Case Report

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Mammographic Breast Pseudocalcifications Associated With Topical Betamethasone Dipropionate

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ABSTRACT

Screening mammography plays a critical role in the early detection of breast cancer. Suspicious breast calcifications on mammography often prompt further diagnostic evaluation due to concern for malignancy, worrying physicians and patients alike. Here, we present a case of a woman in her 70s whose annual screening mammogram with digital breast tomosynthesis demonstrated two new groups of microcalcifications, confirmed after recall with magnification views. However, because of their superficial location, biopsy was thought to be too technically challenging and short follow-up was recommended. At 6-month mammographic follow-up, there was interval non-visualization of both calcifications. Additional clinical history interrogation revealed that due to a diffuse pruritic rash, the patient had been applying topical betamethasone dipropionate daily to her entire body, including her breasts, when she received her initial mammogram. This case illustrates how corticosteroid ointments and lotions may mimic suspicious calcifications on mammography, reinforcing the importance of guidelines recommending avoidance of topical products on the day of imaging.

Keywords: Breast cancer screenings; breast imaging; mammography; pseudocalcifications

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Key Points

- Deodorant, powders, lotions, or ointments for the breast and axillae can all confound screening mammography and cause pseudocalcifications.
- Less commonly considered sources such as topical steroids must be considered as potential sources of pseudocalcifications on screening mammography.
- Early detection of indeterminate microcalcifications play a critical role in breast cancer screening; thus, further awareness regarding pre-imaging preparation among physicians, technologists, and patients must be achieved.

Introduction

The American College of Radiology (ACR), UK National Health Service (NHS), and American Cancer Society (ACS) all recommend avoidance of deodorant, powders, lotions, ointments, or creams on the day of a screening mammogram. These products may contain metallic substances, such as zinc or aluminum, that mimic breast parenchymal calcifications, prompting further diagnostic evaluation due to concern for malignancy. Given the critical role of screening mammography in the early detection of breast cancer in women, ensuring accurate imaging is essential to patient care. Though there are several case reports detailing the presence of pseudocalcifications due to skin products, to the best of our knowledge, none associated with betamethasone dipropionate have been previously described.

Case Presentation

A woman in her 70s presented to a designated comprehensive breast imaging center for her annual mammogram. The patient reported no personal history of breast cancer. However, she did report a family history of breast cancer in her mother in her mid-60s and her sister in her 50s. Prior mammograms demonstrated stable findings with no suspicious calcifications for the past 5 years (Figure 1). On the day of her mammogram, the patient disclosed a one-month history of diffuse pruritic rash, which involved both breasts. Her mammogram demonstrated two groups of microcalcifications in the left upper central breast and left upper outer breast (Figure 2). Due to their superficial location, they would likely not be amenable to stereotactic breast biopsy and were thought to potentially represent dermal calcifications. Short interval mammographic follow-up in six months was recommended. On her follow-up mammogram of the left breast, there was complete interval non-visualization of the previously seen superficial grouped calcifications, suggesting resolution of dermal calcifications versus the presence of residue from skin products (Figure 3). The patient was informed of the results in the clinic at the time of the exam and was questioned about any use of topical agents during her prior mammogram. The patient revealed that due to her rash, she had been applying topical betamethasone dipropionate, USP 0.05%

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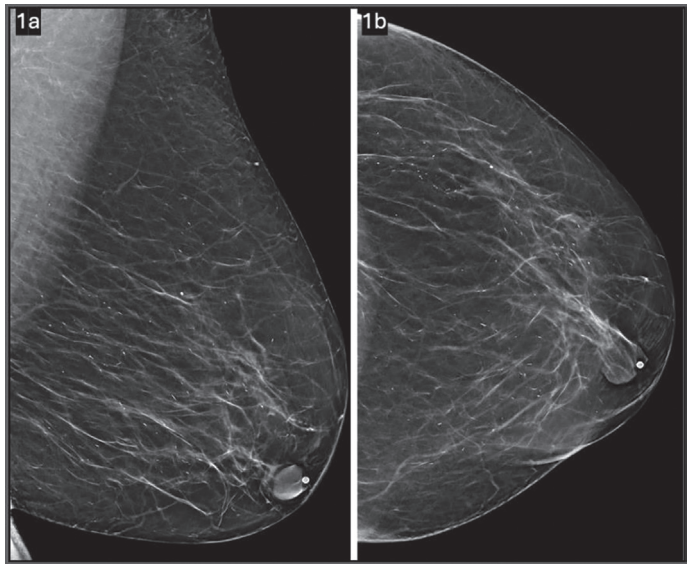

Figure 1. One year prior to the described presentation, digital mediolateral oblique (1a) and craniocaudal (1b) views of the bilateral breasts were obtained with tomosynthesis

The patient's annual screening mammogram one year before the episode described demonstrated breast tissue with scattered areas of fibroglandular density and no suspicious mammographic findings

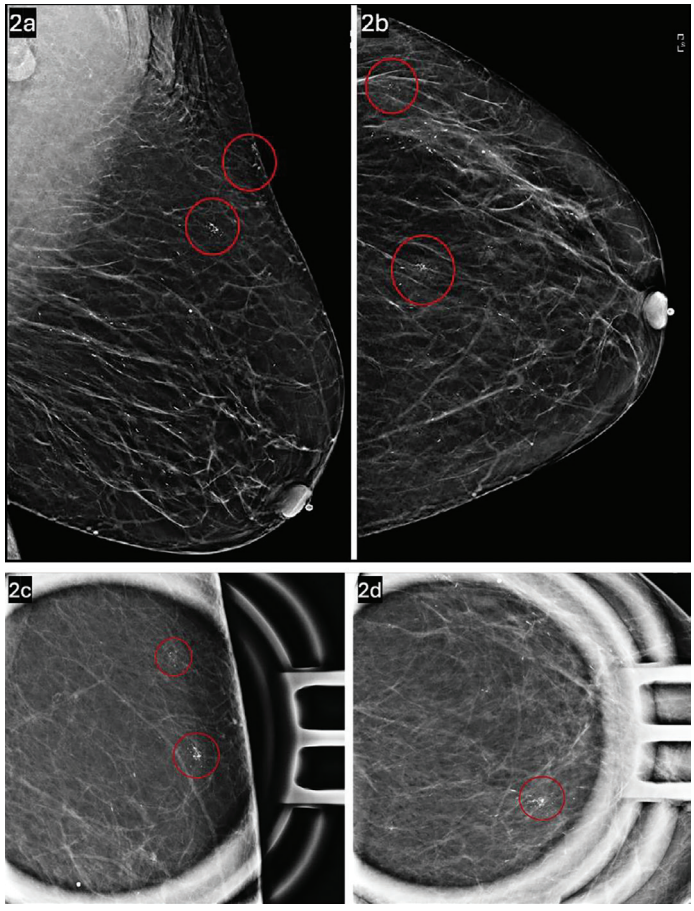

Figure 2. Digital mediolateral oblique (2a) and craniocaudal (2b) views of the left breast were obtained with tomosynthesis. Mediolateral (2c) and craniocaudal (2d) magnification views of the left breast were also obtained

This mammogram revealed a new group of amorphous and coarse heterogeneous calcifications in the left upper central breast at posterior depth, spanning up to 0.8 cm. There was also an additional new group of amorphous calcifications in the left upper outer breast, at posterior depth, spanning up to 0.5 cm. Both groups of calcifications were superficial, possibly representing dermal calcifications. Moreover, due to the superficial location, they were not amenable to stereotactic breast biopsy. The findings corresponded to a Breast Imaging Reporting & Data System category 3, and therefore short-interval follow-up at 6 months with left diagnostic mammography was recommended

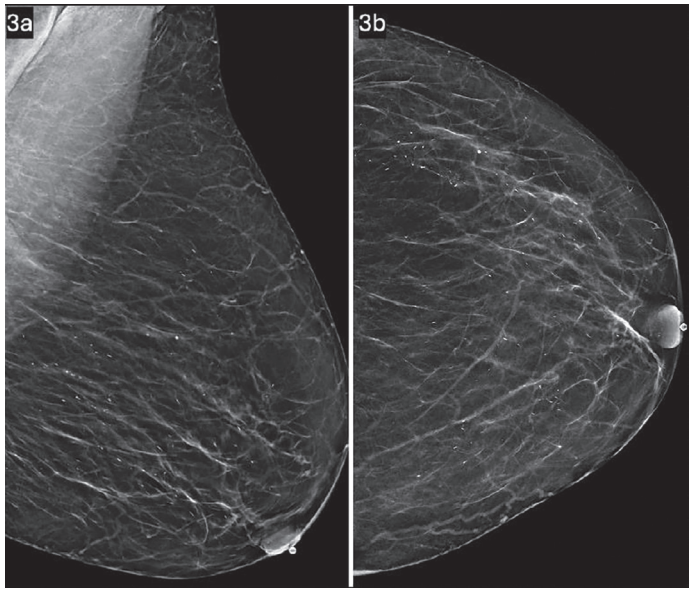

Figure 3. Short interval (six month) follow-up mammogram, digital diagnostic mediolateral oblique (3a) and craniocaudal (3b) views of the bilateral breasts were obtained with tomosynthesis

There was complete interval non-visualization of the grouped coarse heterogeneous and amorphous calcifications in the upper central and upper outer left breast

ointment and lotion to her body, including her breasts. The patient had frequently been treated with topical betamethasone dipropionate for her chronic dermatitis. She did not realize this could affect the outcome of her mammogram, but considered this once she was informed that the superficial calcifications just vanished. The patient was advised to return to routine annual mammographic screening and avoid wearing topical ointments during the day of her mammogram.

Discussion and Conclusion

This case highlights the diagnostic challenge of pseudocalcifications on mammography and underscores the importance of adherence to pre-imaging guidelines and careful consideration of clinical history. Pseudocalcifications on mammography are imaging artifacts that mimic true parenchymal breast calcifications, which are frequently associated with malignancy. As opposed to true calcifications, they are transient, frequently superficial, opacities caused by external radio-opaque particles from topical residues on the skin of the breast. The ability to distinguish between true parenchymal calcifications and pseudocalcifications is important, given that most cases of ductal carcinoma *in situ* are associated with suspicious microcalcifications (1, 2), often warranting further diagnostic imaging, short interval follow-up, and/or stereotactic breast biopsy, the latter particularly relevant in cases of new indeterminate calcifications, as in the presented case. Thus, the ability to distinguish true calcifications from pseudocalcifications or prevent them, will avoid unnecessary diagnostic work-up and follow-up.

In this case, the patient presented with new grouped amorphous, coarse, heterogeneous calcifications on screening mammography, findings frequently associated with malignancy. On follow-up diagnostic mammogram after a six-month interval, the complete non-visualization of the calcifications strongly favored the diagnosis of dermal pseudocalcifications due to an undisclosed topical agent. These transient, calcifications may be caused by radiopaque metallic particles found in deodorants, antiperspirants, talcum powders, lotions, and ointments. In the case of pseudocalcifications associated with betamethasone dipropionate lotion and ointment, the thickness and density of the applied topical treatments, the active ingredient itself, the emollients, the preservatives, and/or trace radiopaque metallic compounds may be contributing factors and require further investigation. Another type of pseudocalcification artifact may be seen when a synthesized 2D reconstruction produced from digital breast tomosynthesis source images enhances dense parenchymal tissue in a way that produces the appearance of calcifications in the reconstructed 2D. However, this type of pseudocalcification artifact would not be reproduced on 2D magnification views.

Though there are ample examples of deodorants and antiperspirants mimicking calcifications in the literature, there are relatively few reported cases associated with dermatological treatments. One case described a 72-year-old woman with pseudocalcifications secondary to zinc-containing ointment (3). Similar to our patient, the complete interval resolution of the calcifications was highly suggestive of an external radiopaque material, and the patient's provided clinical history confirmed this. Suen et al. (4) reported a case of pseudocalcifications on screening mammography of a woman using calamine lotion. In terms of larger studies, one retrospective analysis of 34 patients in Korea identified topical *go-yak*, a Chinese herbal medicine for breast abscesses, as a possible source of pseudocalcifications (5). Another individual example is an Australian case report of pseudocalcifications associated with tungsten particles in a topical skin treatment (6). To the best of our knowledge, however, this is the first case report published on a topical corticosteroid associated with mammographic pseudocalcifications.

Overall, this case reinforces the importance of adhering to pre-imaging guidelines regarding topical products and maintaining an index of suspicion for pseudocalcifications when multiple groups of superficial calcifications are seen, particularly if the patient reports a current

history of a body rash, as in this case. With the ACR, UK NHS, and ACS all recommending avoidance of deodorant, powders, lotions, or creams on the day of a screening mammogram, breast imaging professionals must be vigilant and consider dermatologic treatments, such as betamethasone dipropionate, as a possible confounding factor causing calcific artifacts (7-10). This will be important for both improved quality of screening and reducing unnecessary patient distress, diagnostic work-up and intervention. Further awareness among physicians, technologists, and patients alike will help prevent the presence of exogenous pseudocalcifications and ensure accurate imaging interpretation.

Ethics

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: H.P., J.S., P.S.A., C.P-T.; Concept: H.P., J.S., P.S.A., C.P-T.; Design: H.P., J.S., P.S.A., C.P-T.; Data Collection or Processing: H.P., J.S., P.S.A., C.P-T.; Analysis or Interpretation: H.P., J.S., P.S.A., C.P-T.; Literature Search: H.P., J.S., P.S.A., C.P-T.; Writing: H.P., J.S., P.S.A., C.P-T.

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