Percutaneous tattoo pigment simulating calcific deposits in axillary lymph nodes

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The isolated finding of calcific deposits within axillary lymph nodes on mammography suggests a broad range of differential diagnoses, from benign causes such as granulomatous reaction secondary to previous histoplasmosis infection to malignancies such as breast cancer and metastatic disease from extramammary primary malignancies. Therefore, the isolated finding of intranodal calcium may warrant biopsy for a definitive diagnosis when a benign etiology is not apparent. We present a patient with isolated axillary lymph node densities on mammography and chest computed tomography, which were subsequently proven to represent deposition of tattoo pigment.

CASE DESCRIPTION

A 30-year-old woman presented for a diagnostic mammogram with a palpable lump in her right breast. She was 9 weeks postpartum and otherwise healthy. In the palpable region of concern, prominent lactational changes were seen without any apparent mammographic abnormality. Normal-sized bilateral axillary lymph nodes with punctate hyperdensities were identified, simulating the appearance of intranodal calcium (*Figure 1*). A chest computed tomography (CT) scan confirmed hyperdense foci within bilateral axillary lymph nodes (*Figure 2*). The patient underwent left axillary lymph node excisional biopsy. Histology demonstrated subcapsular and paracortical deposits of dark-colored pigment and multiple histiocytes containing internal black pigment granules (*Figure 3*). There was no evidence of malignancy. Although no tattoos were present on her anterior chest, many multicolor tattoos were present on her back (*Figure 4*).

DISCUSSION

Dermal tattooing provokes predictable body responses, including initial sloughing of the overlying epidermis, variable dermal inflammation, and gradual assimilation of pigment into macrophages. Much of the pigment is eventually carried into regional draining lymph nodes (1). The composition of tattoo pigments is highly variable, but most consist of various metallic ions including aluminum and titanium (2). If sufficient quantities of pigment reach lymph nodes, punctate hyperdensities mimicking intranodal calcific deposits can be seen radiographically.

Figure 1. Right and left mediolateral views from a diagnostic mammogram show punctate densities simulating calcific deposits in bilateral axillary lymph nodes (arrows).

The differential diagnosis of axillary lymph node calcific deposits includes both benign and malignant etiologies. Benign causes include prior granulomatous disease, most commonly histoplasmosis, which typically demonstrates a more coarse appearance (3). Fat necrosis is an additional cause of calcified lymph nodes (4, 5). Gold deposits can mimic intranodal axillary calcific deposits on mammography in patients with rheumatoid arthritis who have undergone chrysotherapy treatment (6). Of the malignant causes, breast cancer is the most common. Malignant axillary nodal calcium can occur with an ipsilateral occult breast cancer and can be seen in the absence of any suspicious calcific deposits in the breast parenchyma (7).

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Figure 2. Contrast-enhanced chest CT. **(a)** Axial image demonstrates small hyperdense foci within the bilateral axillary lymph nodes (arrows). **(b)** and **(c)** Magnified images show intranodal hyperdense foci without discrete calcific deposits (arrows).

Figure 4. Patient's tattoo covering most of her back.

Figure 3. Axillary lymph node at **(a)** low power, showing extensive deposition of dark-colored pigment, and **(b)** high power, showing multiple histiocytes containing dark pigment granules.

Axillary lymph node calcium due to metastatic ovarian cancer and papillary thyroid carcinoma has also been reported (8, 9). Lymph node calcific deposits may also be seen in the setting of treated lymphoma (4, 5). The broad differential diagnosis of axillary intranodal calcific deposits seen on radiologic examinations emphasizes the importance of histologic examination when a benign etiology is not apparent.

An additional clinical situation where intranodal tattoo pigment is an important diagnostic consideration is with sentinel lymph nodes of melanoma patients. Intraoperatively, a darkly pigmented lymph node is concerning for metastatic disease but may represent a draining lymph node containing tattoo pigment if a dermal tattoo is present in the area of the primary melanoma (10). Histologic examination is warranted for definitive diagnosis.

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