Case Report

BI-RADS Category 5 Left Breast Carcinoma with Suspicious Axillary Nodal Metastasis: A Case Report

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Abstract

Background: Breast cancer is the most common malignancy among women, and accurate imaging is essential for early diagnosis and appropriate management. We report the case of a 56-year-old postmenopausal woman who presented with a painless lump in the upper outer quadrant of the left breast for four months. Ultrasonography revealed a 2.4 × 1.6 cm heterogeneously hypoechoic irregular mass with non-circumscribed margins, punctate calcifications, posterior acoustic shadowing, and internal vascularity. Shear-wave elastography demonstrated markedly increased stiffness with a Tsukuba score of 5, elevated strain ratio, and high elasticity values, indicating a high likelihood of malignancy. Multiple enlarged ipsilateral axillary lymph nodes with cortical thickening, irregular margins, loss of fatty hilum, and increased vascularity were also identified, suggesting metastatic involvement. The lesion was categorized as BI-RADS Category 5, and ultrasound-guided core needle biopsy of the breast lesion with FNAC/core biopsy of the axillary lymph node was advised for histopathological confirmation. This case highlights the complementary role of conventional ultrasonography and elastography in improving diagnostic confidence, identifying nodal metastasis, and facilitating early diagnosis and timely management of breast carcinoma.

Keywords: Breast carcinoma; BI-RADS 5; Breast ultrasonography; Shear-wave elastography; Axillary lymph node metastasis; Case report.

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Introduction

Breast cancer is the most frequently diagnosed malignancy among women worldwide and remains one of the leading causes of cancer-related mortality. According to recent global estimates, breast cancer accounts for a substantial proportion of new cancer cases and cancer deaths, emphasizing the importance of early detection and timely management to improve survival outcomes.[1,2] Advances in breast imaging have significantly enhanced the ability to detect suspicious lesions at an early stage, thereby facilitating prompt diagnosis and treatment. The Breast Imaging Reporting and Data System (BI-RADS), developed by the American College of Radiology, provides a standardized lexicon for reporting breast imaging findings and stratifying the likelihood of malignancy. BI-RADS Category 5 lesions are considered highly suggestive of malignancy, with a probability of cancer exceeding 95%, and require immediate tissue diagnosis through image-guided biopsy.[3,4]

Ultrasonography plays a pivotal role in the evaluation of palpable breast masses, particularly in distinguishing benign from malignant lesions based on morphological characteristics such as irregular shape, non-circumscribed margins, posterior acoustic features, internal vascularity, and associated axillary lymphadenopathy.[5,6] More recently, elastography has emerged as a valuable adjunct to conventional ultrasonography by assessing tissue stiffness, an important indicator of malignancy. Malignant breast lesions typically demonstrate markedly increased stiffness compared with benign masses, thereby improving diagnostic confidence and reducing unnecessary biopsies.[7]

We report a case of a 56-year-old female presenting with a BI-RADS category 5 left breast lesion associated with suspicious ipsilateral axillary lymphadenopathy, highlighting the complementary role of conventional ultrasonography and elastography in the early diagnosis of breast carcinoma and guiding subsequent histopathological confirmation.

Case Description

A 56-year-old postmenopausal female presented to the General

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Surgery outpatient department with a painless lump in the left breast of 4 months' duration. The swelling had gradually increased in size without any associated pain, nipple discharge, skin ulceration, fever, or history of trauma. There was no significant past history of breast disease or previous breast surgery. Clinical examination revealed a firm, irregular, non-tender palpable mass in the upper outer quadrant of the left breast. The overlying skin and nipple appeared normal. Multiple palpable ipsilateral axillary lymph nodes were noted. The right breast and right axilla were clinically unremarkable. Ultrasonography (USG) of both breasts demonstrated a heterogeneously hypoechoic irregular mass measuring 2.4 × 1.6 cm in the upper outer quadrant of the left breast, located at the 2 o'clock position, approximately 3–4 cm from the nipple. The lesion exhibited irregular, non-circumscribed margins, parallel orientation, multiple punctate calcifications, marked posterior acoustic shadowing, and internal vascularity on color Doppler examination. The overlying skin and nipple were preserved. The right breast showed normal fibroglandular architecture without any focal lesion.

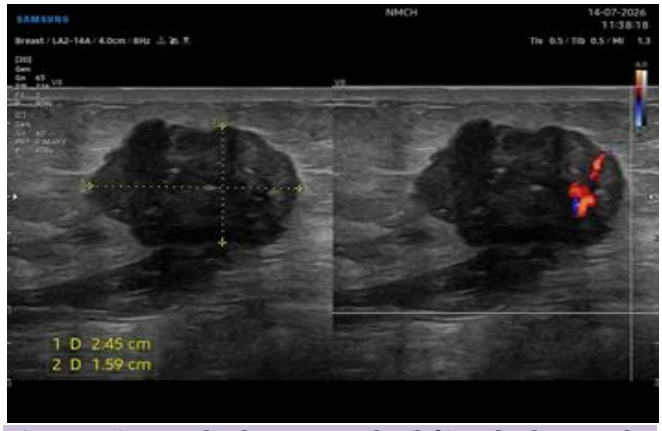

Figure 1: Gray-scale ultrasonography (left) and color Doppler (right) demonstrating an irregular heterogeneously hypoechoic left breast mass with posterior acoustic shadowing and internal vascularity, highly suggestive of malignancy (BI-RADS 5).

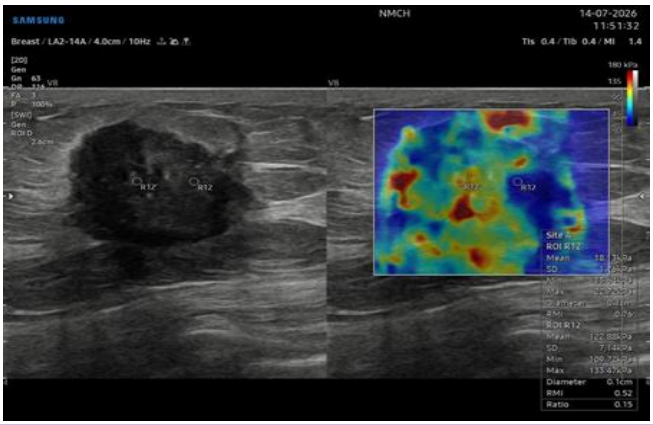

Figure 2: B-mode ultrasonography (left) and shear-wave elastography (right) showing an irregular hypoechoic left breast mass with marked tissue stiffness (high elasticity values), highly suggestive of malignancy (BI-RADS 5).

Shear-wave elastography demonstrated markedly increased stiffness of the lesion with a predominant blue pattern, Tsukuba score of 5, strain ratio of 7.2, E/B ratio >1.2, mean elasticity (Emean) of 145 kPa, maximum elasticity (Emax) of 185 kPa, and mean shear-wave velocity (SWV) of 6.8 m/s, findings highly suggestive of malignancy. Multiple elastography images consistently demonstrated markedly elevated stiffness within the lesion compared with the surrounding breast parenchyma.

Evaluation of the left axilla revealed multiple enlarged lymph nodes, the largest measuring 2.2 × 1.3 cm, with cortical thickening, heterogeneous echotexture, irregular margins, loss of fatty hilum, and increased vascularity, raising strong suspicion of metastatic nodal involvement. The right axilla was normal.

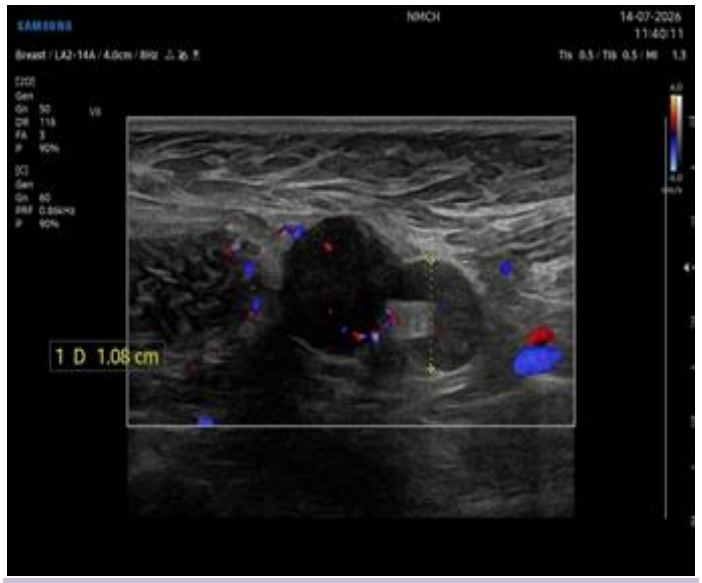

Figure 3: Color Doppler ultrasonography of the left axilla demonstrating an enlarged axillary lymph node with cortical thickening, increased vascularity, and loss of the normal fatty hilum, suspicious for metastatic nodal involvement.

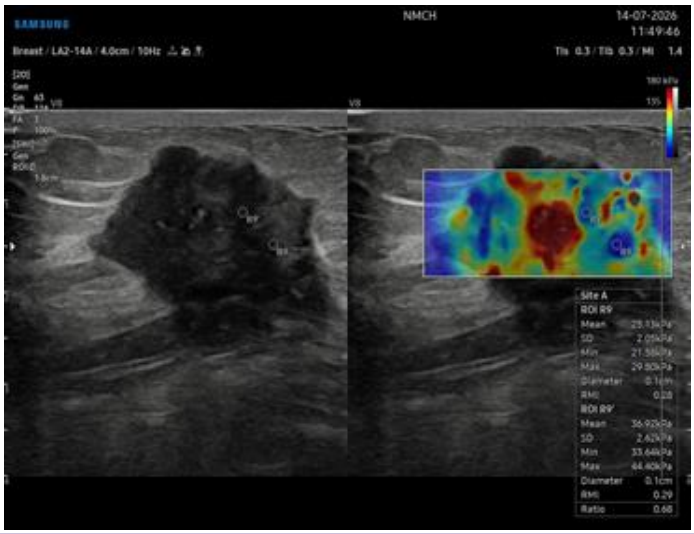

Figure 4: B-mode ultrasonography (left) and shear-wave elastography (right) demonstrating an irregular hypoechoic left breast mass with markedly increased tissue stiffness, consistent with a highly suspicious malignant lesion (BI-RADS 5).

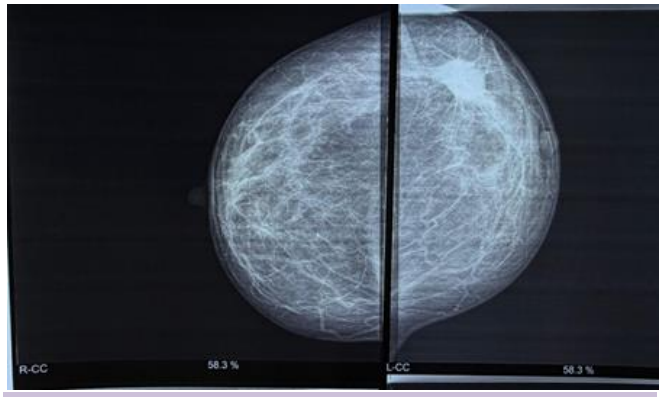

Figure 5: Bilateral craniocaudal (CC) mammographic views demonstrating an irregular high-density spiculated mass in the upper outer quadrant of the left breast, suspicious for malignancy (BI-RADS 5). The right breast shows no obvious focal abnormality.

Based on the combined B-mode ultrasonography, Doppler, and elastography findings, the lesion was categorized as BI-RADS Category 5 (highly suggestive of malignancy). The patient was advised to undergo ultrasound-guided core needle biopsy of the left breast lesion along with ultrasound-guided fine-needle aspiration cytology (FNAC)/core biopsy of the suspicious left axillary lymph node for histopathological confirmation and definitive management.

Discussion

Breast cancer continues to be the most frequently diagnosed malignancy among women worldwide and remains a major cause of cancer-related mortality despite advances in screening and treatment. Early detection through imaging plays a pivotal role in improving prognosis by enabling timely diagnosis and appropriate therapeutic intervention. In the present case, a 56-year-old postmenopausal woman presented with a painless breast lump, and multimodality imaging using conventional ultrasonography, color Doppler, and shear-wave elastography accurately characterized the lesion as highly suspicious for malignancy. The combination of these imaging modalities facilitated prompt BI-RADS 5 categorization and guided the need for histopathological confirmation.

The sonographic appearance of the lesion in our patient was highly suggestive of invasive breast carcinoma. The mass was irregular, heterogeneously hypoechoic, non-circumscribed, associated with punctate calcifications, posterior acoustic shadowing, and internal vascularity. These findings are well-recognized imaging features of malignant breast lesions and have been consistently reported in previous studies. Barr et al. and Cosgrove et al. emphasized that irregular morphology and increased stiffness on ultrasound elastography significantly improve the specificity of breast imaging when used alongside conventional ultrasonography.[8,9]

Elastography has become an important adjunct in breast imaging because malignant tumors are considerably stiffer than surrounding normal breast tissue due to increased cellularity, fibrosis, and desmoplastic reaction. In the present case, the lesion demonstrated a Tsukuba score of 5, markedly elevated strain ratio, high shear-wave elasticity values, and increased shear-wave velocity, all of which strongly supported the diagnosis of malignancy. Evans et al. demonstrated that quantitative shear-wave elastography significantly improves differentiation between benign and malignant breast masses by providing objective measurements of tissue stiffness, thereby enhancing diagnostic confidence and reducing unnecessary biopsies.[10]

An important finding in this case was the presence of enlarged ipsilateral axillary lymph nodes with cortical thickening, irregular margins, loss of fatty hilum, and increased vascularity. Such morphological abnormalities are highly suggestive of metastatic nodal involvement and represent one of the strongest prognostic indicators in breast cancer. Accurate assessment of axillary lymph nodes is essential because nodal status directly influences disease staging, surgical planning, adjuvant therapy, and overall prognosis. The importance of evaluating regional lymph nodes using imaging has been emphasized in current breast cancer staging recommendations and WHO classification guidelines.[11-13]

Based on the combined imaging findings, the lesion was appropriately classified as BI-RADS Category 5, indicating a greater than 95% probability of malignancy. According to contemporary NCCN and ESMO guidelines, BI-RADS 5 lesions require immediate image-guided core needle biopsy for histopathological confirmation before definitive treatment planning.[14,15] The imaging findings in the present case closely correlated with established diagnostic criteria and enabled timely referral for tissue diagnosis.

Overall, this case highlights the complementary role of conventional ultrasonography and elastography in the evaluation of suspicious breast lesions. The integration of morphological assessment with quantitative tissue stiffness measurements improves diagnostic accuracy, facilitates early identification of malignant lesions and metastatic axillary lymph nodes, and assists clinicians in making appropriate management decisions. Such multimodality imaging is particularly valuable in routine clinical practice, where rapid and accurate diagnosis is essential for optimizing patient outcomes.

Conclusion

This case demonstrates the significant diagnostic value of combining conventional ultrasonography with shear-wave elastography in the evaluation of suspicious breast lesions. The presence of an irregular hypoechoic mass with markedly increased stiffness and associated suspicious axillary lymphadenopathy enabled accurate BI-RADS 5 categorization and prompt recommendation for image-guided biopsy. Multimodality breast imaging serves as an effective, non-invasive approach for early detection, risk stratification, and guiding definitive management of breast carcinoma.

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Conflicts of interest
There are no conflicts of interest.

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