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## **Case Presentation**

### **Solitary erythematous, tender plaque of the heel in a young infant**

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## **Abstract**

Calcinosis cutis is a rare disorder resulting from the precipitation and deposition of insoluble calcium and phosphate salts (hydroxyapatite crystals) in the dermis and subcutaneous tissue. It is generally divided into four main groups on the basis of etiology and pathogenesis. Clinical presentation of cutaneous calcinosis cutis varies according to the diagnosis and the underlying process. We report a case of calcinosis cutis of the heel in which both the extravasation of a calcium gluconate infusion and renal failure could have promoted the development of calcinosis cutis

## **Case synopsis**

A 17-month-old girl was referred to us for a 3-week history of an erythematous, edematous plaque covered by small superficial ulcers on the left heel. Because of the suspicion of an abscess, systemic and topical antibiotics were started. The patient was affected by recessive polycystic kidney disease and had been admitted to the pediatric unit of our hospital for the evaluation of anorexia, fatigue, and renal failure. Blood chemistry investigations had shown a severe alteration of renal function [creatinine 7.18 mg/dl (0.50- 1.20), urea 230 mg/dl (15-50), calcium 3.9 mg/dl (8.5-10.5), phosphorus 19.8 mg/dl (3.8-6.5)].

Calcium gluconate was administered intravenously in order to correct hypokaliemia and hyperphosphatemia. During hospitalization, the patient received different placements of catheters for peritoneal dialysis and venous central and peripheral access. The peripheral catheter had been positioned exactly on the left heel, where she developed the lesion. The patient had undergone left nephrectomy and was currently undergoing daily peritoneal dialysis.

Physical examination revealed a small girl with muscular hypotrophy and reduced motility of the lower limbs, especially pronounced in the left leg. Dermatological examination showed an erythematous, plaque covered by small superficial foci of white-yellow ulcers (Figure 1).

An X-ray of the affected foot and an ultrasound examination of soft tissues were performed. X-ray showed a small radio-opaque area of 22 x 18 mm in diameter localized in the upper dermis (Figure 2). Ultrasound examination of the soft tissues confirmed the presence of a plaque, which revealed a hyperechoic pattern with an uneven contrast-enhancement. A diagnosis of cutaneous calcinosis cutis was made on the basis of the clinical presentation and imaging. Cutaneous biopsy was not performed, considering the young patient's general health status.



Figure 1. Erythematous plaque with yellow nodules



Figure 2. Xray showing radio-opaque material.

## Discussion

Calcinosis cutis is a rare disorder resulting from the precipitation and deposition of insoluble calcium and phosphate salts (hydroxyapatite crystals) in the dermis and subcutaneous tissue. It is generally divided into four main groups on the basis of etiology and pathogenesis: dystrophic, idiopathic, metastatic and iatrogenic subtypes [1,2]. The most common subtype is dystrophic calcinosis, which occurs in the absence of abnormalities in serum calcium and phosphate levels in damaged tissues, as in connective tissue diseases (CREST syndrome, juvenile dermatomyositis and systemic lupus erythematosus) or in areas of local tissue injuries (repeated trauma, burns, surgical scars, and keloids). Idiopathic calcinosis occurs in normal tissues with normal serum calcium and phosphate metabolism. Metastatic calcinosis commonly occurs in chronic renal failure and appears as a benign nodule; it may also present in the more severe form, calciphylaxis. Iatrogenic calcinosis is a complication of various procedures, such as extravasation of calcium-containing infusions, electroencephalography with electrodes containing calcium gluconate paste, or after application of calcium gluconate dressings.

The clinical presentation of cutaneous calcinosis cutis varies according to the diagnosis and the underlying process. It usually presents as single or multiple, firm, white-yellow papules, nodules or plaques associated with tenderness, fluctuation or in several cases necrosis. Typically, the histopathology shows irregular foci of calcification in the upper dermis surrounded by loose fibrous connective tissue and a mononuclear infiltrate.

Considering the medical history of our young patient, she was probably affected by metastatic calcinosis cutis in addition to accumulation of calcium from extravasation. However, to the best of our knowledge, there are no reported cases of a similar localization of metastatic calcinosis cutis in the heel. Various cases of calcinosis cutis on the heel, following repeated trauma or as a consequence of heel-sticks in order to draw blood have been described [3,4]. In our patient, no history of heel-sticks in the neonatal period was reported by her parents. However, she was subjected to venous peripheral catheters and calcium gluconate infusion at the site of the lesion. Extravasation of calcium gluconate via the iv-catheters in the site of the lesion was suspected after three days of infusion because of the presence of inflammatory signs (erythema, swelling, and pain). Subsequently the catheter was promptly removed. Topical steroids continue to be applied, with an improvement of the calcinosis. Calcinosis cutis following extravasation of calcium gluconate is well known, especially in newborns with neonatal hypocalcemia [5]. In our case, hypocalcemia was a consequence of renal failure and not a transient event. We believe that both the extravasation of calcium gluconate infusion and the clinical context of the renal failure, could have promoted the development of calcinosis cutis.

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