CASE REPORT

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Axillary Lymph Node Calcifications due to Tattoo Pigment: A Radiologic-Pathologic Correlation

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ABSTRACT

Tattoo pigment may migrate to regional lymph nodes and appear as dense deposits and/or calcifications, mimicking malignant axillary findings on breast imaging. We report a breast imaging case with apparent axillary lymph node calcifications detected on mammography and ultrasound, in which image-guided sampling and histopathology demonstrated tattoo pigment-related deposits without malignancy. Awareness of this benign mimic, combined with careful correlation with the clinical history and multimodality imaging, can prevent unnecessary escalation of care. Additionally, confirming imaging-pathology concordance supports accurate diagnosis and helps avoid overtreatment.

Keywords: Tattoo; axillary lymph node; calcifications; breast imaging

KEY POINTS

- Tattoo pigment migration can mimic calcifications in axillary lymph nodes, potentially simulating malignant disease on breast imaging.
- Careful correlation of imaging features with clinical history and pathology, when required, helps to avoid unnecessary invasive procedures.
- Awareness of this benign mimic is important to prevent overtreatment and patient anxiety.

Introduction

Axillary lymph node calcifications are uncommon findings on mammography and ultrasound, with a differential diagnosis that includes both benign and malignant conditions. In recent decades, the migration of tattoo pigments to regional lymph nodes has been increasingly recognized as a potential diagnostic pitfall, particularly in light of the rising prevalence of both tattoos and breast cancer screening. The first case report describing tattoo pigment mimicking mammographic calcifications was published by Honegger et al. (1) in 2004, and since then, several additional reports have documented similar findings, underscoring the challenge of distinguishing pigment deposits from true pathology (2-5). These deposits can closely resemble calcifications and, in some cases, may be mistaken for metastatic disease, creating significant diagnostic difficulties.

The aim of this case report is to raise awareness of this imaging pitfall and to emphasize the importance of correlating radiological findings with clinical history to avoid misdiagnosis

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and unnecessary interventions, such as biopsies. However, when clinical and radiological findings are inconclusive, histological examination may be required for a definitive diagnosis.

Case Presentation

A 50-year-old woman attended routine screening mammography. Images demonstrated hyperdense foci, simulating coarse heterogeneous calcifications, within two right axillary lymph nodes (Figure 1), which had otherwise normal size and morphology. No suspicious findings were observed in either breast. The patient was recalled for ultrasound, which confirmed the presence of echogenic foci within two lymph nodes of preserved morphology, including an intact fatty hilum and cortical thickness less than 3 mm (Figure 2). Given the absence of breast abnormalities, a contrast-enhanced breast magnetic resonance imaging (MRI) was performed to rule out occult disease. MRI revealed no suspicious breast lesions and showed magnetic susceptibility artifacts inside two right lymph nodes (Figure 3). Despite this, an ultrasound-guided core-needle biopsy was performed to exclude malignancy or extramammary metastasis (Figure 4). Radiography of the biopsy specimen confirmed the retrieval of dense material (Figure 5). Histopathology demonstrated lymphoid tissue containing greenish-black pigment deposits, with no evidence of carcinoma or calcifications (Figures 6, 7). On further clinical questioning, the patient reported a tattoo on the right arm (Figure 8), within the drainage territory of the axillary lymph nodes. Written informed consent was obtained from the patient for publication of this case and accompanying images.

Figure 1. Digital screening mammogram shows hyperdense foci in two right axillary lymph nodes (arrows) simulating calcifications. The breast parenchyma shows no abnormalities, despite the breast being categorized by breast composition c (heterogeneously dense). Technique: Synthesized 2-dimensional mammogram (mediolateral oblique views)

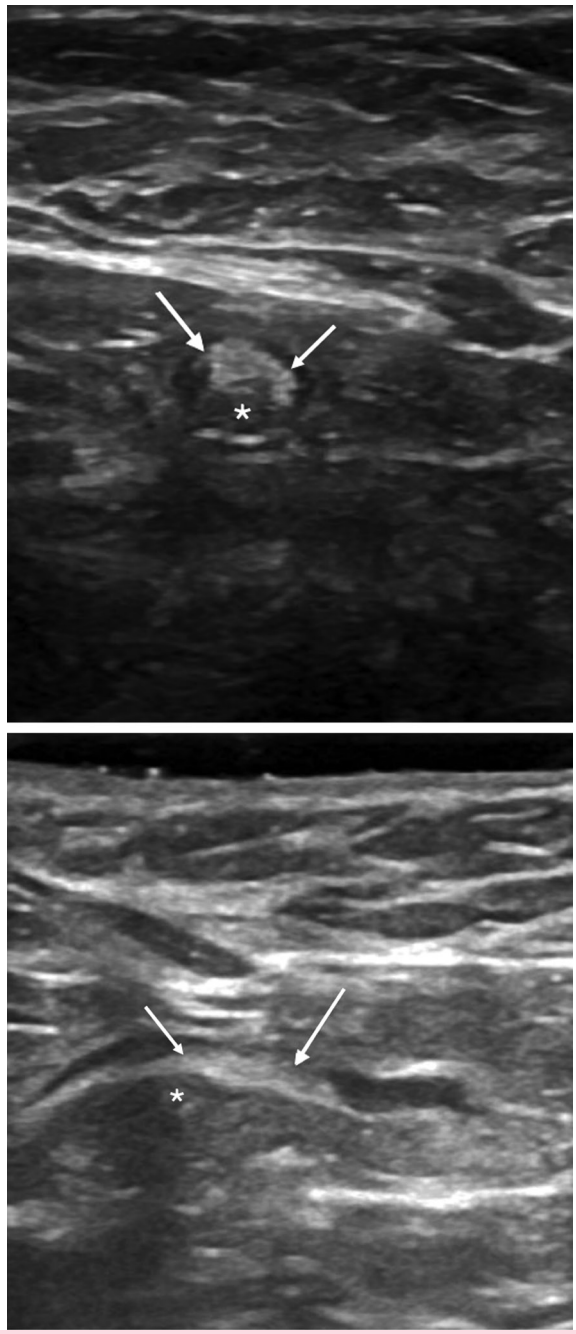

Figure 2. Right axillary ultrasound confirms the presence of apparent calcifications in two axillary lymph nodes (arrows). They have oval shape with a preserved fatty hilum (asterisks) and cortical thickness less than 3 mm. Technique: High frequency linear probe ultrasound, 14 MHz

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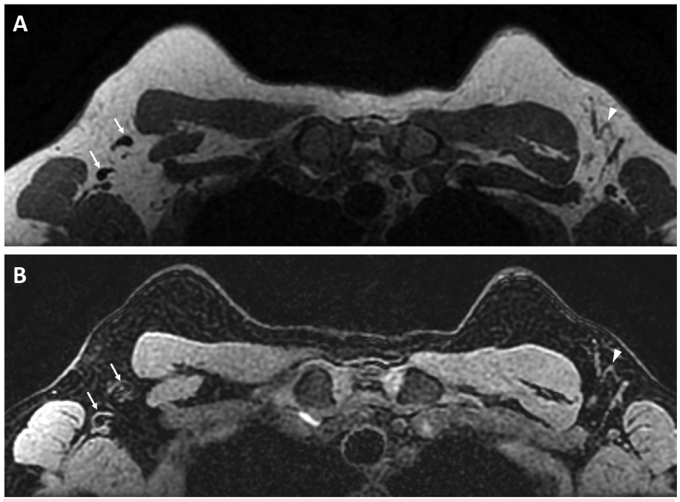

Figure 3. (A) Axial T1-weighted and (B) T1-weighted fat-suppressed magnetic resonance images show magnetic susceptibility artifacts within two right lymph nodes (arrows), which are not observed in the contralateral nodes (arrowhead). No abnormalities were found in the breast parenchyma. Technique: Bilateral breast magnetic resonance imaging (axial) using a 1.5T magnet

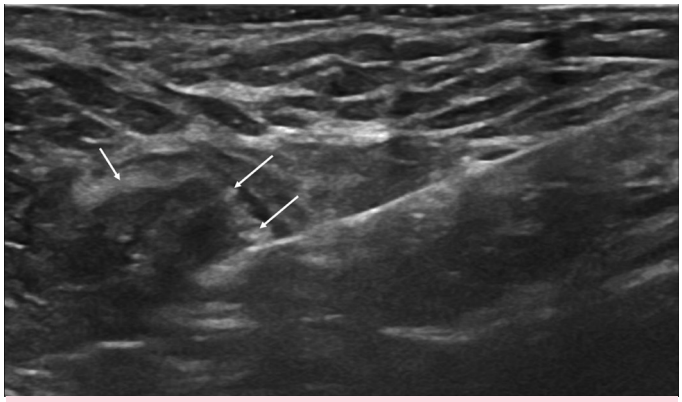

Figure 4. An ultrasound-guided core-needle biopsy was performed. The image depicts the needle passing through the cortex. Notice the hyperechogenic foci within it, corresponding to the apparent calcifications (arrows). Technique: High frequency linear probe ultrasound, 14 MHz

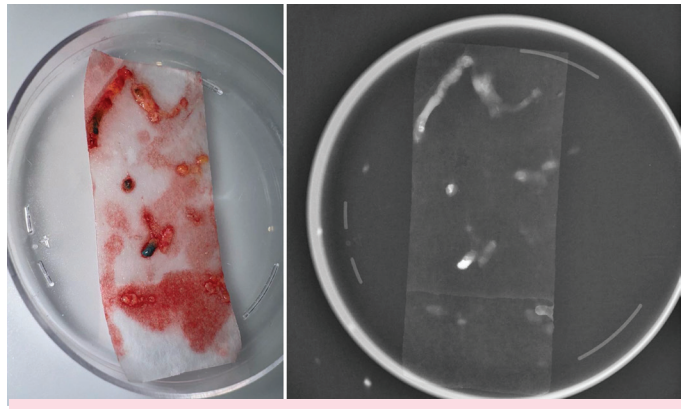

Figure 5. Photograph of the core-needle biopsy specimen with X-ray correlation. Note the darkest areas (due to ink), which correspond to regions of calcification density

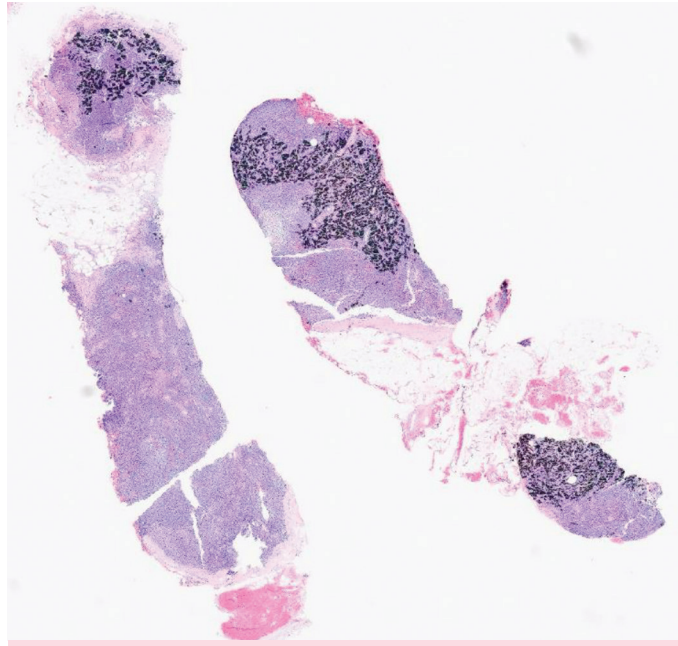

Figure 6. Two lymph node cylinders are observed with blackish areas suggestive of ink marking. Technique: Hematoxylin-eosin stain

Discussion and Conclusion

The presence of calcifications in the axillary lymph nodes is an unusual finding. The deposition of tattoo ink within axillary lymph nodes may mimic calcifications, as the color pigments are commonly mixed with or derived from various heavy metal oxides (6). The most widely accepted theory regarding its etiopathogenesis is that repeated intradermal injection of ink during tattooing initiates an inflammatory response driven by macrophages. These macrophages phagocytose some of the metal fragments, which are then slowly transported to the axillary lymph nodes via lymphatic vessels, where they remain for years (7). The accumulation of tattoo pigment in lymph nodes can also resemble the appearance of blue dye used for sentinel node identification, which may result in unnecessary removal of additional axillary nodes (8).

On mammography, tattoo ink deposits are usually seen as foci of calcification density within the lymph node, which may mimic true calcifications. These deposits may sometimes appear as punctate (5), coarse heterogeneous (2), which was similar to the findings in the presented case, or amorphous (3, 4) calcifications on imaging,

all of which can raise suspicion of malignancy, especially in the case of a personal history of breast cancer (4) or if the lymph node shows other concerning signs, such as enlargement (1). Mammographic features suggestive of abnormal axillary lymph nodes include loss of the fatty hilum, a round rather than oval morphology, poorly defined margins, and increased size or density compared to previous imagind studies (1, 9). However, in most reported cases, lymph nodes with tattoo ink deposits have maintained normal size and morphology (3, 4).

These ink deposits can also be seen on ultrasound, usually as echogenic foci suggestive of calcifications (1). Sonography allows a better assessment of the lymph nodes. In breast cancer, axillary lymph nodes are commonly classified based on cortical morphologic features. The identification of asymmetric focal hypoechoic cortical lobulation or a completely hypoechoic lymph node should prompt cytological or histopathological evaluation (10).

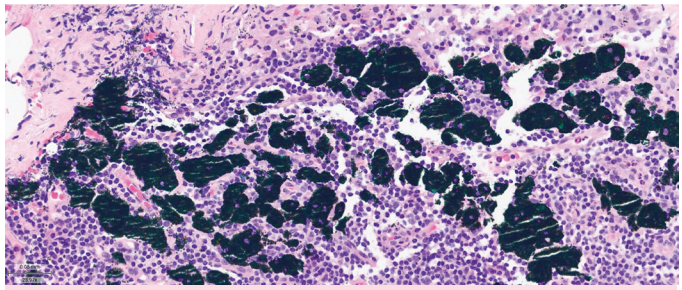

Figure 7. At higher magnification, dark greenish pigment is seen trapped within cellular components in the lymph node tissue. Technique: Hematoxylin-eosin stain

Figure 8. Photograph of the patient's arm tattoo

There are other etiologies that can cause calcified lymphadenopathies, both benign and malignant. The benign causes include, for example, tuberculosis, sarcoidosis, histoplasmosis and prior Bacillus Calmette-Guerin vaccination. These granulomatous calcifications typically exhibit a coarse appearance (5, 11). Long-term chrysotherapy, which involves the administration of gold salts for the treatment of rheumatoid arthritis, can result in their accumulation in the lymph nodes, potentially simulating calcifications. This deposition may persist for up to 20 years after discontinuation of therapy (5, 12). A similar phenomenon occurs with certain drugs, such as cocaine, due to talc deposition. Another benign etiology to consider is fat necrosis, especially when calcifications are located in the axillary tail and the patient has a history of prior trauma (13). Talc powder from certain deodorants may also mimic calcified lymph nodes on mammography, particularly when the calcifications are bilateral (3).

The most common malignant cause of axillary lymph node calcifications is metastasis from breast carcinoma (5, 14). These calcifications are usually unilateral and present as pleomorphic and/or amorphous microcalcifications, similar to those seen in breast cancer lesions, in contrast to the coarse and large calcifications commonly associated with benign processes (14). In cases of occult carcinoma, however, axillary calcifications may be more difficult to differentiate.

Non-breast neoplasms that can occasionally cause calcified adenopathy in the axilla (often bilaterally) include those that produce mucin, such as ovarian serous-papillary adenocarcinoma (4,9), mucinous adenocarcinoma of the colon and papillary thyroid carcinoma. These calcifications typically appear amorphous and peripheral, due to the presence of psammoma bodies (9). In addition, patients with lymphoma undergoing treatment (either chemotherapy or radiotherapy) may exhibit calcification of axillary lymphadenopathy, which, in this context, is associated with a favorable therapeutic response (5, 15).

Both clinical history and physical examination, together with imaging findings, are essential for narrowing the differential diagnoses. In cases of suspicious calcifications in axillary lymph nodes and negative results on conventional imaging (mammography/ultrasound), contrast-enhanced breast MRI may be performed to identify an occult primary tumor (16). In patients where benign status can be confidently established, unnecessary biopsies can be avoided. Nevertheless, if tissue sampling is performed, accurate clinical and radiologic-pathologic correlations are required.

In summary, the presented case report described an uncommon mammographic finding of calcification in axillary lymph nodes resulting from migration and deposition of pigment after

tattooing. This condition, likely unfamiliar to most radiologists, should be considered in the differential diagnosis to avoid unnecessary escalation of care.

Ethics

Informed Consent: Written informed consent was obtained from the patient for publication of this case and accompanying images.

Footnotes

Authorship Contributions

Surgical and Medical Practices: M.P., M.G., R.A.; Concept: M.L-H., M.P., R.A.; Design: M.L-H., M.P.; Data Collection or Processing: M.L-H., M.G., D.L-S., R.A.; Analysis or Interpretation: M.L-H., M.P., M.G., D.L-S., R.A.; Literature Search: M.L-H., R.A.; Writing: M.L-H., M.P., R.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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References

1. Honegger MM, Hesseltine SM, Gross JD, Singer C, Cohen JM. Tattoo pigment mimicking axillary lymph node calcifications on mammography. AJR Am J Roentgenol. 2004; 183: 831-832. (PMID: 15333377) [Crossref]
2. Paul Litton T, Vijay Ghate S. Tattoo pigment mimicking axillary lymph node calcifications on mammography. Radiol Case Rep. Elsevier Inc; 2020; 15: 1194-1196. [Crossref]
3. Heaney RM, Sweeney L, Smith C, O'Brien A. Much 'tattoo' about nothing; tattoo pigment mimicking breast microcalcifications on mammography. Radiol Case Rep. 2021; 16: 1833-1835. (PMID: 34040686) [Crossref]
4. Aguillar VLN, Tucunduva TCM, Carvalho FM, Mazucato MB, Viana MP, Torres US, et al. Tattoo pigment mimicking calcifications in axillary lymph nodes: a pitfall in mammographic imaging evaluation. Breast J. 2020; 26: 764-766. (PMID: 31595606) [Crossref]
5. Yactor AR, Michell MN, Koch MS, Leete TG, Shah ZA, Carter BW. Percutaneous tattoo pigment simulating calcific deposits in axillary lymph nodes. Proc (Bayl Univ Med Cent). 2013; 26: 28-29. (PMID: 23382606) [Crossref]
6. Timko AL, Miller CH, Johnson FB, Ross E. In vitro quantitative chemical analysis of tattoo pigments. Arch Dermatol. 2001; 137: 143-147. (PMID: 11176685) [Crossref]
7. Sperry K. Tattoos and tattooing. Part II: gross pathology, histopathology, medical complications, and applications. Am J Forensic Med Pathol. 1992; 13: 7-17. (PMID: 1585890) [Crossref]
8. Soran A, Menekse E, Kanbour-Shakir A, Tane K, Diego E, Bonaventura M, et al. The importance of tattoo pigment in sentinel lymph nodes. Breast Dis. 2017; 37: 73-76. (PMID: 28697552) [Crossref]
9. Singer C, Blankstein E, Koenigsberg T, Mercado C, Pile-Spellman E, Smith SJ. Mammographic appearance of axillary lymph node calcification in patients with metastatic ovarian carcinoma. AJR Am J Roentgenol. 2001; 176: 1437-1440. (PMID: 11373209) [Crossref]
10. Bedi DG, Krishnamurthy R, Krishnamurthy S, Edeiken BS, Le-Petross H, Fornage BD, et al. Cortical morphologic features of axillary lymph nodes as a predictor of metastasis in breast cancer: in vitro sonographic study. AJR Am J Roentgenol. 2008; 191: 646-652. (PMID: 18716089) [Crossref]
11. Burdeny DA, Reed MH, Ferguson CA. Calcification of axillary lymph nodes following BCG vaccination. Can Assoc Radiol J. 1989; 40: 92-93. (PMID: 2702508) [Crossref]
12. Bruwer A, Nelson GW, Spark RP. Punctate intranodal gold deposits simulating microcalcifications on mammograms. Radiology. 1987; 163: 87-88. (PMID: 3823464) [Crossref]
13. Hooley R, Lee C, Tocino I, Horowitz N, Carter D. Calcifications in axillary lymph nodes caused by fat necrosis. AJR Am J Roentgenol. 1996; 167: 627-628. (PMID: 8751666) [Crossref]
14. Mooney S, Dutmers J, Jameel Z, Weinfurtner RJ. Calcified axillary lymph nodes in a case of de novo metastatic breast cancer. Radiol Case Rep. 2023; 19: 483-488. (PMID: 38046920) [Crossref]
15. Lyou CY, Yang SK, Choe DH, Lee BH, Kim KH. Mammographic and sonographic findings of primary breast lymphoma. Clin Imaging. 2007; 31: 234-238. (PMID: 17599616) [Crossref]
16. Chotai N, Xu GG, Tan HW. Bilateral axillary node calcifications: a case report and revisiting causes. Radiol Case Rep. 2022; 18: 581-583. (PMID: 36452892) [Crossref]