Case Presentation:

A 42-year-old premenopausal woman presented for a baseline screening mammogram. She had no significant past medical history. Her social history revealed prior intravenous drug abuse, multiple sexual partners, treated sexually transmitted diseases, and multiple right upper extremity decorative tattoos obtained approximately 6 years prior to her presentation for screening mammography. She denied weight loss, foreign travel, fever, or night sweats. She denied inflammatory or skin diseases. She had no palpable axillary adenopathy on physical exam.

Her screening mammogram demonstrated radiopaque densities in the right axillary lymph node region, only seen on the MLO view (Fig. A). No other suspicious calcifications, masses or areas of architectural distortion were identified in either breast. The left axilla was unremarkable. Subsequent spot compression views of the bilateral axillae demonstrated the morphology of the intranodal radiodensities in the cortex of a single right axillary lymph node (Fig. B). The remaining lymph nodes were normal in appearance. Ultrasound evaluation of the right axilla revealed a normal sized lymph node with normal morphology, preservation of the fatty hilum, and thin symmetric cortex (Fig. C). Subtle echogenic densities were seen within the cortex of this lymph node. Ultrasound-guided core needle biopsy was performed to exclude occult metastatic malignancy. A specimen radiograph (Fig. D) was immediately obtained to confirm the retrieval of the densities.
Key imaging findings

Radiopaque densities within axillary lymph node on baseline mammogram

Differential diagnoses

Occult metastatic breast carcinoma
Extramammary metastasis (e.g. ovarian or thyroid malignancy)
Granulomatous diseases (e.g. histoplasmosis, tuberculosis, or sarcoid)
Gold salt deposits
Foreign bodies (i.e. tattoo pigment, talcum)
Clumped deodorant in skin crevices

Discussion

The initial detection of intranodal axillary densities on a screening mammogram warrants further work up to exclude occult metastatic disease from mammary or extramammary malignancy, especially in the absence of a benign etiology.

Intranodal coarse, dense calcifications are usually benign and are most often associated with granulomatous disease or fat necrosis. However, intranodal microcalcifications have been reported in a number of additional disease processes, both malignant and benign.

Metastatic primary breast cancer is the most common malignancy associated with axillary lymph node calcifications. Amorphous, peripherally located calcifications have also been reported in metastatic ovarian papillary carcinoma secondary to the production of psammoma bodies. Treatment-related punctate calcific densities have been reported in patients with long standing history of gold intramuscular injections for the treatment of rheumatoid arthritis. Talcum accumulation in lymph nodes, which may resemble coarse heterogeneous calcifications, has been documented in intravenous and inhalation drug abusers.

Imaging features suggestive of metastatic disease within lymph nodes include loss of fatty hilum, loss of the reniform or oval shape, ill-defined margins, increase in size, or increase in density when compared to prior mammograms. In addition to the imaging characteristics, physical examination and clinical history may help guide appropriate work-up and management.

Tattoos are applied by repetitive needle puncture accompanied by the intradermal injection of metallic pigment. This initiates an inflammatory response and leads to the phagocytosis of some of the metallic fragments, which subsequently slowly migrate to lymph nodes via lymphatic channels. Various metals including titanium, aluminum and iron are used in mixing the over 30 pigments commercially available. These fragments create a set of heterogeneous densities which mimic calcifications and introduce a rarely encountered dilemma to a radiologist who may not be aware of this imaging finding. Unfortunately, it is impossible to differentiate tattoo pigment associated radiodensities from other worrisome sources given the varying appearance produced by the types of pigments and their metallic contents. A case report published in 2004 by Honegger et al. demonstrated coarse heterogeneous calcifications almost entirely replacing the nodal parenchyma, while in this case the densities were confined to the nodal cortex and appeared amorphous and dystrophic.

Pathologists and dermatologists encounter a similar dilemma in evaluating patients with a history of melanoma as these tattoo pigments mimic metastatic melanoma on histology slides and gross specimens. Close and thorough histopathological examination of slides is crucial in excluding metastatic melanoma, as the coexistence of metastatic melanoma and tattoo pigment has been reported.
Diagnosis

Tattoo pigment in a benign lymph node

Summary

When intranodal calcific appearing densities are encountered on mammography, the radiologist should be aware of the differential diagnoses associated with such findings, including occult breast or extramammary malignancy. Closely examining the morphology and the distribution of the radiodensities may help in delineating benign from pathologic etiologies. Obtaining a past medical history and examining the patient for upper extremity, breast or shoulder tattoos will aid in narrowing the differential diagnoses; however, biopsy is often necessary to exclude malignancy given the overlap in mammographic and ultrasonographic appearance of normal and pathologic lymph nodes as well as the non-specific presentation of the tattoo pigment radiodensities.

References