Multiple mobile and firm subcutaneous nodules on bilateral shins

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Case report

A 40-year-old woman presented with a 10-year history of multiple subcutaneous nodules on the lower extremities. The first subcutaneous nodule occurred on the left shin, and over the last year, had increased in number and spread to the proximal extremities. The general condition of the patient was otherwise healthy, except that she was diagnosed with descending colon cancer and underwent surgery 2 years ago. A physical examination revealed mobile, firm, subcutaneous and asymptomatic nodules symmetrically distributed over the bilateral shins. The size of these nodules ranged from 2 mm to 4 mm in diameter; the number of the nodules was more than 20 (Figure 1). One subcutaneous nodule was taken from the right shin for histological examination. The epidermis and dermis were unremarkable. There were well-demarcated, round-shaped nodules encapsulated by fibrous tissue (Figure 2). Lipomembranous fat necrosis appeared to be associated with focal calcification in the center of the nodule (Figure 3). The skin lesions persisted during a 6-month follow-up.

Figure 1  (A,B) Multiple mobile and firm subcutaneous nodules distributed symmetrically on the bilateral shins.

Figure 2  Necrotic fat cells encapsulated by a thin to thick, fibrous capsule (H&E, 20×).
Figure 3  Calcification in the center of encapsulated fat necrosis and lipomembranous changes in the periphery (H&E, 200×).

Diagnosis

Nodular cystic fat necrosis.

Discussion

Nodular cystic fat necrosis (NCFD) is a localized form of fat necrosis characterized by discrete encapsulated fat nodules. Clinically, the lesions usually occur in two distinct populations: adolescent boys and middle-aged women. The lesions consist of solitary or multiple subcutaneous papulonodules. The size of the lesions ranges from 2 mm to 35 mm. They typically appear on the lower extremities but are occasionally found on the upper extremities or hips. The duration of the lesions varies from 1 day to 20 years. NCFD has been reported to be associated with systemic diseases such as Ehlers-Danlos syndrome, erythema nodosum, Heerfordt’s syndrome, systemic sclerosis and systemic lupus erythematosus. Histopathologically, most specimens show similar patterns. The nodules are encapsulated by layers of thin to thick fibrous tissue. The fatty tissue inside the fibrous capsule is either variably degenerated or necrotic; it is compartmentalized and occasionally associated with inflammation and calcification. Calcification is thought to represent the end stage of the lesion; it has been found in some cases but can be absent even in cases with several or more years of duration.

The etiology of NCFD is unknown. There are several hypotheses with regard to its pathogenesis: (1) trauma, (2) ischemia by rapid vascular insufficiency, and (3) panniculitis or fat necrosis due to corticosteroid therapy. It is generally agreed that NCFD is mainly related to trauma. In 2008, Segura and Pujol proposed that this disease is related to rapid infarction of lobules of the adipose tissue caused by trauma and subsequent interruption of the blood supply. These lobules become gradually separated from the surrounding tissue and are eventually encapsulated by a layer of thin fibrous tissue. As the capsule forms, it retracts to the surrounding adipose tissue, thereby creating a cleavage between both structures. Because the lobules are sequestered from the blood supply, they cannot be resorbed and remain as encapsulated portions of the necrotic tissue. Once the fat cell is damaged, the liberated lipids undergo hydrolysis to glycerol and fatty acids. The fatty acids combine with calcium, resulting in the calcification of the fat.

In the present case, multiple asymptomatic, firm and mobile subcutaneous nodules with a linear arrangement were found on the bilateral lower legs. Phleboliths could be considered as a differential diagnosis. However, patients with phleboliths often show venous malformation, which was not present in our case. Although our patient could not recall any traumatic history, minor trauma on the lower extremities is often accidental and not noticed. The histological findings showed clear fat necrosis with lipomembranous changes, which are characteristic findings of lipodermatosclerosis and morphea profunda. However, the absence of stasis and sclerosis in the dermis allows differentiation from lipodermatosclerosis and morphea profunda.

In conclusion, NCFD is a distinctive benign subcutaneous lesion. NCFD is a relatively common lesion and is frequently misdiagnosed as lipoma. It often presents symmetrically on the bilateral lower legs without causing any discomfort. Therefore, NCFD should be listed as a differential diagnosis for multiple subcutaneous nodules on the extremities. We believe it is important that dermatologists are more aware of this disease.

References