

Rare case of benign epidermal inclusion cyst mimicking malignancy

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CASE SUMMARY

This case presents a 42-year-old female complaining of right nipple swelling, palpable mass, and non-bloody nipple discharge. The patient reported a history of bilateral breast reduction and no family history of breast cancer. The subareolar location of the patient's swelling and mass complicated diagnosis by limiting physical exam. Diagnostic mammogram revealed a 3.8 cm mass with macrolobulated and partially obscured borders. Ultrasound demonstrated a solid ovoid mass. Radiologic imaging of this breast lesion could not exclude malignancy, resulting in BI-RADS 4a classification. Given the suspicious features of this lesion and the clinical context, subsequent fine needle aspiration was performed and showed squamous epithelium with abundant basket weave keratin.

IMAGING FINDINGS

A diagnostic digital mammogram revealed scattered bilateral fibroglandular tissue, benign appearing bilateral calcifications, and a large mass in the immediate subareolar right breast measuring 3.8×2.1 cm (Figure 1). The mass displayed macrolobulated borders and the medial border was partly



FIGURE 1. (A) Right breast diagnostic mammogram in CC projection showing the subareolar mass, with its medial border somewhat obscured by overlying parenchyma. (B) Right breast diagnostic mammogram in MLO projection showing the subareolar mass with macrolobulated borders.



FIGURE 2. Targeted right breast diagnostic ultrasound showing the subareolar avascular oval, well circumscribed heterogenous hypoechoic solid mass.

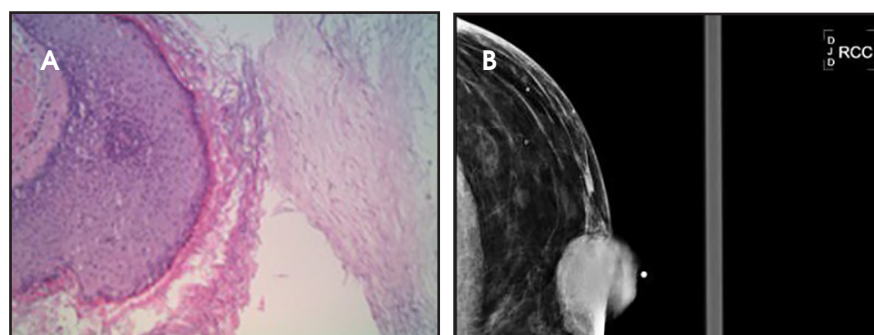


FIGURE 3. (A) Low power magnification showing squamous epithelium with layers of abundant basket weave keratin. (B) High power magnification showing squamous epithelium and giant cells.

obscured by parenchyma. Ultrasound showed a solid well circumscribed ovoid mass in the immediate subareolar right breast measuring 3.5×1.5 cm (Figure 2).

DIAGNOSIS

Ruptured epidermal inclusion cyst of the breast, which resulted in local inflammatory changes including nipple swelling and non-bloody nipple discharge. Based on the mammogram and ultrasound appearance of a 3.8 cm circumscribed solid oval subareolar breast mass, both phyllodes tumor and fibroadenoma of the breast could not be excluded.

DISCUSSION

An epidermal inclusion cyst is the most common cutaneous or subcutaneous cyst, and it is lined by stratified squamous epithelium that contains a granular layer and lamellated keratin.^{1,2} They frequently occur on the face, scalp, neck and trunk; however, very few are found in the breasts.¹⁻⁵ An epidermal cyst rarely calcifies, but when it does, it is usually in older cysts within the keratin debris.^{2,3,6}

Epidermal inclusion cysts can be caused by congenital factors, squamous metaplasia of columnar epithelium, obstructed hair follicle or pore causing inflammatory downward

growth of the epidermis, or trauma related to reduction mammoplasty or needle biopsy that causes epidermal fragments to be implanted more deeply in the breast tissue.^{2,4,5,7,9,14}

Diagnosis of a small epidermal cyst that occurs in the subcutaneous tissue is usually straightforward, but enlarged cysts presenting in the breast parenchyma require them to be differentiated from other benign or malignant breast lesions. There is variable data on the risk of transformation to malignant squamous cell carcinoma (0.045-19 percent) and possible association with Paget's disease of the breast.^{11,12,13} While malignant transformation is possible, the pathogenesis of differentiation of an epidermal cyst into carcinoma is not clear. It has been theorized that chronic irritation or repetitive trauma to the epithelial lining of the cyst plays a role in malignant transformation; however, this relationship has not been definitively established.^{2,3,6,15,16,18}

Epidermal inclusion cysts are benign, but can rupture and lead to serious sequelae, further complicating what might otherwise be a straightforward diagnosis. Rupture releases

nonabsorbable keratin, irritating the surrounding tissue, which can lead to secondary foreign body reactions, granulomatous reactions, or abscess formation.^{1,7,16} Five cases of spontaneous rupture have been reported in the literature.^{7,9} In such atypical or complex cases, fine needle aspiration or surgical excision is usually required for definitive diagnosis and to exclude malignancy.

On mammography, epidermal inclusion cyst of the breast appears as a well circumscribed, usually non-calcified lesion, although older cysts can develop calcification. Ultrasonography demonstrates a solid circumscribed, complex mass.^{2,4,6,10} Alternating concentric hyperechoic and hypoechoic rings correspond to the layers of lamellated keratin, which classically have been described as an onion ring pattern.¹¹ Aspiration of an epidermal inclusion cyst typically shows cheesy, flaky material, differentiating it from a sebaceous cyst.⁸

Here we presented a case of epidermal inclusion cyst of the breast in a patient post bilateral reduction mammoplasty who complained of non-bloody nipple discharge, found to be secondary to ruptured epidermal inclusion cyst. Radiologic findings were suspicious for malignancy, and differential diagnosis included both phyllodes tumor and fibroadenoma. Given a BI-RADS 4a classification, subsequent ultrasound-guided biopsy was performed and showed squamous epithelium with abundant basket weave keratin and giant cells (Figure 3), suggesting an epidermal inclusion cyst.

Given the subareolar location and cyst rupture, physical exam proves unreliable for evaluation.^{1,16} The flexible fat and mammary gland tissue of the breast allows the epidermal inclusion cyst to grow deeper into subcutaneous tissue, making it more difficult to

exclude malignancy.³ Other lesions can present in a similar manner, including fibroadenoma, phyllodes tumor, fibrocystic disease with squamous metaplasia and metaplastic carcinoma.

CONCLUSION

An epidermal inclusion cyst of the breast is an uncommon benign mass but may lead to serious complications. A patient may present with a palpable mass, pain, or non-bloody nipple discharge following spontaneous rupture in complicated cases. Association with Paget's disease and possibility for malignant transformation are rare, but documented in the literature. Ultrasound imaging of the breast typically shows an onion ring pattern or heterogeneous hyperechoic and thus solid echo texture if the cyst has ruptured, and mammography may demonstrate a mass with or without calcifications, making it difficult radiologically to exclude a malignant lesion. Although a benign lesion, epidermal inclusion cysts can develop complications and demonstrate suspicious features; in such appropriate circumstances, biopsy may be warranted for definitive diagnosis.

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Prepared by Ms. Martin while a medical student, Dr. Bombard while serving as a Radiology Resident, Dr. Coker, while a Radiology Resident; Dr. Payne while a Radiology Resident; Dr. Yoxthimer while serving as a Pathology Resident; and Dr. Elsamaloty while a Radiology Professor and Department Chairman of Radiology, at the University of Toledo Medical Center, Toledo, OH.