Case Report

A Rare Case: Lipomembranous Panniculitis Associated with Peripheral Arterial Disease

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Abstract

Lipomembranous panniculitis (LP) is a rare type of fat necrosis characterized by membranocystic alterations. Rare cases of LP associated with peripheral arterial disease (PAD) have been reported. We report a case of 66-year-old female patient with a history of PAD who presented with multiple painful, tender, erythematous nodules and ulcers with irregular borders and violaceous edges on both thighs and legs. Histopathology confirmed the diagnosis of LP. Dermatologists should be aware of this entity when panniculitis is suspected, particularly in patients with vascular disorders.

Keywords: Panniculitis, fat necrosis, Nasu-Hakola disease, membranous fat necrosis

Introduction

Lipomembranous panniculitis (LP), also known as lipomembranous fat necrosis (LFN), lipomembranous changes, membranous fat necrosis, membranocystic changes or fat necrosis, membranous lipodystrophy-like changes, and pseudomembranous fat necrosis, is a rare and specific type of fat necrosis characterized by membranocystic alterations.[1,2] It may be primary or associated with different clinical conditions, such as venous insufficiency that is present most of the time, diabetes mellitus (DM), and rheumatoid arthritis (RA).[3-5] In addition, peripheral arterial disease (PAD) is one of the conditions associated with LP.[2,4-6] There are scarce reports of the entity in the literature.

Here, we present a 66-year-old female patient with a history of various systemic disorders and PAD who presented with painful erythematous papulonodular and ulcerated lesions, sclerotic plaques, and atrophic scars on both legs with acral necrosis of both feet.

Case Report

A 66-year-old female patient was admitted to our clinic with painful bilateral erythematous lesions and wounds for 2 years. She had a history of systemic disorders, including DM, PAD, RA, vertigo, hypertension, hypothyroidism, and arrhythmia. There was no history of smoking, trauma, or discharge. The patient was diagnosed with infection at an external center, and topical and oral antibiotics were initiated; however, there was no regression in the lesions. A history of balloon angioplasty performed on both legs by a cardiovascular surgeon was noted 1 month ago because of peripheral arterial insufficiency. However, balloon angioplasty was unsuccessful in the right leg, where acral necrosis was more severe. She did not report any joint or cardiac problems.

Dermatological examination revealed widespread painful, tender, erythematous papulonodule and ulcers with irregular borders with erythematous and violaceous surroundings and

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atrophic scars on both thighs and legs. Some ulcers had a punch-out appearance and crusts. The right leg has sclerotic plaques. There was necrosis in all right and second, third, and fifth toes of the left foot (Figure 1a-d). There were no signs of stasis dermatitis or varicose veins. During follow-up of the patient, the erythematous, tender papules, and nodules developed ulcers. An incisional biopsy was performed with the differential diagnosis of arterial ulcer, pyoderma gangrenosum, cutaneous embolism, erythema induratum of Bazin, panniculitis, and deep fungal infections for histopathological evaluation. In addition, tissue biopsy cultures of bacteria, mycobacterium, and fungi were also performed. Pseudomonas aeruginosa was identified in the tissue biopsy culture, and ceftazidime was started. Other tissue cultures resulted in negative.

Histopathological examination revealed mixed inflammation under the ulcer, which also inflamed the vascular structures. Lipomembranous structures and calcifications forming hairy appendages in the fatty lobules of subcutaneous fatty tissue were detected. A pale-colored eosinophilic material is present in the necrotic fat lobules (Figure 2a-c). The appearance of the membrane structures was consistent with the arabesque type and was stained with periodic acid-Schiff. The diagnosis of the LP was confirmed by the characteristic histopathological findings.

Deep vein thrombosis was excluded by venous Doppler ultrasound examination. In computed tomography angiography, dense calcific plaque formations were observed in both popliteal arteries along the superficial femoral artery traces and in the arterial segments distal to the popliteal arteries. The results were consistent with advanced peripheral vascular disease with arterial stenosis, and partial amputation was planned after mitigation of the infection.

The laboratory tests showed hemoglobin 104 gr/L [relative risk (RR): 115-155 gr/L], hematocrit: 28.5% (RR: 35.5-48%), erythrocytes: $3.46x10^{12}$/L (RR: $3.8-5.6x10^{12}$/L), neutrophils: $8.49x10^{9}$/L (RR: 1.56-6.13 $x10^{9}$/L), lymphocytes: $0.96x10^{9}$/L (RR: 1.18-3.74 $x10^{9}$/L), monocytes: $0.61x10^{9}$/L (RR: 0.24-0.36 $x10^{9}$/L), aspartate aminotransferase: 32 U/L (RR: 28-100 U/L), C-reactive protein: 333 mg/L (RR: < 5 mg/L),

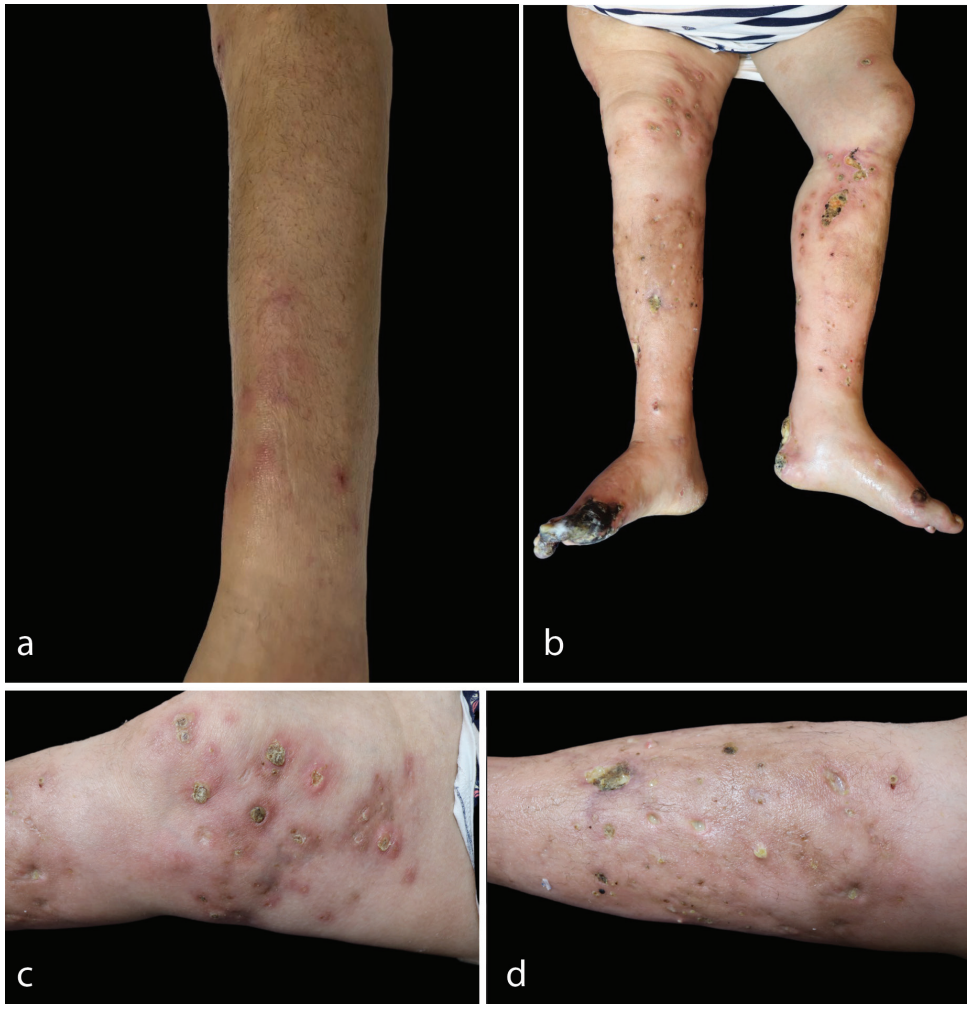

Figure 1. (a) Multiple erythematous nodules on the left leg. (b-d) Multiple ulcers with irregular borders and violaceous edges on both legs and thighs

erythrocyte sedimentation rate: 52 mm/h (RR: 2-20 mm/h), albumin: 30.5 g/L (RR: 35-52 g/L), sodium: 125 mmol/L (RR: 136-145 mmol/L), calcium: 8.4 mg/dL (RR: 8.5-10.3 mg/dL), chlorine: 90 mmol/L (RR: 98-107 mmol/L), creatinine: 3.42 mg/dL (RR: 0.5-0.9 mg/dL), lactate dehydrogenase: 361 U/L (RR: 135-214 U/L), creatine kinase: 389 U/L (RR: 26-192 U/L), blood glucose level: 138 mg/dL (RR: 74-109 mg/dL), total protein: 56.3 g/L (RR: 66-87 g/L), free T4: 20.2 ng/L (RR: 8.9-17.1 ng/L). Serum complement, alpha-1 antitrypsin, serum amylase, and lipase levels, and complete urinalysis were normal. Rheumatoid factor was positive, and antithrombin III activity was 73% (RR: 80-120%). Laboratory studies were negative for antinuclear antibodies, anti-dsDNA, anti-Ro, anti-La, anti-SM, anti-RNP, and anti-Scl 70.

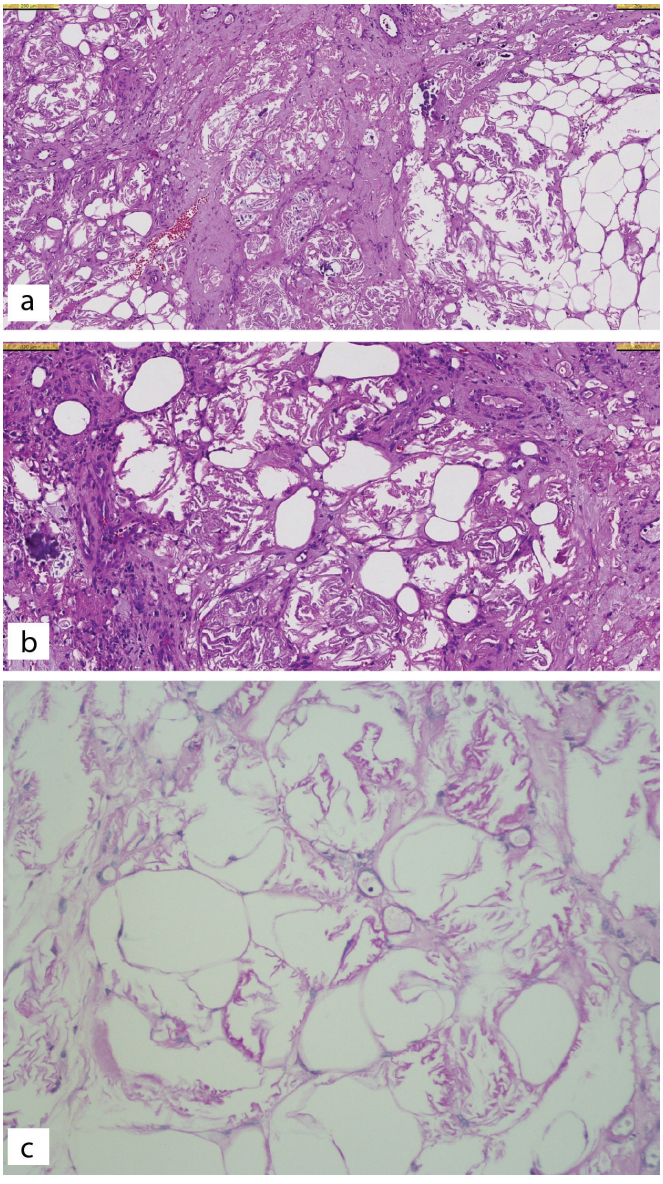

Figure 2. (a, b) Pseudocyst structures lined with thin eosinophilic biomembrane structures and hairy extensions in fat spaces. Hematoxylin and eosin: (x200, x400, respectively). (c) The membrane was stained with periodic acid-Schiff (x200)

Discussion

LP was first described in the Nasu-Hakola disease, which is characterized by the membranocystic degeneration of long bones and adipose tissues as well as the sudanophilic leukodystrophy of cerebral hemispheres first described by Nasu et al.[7] in 1973. However, subsequent reports demonstrated that the membranocystic changes could be associated with various conditions.[2-6,8] Considering data in the literature, factors such as diabetic microangiopathy, vasculitic involvement in RA, PAD, and susceptibility to thrombosis (low antithrombin III activity) are also included in the pathogenesis of this disease, which is thought to be a result of ischemia of the fatty tissue.[3-5,8,9] In our patient, there was a history of DM, PAD, RA, and low antithrombin III activity in laboratory findings. The coexistence of many conditions associated with the etiopathogenesis of the disease may explain why our patient's clinic was so acute and severe. In addition, following the emergence of symptoms such as pain and bruising related to PAD; painful, erythematous nodules subsequently turned into ulcers on the bilateral legs and thighs. Therefore, the onset of LP lesions in the legs occurred simultaneously with the symptoms of PAD, suggesting that PAD was the main factor in the pathogenesis of the disease in our patient. No treatment has been reported to be particularly effective in the literature.[10]

The typical clinical feature of this disease is the presence of subcutaneous nodules or sclerotic plaques, often found on the lower legs and symmetrically distributed. The clinical findings in our patient, clinical findings consistent with the literature. In addition, LFN may involve the joints and heart valves.[1] However, there was no evidence of joint or heart valve involvement in our case.

The histological features of the LP are characterized by cystic areas of fat necrosis lined by hyaline acidophilic membranes on hematoxylin and eosin (H & E)-stained sections. The membranes are projected into the cystic spaces. LFN can also be demonstrated by periodic acid-Schiff staining with or without diastasis, Sudan black B, oil red O staining, Azan-Mallory or Masson trichrome staining, orcein staining, long Ziehl-Neelsen staining, silver impregnation, phosphotungstic acid-hematoxylin staining, and Luxol fast blue staining. In addition, LFN membranes with an "arabesque" or "frost on a windowpane" appearance have been described by some authors.[1] Other variable histological features of LP include dilated veins, hemorrhage, endarteritis obliterans, sclerosis, calcified vessels, and hemosiderin deposition.[2] Previous studies have suggested that lipomembranous changes occur as a result of the interaction between residual elements of necrotic fat cells and macrophages, probably as a consequence of inflammatory and ischemic disorders in fatty tissues.[8] Other than LP, panniculitis associated with vascular disease includes

arteriosclerosis, diabetic microangiopathy, necrotizing vasculitis, panarteritis nodosa, thromboangiitis obliterans, and venous insufficiency.[11]

On the other hand, loss-of-function variants in TYROBP/DAP12 or TREM2 have been reported in "Nasu-Hakola disease", but patients without this hereditary disease have also been reported.[1] Unfortunately, we did not perform genetic testing in our case.

In a study conducted by Snow and Su[8], which evaluated 38 cases, the mean age of the patients was 57 years (range 32-86 years), and 34 patients (89%) were women. The most common clinical context in which this condition was observed was in patients with chronic sclerotic plaques of the lower legs associated with venous insufficiency (37% of the total cases). All patients were women, and the majority were obese in these cases.[6] The demographic and clinic features, such as age, sex, and location of the lesions, were compatible with the literature in our case.

In conclusion, in cases of suspected panniculitis, particularly in patients with vascular disorders, it is important to consider the LP, which is a rare histopathological variant. New studies are needed on the treatment of LP, regardless of any associated diseases and the underlying cause.

Footnotes

Informed Consent: It was obtained.

Authorship Contributions

Concept: İ.K.A., D.T., A.A., B.Ö.K., S.Ö.H., E.K., Design: D.T., Data Collection or Processing: K.A., D.T., A.A., B.Ö.K., Analysis or Interpretation: İ.K.A., B.Ö.K., Literature Search: İ.K.A., D.T., A.A., B.Ö.K., S.Ö.H., E.K., Writing: İ.K.A., D.T., B.Ö.K., S.Ö.H., E.K.

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References

1. Matsukuma S, Matsunaga A, Takahashi O, Ogata S. Lipomembranous fat necrosis: A distinctive and unique morphology (Review). Exp Ther Med. 2022;24:759.
2. Alegre VA, Winkelmann RK, Aliaga A. Lipomembranous changes in chronic panniculitis. J Am Acad Dermatol. 1988;19:39-46.
3. Asadi-Kani Z, Moravvej H, Gaisari M, Kavand S, Saeedi M. A case of lipomembranous panniculitis associated with rheumatoid arthritis. Iran J Dermatol. 2009;12:27-29.
4. Machinami R. Incidence of membranous lipodystrophy-like change among patients with limb necrosis caused by chronic arterial obstruction. Arch Pathol Lab Med. 1984;108:823-826.
5. Sueki H, Shinmura Y, Fujisawa R, Jitsukawa K, Sato S. Ultrastructural study of the histogenesis of membranocystic lesions (Nasu) in diabetics. J Cutan Pathol. 1986;13:390-401.
6. Segura S, Pujol RM. Lipomembranous fat necrosis of the subcutaneous tissue. Dermatol Clin. 2008;26:509-517.
7. Nasu T, Tsukahara Y, Terayama K. A lipid metabolic disease-"membranous lipodystrophy"-an autopsy case demonstrating numerous peculiar membrane-structures composed of compound lipid in bone and bone marrow and various adipose tissues. Acta Pathol Jpn. 1973;23:539-558.
8. Snow JL, Su WP. Lipomembranous (membranocystic) fat necrosis. Clinicopathologic correlation of 38 cases. Am J Dermatopathol. 1996;18:151-155.
9. Yamamoto T, Furuhata Y, Tsuboi R. Lipomembranous changes and calcification associated with systemic lupus erythematosus. Clin Exp Dermatol. 2007;32:278-280.
10. Halvorson CR, Kwon SY, Kao GF, Germanas JP. Lipomembranous fat necrosis in a patient with mixed connective tissue disease. J Am Acad Dermatol. 2011;64:1010-1011.
11. Diaz-Cascajo C, Borghi S. Subcutaneous pseudomembranous fat necrosis: new observations. J Cutan Pathol. 2002;29:5-10.