

Idiopathic Circumscripta Calcinosis Cutis of the Knee

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BACKGROUND. Calcinosis cutis, a disease characterized by the presence of calcium deposits in the skin, is classified into four types according to etiology: dystrophic, metastatic, iatrogenic and idiopathic. The dystrophic form is the most common while the idiopathic one is the rarest, but specific incidence and frequency data are not available in scientific literature.

OBJECTIVE. Calcinosis cutis circumscripta is a very rare form of idiopathic calcinosis cutis arising in the second half of life. It typically involves the extremities and is associated with prior trauma and scleroderma. We dealt with a very rare form of calcinosis cutis circumscripta in a healthy patient, for whom

surgical excision revealed to be an effective and successful treatment.

METHODS AND MATERIALS. We present the case of a 46-year-old woman affected by idiopathic circumscripta calcinosis cutis of the left knee, successfully treated by surgical removal.

DISCUSSION. Medical and surgical treatment are options to cure calcinosis cutis. Medical therapy is not very effective. Surgical excision has shown to be beneficial, as it can provide a symptomatic relief. However, since calcinosis cutis limits are not always well defined a recurrence of the lesions may occur.

L. VALDATTA, MD, FACS, M. BUORO, MD, A. THIONE, MD, C. MORTARINO, MD, S. TUINDER, MD, C. FIDANZA, MD, AND E. DAINESE, MD HAVE INDICATED NO SIGNIFICANT INTEREST WITH COMMERCIAL SUPPORTERS.

CALCINOSIS CUTIS circumscripta treatment consists of medical or surgical therapies in which the benefit is limited and temporary.^{1,2} We present the case of a 46-year-old woman affected by idiopathic circumscripta calcinosis cutis of the left knee who was successfully treated by surgical removal.

Case Report

A 46-year-old white woman presented to our outpatient department in June 2001 because of a nodular lesion in the left infrapatellar region. The mass, 3 cm in diameter, had appeared 2 years before and had been enlarging and hardening in the last few months. It was asymptomatic and did not impair joint mobility. The overlying skin showed several whitish yellow millimetric spots; the nodule was firmly adherent to the skin but not to the underlying tissues (Figure 1).

The patient, an athlete performing marathons, was in perfect health condition. Ultrasound evaluation of the lesion was performed in order to establish whether the lesion was cystic (calcific sebaceous cyst) or solid (neurofibroma, sarcoma). The lesion appeared hyper-

echogenic and disomogeneous, with irregular margins and a probable calcific component in its content and was adherent neither to the left patellar tendon nor in relationship with the articular capsule.

The mass was surgically removed: After a first superficial incision, a chalky white liquid and some white gritty fragments came out, filling a central cavity surrounded by a hard fibrous tissue scattered with round calcifications.

The histologic examination diagnosed a calcinosis cutis: As a result, it was possible to detect a remarkable flogistic reaction, rich in mononucleate elements, that surrounded many nodular calcium deposits in the dermis and subcutaneous tissue (Figure 2).

The patient, even if completely asymptomatic, was then studied for possible diseases related to calcinosis: serum calcium, inorganic phosphate, blood cell count, parathormone levels, and renal and pancreatic function resulted normal, and there were no antinuclear antibodies.

Moreover, the patient did not remember any previous trauma or infection of her left knee region, nor had she ever been under calcium therapy. No articular injections, as well as electromyography, had ever been performed, and none of her relatives had shown similar lesions. At 1 year after the surgical treatment, no local recurrence has occurred.

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Figure 1. Preoperative view. A nodular lesion is visible in the left infrapatellar region. Little nodular calcifications, present in the dermis, are visible on the surface of the lesion (arrows).

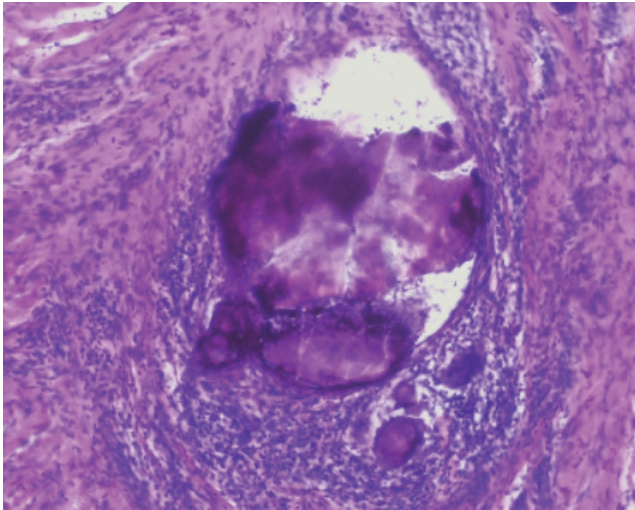


Figure 2. A marked flogistic reaction, consisting of mononucleate cellular elements, is observed around a nodular calcium deposit in the dermis (optic microscope $\times 200$, hematoxylin and eosin).

Discussion

Calcinosis cutis is a disorder that is characterized by the localized and organized deposition of calcium in the skin; it is often associated with local or systemic diseases as first described by Virchow in 1855.^{1,2}

Insoluble calcium phosphate and hydroxyapatite crystals deposit in the intercellular substance: The process of mineralization is first linked to the microfibrils of elastic fibers. Then flower-like arrangements of pleomorphic crystals generate around single-collagen fibrils.^{3,4}

The pathogenesis is unknown, but many theories have been advanced. One of these states that local

elevations in alkaline phosphatase activity can lead to hydrolysis of extracellular pyrophosphatases, which normally inhibit calcium deposition. A second assumption is that local tissue injuries can increase cell membrane permeability, allowing cytosolic influx of calcium, and can lead to the precipitation of cytosolic CaPO_4 . The same mechanisms could occur in the hypercalcemia and/or hyperphosphatemia setting.⁵

According to its etiology, calcinosis cutis is classified into four types: dystrophic (trauma, infections,^{5,6} LES, CREST syndrome^{7,8}), metastatic (destructive bone diseases, hyperparathyroidism¹), idiopathic (no associated diseases⁹⁻¹³), and iatrogenic (calcium or phosphate injections, use of calcium-containing electrode paste^{14,15}).

Specific frequency and incidence data are not available in literature. The dystrophic form is the most commonly described, whereas the idiopathic is the rarest. Both genders, at different ages, are equally affected by the various forms of calcinosis. This condition is benign, characterized by lesions that are mostly asymptomatic and that gradually enlarge. Morbidity can develop according to their size and location: Complications may arise, such as pain, limitation of joint movement, neural compression, ulceration, and infection. Generally, the clinical presentation consists of whitish, firm skin or subcutaneous nodules or plaques, which can be single or multiple.^{1,2}

In the reported case, we dealt with a form of idiopathic calcinosis cutis. It is usually localized in a specific area and is not associated with any known disease or possible cause. Few rarer subtypes can be identified: idiopathic calcinosis cutis of the external genitalia,⁹ milia-like idiopathic calcinosis cutis (multiple lesions, often associated with syringomas and Down's syndrome^{10,11}), subepidermal calcified nodule (mainly solitary lesions especially on the children faces, maybe because of the calcification of adnexal structures¹²), tumoral idiopathic calcinosis cutis (it arises in the first 2 decades of life and is associated with hyperphosphatemia because of renal metabolic errors; the lesions are large, located near the joints, and usually recur after excision; there is probably an autosomal recessive trait¹³), circumscribed idiopathic calcinosis cutis (very rare, it arises in the second half of life, affecting the extremities; it may be associated with trauma and scleroderma²), calcinosis universalis (very rare, it arises in the 2nd decade of life and has a widespread pattern¹).

Calcinosis cutis must be differentiated from milia, osteomas, warts, xanthomas, gout tophi, and progressive osseous hyperplasia. Laboratory studies (serum calcium and phosphate, albumin, urea nitrogen and creatinine, parathormone, and autoantibodies levels) are suggested to investigate the presence of diseases,

which are often associated to calcinosis cutis. Imaging studies (radiographies, computed tomographies) can help in diagnosis, as well as in the evaluation of the presence of visceral calcifications.^{1,2} Biopsy or fine-needle aspiration of skin lesions with a histopathologic examination is diagnostic, revealing the presence of amorphous calcium salts along with histiocytes, which sometimes surround foreign body giant cell reactions.¹⁶

Medical and surgical treatments are options to cure calcinosis cutis. Obviously, prevention or the treatment of an underlying disease is mandatory. Medical therapy is not very effective: It includes intralesional corticosteroid injection (inhibition of fibroblast activity, anti-inflammatory effect), magnesium or aluminum hydroxide (phosphate binders, for patients with hyperphosphatemia), etidronate disodium, and other bisphosphonates (growth inhibition of ectopic hydroxyapatite crystals). Surgical excision has shown to be beneficial, as it can provide a symptomatic relief. However, because calcinosis cutis limits are not always well defined and surgical trauma itself may induce calcification, a recurrence of the lesions may occur.^{1-3,5-13}

In our patient, the clinical diagnosis was unclear, and consequently, ultrasound imaging was carried out. This is a cheap investigation that describes the lesion (if cystic or solid) and its relationships with the surrounding tissues. Literature lacks information on the best kind of imaging for calcinosis cutis; bone scintigraphy and computed tomography scans are mainly performed in systemic diseases to look for visceral calcifications.^{1,3,13} In our case, a diagnosis of calcinosis cutis had not already been done. The mass was asymptomatic, and we chose not to perform further expensive investigations because ultrasounds had already given us important information (the lesion was localized and not infiltrating deeper tissues). A biopsy was not performed because the lesion was small enough to be easily and radically removed: Surgical excision and the following histologic examination would have been a therapeutic and diagnostic procedure at the same time.

The diagnosis of calcinosis cutis has been quite surprising: It is a rare disease that we had never dealt with before. Furthermore, during surgery, the macroscopic aspect of the lesion had led us to suspect a sarcomatous mass because of its firmness, its very hard sclerotic consistence, and its fibrotic irregular margins.

We made a diagnosis of idiopathic calcinosis cutis circumscripta by exclusion because our patient was perfectly healthy. The laboratory screening was

normal, and nothing in her anamnesis could be related to calcinosis cutis. We reported just one atypical datum. In fact, circumscripta forms are generally associated with trauma and scleroderma, but they both were excluded in our case. There was another unexpected observation: At 1 year after surgery, there has not been local recurrence of the disease, even if surgery is considered to be a further factor stimulating calcification and relapses.

In conclusion, we dealt with a very rare form of calcinosis cutis circumscripta in a healthy patient, for whom surgical excision revealed to be an effective and successful treatment.

References

1. Nunley J-R, Jones L-M-E. Calcinosis cutis. EMedicine Journal [serial online], November, 2001;2. Accessed August 10, 2002.
2. Mendoza L-E, Lavery L-A, Adam R-C. Calcinosis cutis circumscripta: a literature review and case report. *J Am Pediatr Med Assoc* 1990;80:97-9.
3. Mora R-G-S, Cortés C-B. Calcinosis cutis. *Rev Cent Dermatol Pascua* 1997;6:40-4.
4. Fartasch M, Haneke E, Hornstein O-P. Mineralization of collagen and elastic fibers in superficial dystrophic cutaneous calcification: an ultrastructural study. *Dermatologica* 1990;181:187-92.
5. Lee S-Y, Kim K-S, Kim D-Y, Cho B-H, Lee S-W. Dystrophic calcinosis cutis in a patient with squamous cell carcinoma secondary to postburn scar. *Ann Plast Surg* 2001;46:457-8.
6. Ito A, Sakamoto F, Ito M. Dystrophic scrotal calcinosis originating from benign eccrine epithelial cysts. *Br J Dermatol* 2001;144:146-50.
7. Bhatia S, Silverberg N-B, Don P-C, Weinberg J-M. Extensive calcinosis cutis in association with systemic lupus erythematosus. *Acta Derm Venereol* 2001;81:446-7.
8. Buchowski J-M, Ahn U-M, McCarthy E-F, Mehta M-B. Disproportionately severe calcinosis cutis in an 88-year-old patient with CREST syndrome. *Skeletal Radiol* 2001;30:478-81.
9. Ozcelik B, Serin I-S, Basburg M, Ozturk F. Idiopathic calcinosis cutis of the vulva in an elderly woman: a case report. *J Reprod Med* 2002;47:597-9.
10. Schepis C, Torre V, Siragusa M, et al. Eruptive syringomas with calcium deposits in a young woman with Down's syndrome. *Dermatology* 2001;203:345-7.
11. Kotsuji T, Imakado S, Iwasaki N, et al. Milia-like idiopathic calcinosis cutis in a patient with translocation Down syndrome. *J Am Acad Dermatol* 2001;45:152-3.
12. Nico M-M, Bergonse F-N. Subepidermal calcified nodule: a report two cases and review of the literature. *Pediatr Dermatol* 2001;18:227-9.
13. Viegas S-F, Evans E-B, Calhoun J. Tumoral calcinosis: a case report and review of the literature. *J Hand Surg* 1985;10:744-8.
14. Soon S-L, Chen S, Warshaw E, Caughman S-W. Calcinosis cutis as a complication of parenteral calcium gluconate therapy. *J Pediatr* 2001;138:778.
15. Puig L, Rocamora V, Romani J, et al. Calcinosis cutis following calcium chloride electrode paste application for auditory-brain stem evoked potentials recording. *Pediatr Dermatol* 1998;15:27-30.
16. Deshpande A, Munshi. Calcinosis cutis: diagnosis by aspiration cytology: a case report. *Diagn Cytopathol* 1999;21:200-2.