



Case Report

## Epidermoid Cyst in Male Patient Mimicking a Suspicious Breast Mass and Consequences of Biopsy

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### ABSTRACT

Male patients presenting to the mammography department for workup of breast disease is an overall rare event compared to females. Gynecomastia is statistically the most common breast condition afflicting male patients, with ductal carcinoma an uncommon secondary diagnostic consideration. Secondary benign breast conditions or mimickers of breast disease in men are even rarer than primary carcinoma and can pose a significant challenge in breast imaging workups. We present a challenging workup of a superficial epidermoid cyst (EC) in a male patient with significant subcutaneous growth and indeterminate imaging characteristics, mimicking a breast neoplasm. Furthermore, we present undesirable consequences of performing a biopsy of an EC including rupture and abscess formation.

**Keywords:** Epidermal inclusion cyst, Epidermoid cyst, Male breast disease, Superficial breast lesions

### INTRODUCTION

Evaluation of male breast imaging can be challenging. Unlike imaging, the female breast, the number of cases of men requiring breast imaging is limited. The number of diagnostic breast imaging cases performed for males is far fewer than that of the female population and the incidence and prevalence of male breast cancer is quite low. There are established imaging characteristics that can help differentiate the far more common benign entity of gynecomastia from male breast carcinoma. Other benign breast lesions in men are exceedingly rare and may be difficult to differentiate from malignancy. One such entity we present in this case report is an epidermoid cyst (EC).

EC is keratin filled lesions arising from the deeper layers of the dermis. Superficial breast lesions, such as EC, can have characteristic imaging findings on ultrasound. Unfortunately, they often have variable presentations on imaging and can be confused with indeterminate breast masses, resulting in biopsy. It is important to keep this entity in mind when evaluating superficial breast lesions, as diagnostic or therapeutic procedures can result in rupture, severe inflammation, and abscess formation.

### CASE REPORT

A 76-year-old male presented to an outpatient primary care clinic with complaints of a breast mass, superomedial to the right nipple, which had been enlarging for the past 1–2 years. Per physical exam and patient description, the lump was growing beneath the skin as opposed

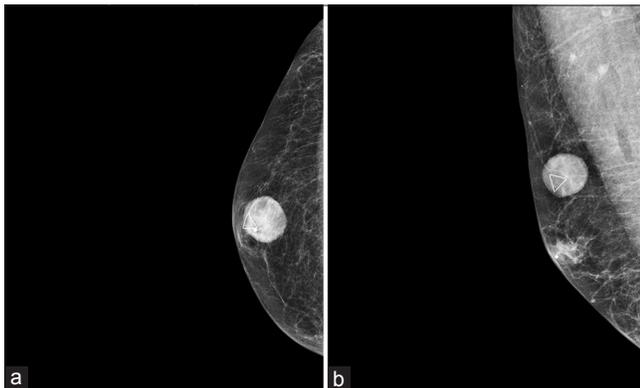
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to growing within the skin. The lump was described as semi-solid, non-fluctuant, and incompressible on palpation by the referring physician. There was no referred pain or nipple discharge associated with this lump. The patient's history included benign prostatic hypertrophy, multiple hereditary exostoses, and osteoarthritis without a history of familial breast cancer. The patient was referred to the breast imaging department for a full diagnostic workup.

Diagnostic mammography was initially performed of the right breast with cranial-caudal, mediolateral oblique, and mediolateral views. Mammography confirmed the presence of a well-circumscribed oval hyperdense mass in the upper inner quadrant of the right breast [Figure 1a and b]. There was no definite attachment to the underlying skin on the views obtained and as such, the mass was thought to be within the breast parenchyma.

Ultrasound imaging of the right breast at the 12 o'clock position 4 cm from the nipple demonstrated a 2.1 cm oval circumscribed mass with heterogeneous internal echogenicity [Figure 2]. The mass was predominately located within the subcutaneous tissue with only the superficial most portion of the mass abutting the deep layer of the dermis. The angle formed at the junction of the mass and dermis was an obtuse angle, favoring against a dermal origin. No tract to the skin surface was identified. Additional features of the mass included a small focus of suspected internal vascularity and posterior acoustic enhancement [Figure 3]. The mass was deemed suspicious for a parenchymal breast mass and was given a breast imaging-reporting and data system four category. The patient was scheduled for ultrasound-guided core biopsy which was performed 2 weeks later with a 12-gauge spring-loaded needle [Figure 4].

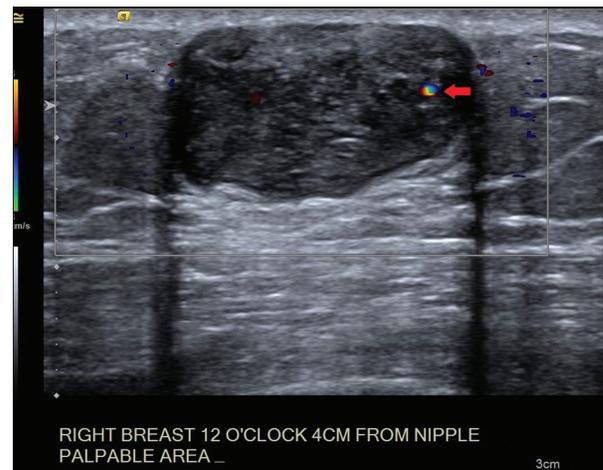


**Figure 1:** A 76-year-old male who presented with enlarging right breast lump which proved to be an epidermoid cyst. (a) Cranial-caudal mammogram of the right breast demonstrates a circumscribed oval hyperdense mass within the central breast. (b) Mediolateral oblique mammogram of the right breast demonstrates a well-circumscribed oval hyperdense mass within the upper breast.

The patient returned to the outpatient clinic a few weeks post-biopsy with new complaints of erythema, pain, and draining pus from the location of the biopsied mass. The pathology report from the biopsy revealed a benign EC of dermal origin. Repeat ultrasound was performed and again demonstrated the biopsied mass, now with an adjacent complex collection and a fluid-filled tract extending to the skin surface [Figure 5]. The findings were consistent with ruptured EC with surrounding inflammation and abscess formation. The patient was referred to surgery for



**Figure 2:** A 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. Gray scale ultrasound of the right breast demonstrates an oval circumscribed mass with heterogeneous echogenicity at the 12 o'clock position 4 cm from the nipple. The mass is primarily located within the subcutaneous tissue. Contact with the deepest dermal layer forms an obtuse angle.



**Figure 3:** A 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. Color Doppler ultrasound of the right breast mass demonstrates internal vascularity (arrow).

incision and drainage with wound care until it was deemed appropriate for surgical excision.

## DISCUSSION

Diagnostic imaging workups of male breast disease can pose several challenges. Given the overall low incidence and prevalence of both benign and malignant breast conditions in male patients, radiologists often do not have extensive experience with complicated male breast cases. The male breast is primarily composed of skin and subcutaneous fat, with only small quantities of atrophic ducts and stromal

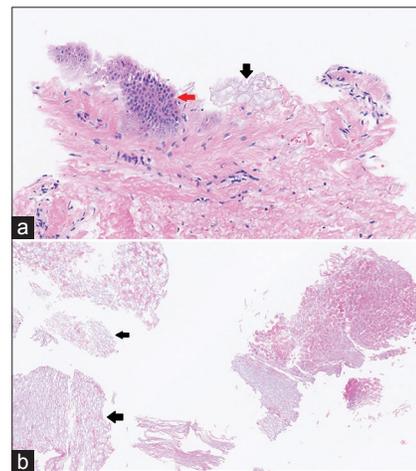
tissue.<sup>[1]</sup> Gynecomastia is by far the most common breast condition affecting male patients and is caused by benign proliferation of ductal and stromal tissue.<sup>[1]</sup> Ductal carcinoma of the male breast is a rare entity accounting for <1% of all breast malignancies.<sup>[1]</sup> How to differentiate between these two entities mammographically is well-established with the former presenting as a flame-shaped ill-defined subareolar density and the later as a discrete solid mass often eccentric to the nipple-areolar complex.<sup>[1]</sup> These imaging characteristics are highly relied on in differentiating the two conditions, as both occur frequently in men in the sixth decade of life and beyond. Evaluation of other breast conditions or mimickers of breast disease in male patients presenting for breast imaging evaluation is even rarer events than workup of primary breast cancer. Such entities may include enlarged intramammary lymph nodes, fat necrosis, and ECs, among others.<sup>[1]</sup> Comparing these exceedingly rare entities with one another and with primary male breast cancer can be challenging, even more so when there is a non-classical presentation. We present above an unusual case of a non-classical superficial EC mimicking an indeterminate breast mass in a male patient, ultimately leading to biopsy. There are several features of our case report that are unique to EC of the breast. First, EC is a very rare cause for mammographic workups, particularly in male patients. Second, the clinical and imaging characteristics were non-classical and mimicked a parenchymal mass. Finally, we establish the potential consequences of performing core needle biopsy on such a lesion.



**Figure 4:** A 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. Ultrasound-guided core biopsy of the right breast mass was performed with a 12-gauge needle.



**Figure 5:** A 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. Post-biopsy ultrasound of the right breast mass 2–3 weeks later demonstrates a ruptured epidermoid cyst with surrounding inflammation and abscess formation. Note pus-filled tract extending to the skin (arrow).



**Figure 6:** (a) A 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. H and E stain ( $\times 230$ ) of the right breast mass specimen demonstrates fragments of the epidermoid cyst, showing squamous epithelium (red arrow) adjacent to epithelium with orthokeratosis (basket weave pattern) (black arrow). (b) 76-year-old male who presented with an enlarging right breast lump which proved to be an epidermoid cyst. H and E stain ( $\times 230$ ) of the right breast mass specimen demonstrates portions of the epidermoid cyst, exhibiting loose lamellar keratin (black arrows).

ECs, interchangeable with infundibular cysts and epidermal inclusion cysts, are benign superficial cystic masses that generally arise from the infundibulum of hair follicles within the dermis.<sup>[2]</sup> Histologically, they are walled-off cavities, lined by squamous epithelium and containing a granular layer [Figure 6a]. This granular layer is one of the three features that distinguish the EC from another entity known as pilar cysts (also known as a trichilemmal cyst). The other two features that help distinguish EC from pilar cysts are the presence of loose lamellar “onion skin” orthokeratin in EC versus amorphous, dense, and homogenous keratin in pilar cysts; and the presence of calcifications in pilar cysts [Figure 6b].<sup>[3,4]</sup> These features of EC represent the implantation or proliferation of superficial epidermal elements within the deeper dermis.<sup>[2,5]</sup> ECs are filled internally with orthokeratin material.<sup>[6]</sup> There are several proposed mechanisms for the growth of ECs. Two commonly accepted mechanisms include: Implantation of the superficial epidermal layer into the deeper dermis from such etiologies as trauma and obstruction of the hair follicle.<sup>[5,7,8]</sup> EC is one of the most common cutaneous cysts, occurring almost anywhere on the skin, particularly head, neck, and trunk.<sup>[6,8]</sup> These cysts are usually not symptomatic, with patients often presenting for cosmetic reasons. They can, however, be worrisome for the patient when there is progressive growth or symptomatic rupture. When ruptured, the released internal keratin contents serve as an irritant, creating inflammation and possible abscess formation.<sup>[6]</sup> Although benign, there is a known rare potential for EC to degenerate into squamous cell carcinoma.<sup>[2,7]</sup>

Although an overall common occurrence throughout the body, EC can occasionally mimic breast disease, requiring diagnostic imaging workup.<sup>[2,5-8]</sup> One review reported somewhere between eighty and ninety cases of symptomatic or palpable EC of the breast presenting for clinical workup.<sup>[6]</sup> Of these, however, only twenty to thirty patients had documented mammographic and ultrasound workup.<sup>[6]</sup> Furthermore, only 10% of overall reported cases involved male patients.<sup>[6]</sup> Although this is a rare superficial lesion presenting for diagnostic workup, there are established imaging characteristics that can guide the radiologist to consider this entity.

There are several known imaging characteristics of cutaneous masses in general and EC specifically that can help differentiate them from parenchymal masses of breast origin. Superficial lesions can be thought of as either arising from the cutaneous tissues, consisting of the outer epidermis and the deeper dermis, or from the subcutaneous tissues consisting of mostly adipose tissue. Superficial breast lesions arising from the cutaneous tissues are statistically considered benign, whereas lesions arising from the subcutaneous tissues are only mostly benign.<sup>[9]</sup> One cannot entirely exclude primary breast malignancy when evaluating subcutaneous lesions,

as breast parenchymal tissue can exist in this superficial location.<sup>[9]</sup> As with our case, mammography is usually the first diagnostic test performed for a potential breast lesion. The well-established use of mammography in male breast disease is to differentiate the often more mammographically ill-defined entity gynecomastia from the frequently more mass-like breast carcinoma.<sup>[10]</sup> Mammography is also very useful for general localization of a lesion within the breast, again useful in differentiating the often more eccentrically located breast carcinoma from subareolar gynecomastia. Mammography can suggest a lesion as being superficial; however, there are limitations in assessing the exact relationship with the dermis.<sup>[6]</sup> Unfortunately, EC often presents as superficial well-circumscribed masses with homogenous density and is challenging to distinguish from breast cancer on mammography.<sup>[8,10]</sup> One would expect the presence of irregular shape or architectural distortion to favor malignancy; however, male breast cancers can present as well-circumscribed masses located eccentrically, similarly to the case of the EC which we present.<sup>[10]</sup>

Ultrasound has superior ability in evaluating superficial breast lesions and can demonstrate defining features of an EC.<sup>[6]</sup> The minimal requirement for a lesion to be considered cutaneous in origin is abutment of the mass with the dermis. The most obvious ultrasound findings that help to further confirm a cutaneous mass include localization of the mass entirely within the dermis or the presence of a tract to the outer epidermal layer.<sup>[9]</sup> Although our case abutted the deep dermal layer, it was located subcutaneously without a discrete tract to the outer epidermis. EC usually grows outwardly from thin skin; however, flexible adipose and parenchymal tissue in the breast allow for inward subcutaneous growth.<sup>[2,7,8]</sup> This feature of breast EC, as present in our case, further obscures the matter of differentiating these lesions from breast carcinoma. When a lesion has both dermal and hypodermal components, the presence of an acute angle at the point of contact of the mass with the dermis suggests cutaneous origin.<sup>[9]</sup> Again, this helpful feature was not present in our case as the angle formed between the EC and the dermis was obtuse [Figure 2]. There are two ultrasound features specific to EC that is noteworthy. First, the classic appearance of an EC that can strongly suggest the diagnosis is the presence of concentric alternating hyperechoic and hypoechoic bands.<sup>[6,8]</sup> Although this feature is highly specific, in practice EC can have a variety of ultrasound appearances ranging from mostly anechoic to heterogeneous hypoechoic. Our case presented as a heterogeneous hypoechoic mass, features that were non-specific and of limited value in excluding breast carcinoma. Second, although EC can have peripheral vascularity, there should be no internal vascularity. Our case demonstrated an EC with a small focus concerning internal vascularity, further increasing suspicion for breast carcinoma.

Although the imaging features of our case were not inconsistent with an EC, we felt they were certainly non-classical and indeterminate. In addition, given the overall rare occurrence of benign mimickers of breast masses in men, there was a concern for possible breast carcinoma. We felt that biopsy was the appropriate next step in our workup, considering the clinical features and indeterminate imaging characteristics.<sup>[2,5]</sup> Unfortunately, our biopsy of this mass resulted in rupture of the EC with subsequent abscess formation [Figure 5]. Rupture of an EC with subsequent superimposed infection is a known sporadic and iatrogenic complication.<sup>[2,5,9]</sup> When ruptured, the internal keratin contents leak into the surrounding tissues and serves as a source for an acute and granulomatous inflammatory response and subsequent infection.<sup>[5]</sup> In this case report, we present the ultrasound imaging findings of this complication. If one suspects an EC with confidence, the patient should be referred for excisional biopsy in attempts to remove the entire lesion out without violating the internal contents.<sup>[5,7,9]</sup> If there is active infection from a ruptured EC, it is best to delay excision as the boundaries of the lesion may be obscured. Instead, incision and drainage are initially preferred with surgical excision postponed until inflammation subsides.<sup>[2,5,7]</sup> Non-symptomatic ECs can be conservatively followed, however, given the rare malignant potential and risk of infection, any sign of growth warrants complete excision.<sup>[2,5,7]</sup>

## CONCLUSION

ECs are rare mimickers of breast parenchymal masses, even more so in male patients. They can be challenging to diagnose when presenting with atypical features. It is important to recognize this entity, when possible, as biopsy can lead to rupture, severe inflammation, and abscess formation.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Nguyen C, Kettler MD, Swirsky ME, Miller VI, Scott C, Krause R, *et al.* Male breast disease: Pictorial review with radiologic-pathologic correlation. *Radiographics* 2013;33:763-79.
2. Mahmud MU, Sheuly SB, Bhuiyan NH, Chowdhury R, Ali R. Giant epidermoid cyst in the breast: A common benign lesion at a rare site-A case report. *Int J Surg Case Rep* 2017;36:130-2.
3. Rappini RP. Cysts. In: *Practical Dermatopathology*. 1<sup>st</sup> ed. Philadelphia, PA: Elsevier Mosby; 2005. p. 253-4.
4. Elston DM, Ferringer T. Benign tumors and cysts of the epidermis. In: *Requisites in Dermatopathology*. 1<sup>st</sup> ed. New York: Elsevier Saunders; 2009. p. 45-6.
5. Zito PM, Scharf R. Cyst, Epidermoid (Sebaceous Cyst). Treasure Island, FL: StatPearls Publishing; 2019. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK499974>. [Last accessed on 2019 Jul 21].
6. Paliotta A, Sapienza P, D'Ermo G, Cerone G, Pedullà G, Crocetti D, *et al.* Epidermal inclusion cyst of the breast: A literature review. *Oncol Lett* 2016;11:657-60.
7. Wynne E, Louie A. Epidermoid cyst of the breast: Mammography, ultrasound, MRI. *Radiol Case Rep* 2011;6:431.
8. Raghupathi S, Suma S, Prakash S, Sreeramulu PN. Epidermal inclusion cyst of the breast. *J Surg* 2017;5:2.
9. Giess CS, Raza S, Birdwell RL. Distinguishing breast skin lesions from superficial breast parenchymal lesions: Diagnostic criteria, imaging characteristics, and pitfalls. *Radiographics* 2011;31:1959-72.
10. Chau A, Jafarian N, Rosa M. Male breast: Clinical and imaging evaluations of benign and malignant entities with histologic correlation. *Am J Med* 2016;129:776-91.

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