

Beyond Benign Appearances: Triple-Negative Breast Carcinoma Mimicking Benign Breast Lesions on Ultrasound - A Report of Two Cases

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Abstract: Triple negative breast cancer remains one of the most aggressive forms of breast malignancy, yet its imaging appearance can be unexpectedly reassuring and may resemble common benign breast lesions. This report presents two biopsy confirmed cases in which ultrasound demonstrated oval, circumscribed hypoechoic masses with posterior acoustic enhancement, features that could easily delay suspicion of cancer. In both patients, mammographic findings and clinical assessment raised greater concern, leading to core biopsy that confirmed invasive ductal carcinoma with triple negative receptor status. A review of published evidence highlights that this tumour subtype frequently lacks the classic imaging signs associated with breast cancer, including spiculated margins and suspicious calcifications, making diagnosis more challenging. Careful comparison of clinical findings with ultrasound and mammography is therefore essential, especially when imaging results appear inconsistent. Early tissue sampling in newly detected palpable masses, even when sonographic features appear benign, allows prompt diagnosis and timely treatment. Greater awareness of these atypical imaging patterns can help reduce missed or delayed diagnoses and improve clinical decision making for patients with suspected triple negative breast cancer.

Keywords: Triple Negative Breast Cancer, Breast Ultrasound, Mammography, Core Needle Biopsy, Invasive Ductal Carcinoma

1. Introduction

Triple negative breast cancer (TNBC) is a distinctive subtype of breast cancer that does not express estrogen receptors (ER), progesterone receptors (PR) or human epidermal growth factor receptor 2 (HER2). It constitutes 15-20% of all breast cancers and is associated with higher histologic grade, younger age at onset and known to have aggressive biologic features, faster growth and propensity for early metastasis and recurrence. (1) Despite the aggressiveness, they often present as circumscribed masses and lack the typical features of malignancy such irregular mass shape, spiculated margins and associated suspicious calcifications (2) which makes the imaging evaluation challenging. We present two biopsy-proven TNBC cases with benign-appearing sonographic features to emphasize the importance of careful imaging interpretation and appropriate biopsy despite reassuring morphology

2. Case Description

Case 1: 30 year old premenopausal, nulliparous woman with no family history of carcinoma breast, presented with palpable left breast lump.

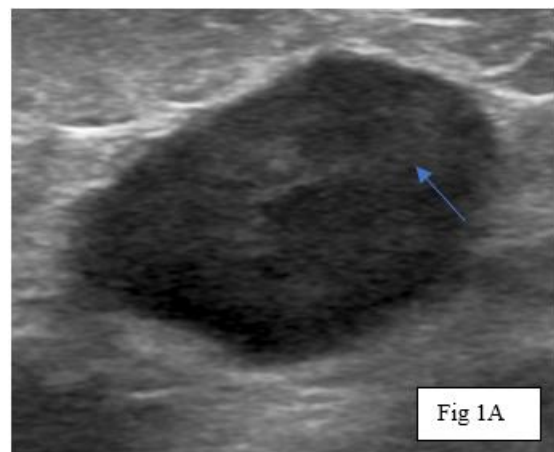


Figure 1 (a): Left breast ultrasound demonstrating an oval hypoechoic mass (arrow) with circumscribed lobulated margins and posterior acoustic enhancement.

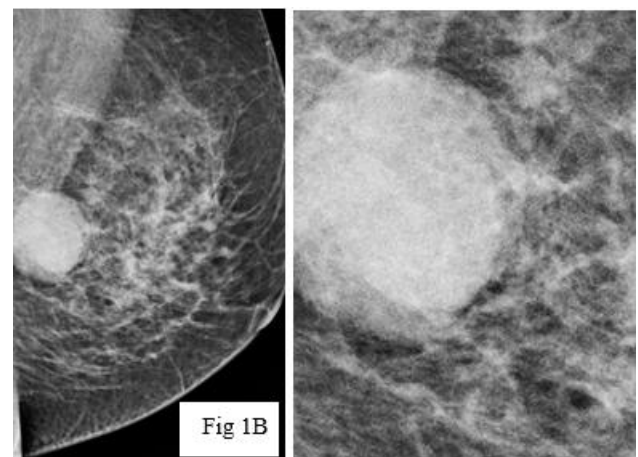


Figure 1 (b): Digital Mammography (MLO) view of left breast shows heterogeneously dense breast (ACR category C) with an oval, equal density mass at 4-5 o'clock position

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near chest wall of size ~3 cm, with smooth but partially ill-defined margins. No microcalcifications seen.

Despite benign sonographic appearance, core biopsy was performed given new palpable lump and partial mammographic concern. Histology revealed Invasive ductal carcinoma, grade 3. IHC was ER/ PR/ HER2 all negative (TNBC), Ki-67 ~95%. GATA3 and Pan-Cytokeratin was positive, confirming breast origin. Final staging (clinical/pathologic) was cT2N0M0. Patient was referred for neoadjuvant chemotherapy.

Case 2- 48-year-old, multiparous woman with irregular menstrual periods, no family history of carcinoma breast. Complained of left breast lump; occasional itching, no discharge or trauma.



Figure 2 (a): Ultrasound showing a $4.0 \times 3.2 \times 3.1$ cm hypoechoic solid mass corresponding to the palpable lump. The lesion was oval with mild lobulations in margin, parallel orientation, and mild posterior acoustic enhancement. No significant internal calcifications seen. Flow Doppler showed mild peripheral vascularity.

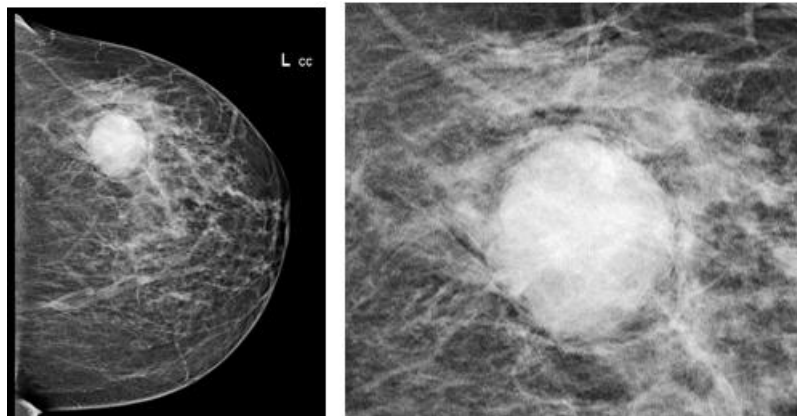


Figure 2 (b): Digital mammogram CC view of left breast showing a large irregular high-density mass at 2 o'clock position. Margins were partially obscured, with no suspicious microcalcifications.

Findings were discordant (BI-RADS 3 morphology on US but BIRADS 4C on mammography), biopsy was recommended. Ultrasound-guided core biopsy of the left breast mass was performed. Core biopsy pathology was Invasive ductal carcinoma, grade 2, triple-negative (ER/PR/HER2 all negative), Ki-67 ~60–70%. Stage was T2N0M0, suggesting further oncologic evaluation. Treatment plan was neoadjuvant chemotherapy.

3. Discussion and Conclusion

Triple-negative breast cancer (TNBC) often demonstrates imaging characteristics that differ from other invasive breast cancers. It may appear with features typically seen in benign tumors, including circumscribed margins, parallel orientation, and posterior acoustic enhancement (3) rather than the typical irregular margins and posterior shadowing seen in hormone receptor-positive tumors. Du et al (4) found that 82% of TNBCs had circumscribed margins on US. In another study by Karbasian et al, two-thirds of TNBCs exhibited parallel orientation, and one-third of them exhibited posterior acoustic enhancement. (5)

On Mammogram, TNBC often presents as high-density masses, with oval or round being their most common shape

(6-8) with circumscribed margins compared to other types of carcinoma breast that presents with irregular shape and spiculated margins. TNBC also often lacks suspicious calcifications. In a study by Yang et al (9), masses with indistinct margins, followed by those with circumscribed margins, were the most common mammographic features of TNBC.

On Ultrasound, TNBCs appear as masses with parallel orientation in two third of cases (5). They are typically markedly hypoechoic and may occasionally appear nearly anechoic or present as complex solid-cystic masses due to central necrosis. Posterior acoustic enhancement is another characteristic feature, reported in a substantial number of cases which indicate an internal fluid component, as in tumour necrosis, a feature frequently reported on pathological assessment of TNBC (10).

Owing to this combination of imaging findings including circumscribed margins, parallel orientation, marked hypoechogenicity, cystic change, and posterior enhancement, TNBC can mimic benign entities such as fibroadenoma, complicated cysts, or abscesses, posing a diagnostic challenge.

However certain sonographic findings including non-circumscribed or microlobulated margins, heterogeneous echotexture, marked hypoechogenicity, increased internal vascularity, and associated suspicious axillary lymph nodes should raise concern for malignancy. Correlation with clinical examination, mammography, and histopathological evaluation remains essential.

Recognition of these atypical imaging patterns is particularly important because TNBC is an aggressive molecular subtype associated with rapid growth, early recurrence, and poorer prognosis. Early biopsy of suspicious lesions, even when imaging appears relatively benign, facilitates timely diagnosis and initiation of appropriate treatment.

Current BI-RADS guidelines recommends that lesions with classic benign features (oval, circumscribed masses) may be given BI-RADS 3 (short-interval follow-up) rather than immediate biopsy. Yet our cases and literature suggest caution. Further MRI can aid when ultrasound or mammographic findings are inconclusive which shows post contrast rim enhancement and persistent enhancement on kinetic imaging (11,12) In young or high-risk patients with a new palpable mass, even benign-appearing findings warrant biopsy. Radiologists must maintain vigilance for any discordance between suspicious mammographic or clinical findings and benign sonological features.

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