

Two Cases of Nodular Cystic Fat Necrosis Possibly Related to Previous Trauma

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Nodular cystic fat necrosis, first described by Przyjemski and Schuster, is a peculiar form of encapsulated necrosis of subcutaneous fat characterized by totally or near-totally encapsulated necrosis of fatty tissue in which clusters of nonviable adipocytes are surrounded by condensed fibrous tissue¹⁻³.

We report two cases of nodular cystic fat necrosis associated with history of trauma about the site of the lesion. Each lesion was a subcutaneous movable nodule on buttock (case 1) and shin (case 2) which has evolved over months. Both cases showed possible relation to multiple intramuscular injection or direct trauma injury. Pathologically, encapsulated nodule showed a characteristic feature of nodular cystic fat necrosis which composed of the ghosts of anucleated adipocytes showing fairly well-preserved outline.

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Key Words: Nodular cystic fat necrosis, Encapsulated fat necrosis, Anucleated adipocytes, Trauma

CASE REPORT

Case 1

A 58-year-old female presented with a subcutaneous nodule on her left buttock. She discovered it two months ago and recalled the location was the site of prior multiple intramuscular injections for several episodes of common cold.

Physical examination revealed a slightly tender freely movable rubbery subcutaneous nodule of large bean size on the upper-outer quadrant of left buttock (Fig. 1). The results of the following laboratory studies were within normal limits or negative: complete blood count, urinalysis, liver and renal function test, thyroid function test, chest and pelvis X-ray, electrocardiogram, and stool examination. The clinical impression included lipoma, angiolipoma and nodular fasciitis, and it was surgically removed by excisional biopsy as usual.

Histopathologically, the subcutaneous nodule was encapsulated with a rather sharp cleavage plane of fibrotic zone from the surrounding viable fatty tissue and multiple small foci exhibited variable amounts of lobular panniculitis, just adjacent to the capsule

Nodular cystic fat necrosis (NCFN) showing characteristic histopathologic features typically presents as solitary or multiple mobile subcutaneous papules or nodules on the lower extremities¹⁻³. Its clinical differential diagnosis includes lipoma, angiolipoma, nodular fasciitis or uncertain subcutaneous tumors. The pathogenesis of NCFN has been considered to be related to abrupt development of vascular insufficiency possibly due to preceding trauma, and subsequent fibrous encapsulation of ghosts of dead adipocytes.

Herein we present two cases of nodular cystic fat necrosis with the preceding traumatic event.

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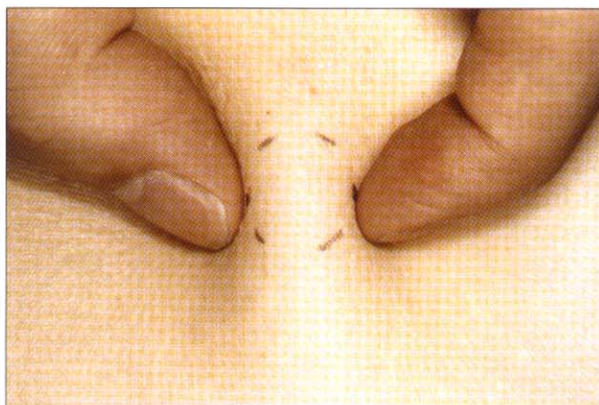


Fig. 1. A solitary large bean-sized subcutaneous nodule on the left buttock.

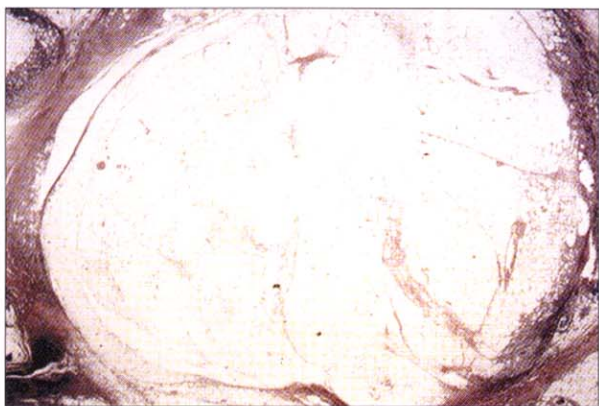


Fig. 2. Almost completely encapsulated fatty tissue by condensed fibrous tissue (H&E stain, $\times 12.5$).

(Fig. 2). The major portion of the nodule was composed of outlines of fairly well-preserved anucleated adipocytes mimicking a honeycomb appearance (Fig. 3). Several small blood vessels were found, and many of them were thrombosed. Focal collection of foam cells and giant cells of foreign body type were also observed within the portion of panniculitis. Neither dystrophic calcification nor iron on prussian blue stain was found.

Case 2

A 21-year-old female presented with a two month history of subcutaneous nodule on the right lower shin. About 1 year previously, the site had been injured physically with longstanding bruise.

Physical examination revealed a non-tender, large

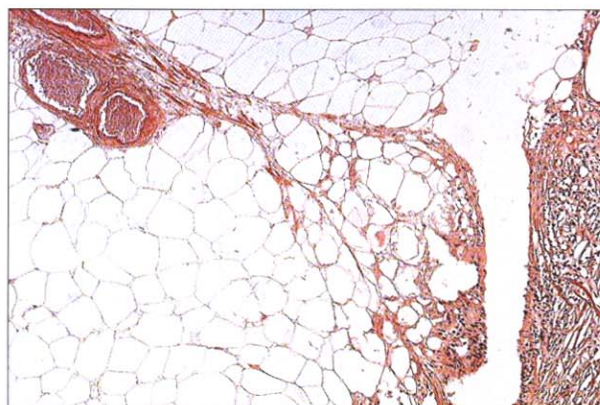


Fig. 3. The outlines of fairly well-preserved and anucleated adipocytes forming a honeycomb pattern and congested blood vessels (H&E stain, $\times 100$).



Fig. 4. Multiple yellow firm masses (After incision).

bean-sized, slightly movable subcutaneous nodule on the lower portion of right shin. The results of the same routine studies were within normal limits or negative. The clinical differential diagnosis included lipoma, thrombophlebitis and erythema nodosum. The lesion was surgically removed by excisional biopsy and multiple small yellow nodules were extruded spontaneously after incision. Each was firm and millet to bean in size (Fig. 4). Pathologically, each nodule composed of encapsulated nonviable adipose tissues (Fig. 5) and rather well-maintained outlines of "ghosts" of anucleated adipocytes were noted (Fig. 6). They showed neither evidence of dystrophic calcification nor iron deposition. No

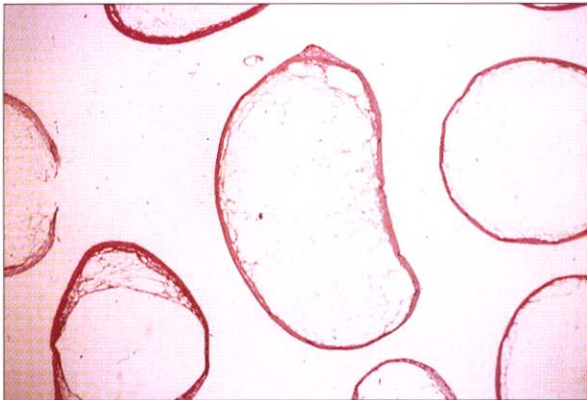


Fig. 5. Multiple encapsulated non-viable adipose tissue (H&E stain, $\times 40$).

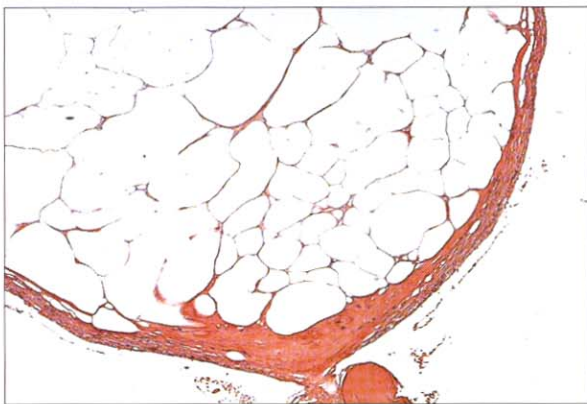


Fig. 6. The individual nodule surrounded by dense fibrous tissue and only outline of necrotic adipocytes within it (H&E stain, $\times 200$).

inflammatory cell infiltration around or in the nodule was revealed.

DISCUSSION

Nodular cystic fat necrosis (NCFN), first described by Przyjemski et al.⁴ in 1977, is a distinct benign subcutaneous lesion characterized pathologically by encapsulated fat necrosis. Various synonyms have been used to describe this entity, including nodular cystic fat necrosis⁴, mobile encapsulated lipoma⁵⁻⁷, encapsulated necrosis⁸, and encapsulated fat necrosis⁹. Strictly speaking, since the lesions are not classical lipoma, and some of them are not mobile, the term mobile encapsulated lipoma is not accu-

rate⁹. Encapsulated necrosis is characterized by immobile membranocytic lesions and appears too vague to fit for this disease⁹. Ohtake et al.⁹ believed the designation used should be broad enough to include other forms of subcutaneous adipose tissue disease in addition to this disease, and suggested the term encapsulated fat necrosis. In contrast, Trapp and Baker⁷ proposed that nodular cystic fat necrosis is one of two variants of benign encapsulated lipoma; the second is mobile encapsulated lipoma. The latter represents an encapsulated neoplastic proliferation of viable adipocytes, whereas nodular cystic fat necrosis is a reactive phenomenon of cystic walling-off of lobules of traumatized necrobiotic fat. Among them NCFN may be a more precise term than others and most commonly used, even though it doesn't emphasize the characteristic encapsulated feature and it can also be confused with the nodular or subcutaneous fat necrosis associated with pancreatic disease⁹.

Clinically, the lesions usually occur in two distinct populations: adolescent boys and middle-aged women. It presents as solitary or multiple, 1 to 35 mm in diameter, subcutaneous papules or nodules. They usually occur on the lower extremities, however, occasionally on the upper extremities, trunk, and hip and approximately half of the lesions are mobile¹⁻³. In present cases, both showed a solitary mobile asymptomatic to slightly tender subcutaneous nodule on the buttock and shin.

Histopathologically, in early lesions, because of a rapidly compromised blood supply, all nodules are completely or almost completely encapsulated with variable amounts of fat necrosis at the periphery, adjacent to the capsule and a compromised central vascular supply¹. Kikuchi, et al.⁶ called these early lesions 'candidates for future nodule' and encapsulation of necrotic tissue may prevent further extension of the adiponecrosis⁸. Subsequently, no viable tissue is found within the center of the lesion, which becomes separated from the surrounding viable tissue. In end-stage lesions, fibrosis and dystrophic calcification are seen within the encapsulated nodules^{1,2}. Focal areas of lipomembranous changes have also been reported incidentally^{2,3} as a nonspecific pattern of the necrosis due to the compromise in blood supply to the subcutaneous tissue. Our cases showed well encapsulated nodules which consisted of nonviable adipocytes mimicking a characteristic honeycomb appearance, even though some lobular

panniculitis including foam cell at periphery of case 1.

The pathogenesis of NCFN is unknown. Hurt and Santa Cruz¹ postulated that a rapid compromise in the blood supply, presumably after a traumatic event, would lead to a separation of lobules of the ghost like adipose tissue from the surrounding viable fat, with subsequent perilesional fibrosis and encapsulation. Also, a case of nodular cystic fat necrosis associated with erythema nodosum had been reported¹⁰. Such preceding trauma to the area is recorded in approximately 30% to 40% of patients¹⁻³ and there was definite trauma history of prior multiple intramuscular injection (case 1) and physical trauma (case 2).

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