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Rare disease

Lupus mastitis: a mimicker of breast carcinoma

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Summary

The authors present a case of lupus mastitis which was initially diagnosed following an incisional biopsy of a breast lump, with similar pathology found 2 years later after an ultrasound guided biopsy of the same lump. The woman had been diagnosed 7 years before with systemic lupus erythematosus. The radiological and pathological features are presented in this report with discussion of similar cases in the literature.

BACKGROUND

Lupus panniculitis (LP) is an uncommon entity, first described by Kaposi in1883.[1] Lupus mastitis (LM) is a rare presentation of LP involving the deep subcutaneous adipose tissue of the breast. While affected patients are usually known to have systemic (SLE) or discoid lupus erythematosus (DLE), mastitis can also herald the onset of SLE or DLE. The pathological process that causes LM is not fully understood.[2]

SLE is an autoimmune disease in which cells undergo damage mediated by autoantibodies and immune complexes. On breast imaging, LM can mimic malignancy, however it has distinctive histologic features including a lobular lymphocytic panniculitis and hyaline fat necrosis,

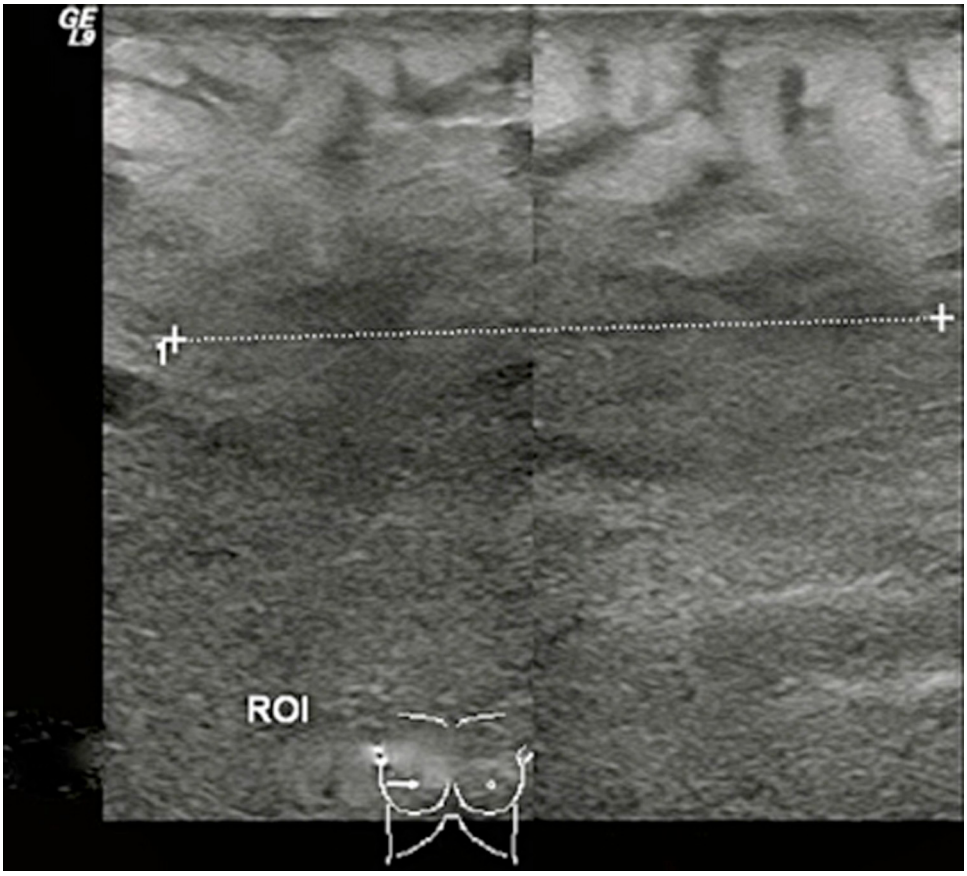

Figure 1 Right breast ultrasound: diffusely oedematous tissue throughout the breast with an irregular hypoechoic mass at the lateral aspect of the breast in the 9 o'clock position.

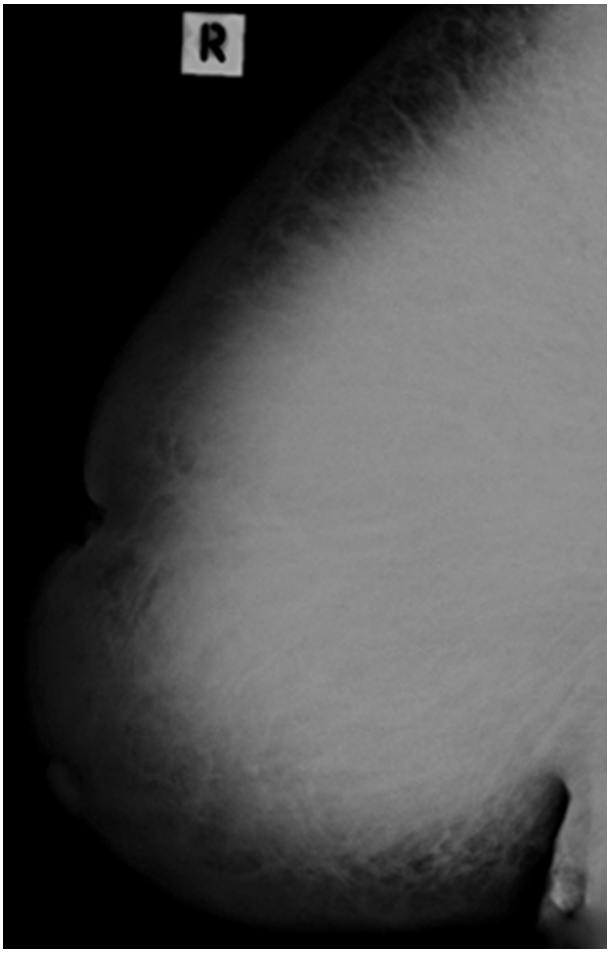

Figure 2 Right breast mammogram: gross asymmetric increase density involving the right breast when compared to the left. No focal mass lesion or calcification was noted.

which enable specific diagnosis. Marked improvement of symptoms often occurs with immunosuppressive therapy and surgery should be avoided where possible, as this may trigger an additional flare of the disease.[3]

A case of LM is reported emphasising the radiological and pathological findings and briefly reviewing the literature.

CASE PRESENTATION

A 34-year-old female presented to the emergency department with fever, right breast swelling and pain. She had known complications secondary to SLE including lupus-induced nephritis resulting in end stage renal failure, which was managed by haemodialysis. A combination of a right brachiocephalic fistula and superior vena cava stenosis led to right breast oedema that subsided following angioplasty and stenting.

Other medical history included mitral valve disease secondary to rheumatic fever with subsequent mechanical valve replacement, hypertension, staphylococcal endophthalmitis, recurrent pneumococcal sepsis and dyslipidaemia.

On examination of the right breast, swelling of the axillary tail of the breast and the tissues over the lateral thoracic wall

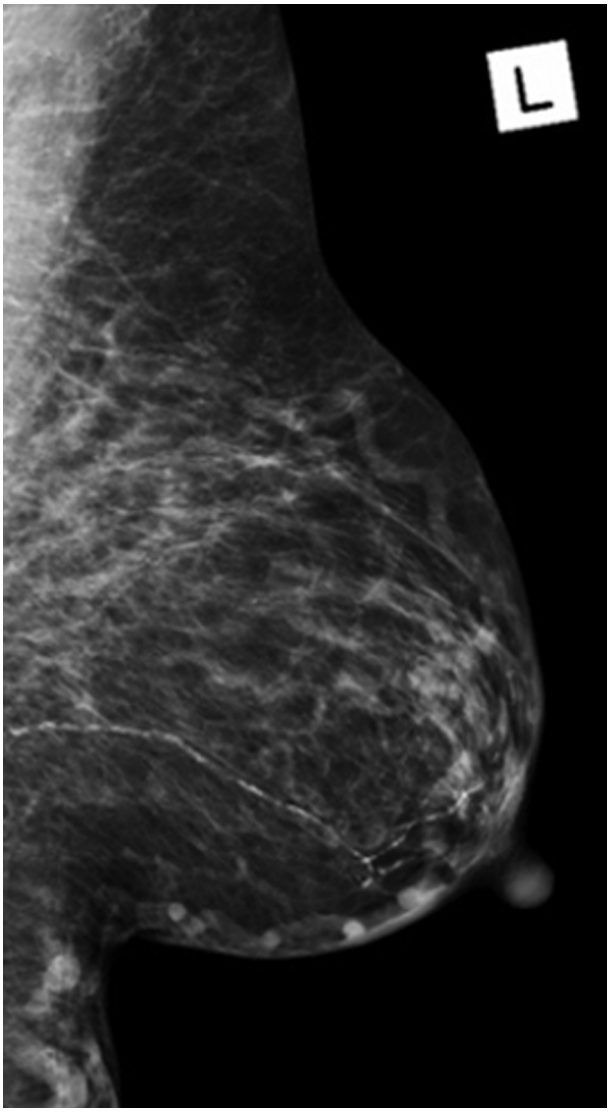

Figure 3 Left breast mammogram: gross asymmetric increase density involving the right breast when compared to the left. No focal mass lesion. Vascular calcification was noted.

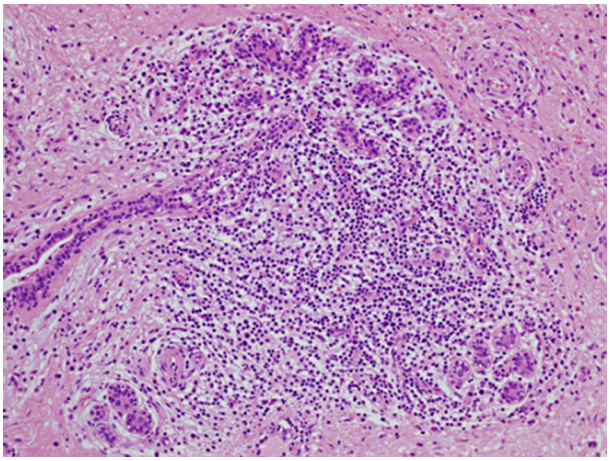

Figure 4 H&E stain: lymphocytic lobulitis with lobular atrophy, objective magnification x20.

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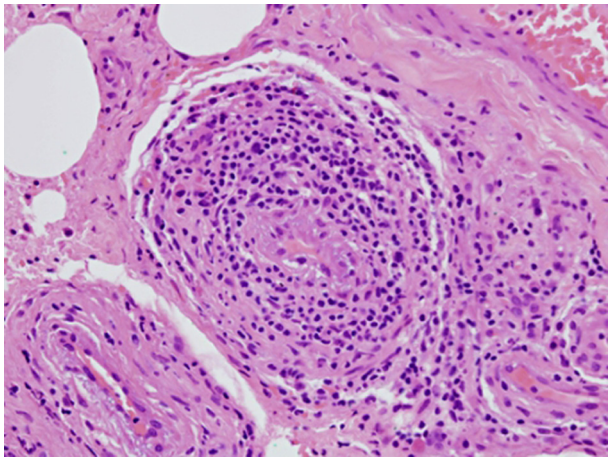

Figure 5 H&E stain: perivascular lymphocytic infiltration, objective magnification x40.

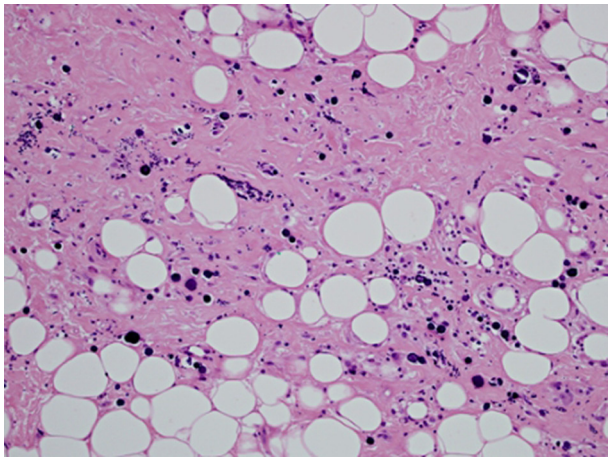

Figure 6 H&E stain: interstitial fibrosis and calcification within fat, objective magnification x20.

Table 1 Demographic findings in LM

Demographics				
Study	**Age (y)**	**Sex**	**Race**	**Lupus history**
Arsenovic and Terzic[23]	33	F	NA	SLE 3 years
Bachmeyer *et al*[18]	30	F	NA	DLE for 11 years
Bayar *et al*[3]	23	F	NA	DLE for 2 years
Carducci *et al*[7]	62	F	NA	DLE diagnosed after LM
Castro *et al*[5]	18	F	Afro-Brazilian	SLE for 2 years
Cernea *et al*[24]	33	F	White	DLE
Cerveira *et al*[15]	28	F	NA	5 Year history of SLE; 2 Year history of LP at other sites
Chen *et al*[6]	29	F	African American	SLE for 5 years
Crevits *et al*[16]	50	M	NA	SLE
De Bandt *et al*[8]	21	F	African American	SLE diagnosed after LM presentation
Fernandez-Flores[11]	42	M	NA	None identified
Fernandez-Torres[11]	57	F	NA	None identified
Georgian-Smith *et al*[17]	44	F	NA	SLE for 16 years
Guerre *et al*[19]	46	F	NA	SLE for 10 years
Harris and Winkelmann[28]	36	F	African American	DLE for 11 years
Harris and Winkelmann[28]	70	F	White	DLE for 37 years
Holland *et al*[20]	49	F	African American	DLE (length of disease not specified)
Holland *et al*[20]	26	F	African American	SLE 6 years
Kinonen *et al*[4]	52	F	African American	DLE
Kinonen *et al*[4]	58	F	African American	SLE 15 years
Martella *et al*[12]	43	M	NA	SLE and antiphospholipid antibody syndrome for 8 years
Nigar *et al*[25]	40	F	NA	SLE for 1 year
Pons and Ortiz-Medina[29]	58	F	Hispanic	None identified
Sabate *et al*[26]	33	F	NA	SLE for 7 years with discoid lesions
Summers *et al*[10]	43	F	African American	SLE (length of disease not specified)
Tuffanelli DL[13]	49	F	White	SLE with discoid for 20 years
Vidal Pich *et al*[14]	13	F	Hispanic	SLE (length of disease not specified)
Wang *et al*[21]	28	F	Asian	SLE for 13 years
Wani *et al*[22]	26	F	NA	SLE for 15 years
Current case	36	F	Australian Aboriginal	SLE for 8 years
Winkelmann[9]	NA	M	NA	NA

DLE, discoid lupus erythematosus; LM, lupus mastitis; LP, lupus panniculitis; SLE, systemic lupus erythematosus;

was noted. The breast appeared inflamed, and was tender and warm to palpation. Other systems were normal.

INVESTIGATIONS

A breast ultrasound was performed to search for an abscess or collection. The breast appeared diffusely oedematous and an irregular hypoechoic area was noted laterally at the 9 o'clock position (figure 1).

Mammography showed generalised increased density of the right breast compared with the left. No focal mass lesion or calcification was visible (figures 2 and 3).

Table 2 Imaging findings in lupus mastitis

Study	Mammography	Ultrasound
Arsenovic and Terzic[23]	Heterogeneous mass with multifocal coarse calcifications with poorly defined margins	Ill-defined heterogeneous mass with multifocal coarse calcifications
Bachmeyer *et al*[18]	Coarse and curvilinear calcifications along the galactophoric ducts	Not suggested
Bayar *et al*[3]	Dense tissue with coarse calcifications in the midline and lower half of the breast	Ill-defined, heterogeneous breast area with axillary lymphadenopathy. Parenchymal heterogeneity with skin thickening. No distinct mass
Carducci *et al*[7]	An area of asymmetric density and hypodiaphania in the upper quadrant of the right breast	Subcutaneous tissue thickening. Ill-defined hyperechoic area in the subcutaneous fat with no associated vascularity
Castro *et al*[5]	Dense breast tissue with an irregular, heterogeneous, ill-defined mass	Multiple nodular areas with inner echoes and ductal ectasia. Diffuse parenchyma texture and subcutaneous thickening
Cernea *et al*[24]	Dense breast tissue with an irregular, heterogeneous, ill-defined mass	Ill defined, heterogeneous hyperechoic mass, extending into the subcutaneous fat
Cerveira *et al*[15]	Bilateral coarse multiple calcifications	Coarse calcifications
Chen *et al*[6]	Not suggested	Ill-defined isoechoic heterogeneous mass
Crevits *et al*[16]	Coarse pleomorphic calcifications, diffusely spread all over the right breast	Not suggested
De Bandt *et al*[8]	Homogenous round opacities	Not suggested
Fernandez-Flores[11]	Not suggested	Not suggested
Fernandez-Torres[11]	No significant abnormality	Not suggested
Georgian-Smith *et al*[17]	Segmental heterogeneous calcifications. Diffuse increased density of fibroglandular tissue	Not suggested
Guerre *et al*[19]	Bilateral non-specific breast calcification	Multiple cysts with generalised parenchymal oedema and skin thickening
Harris and Winkelmann[28]	Mammograms were interpreted as carcinoma of the breast	Not suggested
Harris and Winkelmann[28]	Tiny, benign-appearing nodule in the upper portion of the left breast	Not suggested
Holland *et al*[20]	Scattered microcalcifications with a small amount of residual fibroglandular tissue	Not suggested
Holland *et al*[20]	Right upper outer quadrant breast mass	Solid mass
Kinonen *et al*[4]	Hazy, ill-defined, soft tissue density, but no discrete mass or calcifications	Ill-defined hyperechoic mass with mild to moderate vascularity
Kinonen *et al*[4]	Focal irregular density in the upper central portion of the breast with microcalcifications	Heterogeneous area with increase vascularity
Martella *et al*[12]	Not suggested	Echogenic subcutaneous lump, with irregular margins
Nigar *et al*[25]	Irregular mass in the superior aspect of the right breast	Hypoechoic area with minimal vascularity
Pons and Ortiz-Medina[29]	Not suggested	Not suggested
Sabate *et al*[26]	Irregular mass with ill-defined margins involving the subcutaneous fat pad and skin thickening	Echogenic mass with ill-defined margins concerning the anterior fat pad involving the adjacent glandular parenchyma with skin thickening
Summers *et al*[10]	Dense breast tissue with an irregular, heterogeneous, ill defined mass with calcifications	Not suggested
Tuffanelli DL[13]	Not suggested	Not suggested
Vidal Pich *et al*[14]	Not suggested	Not suggested
Wang *et al*[21]	Multifocal, coarse calcifications with a linear pattern in both breasts	Several ill-defined hypoechoic areas in the breast parenchyma bilaterally. No associated vascularity
Wani *et al*[22]	Diffuse calcifications bilaterally	Diffuse calcifications with acoustic shadowing
Current case	Widespread increased density compared to the left breast	Irregular nodular mass with multiple axillary lymph nodes showing thickened cortices
Winkelmann[9]	Not suggested	Not suggested

The differential diagnosis for these appearances included mastitis with early abscess formation and malignancy with inflammatory carcinoma.

Surgical incision and drainage of the right breast was performed, however, there was no drainable collection and an excisional biopsy (30×25×15 mm) was performed.

Histopathological analysis revealed hyaline fat necrosis with prominent calcification and sclerosis, periductal and perilobular lymphocytic infiltrates and vascular changes including lymphocytic vasculitis. No evidence of malignancy was seen and in the clinical setting of existing SLE, LM was diagnosed (figures 4–6).

DIFFERENTIAL DIAGNOSIS

The most important differential diagnosis to exclude is inflammatory carcinoma of the breast. As the sonographic imaging features were suspicious, biopsy was performed to exclude malignancy.

Histopathological analysis demonstrated hyaline fat necrosis, sclerosis, calcification and lymphocytic vasculitis. These features are considered virtually pathognomonic for LM, with the presence of germinal centres excluding a subcutaneous panniculitis like T cell lymphoma.

Diabetic mastopathy can mimic LM histopathologically however, LM has a more extensive, less circumscribed lobular infiltrate.[4]

Primary medullary carcinoma also needs to be considered in the differential diagnosis, however in this case given the absence of both malignant epithelial cells on histology and the lack of a well-circumscribed lesion on mammogram and ultrasound, led this to be discounted.

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Table 3 Histopathological findings in lupus mastitis

Study	Location	Pathology
Arsenovic and Terzic[23]	Right breast	Extensive hyaline fat necrosis associated with a lymphocytic infiltrate, both surrounding and in the lobular septa; microcalcifications present; lymphocytic vasculitis
Bachmeyer *et al*[18]	Right breast	Voluminous calcifications with a fibrous reaction in breast parenchyma and rare ducts surrounded by lymphocytic infiltrate
Bayar *et al*[3]	Right breast	Extensive stromal fibrosis, ductal and lobular atrophy and scattered stromal lymphocytes infiltrating some ducts
Carducci *et al*[7]	Right breast	Lymphocytic lobular panniculitis with fat necrosis
Castro *et al*[5]	Right breast	Lymphoplasmacytic infiltrate rich in xanthomatous histiocytes, fat necrosis and ductal hyperplasia
Cernea *et al*[24]	Left breast	Hyalinisation of subcutaneous fat cells and collagen in the dermis with lymphocytic infiltrate
Cerveira *et al*[15]	Left breast	Lobular and periseptal panniculitis with focal hyaline fat necrosis, lymphocytic infiltrate and coarse calcifications
Chen *et al*[6]	Both breasts	Extensive mixed inflammatory cell infiltrate of lymphocytes, plasma cells around breast lobules and small vessel walls
Crevits *et al*[16]	Right breast	No biopsy or excision performed
De Bandt *et al*[8]	Both breasts	Hyaline fat coagulation, lymphocytic reaction and hyalinization of fat lobules with sclerosis/ microcalcifications
Fernandez-Flores[11]	Left breast	Lymphocytic panniculitis and vasculitis
Fernandez-Torres[11]	Left breast	Hyaline fat necrosis/calcifications, lymphocytic vasculitis; lymphoplasmacytic infiltrate in the reticular dermis/subcutaneous fat, germinal centres present
Georgian-Smith *et al*[17]	Left breast	Fat necrosis with microcalcification. Mastectomy confirmed the diagnosis of lupus mastitis
Guerre *et al*[19]	Both breasts	Lymphocytic panniculitis with fat necrosis
Harris and Winkelmann[28]	Left breast	Did not describe specific features – 'consistent with lupus erythematosus panniculitis'
Harris and Winkelmann[28]	Both breasts	Biopsy never performed
Holland *et al*[20]	Right breast	Fat necrosis and inflammation
Holland *et al*[20]	Right breast	Chronic inflammation and fat necrosis compatible with panniculitis
Kinonen *et al*[4]	Both breasts	Hyaline fat necrosis with lymphocytes in the subcutaneous fat, with germinal centre formation
Kinonen *et al*[4]	Left breast	Prominent hyaline fat necrosis with widespread lymphocytic infiltration of the adipose tissue
Martella *et al*[12]	Left breast	Panniculitis with areas of hyaline necrosis, perivascular inflammation and vasculitis
Nigar *et al*[25]	Right breast	Inflammation and degenerative features consistent with lupus mastitis
Pons and Ortiz-Medina[29]	Both breasts	Findings suggestive of lupus mastitis
Sabate *et al*[26]	Left breast	Lobular panniculitis, including areas of hyaline and fat necrosis, perivascular lymphocytic inflammation and vasculitis
Summers *et al*[10]	Right breast	Lobular lymphocytic panniculitis with lymphoplasmacytic infiltrates extending into fat and hyaline sclerosis of fat lobules
Tuffanelli DL[13]	Right breast	Lymphocytic panniculitis
Vidal Pich *et al*[14]	Right breast	Findings suggestive of lupus mastitis
Wang *et al*[21]	Both breasts	Coarse dystrophic calcification, fatty necrosis and perivascular lymphocyte infiltration
Wani *et al*[22] (BMJ case reports)	Left breast	Did not describe specific features – 'consistent with lupus mastitis'
Current case	Right breast	Fat necrosis with prominent calcifcation and sclerosis, lymphocytic infiltrates/vasculitis
Winkelmann[9]	Breast	ductal calcification

Other differential diagnoses for a tender swollen breast included mastitis with abscess formation and breast oedema secondary to superior vena cava obstruction.

TREATMENT

While steroid therapy is the treatment of choice for LP, this was deemed inappropriate for our patient because Pseudomonas was isolated from a swab of the biopsy site placing her at risk of developing local infection or systemic complications, and in view of the history of recurrent sepsis. She continued on oral antibiotics and the changes in her right breast gradually improved.

OUTCOME AND FOLLOW-UP

Two years later, the patient presented with similar symptoms in the right breast with swelling, pain and fever. Clinical examination revealed peau d'orange and no discrete underlying palpable mass.

Breast ultrasound showed a 7 cm mass in the upper outer quadrant associated with generalised breast oedema and axillary lymphadenopathy. Ultrasound guided core biopsy again showed findings consistent with LM.

DISCUSSION

Panniculitis is an inflammatory reaction in the subcutaneous adipose tissue that affects connective tissue septa of fat lobules.[2]

Panniculitis may be acute or chronic[4] and when associated with SLE or DLE, is termed lupus erythematosus profundus or lupus panniculiltis (LP), a name first coined by Kaposi in 1883.[1] LP is rare, occurring in only 2–3% of patients with SLE.[5 6] LP is usually seen following the diagnosis of SLE/DLE but on rare occasions, may be the initial presentation.[7 8]

If breast tissue is involved, LP is called LM. Overlying skin can be normal erythematous, poikilodermic, hyperkeratotic or ulcerated.[9] The aetiology of SLE is not well understood, but is thought to be an autoimmune disease in which organs, tissues and cells undergo damage mediated by tissue-binding autoantibodies and immune complexes.[10]

A literature search using PubMed revealed 30 previously described cases of LM[6 9 11–14] in addition to ours, with the findings summarised in tables 1–3.

Of the 31 cases, 27 were female and 4 were male. The age of diagnosis ranged between 13 to 70 years in women

(mean 39 years) and 42 to 50 years in men (mean 45 years).

In two of the female cases, SLE/DLE was diagnosed following the initial finding of LM.[7 8]

Mammogram

Frequency of mammographic findings in LM:

Mammographic findings	Frequency	Percentage total (%)
Calcification of various types only	9[3 15–22]	30
An irregular ill-defined mass associated with calcifications	3[4 10 23]	10
An irregular non-calcified mass	5[5 20 24–26]	16
An area of asymmetric density	2[4 7]	6
No significant abnormality	1[27]	3
Appearances suggesting breast carcinoma	1[28]	3
Solitary benign nodule	1[28]	3
Multiple round well-defined nodules	1[8]	3
Widespread increased density	Current case	3
Not performed or findings not discussed	7[6 9 11–14]	23

Ultrasound

Frequency of ultrasound findings in LM:

Ultrasound findings	Frequency	Percentage total (%)
Ill-defined mass with varying echogenicity	10[3 4 6–7 12 21 23–24 26]	33
Coarse or diffuse calcification	2[15 22]	6
Calcified mass	1[23]	3
Solid mass	1[20]	3
Nodular areas	1[5]	3
Heterogeneous area with increased vascularity	1[4]	3
Multiple cysts with generalised parenchymal oedema and skin thickening	1[19]	3
Not performed or radiological report not discussed	14[8–11 13 14 16–18 20 27–29]	46

MRI

A single case of LM evaluated by MRI showed an ill-defined, lobulated heterogeneous rim enhancing mass involving the subcutaneous fat.[26]

Histopathology

Highly indicative (virtually pathognomonic) findings include lymphocytic lobular panniculitis with hyalinised fat necrosis.[10]

The lymphocytic infiltration is one of small, mature lymphocytes admixed with plasma cells mainly involving fat lobules however septal involvement may occur.

The presence of germinal centres may aid in differentiating LM from low-grade lymphoma.[4]

Treatment

LM is a medical disease with treatment consisting of antimalarial agents and corticosteroids for combination therapy. Surgical management can risk triggering an additional flare and should only be considered in patients who do not respond to medical treatment.[3]

Learning points

- LM should be considered in the differential diagnosis of a suspicious breast mass on mammography or ultrasound particularly if the patient has a background of SLE/DLE.
- Histopathological findings of lymphocytic lobular panniculitis with hyalinised fat necrosis are virtually pathognomonic for LM.
- The diagnosis of LM is important to consider because the condition may be exacerbated by surgery.
- Antimalarial agents and corticosteroids are the first line treatment agents for LM.
- Careful patient follow-up is necessary to exclude malignancy.

Competing interests None.

Patient consent Obtained.

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