small bowel [14]. Here we report a case of lymphangitic spread of invasive lobular carcinoma to the contralateral breast.

2. Case report

A 58-year-old woman presented to our hospital complaining of an indurated right breast mass of 4-months duration. She reported having been recently diagnosed with breast cancer in Mexico via needle biopsy. Physical exam showed a large mass with induration palpated on the right breast and a large lymph node in the right axilla. Initial mammography and ultrasound showed a mass measuring 7.5 cm with spiculated margins in the central region of the right breast with a 7 mm adjacent satellite mass in the upper outer quadrant of the right breast. Additionally, an irregular mass was seen in the right axilla measuring 3.7 cm. No suspicious masses were seen in the left breast. (Fig. 1). Biopsy of the right breast mass showed grade II invasive lobular carcinoma, and biopsy of the right axillary mass showed metastatic spread. Prognostic markers were estrogen receptor (ER)-negative, progesterone receptor (PR)-negative, her-2/neu negative, with ki67 of 20–40%.

Subsequent CT of the chest showed tumoral involvement of the right major and minor pectoralis muscles, abnormal contralateral left axillary/subpectoral lymph nodes, and scattered nonspecific sub-4 mm

* Corresponding author.

E-mail addresses: zachariah.burns@utsouthwestern.edu (Z. Burns), lena.omar@utsouthwestern.edu (L. Omar), lindsay.compton@utsouthwestern.edu (L. Compton), jody.hayes@utsouthwestern.edu (J. Hayes), sunati.sahoo@utsouthwestern.edu (S. Sahoo), kanwal.merchant@utsouthwestern.edu (K. Merchant).

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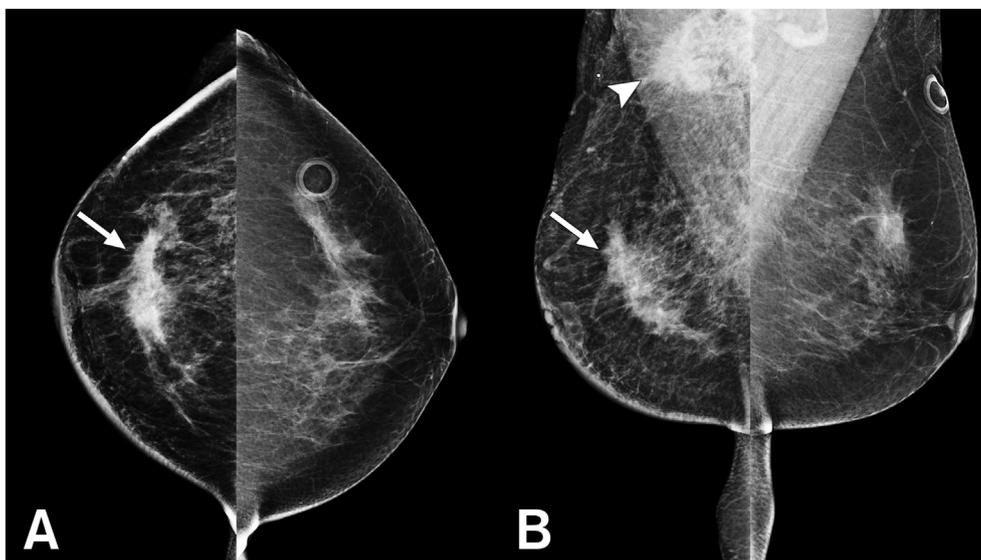


Fig. 1. Bilateral Diagnostic Mammogram. CC (A) and MLO (B) views show an irregular, high density mass (arrows) in the central right breast with diffuse skin thickening, and an irregular mass in the right axilla (arrowhead). No mammographic abnormalities are seen in the left breast.

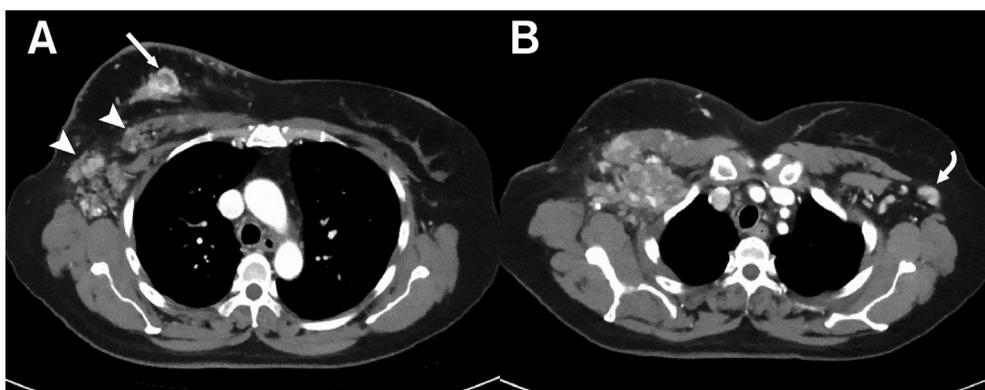


Fig. 2. Right Breast Invasive Lobular Carcinoma with axillary metastasis: Contrast Enhanced Chest CT Axial images (A, B) show enhancing heterogeneous masses in the right breast parenchyma (arrow) and right axillary metastases involving the chest wall (arrowheads). Abnormal left axillary lymph node is also seen (curved arrow).

lung nodules. (Fig. 2) CT of the abdomen and pelvis was negative for evidence of metastatic spread. Technetium-99m Nuclear Medicine Bone Scan showed no scintigraphic evidence of osseous metastases. A left axillary ultrasound was performed and demonstrated an abnormal left axillary lymph node which corresponded to the chest CT findings. Subsequent biopsy of the node demonstrated metastasis.

Due to the biopsy proven contralateral axillary metastatic node, a bilateral breast MRI was performed to evaluate the left breast. Significant background enhancement was seen in left breast but no suspicious enhancing mass was identified (Fig. 3). The case was reviewed in multidisciplinary tumor board and a blind biopsy of the significant background enhancement in the left breast was requested based on consensus opinion.

MRI-guided biopsy of the left breast (Fig. 4) showed rare foci of lymphatic tumor emboli in a background of normal fibroglandular breast tissue, consistent with lymphangitic spread of breast cancer.

At this point in her treatment, further imaging demonstrated that the patient was a good candidate for surgery. She underwent right radical mastectomy and left modified radical mastectomy. Surgical pathology of the right breast revealed a 5.3 × 4.5 cm tumor bed with several foci of residual carcinoma with negative margins and 9/16 lymph nodes positive for carcinoma. Surgical pathology of the left breast revealed tumor emboli in angiolymphatic spaces with rare carcinoma cells in the breast parenchyma and 0/19 lymph nodes positive for carcinoma. Because the tumor cells were present predominantly in lymphovascular spaces with rare tumor cells in the breast parenchyma,

the left breast was interpreted to have lymphangitic metastasis from the opposite breast.

Subsequent brain MRI (Fig. 5) demonstrated multiple leptomeningeal metastases with infiltration of brain parenchyma, and CSF cytology was positive for malignant cells.

3. Discussion

Invasive lobular carcinoma is the second most common invasive breast cancer after invasive ductal carcinoma, comprising about 5–15% of all invasive breast cancers. Invasive lobular carcinoma tends to spread first to the ipsilateral lymph nodes, and then metastasizes most commonly to the bone, liver, and lung through hematogenous pathways. Rarely, breast cancer can metastasize to the lungs via lymphangitic spread, causing pulmonary lymphangitic carcinomatosis. To our knowledge, lymphangitic spread of breast cancer has not yet been reported at sites other than the lungs, chest wall, and skin.

Pulmonary lymphangitic carcinomatosis tends to present with progressive dyspnea due to lymphatic obstruction by tumor emboli. The prognosis for patients with pulmonary lymphangitic carcinomatosis is poor. In one study of 32 patients, 18 did not survive past 3 months of symptom onset [5]. The prognosis is similarly poor in other cases of non-pulmonary lymphangitic spread unrelated to breast cancer; in a study of 4 patients with duodenal lymphangitic carcinomatosis, all 4 died within 6 months of admission or endoscopic evaluation [14]. In our case, the lymphangitic spread to the contralateral breast was found

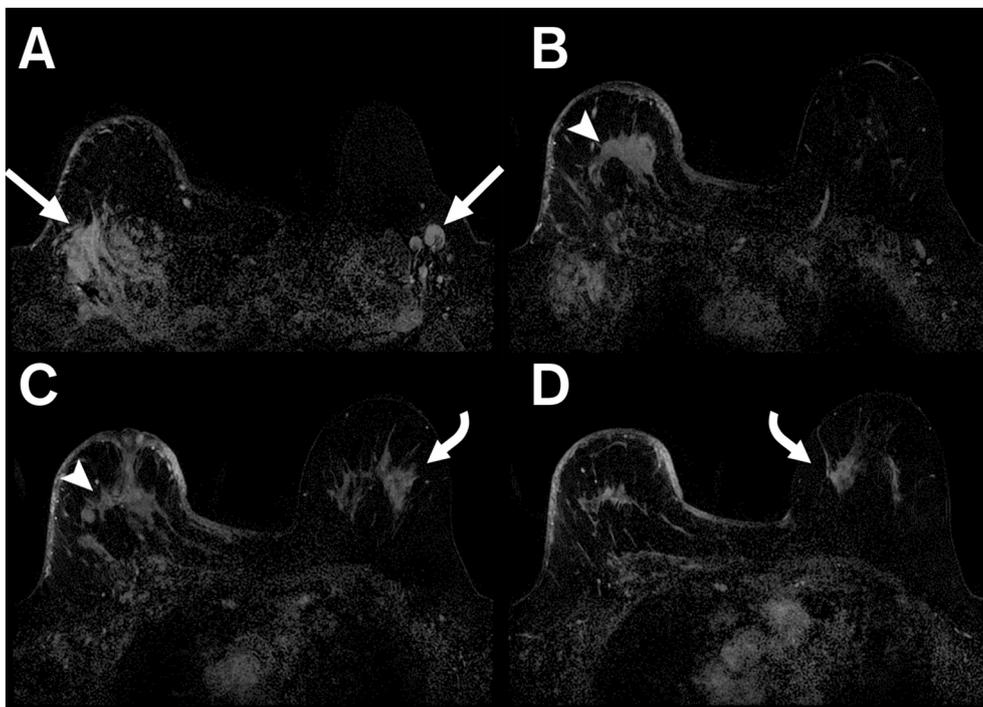


Fig. 3. Contrast enhanced breast MRI subtracted axial T1 weighted images (B and C) demonstrate an irregular mass in the right breast corresponding with the known malignancy (arrowheads) with associated skin thickening and enhancement. Image A shows abnormal bilateral axillary adenopathy (arrows). Patchy areas of enhancement (curved arrows) believed to be background parenchymal enhancement at the time of interpretation are seen throughout the left breast (C and D). Subsequent biopsy of the left breast showed this enhancement to be metastatic spread of cancer from the contralateral side.

incidentally on biopsy and was not associated with any specific symptoms. Additionally, our patient underwent surgical resection, an option not always clinically feasible with lymphangitic spread at other sites. One other factor in our patient's case which makes it unique is that her invasive lobular carcinoma is triple negative and had already undergone metastatic spread, which is more likely to have a higher impact on the patient's prognosis. However, more information is needed to assess the prognostic impacts of lymphangitic spread of malignancy to the breast.

While the diagnostic impact of lymphangitic spread to the contralateral breast is not well understood, if lymphangitic spread of cancer is discovered, further evaluation for other sites of distant metastasis may be warranted. In our patient's case, subsequent imaging revealed leptomeningeal metastases in the brain, for which breast cancer is the most common cause [15]. At the time of publication/submission, our patient has been followed for 16 months after diagnosis. She has since returned to Mexico to be with her family.

4. Conclusion

Ultimately, this case report demonstrates an unusual pattern of breast cancer metastasis that may have clinical management and prognostic implications. It is important for clinicians to consider possible lymphangitic spread when looking at significant background enhancement in the contralateral breast, even in the absence of a suspicious mass. Lymphangitic spread of breast cancer to the contralateral breast represents distant metastasis, and further evaluation for other sites of possible metastasis should be considered.

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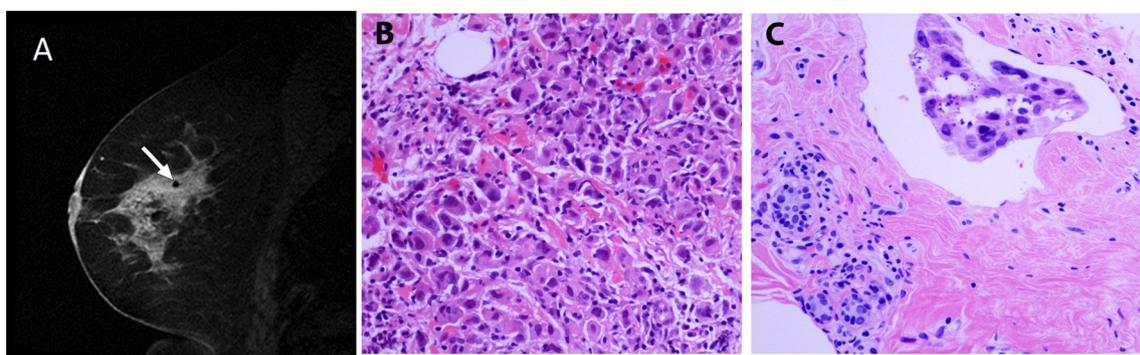


Fig. 4. A, Sagittal MRI image of the left breast at the time of biopsy demonstrates signal void (arrow) from the needle in an area of marked background parenchymal enhancement. B, An initial diagnostic core biopsy of the right breast demonstrate large pleomorphic single cells with discohesion, which were negative with E-Cadherin (not shown), consistent with pleomorphic lobular carcinoma. C, Biopsy of the left breast demonstrates tumor emboli in lymphatic space compatible with lymphangitic metastasis from the contralateral breast.

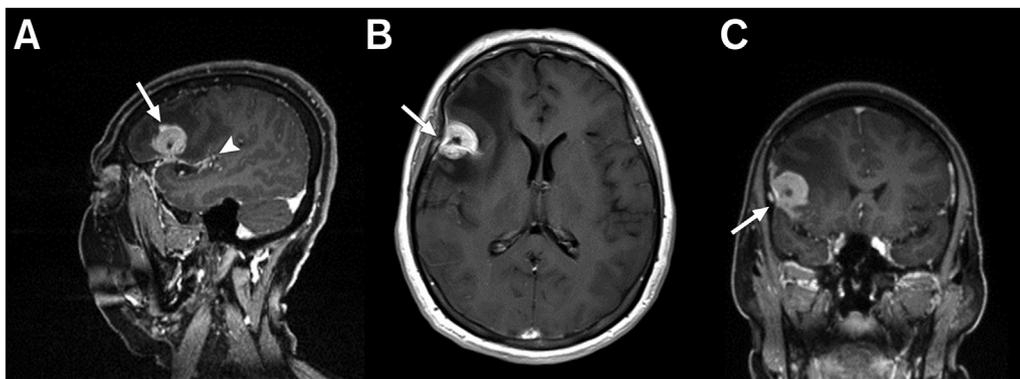


Fig. 5. Sagittal (A), axial (B), and coronal (C) contrast enhanced images of the brain demonstrate a heterogeneously enhancing metastatic mass arising from the inferior frontal gyrus (arrows) with enhancement seen surrounding the right sylvian fissure (arrowhead) consistent with CSF spread of malignancy. Associated with the mass is vasogenic edema and infiltration of the leptomeninges and brain parenchyma.

Declaration of competing interest

None.

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