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BREAST IMAGES

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The evolving imaging features of lupus mastitis

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Systemic Lupus Erythematosus (SLE) is an autoimmune disorder that affects multi-organ systems. A total of 2%-3% of patients with SLE may develop recurrent lupus panniculitis that typically involves the upper arms, shoulders, face, and buttocks. When lupus panniculitis involves the breast, it is called lupus mastitis (LM). These patients often present with single or multiple palpable subcutaneous nodules, with or without skin involvement. LM can present with extensive peau d'orange appearance, mimicking inflammatory carcinoma.

The pathophysiology of LM is thought to be due to chronic inflammation of the subcutaneous fat, often as an extension of the inflammation in the overlying skin. In cases without dermal involvement, LM may result from vasculitis. SLE usually occurs before or concurrently with LM. Rarely, LM may precede clinical evidence of lupus. Biopsy is often required when the clinical and imaging features suggest malignancy. Because surgery may exacerbate LM, core biopsies are preferred over surgery for tissue diagnosis.

The histologic features of LM include lobular lymphocytic panniculitis and hyaline fat necrosis with dermal or epidermal involvement. Prominent perivascular, periductal, and perineural chronic inflammation can also be seen. Although not pathognomonic, these findings should raise a suspicion for LM. Due to the underlying histopathology of fat necrosis, the imaging findings of LM often evolve

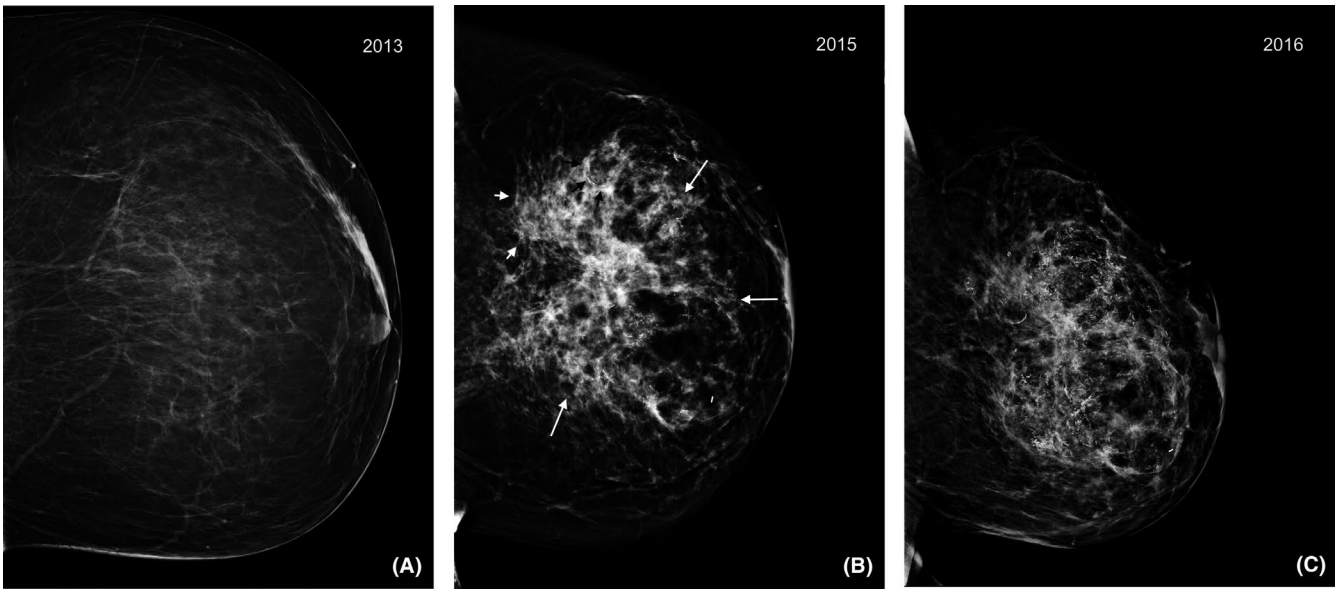

FIGURE 1 A 44-year-old woman with SLE present with bilateral palpable breast masses. Biopsies yielded fat necrosis. Sequential craniocaudal views of the left breast, A through C, demonstrate increasing breast density and decreasing breast size over 3 years. (A) Mammogram in 2013 is normal. (B) Mammogram in 2015 demonstrates heterogeneous microcalcifications (between white arrows) and rare curvilinear calcification (black arrowheads). Note architectural distortion due to fibrosis (white arrow heads). (C) Mammogram in 2016 shows dystrophic calcifications classic of fat necrosis

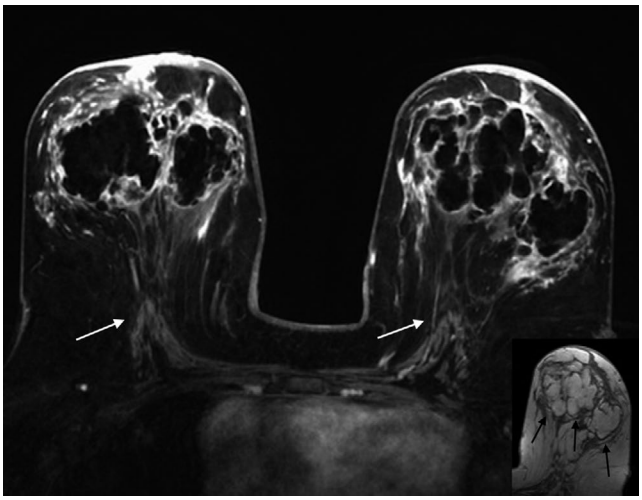

FIGURE 2 Bilateral axial fat-suppressed T1-weighted post-contrast MRI of the same patient reveals multiple fat-containing cavities surrounded by irregular enhancing rims, consistent with extensive fat necrosis. The enhancement is rapid, with mixed kinetics. Note tethering of pectoral muscles due to fibrosis (arrows) and thick, enhancing periareolar skin. The inset confirms fat signals within the cavities (black arrows) on a T1-weighted noncontrast image

with the various stage of fat necrosis during which the breasts are imaged. This explains its widely varied imaging features described by previous reports.

On mammography, LM may present as heterogeneous microcalcifications that eventually become curvilinear, and then progressively coarsen to form confluent sheets of dystrophic calcifications typical of fat necrosis. There are increasing mammographic density and decreasing breast size over time, reflecting fibrosis (Figure 1). Like fat necrosis, other mammographic findings include focal asymmetries and irregular ill-defined or circumscribed masses.

Sonographic findings reflect various stages of fat necrosis, including ill-defined echogenic areas upon acute adipocyte injury, hypoechoic masses during the fibrotic phase, and masses with hyperechoic foci and acoustic shadowing representing calcifications.

The MRI features of LM closely follow that of fat necrosis (Figure 2). Initially, there is a fat containing mass with thick, continuous, peripheral enhancement, which becomes thin and discontinuous with medical treatment. Multiple lesions of different acuity often coexist. MRI findings of bilateral extensive fat necrosis may be useful in establishing a diagnosis of LM and demonstrating extent of disease when the findings on other modalities are equivocal.

For appropriate diagnosis and management, LM should be included in the differential diagnosis when a patient with a history of SLE presents with a palpable mass or skin changes of the breast.

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