

Case Report

What's the Worm? Breast Calcifications in a Patient from Cameroon

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Abstract

Determining the significance of calcifications seen on mammogram can be a vexing problem for radiologists. Identifying benign morphologies can avoid unnecessary work-ups and procedures. We describe breast calcifications typical for filarial infection seen on screening mammogram in a patient who is a native of Cameroon. Filariasis is the most common parasitic infection affecting the breast, and is transmitted by insect vectors. It is most prevalent in parts of Africa, Asia, and India. In general, breast calcifications due to filarial infection in Westernized countries are seen in asymptomatic patients from endemic areas, and are the result of treated, chronic, or "burned out" infection. The epidemiologic, mammographic, and clinical and features of filarial infection are discussed.

Keywords: Filariasis; Breast calcifications; Mammogram

Case Presentation

A 68 year old female was referred by her primary care physician for routine screening mammography on our mobile mammography unit. The patient is a native of West Africa. She reported that her prior mammograms were performed in Cameroon and were not obtainable for comparison. At the time of screening, she was asymptomatic. She denied a family history of breast cancer, or a personal history of hormone use, prior breast procedures, or reduction surgery. Routine mammographic views show calcifications bilaterally. In the lower inner left breast (Figure 1a), there are thick linear calcifications with lucent centers. In the subareolar right breast (Figures 1b & 1c), there are thick linear calcifications arranged in a serpiginous configuration. In the upper inner right breast and central outer left breast (Figures 1d & 1e), there are fine linear calcifications arranged in a coiled configuration. In the upper outer right breast, there are more tightly grouped thick linear calcifications, for which the patient was called back for additional imaging. On magnification imaging (Figure 2), this group is comprised of monomorphic thick linear calcifications, representing fragments of similar-appearing calcifications in other areas of the breasts.

Based on the characteristic appearance of the breast calcifications, and appropriate epidemiologic history, the patient was given a BI-RADS Category 2 assessment and advised to return in one year for routine screening. The findings were reported by telephone to the referring Nurse Practitioner.

Discussion/Conclusion

Breast calcifications seen on this patient's mammogram are consistent with filariasis infection.

Filariasis is the most common parasitic infection affecting the breast [1], occurring mainly in sub-Saharan Africa; Southeast Asia; the Indian subcontinent; several Pacific islands; Northern Australia [2]; areas of Central and South America; and small areas of Caribbean, especially Haiti [3]. It is caused by roundworms that infect

the lymphatics and subcutaneous tissues. The majority of filarial lymphatic infections are caused by the *W. Bancrofti* species [3], which is transmitted to humans by mosquito vectors. Similar breast calcifications may also be seen from cutaneous infection with *Loa*, a nematode endemic to west and central Africa [4,5]. Co-infection with more than one helminthic species is not uncommon.

Filarial disease starts with a bite from an infected mosquito, which introduces larvae into the patient's bloodstream. The larvae migrate to local lymphatic vessels, where they mature into adult worms over a period of almost a year. At this time, the adult worms mate, producing microfilaria, which migrates through lymphatic's into the bloodstream. In most geographic areas, the concentration of circulating microfilaria is highest in the evening [3]. If a mosquito bites the infected individual during this time, it will ingest the organisms and then may infect other humans. The circulating microfilarias do not mature into adult worms; additional adult worms may only be introduced into a human host through subsequent bites by infected mosquitoes. Adult worms survive in the human lymphatics for five years or more.

Most individuals infected with filarial organisms are asymptomatic. However, the worms may incite a brisk inflammatory reaction. When the inflammation occurs around lymphatic vessels, it causes fibrosis, and over a period of time, lymphatic obstruction. This obstruction leads to the clinical syndrome of elephantiasis - swelling and skin thickening of the extremities. An elephantiasis-type presentation, however, is uncommon in the breast.

Acute symptomatic filarial infections involving the breast are unusual, and occur almost exclusively in endemic regions. They may present as firm, non-tender or painful subcutaneous breast nodules [6-9], with overlying skin hyperemia, peau d'orange, and/or nipple discharge [8]. On mammography, the nodules appear as dense ovoid masses [1], and may be associated with calcifications [1,9,10]. In this setting, the findings may appear alarming and prompt recommendation for biopsy. Rarely, ultrasound of the nodules show

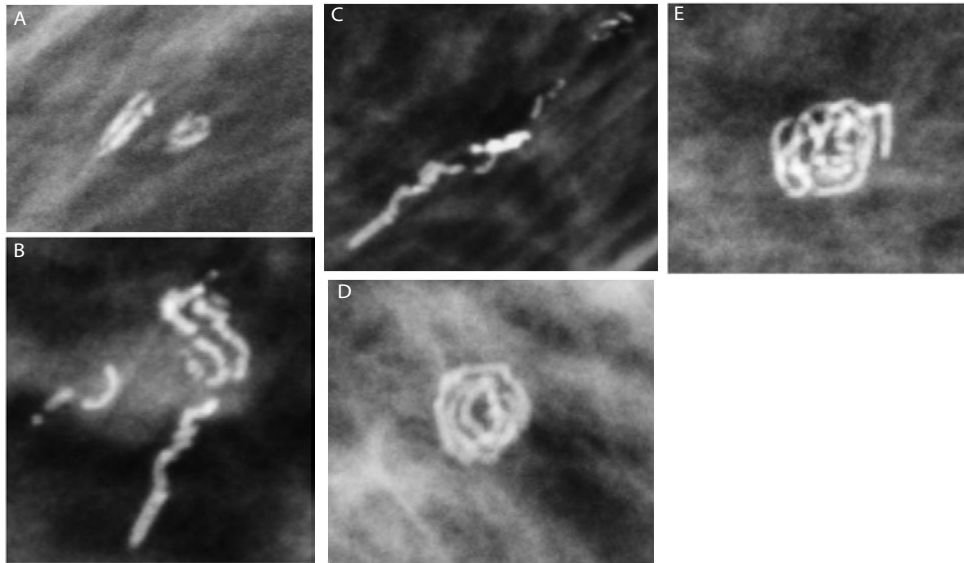


Figure 1: Screening mammogram of a 68 year old female from Cameroon shows calcifications characteristic of filarial infection. In the lower inner left breast, a left MLO view (a) shows thick linear calcifications with lucent centers. In the subareolar right breast, right CC (b) and right MLO (c) views show thick linear calcifications arranged in a serpiginous configuration. In the upper inner right breast and central outer left breast, right (d) and left (e) MLO views show fine linear calcifications arranged in a coiled configuration.



Figure 2: Magnification ML view of the upper outer right breast show a group of monomorphic thick linear calcifications, resembling fragments of similar-appearing forms in other areas of the breasts.

rhythmic movements of the organisms in dilated cystic lymphatics, a finding described as “filarial dance” [1,9].

Most breast calcifications from filarial infection, like those seen in our patient, are the result of treated, chronic, or “burned out” infection. Their presence is attributed to calcification of the dead parasites in perilymphatic soft tissue [1,2,5,9]. Although they are rarely encountered in Western countries, they are not unusual in other parts of the world. For example, Adeniji-Sofoluwe et al. [9] found them present in 7.4% of mammograms in Nigeria. As noted, their morphology does not readily conform to the BI-RADS lexicon. They have been described as serpiginous [1,2,5-7]; tortuous and ring-like [9]; wormlike [1,2,5]; meandering [5]; vermiform [4]; filamentous [5,6]; and tubular with lucent centers [7]. They have also been described as “continuous or beaded fine calcifications” and coiled, “hair-like whorls of calcifications” [9]. Several authors have

described them as typically bilateral, while one author notes them to be bilateral in only 12% of cases [4,5,9]. The calcifications may be seen in any area of the breast, including the subareolar region, but they most are most commonly found in the lower inner and upper outer quadrants [9,11]. Adeniji-Sofoluwe [9] reports that they occur more often in the left breast. In cases where only small fragments of the calcified worm are present, the findings may raise concern for breast malignancy and result in additional imaging, biopsy, and/or surgery. Calcifications due to chronic filarial infection tend to remain stable on follow up examinations [1,2,5].

In asymptomatic immigrants with filarial calcifications on mammogram, a CBC to exclude peripheral eosinophilia is sufficient to rule out active infection. In rare instances in which acute or active infection is suspected, assays for Circulating Filarial Antigen (CFA) and examination of peripheral blood smears for microfilaria may help confirm the diagnosis. Polymerase chain reaction assays have been used as research tools but are not commercially available [3].

In our case, the patient reported no palpable abnormalities, skin changes or nipple discharge in either breast at the time of screening or prior. The patient’s peripheral eosinophil level was normal. Most of the calcifications have the typical whirled, lucent-centered, or serpiginous, morphology described in other reports; however, some of the calcifications are located in the upper inner quadrant, an area of the breast less commonly involved. As is sometimes the case, a group of calcifications in the upper outer right breast comprised of only fragments of worms prompted additional imaging.

In summary, when characteristic calcifications are seen on mammograms in women from endemic areas, the diagnosis of filarial infection can be made. Knowledge of these unusual imaging findings may prevent unnecessary additional imaging or biopsy, especially when the patient is asymptomatic.

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