

Pathological findings of suspicious axillary lymph nodes in patients with normal screening mammograms

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Authors: E. Lopez Uzquiza¹, A. Iturralde-Garriz², A. De Diego Diez²,
P. Alonso Bartolomé¹, E. Ortega García¹, P. Merino Rasillo¹;
¹Suances/ES, ²Santander/ES
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Aims and objectives

Axillary nodes occasionally may be detected on mediolateral oblique mammographic images and may present a diagnostic problem for the radiologist. While the most common cause is inflammation, infection or trauma of the breast, thoracic wall or arm, a significant proportion of cases are due to occult malignancy.

Because there has been little scientific research on mammographic axillary abnormalities, the only standard teaching has been that benign and malignant lymph nodes cannot usually be distinguished from each other mammographically.

Our purpose was to evaluate the pathological findings in patients who have suspicious axillary lymph nodes with an otherwise normal mammogram and also to investigate the usefulness and safety of the US-guided fine needle aspiration and/or core needle biopsy of these axillary lesions.

Methods and materials

From January 2005 to December 2012 a total of 57 patients out of 185.479 women (0.03%) from the Screening Program in Cantabria, Spain, were found to have suspicious axillary lymph nodes with an otherwise normal mammogram, that required an ultrasound evaluation and a fine needle aspiration (44 cases) and/or a core needle biopsy (20 cases).

All patients underwent ultrasound scanning of the axilla that was carried out with a lineal 7-12 Mhz transducer (MyLab 70XV, Esaote, Biomedica, Genoa, Italy).

The normal axillary node appear on the mammogram as a round or oval well-defined mass, isodense or hypodense compared with breast parenchyma, and containing a central area of hilar fat.

Lymph node cortical thickness and uniformity were the most important criteria for distinguishing between normal and abnormal nodes. Normal lymph nodes have a reniform shape, a uniformly hypoechoic cortex with a maximal thickness of 3 mm, smooth margins, and a central fatty hilum. Findings of cortical thickness in excess of 3 mm, eccentric thickening, irregular margins, and encroachment on or displacement of the fatty hilum are suggestive of a pathologic process.

All biopsies and fine needle aspirations were ultrasound-guided with a free hand approach.

Core needle biopsies were performed with an automated fourteen-gauge needle with a 22 mm throw (Acecut, TSK, Laboratory; Japan). A minimum of three biopsy samples were obtained with additional samples collected at the discretion of the radiologist.

Results

Histopathology and/or cytology of these 57 lymph nodes showed 11 malignant and 46 benign results. Of the malignant results, 6 were non-Hodgkin lymphomas and 5 were metastases from breast carcinoma. Of the 46 cases with a benign results, 2 were granulomatous lymphadenitis (one tuberculosis), 2 showed patterns of sinus histiocytosis ([Fig. 1](#) on page 6), 1 was a siliconoma and the other 41 benign results showed benign reactive lymph node hyperplasia ([Table 1](#) on page 6).

The largest category (71.9%) seen was nonspecific benign reactive lymphadenopathy; this category included all of the clinically or pathologically benign cases in which no causative agent could be identified. It is caused by inflammation of the lymph nodes or the adjacent organs, such as the breast or lung. Collagen vascular disorders, also cause nodal hyperplasia. On mammography, nodal hyperplasia shows increased density that cannot be distinguished from lymphoma or metastatic lymphadenopathy ([Fig. 2](#) on page 7).

Tuberculous lymphadenitis is a common cause of benign peripheral lymphadenopathy, especially in our environment with a prevalence between 15-20 % of the population of Cantabria affected by tuberculosis. Typically, the presence of enlarged, mammographically dense, and sonographically hypoechoic axillary nodes containing coarse internal calcifications suggests the diagnosis. Tuberculous lymphadenitis commonly has ragged indistinct borders because of periadenitis and surrounding soft tissue edema ([Fig. 3](#) on page 8 [Fig. 4](#) on page 9).

The siliconoma represents an inflammatory mass caused by foreign body reaction to silicone gel. We usually find it at the edge of the implant or in the axilla but it can occur wherever silicone migrates (lymph nodes, arm, abdominal wall, back, groin, etc).

Mammographic findings consist on a dense, circumscribed round mass with or without rim calcifications and sonographically it sometimes presents as "snowstorm" (mass of echogenic noise on US due to acoustic scattering with distal margin not visible) ([Fig. 5](#) on page 10).

Non-Hodgkin lymphomas and metastatic breast cancer were the second and third most frequent causes for lymphadenopathy, 10.5% and 8.8% respectively.

On mammography, lymphoma shows well-defined, markedly enlarged, and homogeneously hyperdense lymph nodes ([Fig. 6](#) on page 10). On ultrasound, we can see both, markedly hypoechoic/pseudocystic appearance of the nodes and a heterogeneous micronodular pattern. Lymphomatous nodes are likely to show mixed vascularity (peripheral and hilar) ([Fig. 7](#) on page 11).

Metastatic lymphadenopathy is nonspecific at imaging, especially when

the metastases is early and small. Although malignant lymph nodes usually have circumscribed borders on mammography, ill-defined or spiculated borders may be seen in cases with extranodal spread. Rarely, tumoral calcifications can be identified within metastatic lymph nodes. On ultrasound, metastatic nodes are characterized by a more spherical shape and more frequent hilar loss and necrotic center than lymphoma or tuberculous lymphadenitis. Metastatic nodes tend to have peripheral or mixed (both peripheral and hilar) vascularity on Doppler ultrasound ([Fig. 8](#) on page 12 [Fig. 9](#) on page 13).

Images for this section:

57 Suspicious Lymph Nodes	
46 Benign	11 Malignant
2 Granulomatous lymphadenitis (1 Tuberculosis)	6 Non Hodgkin Lymphomas
2 Sinus Histiocytosis	
1 Siliconoma	5 Metastases from breast carcinoma
41 Benign reactive lymph node hyperplasia	

Table 1: Histopathologic/ cytologic results of large needle core biopsies/fine needle aspiration of axilla lesions.

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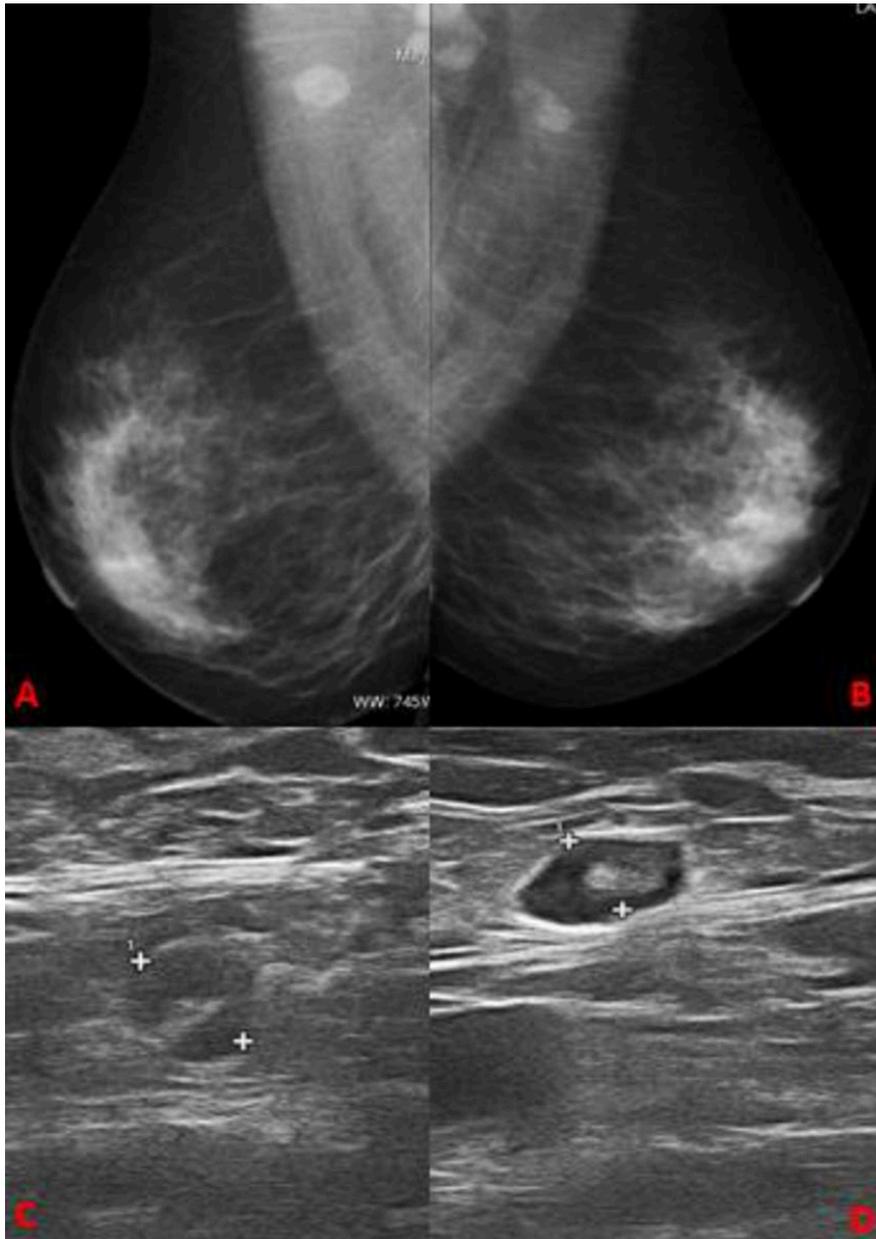


Fig. 1: Bilateral MLO (mediolateral oblique) (A/B) mammograms in this 56-year-old woman with a palpable node in the right axilla, show no pathologic findings in the breast but bilateral dense adenopathies are seen. The US (ultrasound) of both axillas demonstrated adenopathies with the normal hilar fat. The FNAB (fine needle aspiration biopsy) showed findings consistent of sinus histiocytosis.

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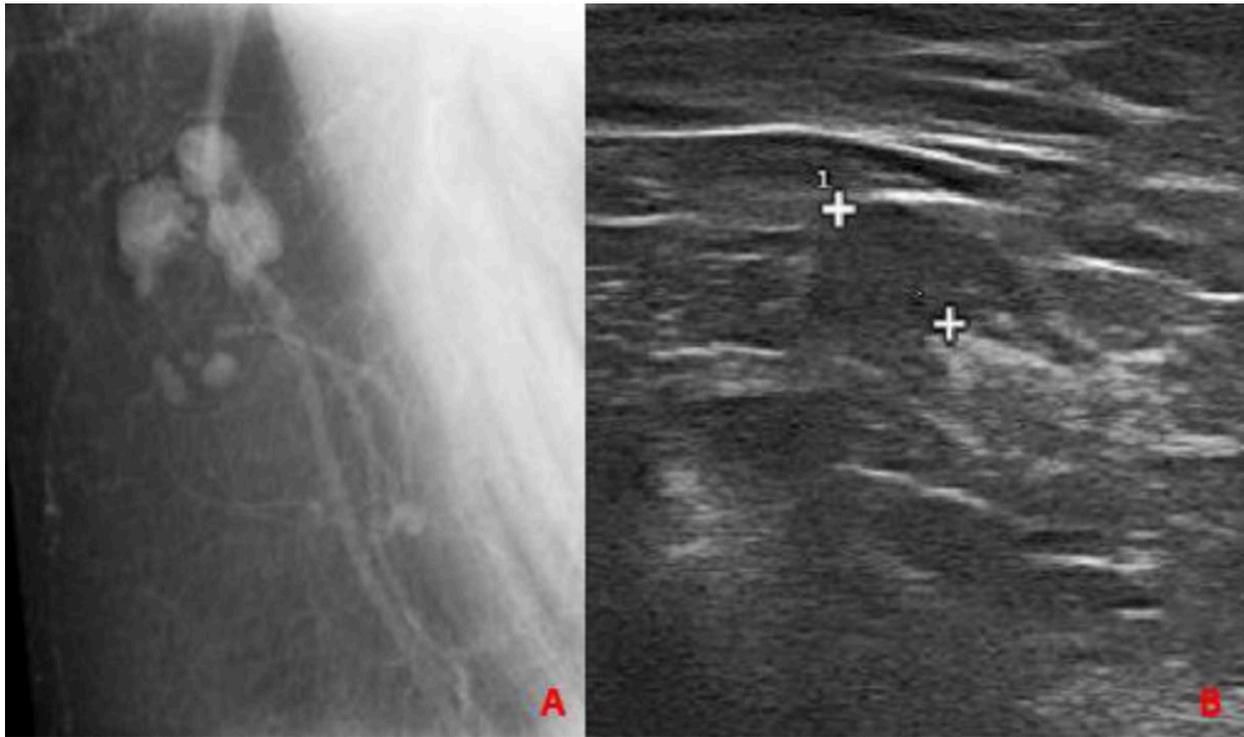


Fig. 2: This magnified mammogram (A) in an asymptomatic 40-year-old woman, shows at least three round, dense adenopathies in the right axilla. In the US (B), some of the adenopathies showed cortical thickness about 7 mm. A FNAB was performed and the result was benign reactive lymphadenopathy.

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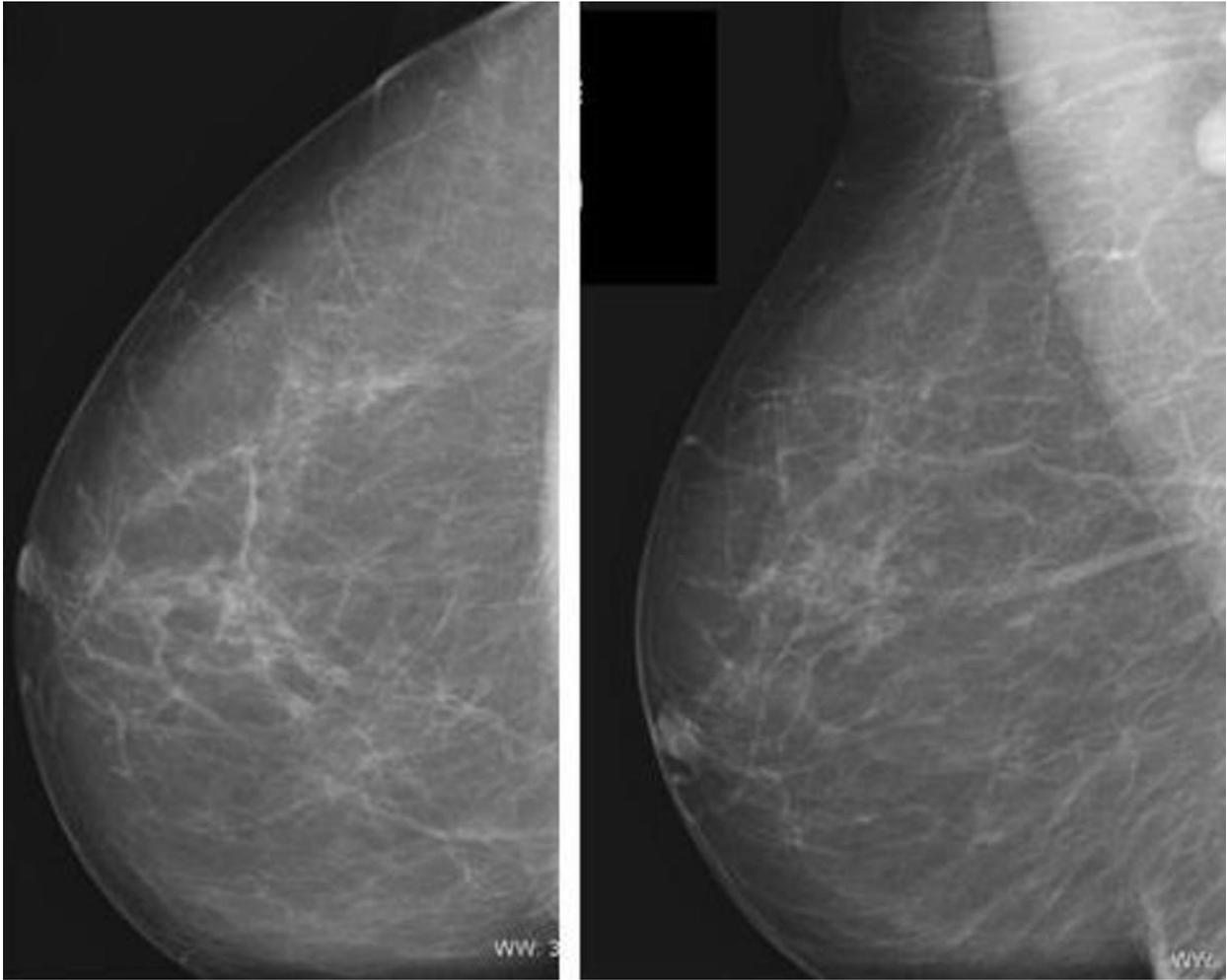


Fig. 3: CC/MLO (cranio-caudal and mediolateral oblique) mammograms of the right breast in an asymptomatic 59-year-old woman show some dense axillary nodes.

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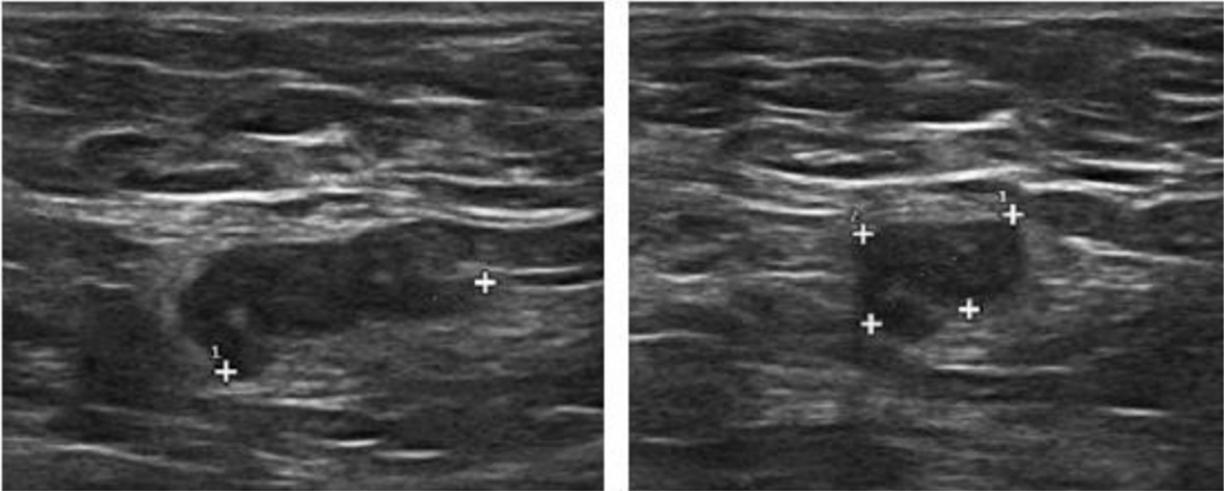


Fig. 4: US of the right axilla demonstrated an oval, hypoechoic node. US-guided FNAB (fine needle aspiration biopsy) showed tuberculosis.

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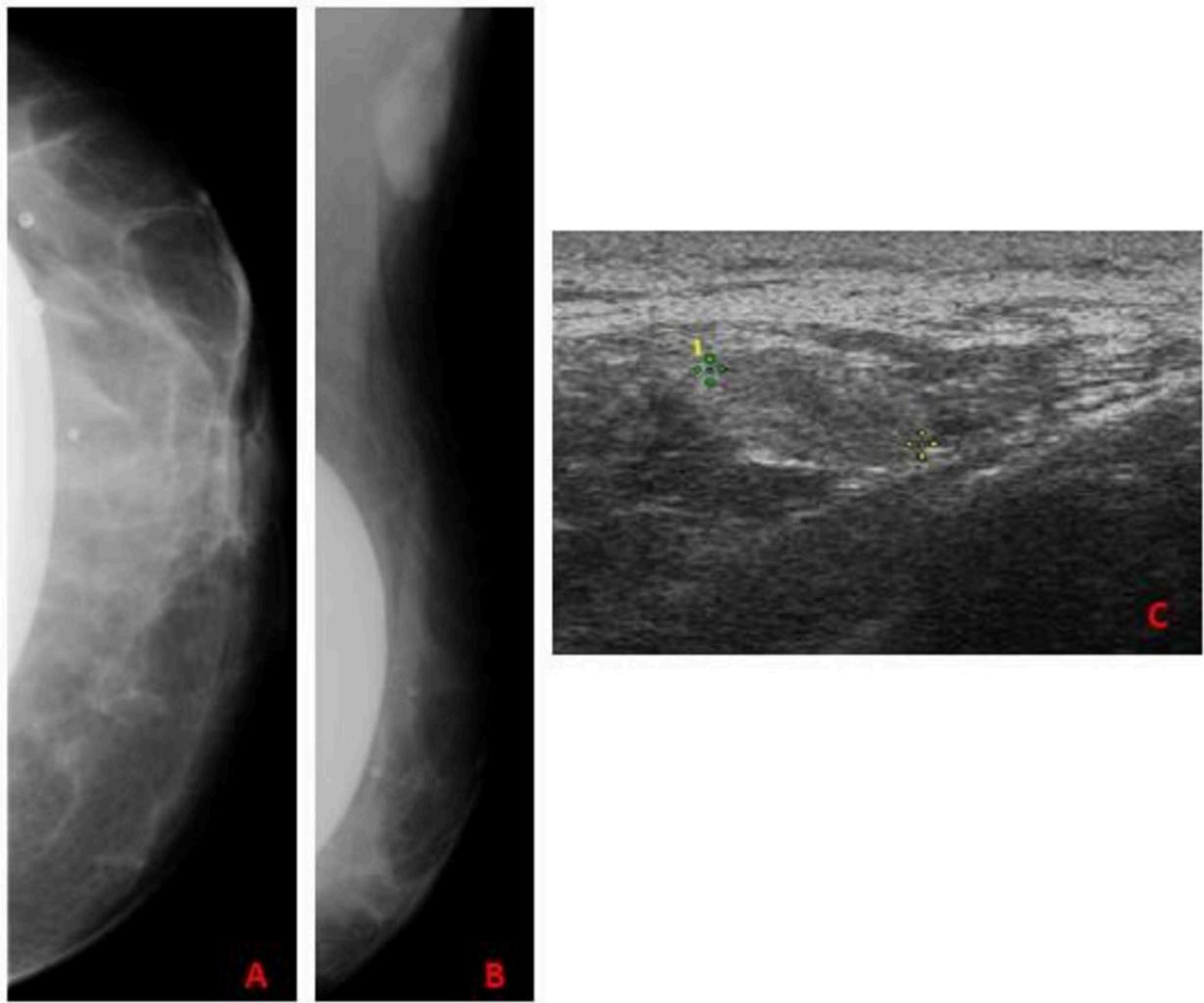


Fig. 5: CC/MLO mammograms (A/B) from a 54-year-old woman with subpectoral silicone implants and a palpable lump in the left axilla show a lobulated dense mass. The US (c) confirmed an echogenic mass. A FNAB was performed without concluding result. The imaging findings are consistent with siliconoma.

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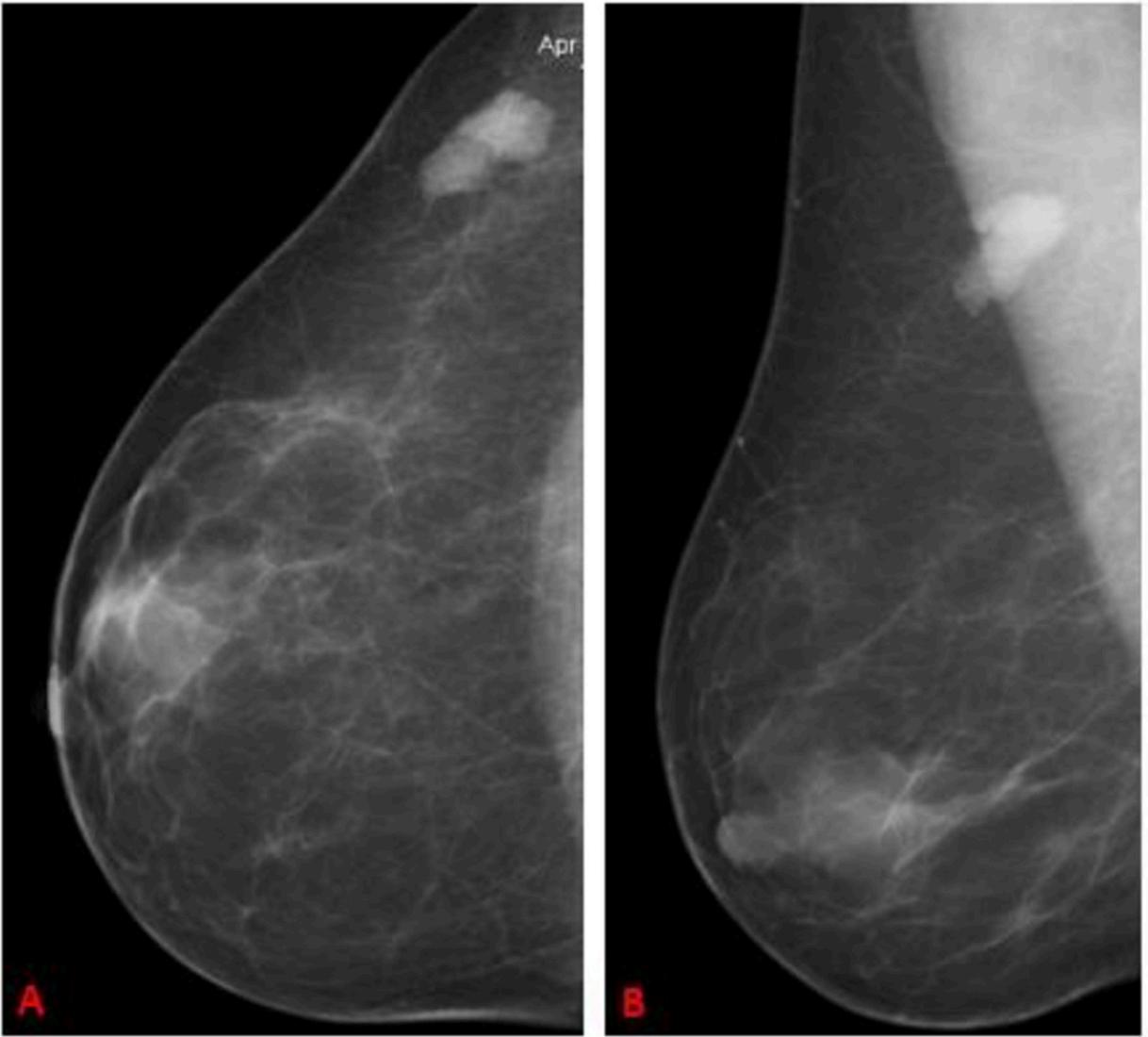


Fig. 6: CC/MLO (craneo caudal/mediolateral oblique) (A/B) mammograms of the right breast in an asymptomatic 49-year-old woman show a large, dense axillary node.

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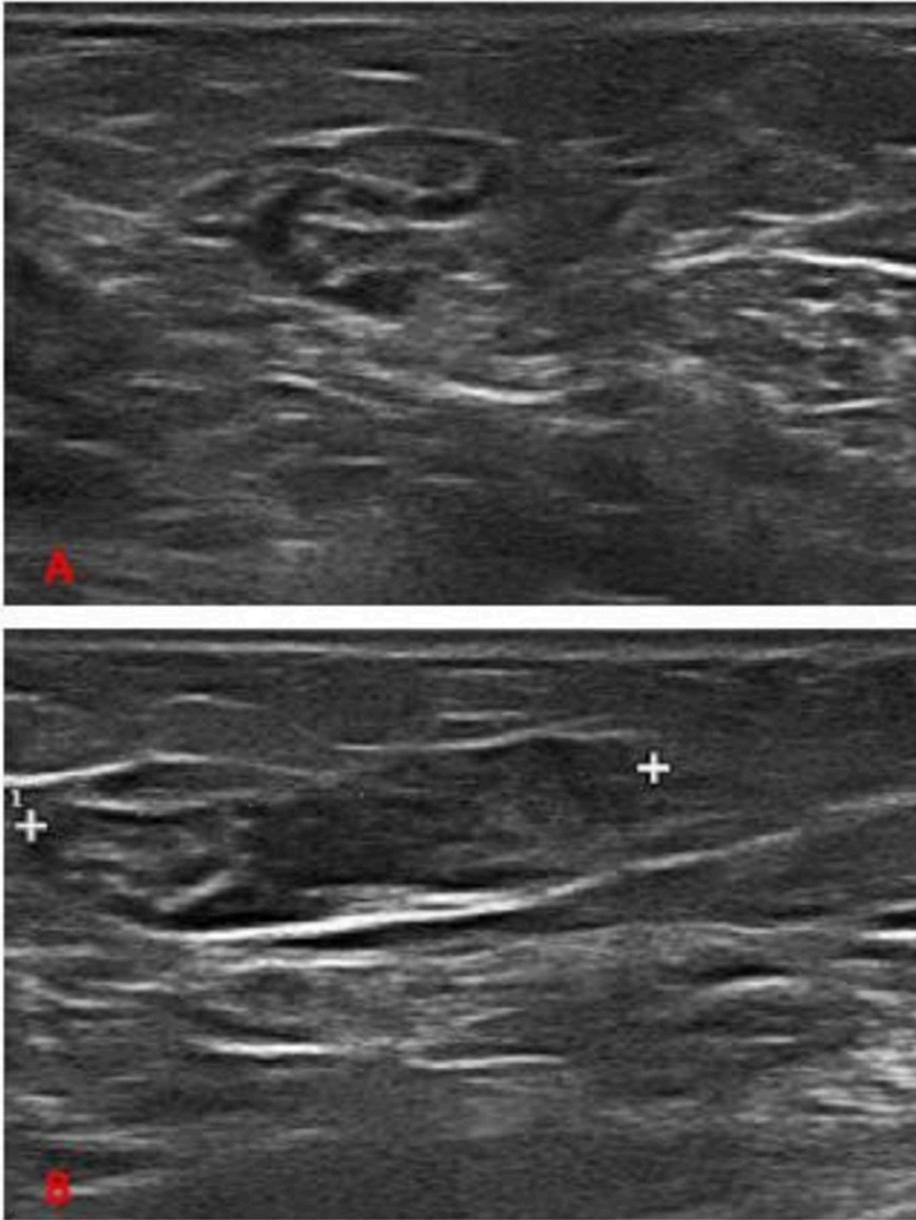


Fig. 7: US (ultrasound) in the same woman shows suspicious right axillary node with cortical thickening. Non-Hodgkin lymphoma was proven on US-guided core biopsy.

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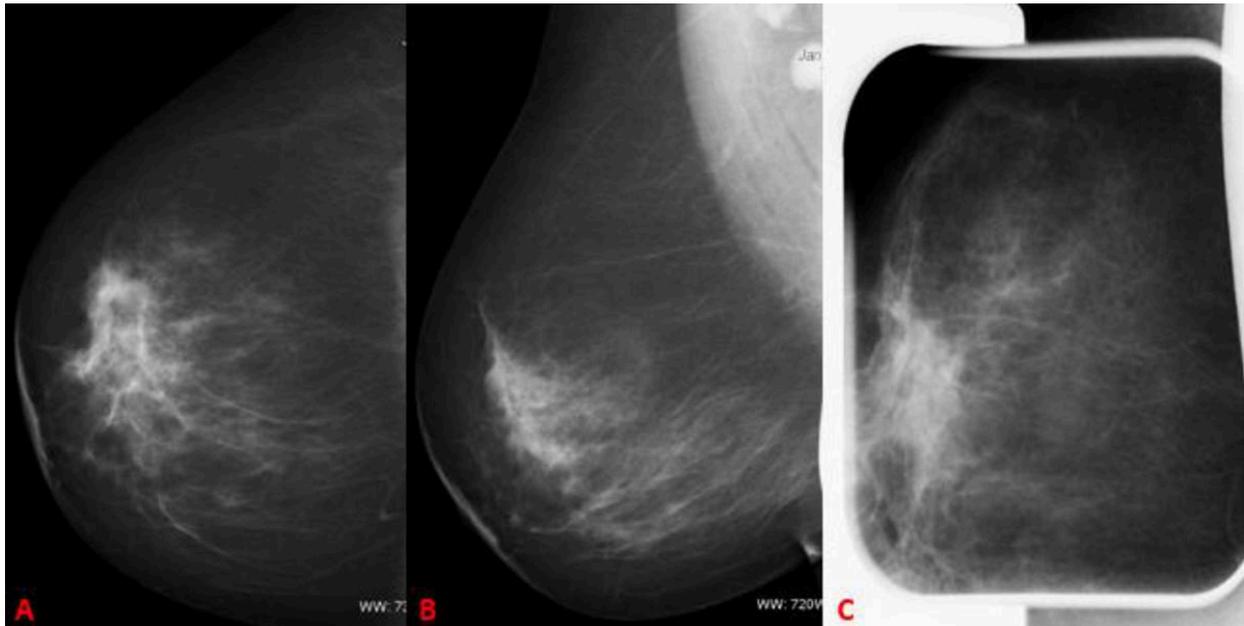


Fig. 8: CC/MLO mammograms (A/B) in a 51-year-old woman with a palpable node in the right axilla, show at least two round, dense axillary adenopathies and a tissue asymmetry between the upper quadrants of the right breast, best seen at the magnification view (C).

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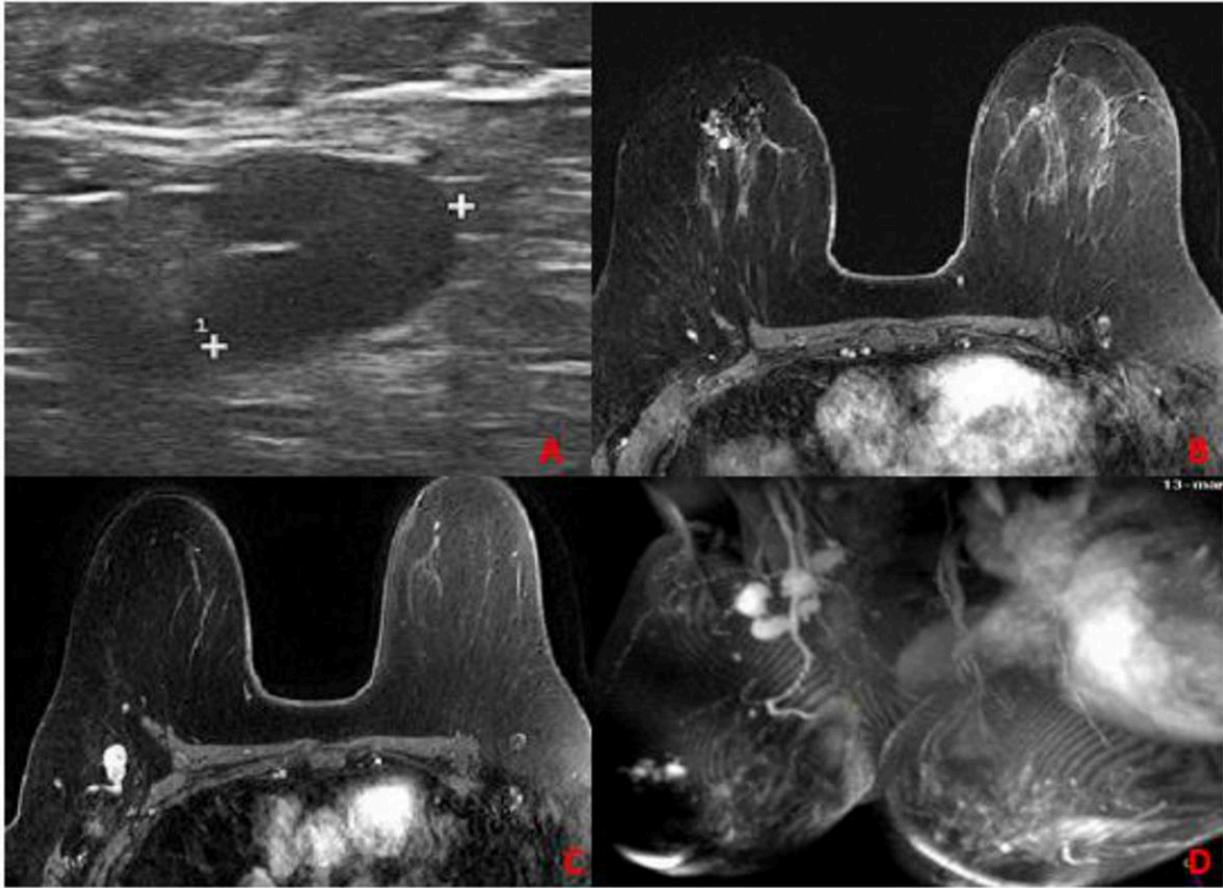


Fig. 9: Targeted US in the same patient (A) shows multiple rounded, nearly anechoic nodes with loss of fatty hilia. US-guided fine needle aspiration confirmed metastatic breast cancer. Whole breast US showed suspicious hypoechoic ill-defined areas between the upper quadrants of the breast. MR was performed to identify the occult primary. Multiple small nodules were found in the retroareolar area (B) which showed pathologic enhancing, consistent with the primary invasive cancer. The matted metastatic nodes were well seen (C, D).

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Conclusion

The percutaneous image-guided core biopsy or fine needle aspiration increasingly becomes an alternative to a surgical biopsy for the histologic assessment of breast lesions and lymph nodes. Especially, the ultrasound-guided procedure is safe, fast and accurate. Other advantages include its lack of ionizing radiation and the accessibility of all areas of the breast when the lesion is sonographically evident. For those reasons we consider that patients with suspicious axillary lymph nodes and a normal screening mammogram require further evaluation with ultrasound and fine needle aspiration and/or core needle biopsy as significant pathology must be ruled out.

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