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Case Report

Eosinophilic mastitis mimicking a developing asymmetry[☆]

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ABSTRACT

Eosinophilic mastitis is a very rare form of mastitis with few reported cases in the literature. This is a case of eosinophilic mastitis in a 48-year-old woman which presented as a screen detected right breast developing asymmetry. No sonographic abnormalities were visualized on diagnostic workup, and subsequent tomosynthesis-guided biopsy was performed. Knowledge of this rare entity is helpful in the radiologic-pathologic correlation, diagnosis, and clinical management of future cases.

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Introduction

Only a few cases of eosinophilic mastitis have been reported in literature. Eosinophilic mastitis entails infiltration of mammary glands with eosinophils and appears to be a benign condition that can be managed non-operatively with steroids and antihistamines [1]. It can present as a developing asymmetry that can be radiologically ambiguous and may warrant further evaluation, as seen in this patient. Detection and identification of eosinophilic mastitis is important because accepting the benign histology as “concordant” after biopsy can prevent unnecessary surgical intervention and the complications that surgery may provide [2]. This is a case of a patient with a developing asymmetry in her right breast over several years that was eventually diagnosed as eosinophilic mastitis.

Case report

An asymptomatic 48-year-old woman underwent further diagnostic evaluation after a screening mammogram revealed a developing asymmetry in the inner right breast (Fig. 1). A 1.4 cm developing asymmetry in the right inner breast was also seen on additional full-field and spot craniocaudal and mediolateral oblique views (Fig. 2). Targeted sonographic evaluation of the inner right breast was performed, showing no suspicious sonographic abnormalities and no discrete correlate for the developing asymmetry that was seen on the screening mammograms (Fig. 3). Given that the asymmetry persisted mammographically, a tomosynthesis-guided biopsy was recommended.

A tomosynthesis-guided biopsy of the right breast was carried out with a 9-gauge vacuum-assisted needle biopsy de-

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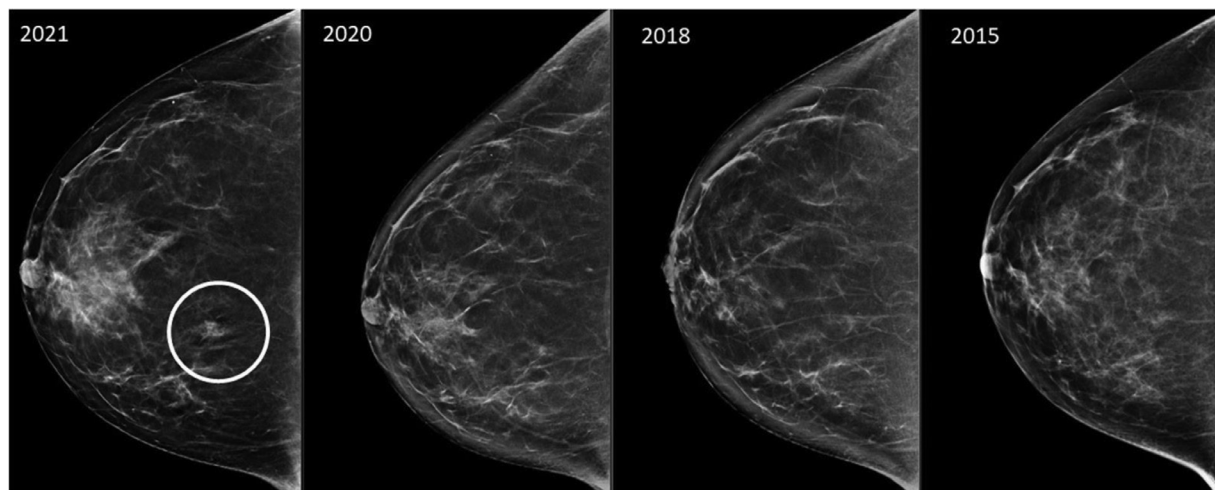


Fig. 1. – Craniocaudal views of the right breast from 2015, 2018, 2020, and 2021. The screening mammograms showed a developing asymmetry in the inner right breast.

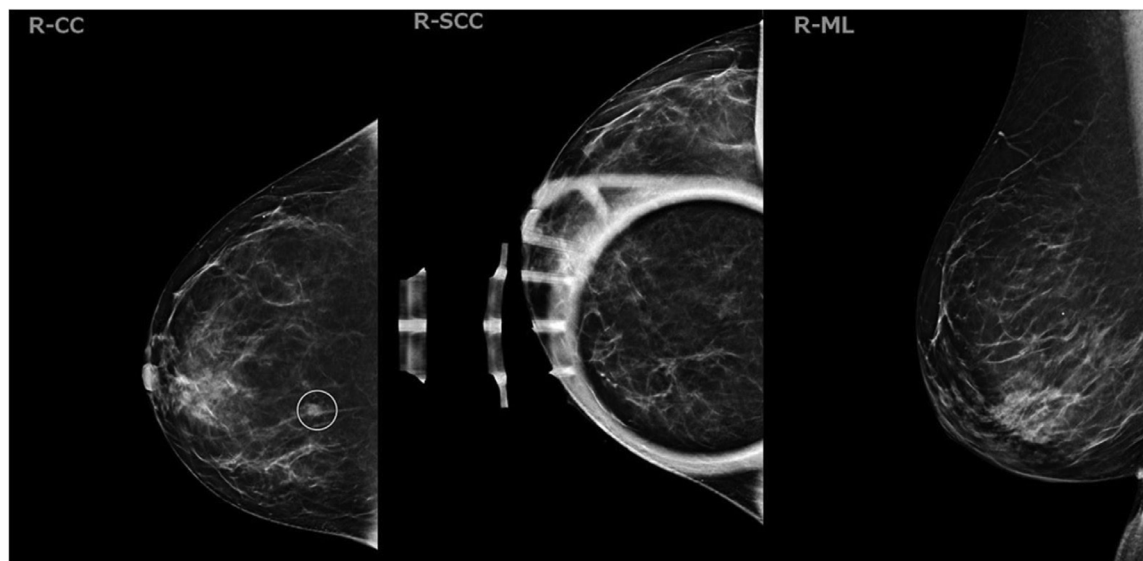


Fig. 2. – Mammograms showing repeat full field craniocaudal, spot craniocaudal, and full field mediolateral oblique views revealed a persisting asymmetry in the right inner breast.

vice and 12 cores were obtained. The final pathology report was interpreted as “marked perilobular and periductal mixed chronic inflammatory infiltrate enriched in eosinophils, with lymphocytes and plasma cells and no granulomata.” The pathology findings were suggestive of eosinophilic mastitis (Fig. 4).

The Allergy and Immunology Department was consulted, and it was noted that the patient was asymptomatic with no history of urticaria, asthma, angioedema, or pruritis except for seasonal allergic rhinitis. Hypereosinophilic syndrome was excluded from the differential diagnosis due to normal levels of peripheral eosinophils and a negative clinical history. No treatment was recommended given the asymptomatic nature and benign history. The patient was instructed to resume annual screening mammography with follow up as needed.

Discussion

Eosinophilic mastitis is described as tissue eosinophilia that is limited to the mammary glands. Eosinophilia is defined as the presence of more than 500 eosinophils/mm³ in the peripheral blood, as seen in conditions such as parasitic infection, hypereosinophilic syndrome, eosinophilic granulomatosis, and Churg-Strauss syndrome. Previous reports have documented that focal eosinophilic infiltration into tissue, usually associated with peripheral eosinophilia, has been seen in sites including skin, lung, liver, and gastrointestinal tract. Eosinophilic infiltration into breast tissue, however, is a very rare entity [2]. In the case of this patient, eosinophilic mastitis presented as a develop-

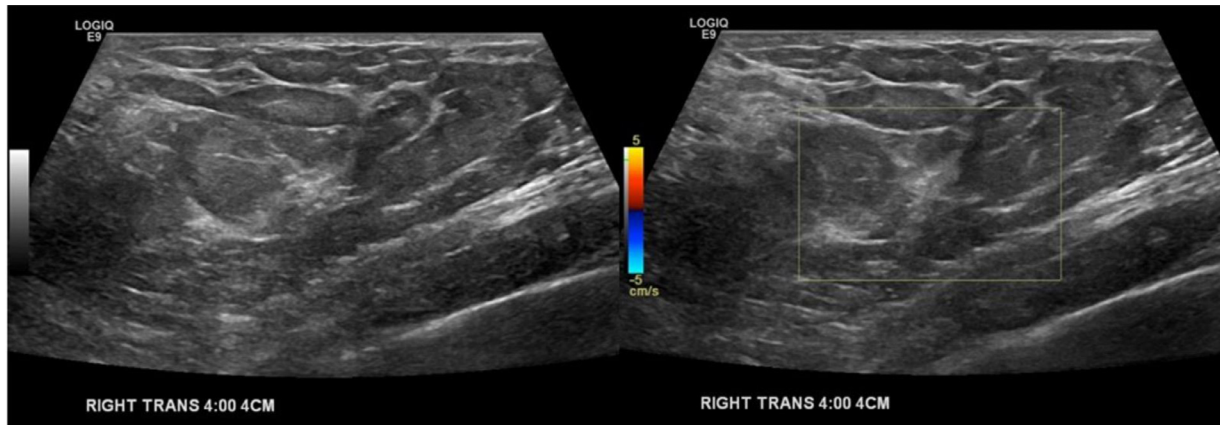


Fig. 3. – Further sonographic evaluation of the right breast showed no discrete abnormalities. Representative grey scale and color Doppler images from 4:00, 4 cm from the nipple are shown.

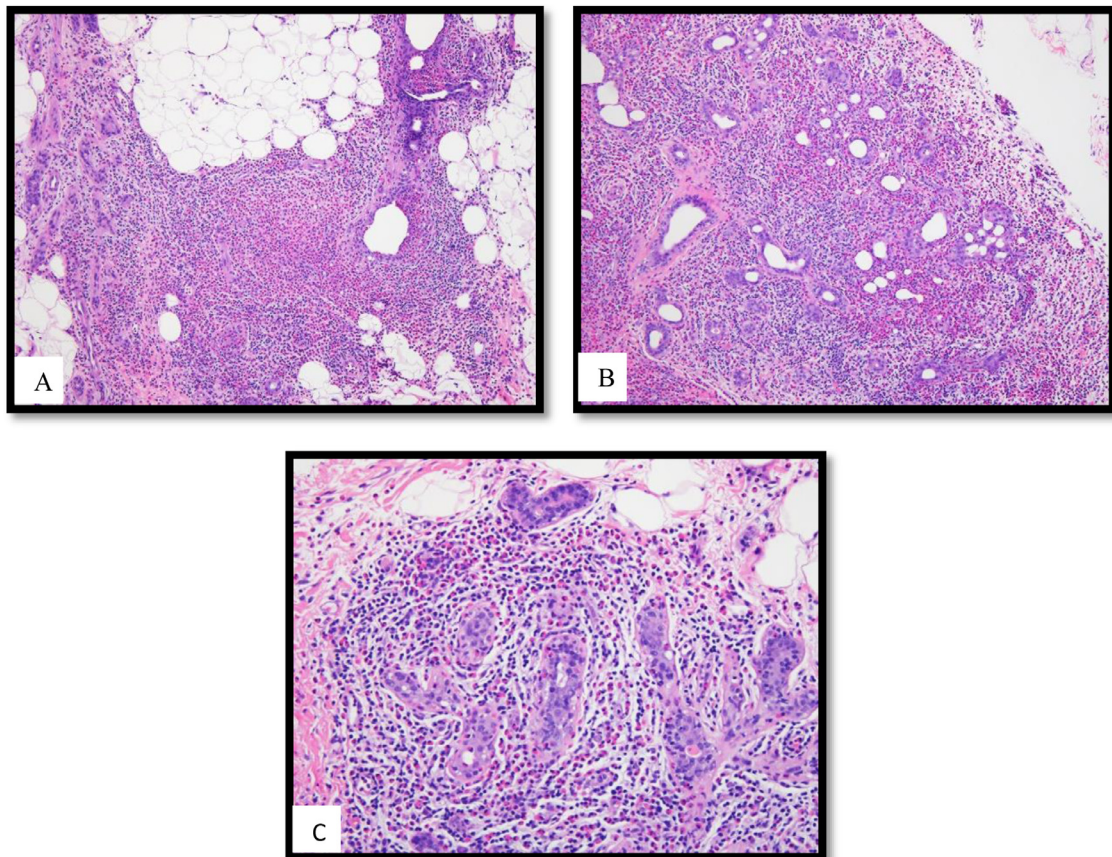


Fig. 4. – Figure panel shows (A) and (B) medium power (100x), and (C) high power (200x) magnification of breast parenchyma with dense perilobular mixed inflammatory infiltrate enriched with eosinophils, along with lymphocytes and plasma cells. These features are suggestive of eosinophilic mastitis.

ing asymmetry due to compounded tissue damage over time.

Biopsy specimens in previously reported cases of eosinophilic mastitis demonstrated similar histopathological findings as the one seen in this patient. Takahashi

reported diffuse eosinophilic and lymphocytic infiltration on core needle biopsy of the mammary gland. Tissue damage induced by the infiltration of eosinophils has been documented in the breast and other organs, as seen in Takahashi's case report. The damage is in-part mediated by cytotoxic proteins

such as major basic protein and eosinophilic peroxidase that are released upon degranulation of eosinophils [1]. Bajad et al. found acini surrounded by an inflammatory infiltrate consisting predominantly of eosinophils mixed with other polymorphonuclear leukocytes and lymphocytes with no evidence of malignancy, and Parakh et al. found a dense infiltrate consisting of a variety of inflammatory cells, predominantly eosinophils again with no evidence of malignancy [2,3]. In cases of eosinophilic mastitis that present similarly to breast carcinoma, clinical and radiologic findings along with definitive tissue diagnosis with histopathology is essential due to the varying outcomes and management of these differential diagnoses.

Eosinophilic mastitis has been associated with asthma, Churg-Strauss syndrome, and hypereosinophilic syndrome in previous case reports [3]. This patient is unique in that she did not present with any symptoms or clinical history that might indicate diagnosis of any of these conditions. Review of current literature on eosinophilic mastitis showed that only ten cases of eosinophilic mastitis have been reported, with 3 of them being associated with asthma, 2 associated with Churg-Strauss syndrome, 2 associated with hypereosinophilic syndrome, one with peripheral eosinophilia, one with bilateral eosinophilic mastitis, and one without peripheral eosinophilia or systemic symptoms, as was the case for this patient [2]. This case differed from that of the previously reported case of eosinophilic mastitis without peripheral eosinophilia in that the patient did not present with erythema or tenderness of the breast [3]. Eosinophilic mastitis can therefore present completely asymptotically and without increased levels of eosinophils in the blood.

As noted in the case report, this patient had no prior history of asthma or history of allergic reactions including urticaria, angioedema, or pruritis, except for seasonal allergic rhinitis. Elevated levels of eosinophils are seen in various allergic conditions, and these cells have been shown to play a modulatory role in the allergic immune response through various signaling molecules [4]. Although previous cases of eosinophilic mastitis have been associated with asthma, this was not the case for this patient.

Churg-Strauss syndrome is a form of vasculitis that affects small and medium-sized blood vessels. It is also known as granulomatosis with polyangiitis or allergic granulomatosis, and is associated with increased levels of eosinophils in the blood [1]. Final pathology in this patient did not reveal any granulomata or any other signs of Churg-Strauss vasculitis.

Hypereosinophilic syndrome is diagnosed by prolonged (6 months or more) peripheral eosinophilia (>1500 eosinophils per microliter) of unknown origin. It is defined by an increased number of peripheral eosinophils in the absence of any distinctive cause of eosinophilia, such as allergic conditions or parasitic infection [1]. Hypereosinophilic syndrome can lead to end organ damage mediated by activated eosinophils. The

activated eosinophils release cytokines that stimulate proliferation of other immune cells that infiltrate organs and lead to organ damage [5]. Peripheral eosinophil levels were normal in this case, and hypereosinophilic syndrome was ruled out.

In cases where hypereosinophilic syndrome or peripheral eosinophilia are present, eosinophilic mastitis has been treated with steroidal agents or antihistamine therapy, depending on the disease burden [1,5,6]. No treatment was necessary in this case as the patient was asymptomatic without peripheral eosinophilia.

It is important to note that while eosinophilic mastitis appears to be a benign, inflammatory condition, to the authors' knowledge no studies have been performed to investigate clonality of eosinophils or molecular drivers of the condition. Regardless of pathogenesis, eosinophilic mastitis can be managed conservatively without surgical intervention. Previous cases have described the condition presenting radiologically as an asymmetric density, an ill-defined mass, or increased reticulations seen on diagnostic mammogram. These findings are nonspecific and warrant further investigation to diagnose eosinophilic mastitis [3,6,7]. Eosinophilic mastitis can present similarly to breast carcinoma clinically and radiologically, and so it is imperative that it be accepted as a concordant finding when sampled adequately, in order to prevent patients from undergoing unnecessary follow up surgeries [6].

Patient consent

Consent has been obtained from the patient to use their information in this case report.

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