

## Case Report

## Uncommon Presentation of Metastatic Melanoma to the Breast

Jodi A. Veach, B.A.<sup>1</sup>, Molly Hill, M.D.<sup>1,2</sup>, Ashley I. Huppe, M.D.<sup>1,2</sup><sup>1</sup>The University of Kansas School of Medicine-Kansas City, Kansas City, Kansas<sup>2</sup>Department of RadiologyReceived Sep. 21, 2024; Accepted for publication Nov. 27, 2024; Published online Feb. 17, 2025  
Kans. J Med 2025, Jan-Feb; 18:19-20. <https://doi.org/10.17161/kjmvoll8.22874>

## INTRODUCTION

Melanoma is the sixth most common malignancy in women and the fifth most common in men, making it the most lethal form of skin cancer.<sup>1,2</sup> Approximately 20% of patients with melanoma develop metastatic disease, with common sites of metastasis including the lungs, liver, bone, and brain.<sup>1,3,4</sup> Metastasis to the breast is rare, accounting for less than 3% of all breast masses. However, melanoma is one of the most frequent extramammary malignancies found in the breast.<sup>5</sup> Lesions originating from melanomas on the trunk or upper extremities are more likely to metastasize to breast tissue compared to those originating on the lower extremities.<sup>5</sup>

Breast metastases often present with nonspecific imaging features, resembling both benign and malignant breast masses. Consequently, breast radiologists must maintain a high degree of clinical suspicion for metastasis when assessing suspicious breast findings in patients with a history of non-breast malignancies. This is especially critical, as breast metastases are associated with a relatively worse prognosis.<sup>1</sup>

The following case highlights the unique clinical presentation and diagnostic challenges faced in evaluating a premenopausal woman diagnosed with metastatic melanoma. Her presentation included symptoms and imaging findings that initially raised concern for primary inflammatory breast carcinoma (IBC), underscoring the importance of thorough clinical evaluation in such complex cases.

## CASE REPORT

A 47-year-old woman with a history of recurrent melanoma on the ventral side of the right upper abdomen and biopsy-proven right axillary nodal metastasis presented for dedicated breast imaging 19 months after her initial melanoma diagnosis. Her prior treatments included wide local excision, axillary nodal dissection, and systemic therapy with nivolumab and relatlimab. This presentation followed findings on a recent positron emission tomography (PET) scan, which demonstrated heterogenous increased fluorodeoxyglucose (FDG) uptake in the lateral portion of the right breast with a maximum standardized uptake value of 9.2 (Figure 1). These findings were suspicious for metastatic melanoma; however, a differential diagnosis included primary breast malignancy, warranting further imaging and tissue diagnosis.

Between the PET scan and dedicated breast imaging, the patient developed diffuse right breast hardening, skin thickening, and a peau d'orange appearance – clinical symptoms highly suspicious for IBC. Diagnostic mammography revealed global asymmetry of the right

breast with asymmetric enlargement, diffuse skin and trabecular thickening, and areas of architectural distortion (Figure 2). Breast ultrasound showed diffuse abnormal non-mass tissue, accompanied by an irregular mass with indistinct margins centered at 12 o'clock, 9 cm from the nipple (Figure 3). No morphologically abnormal lymph nodes were identified in the right axilla, consistent with her prior axillary nodal dissection. While imaging findings strongly suggested IBC, metastatic melanoma remained a differential diagnosis given her medical history.

An ultrasound-guided biopsy confirmed metastatic melanoma. Subsequent breast magnetic resonance imaging (MRI) revealed numerous partially necrotic enhancing masses throughout the right breast parenchyma and skin, accompanied by asymmetric skin thickening, enhancement, and subcutaneous edema (Figure 4). The left breast showed no abnormal findings.

Following her diagnosis of metastatic melanoma to the breast, the patient underwent clinical management involving medical and radiation oncology. Treatments included chemoradiation therapy and participation in a tumor-infiltrating lymphocyte therapy trial. Unfortunately, the patient passed away 28 months after her initial melanoma diagnosis and eight months following the detection of breast metastasis.

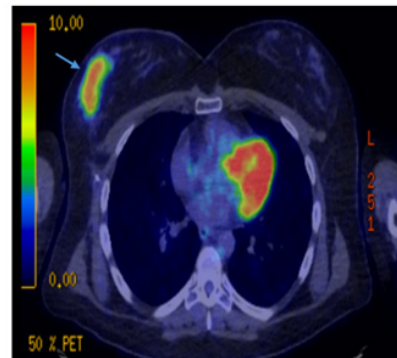


Figure 1. FDG-PET demonstrating heterogenous mass-like uptake in the lateral right breast (arrow).

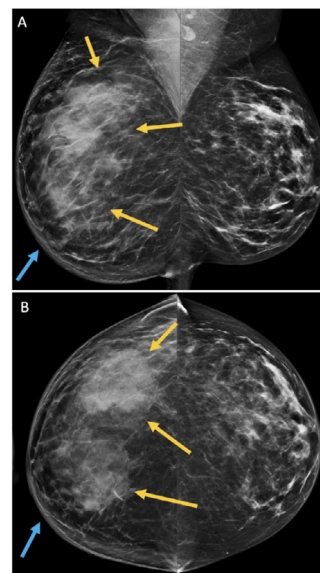


Figure 2. Bilateral diagnostic mammography mediolateral oblique (a) and craniocaudal (b) synthetic 2-D images demonstrate global right breast asymmetry (yellow arrows) with diffuse skin thickening (blue arrows) and trabecular thickening.

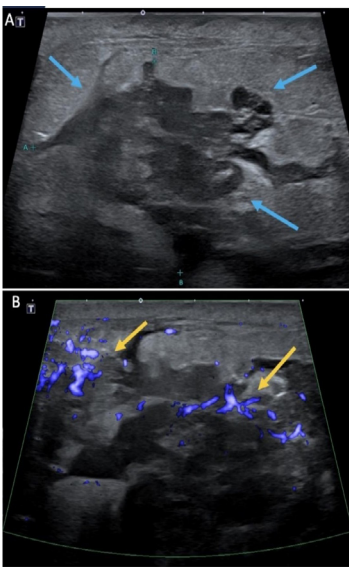


Figure 3. Sonographic grayscale (a) and power doppler (b) images demonstrate diffuse abnormal non-mass tissue with an associated irregular mass with indistinct margins (blue arrows) demonstrating increased blood flow (yellow arrows), corresponding to the mammographic asymmetry. This tissue was targeted for percutaneous ultrasound-guided biopsy.

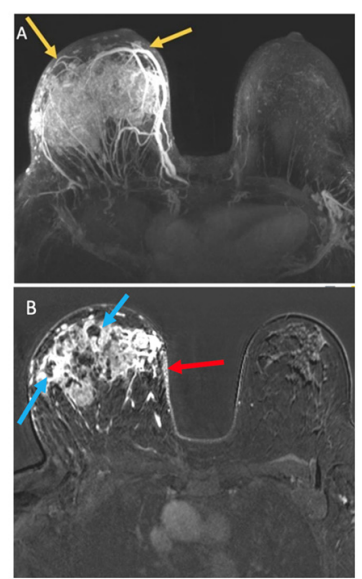


Figure 4. Breast MRI maximum intensity projection (MIP) (a) and axial subtracted contrast-enhanced image (b) demonstrate asymmetric right breast enlargement and enhancement (yellow arrows) with multiple contiguous, irregular, enhancing and partially necrotic masses (blue arrows) throughout the right breast in addition to skin enhancement and thickening (red arrow). The left breast demonstrates no suspicious findings.

## DISCUSSION

Breast metastases from extramammary malignancies can occur through hematogenous or lymphatic routes.<sup>6</sup> Hematogenous spread is more common and typically presents as solitary or multiple round or oval circumscribed masses, lacking spiculated margins, calcifications, or architectural distortion. These metastases can mimic benign lesions such as cysts or fibroadenomas and are less likely to involve axillary lymph nodes. Conversely, lymphatic spread, though less frequent, leads to tumor obstruction of lymphatic channels.<sup>7</sup> This results in skin and trabecular thickening, subcutaneous edema, lymphedema, and lymphadenopathy, which closely resemble advanced or inflammatory primary breast malignancy.

In this case, the imaging findings included diffuse skin and trabecular thickening, architectural distortion, and subcutaneous edema.

The absence of lymphadenopathy was attributed to the patient's prior axillary dissection. IBC, a rare but aggressive form of breast cancer, constitutes 2-4% of breast cancer cases and 7% of breast cancer-related mortality in the U.S.<sup>8</sup> It frequently presents with nonspecific features such as breast edema and erythema, hallmarks of the disease, and also may exhibit imaging findings typical of primary breast malignancy, including mass formation, calcifications, or architectural distortion, all accompanied by skin thickening. When no underlying mass is present, the findings may resemble mastitis, further complicating diagnosis.<sup>8,9</sup>

## CONCLUSIONS

This case underscores the diagnostic complexity of metastatic cancer to the breast due to overlapping clinical and imaging characteristics with primary breast malignancy. A known history of metastatic melanoma raised suspicion for secondary malignancy; however, the imaging features were indistinguishable from primary IBC. Accurate diagnosis is essential, as both metastatic melanoma and IBC are rare and aggressive malignancies requiring distinct treatment approaches. Radiologists and clinicians must maintain a broad differential diagnosis and prioritize timely biopsy to guide management.

The increasing prevalence of melanoma, coupled with its aggressive metastatic behavior, calls for heightened vigilance when these patients present with new breast findings. This case demonstrates the indispensable role of advanced imaging and biopsy in establishing an accurate diagnosis and guiding treatment decisions. Although the prognosis for metastatic melanoma remains poor, continued advancements in early detection and characterization of metastatic patterns may improve patient outcomes. Future research should focus on refining diagnostic strategies to better identify and address metastases, ultimately enhancing care for patients with aggressive malignancies.

## REFERENCES

- 1 Brodhead M, Woods RW, Fowler AM, Roy M, Neuman H, Gegios A. Multimodality imaging review of metastatic melanoma involving the breast. *Curr Probl Diagn Radiol* 2024; 53(2):289-296. PMID: 38307731.
- 2 Dzwierzynski WW. Melanoma risk factors and prevention. *Clin Plast Surg* 2021; 48(4):543-550. PMID: 34503715.
- 3 American Cancer Society. Cancer statistics center. <https://cancerstatisticscenter.cancer.org>. Accessed August 28, 2024.
- 4 Tas F. Metastatic behavior in melanoma: Timing, pattern, survival, and influencing factors. *J Oncol* 2012; 2012:647684. PMID: 22792102.
- 5 Al Samaraee A, Khout H, Barakat T, Fasih T. Breast metastasis from a melanoma. *Ochsner J* 2012 Summer; 12(2):149-151. PMID: 22778680.
- 6 Sippo DA, Kulkarni K, Carlo PD, et al. Metastatic disease to the breast from extramammary malignancies: A multimodality pictorial review. *Curr Probl Diagn Radiol* 2016; 45(3):225-232. PMID: 26293973.
- 7 Mun SH, Ko EY, Han BK, Shin JH, Kim SJ, Cho EY. Breast metastases from extramammary malignancies: Typical and atypical ultrasound features. *Korean J Radiol* 2014; 15(1):20-28. PMID: 24497788.
- 8 Chippa V, Barazi H. Inflammatory breast cancer. 2023 Apr 16. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. PMID: 33231994.
- 9 Radswiki T, Niknejad M, Knipe H, et al. Inflammatory carcinoma of the breast. Reference article, *Radiopaedia.org*. <https://doi.org/10.53347/rID-12469>. Accessed November 6, 2024.

*Keywords: melanoma, inflammatory breast neoplasms, mammography*