Case report

Idiopathic Calcinosis cutis: Cytodiagnosis of three cases with literature review

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Abstract

Idiopathic Calcinosis cutis is an uncommon soft tissue lesion characterized by organized and localized deposition of calcium salts in the skin and subcutaneous tissue. There are multiple clinical settings attributed to calcium deposition and these can be subjected to fine-needle aspiration (FNA). Since cutaneous calcific deposits may clinically mimic a tumor, it is advisable to diagnose them by FNA cytology (FNAC) which is a rapid, reliable and simple procedure. We reported three cases of idiopathic calcinosis cutis by FNA. The diagnoses were further confirmed by special stain, Von kossa stain. Cytological finding of amorphous granular material consistent with calcium salts and the appropriate clinical background led to the cytodiagnosis of idiopathic calcinosis cutis. Points of concern for a correct interpretation of the cytological findings along with review of literature were also discussed.

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Introduction

Physiological calcium stores are found in the bones and teeth of the human body in the form of calcium hydroxyapatite. In its ionized form, calcium plays a very important role in muscular contractility, vascular constriction and dilatation, clotting of blood, and transmission of nerve signals[1]. Calcinosis cutis, first described by Virchow in 1855, is characterized by the deposition of calcium salts in the skin and subcutaneous tissue. It develops due to the deposition of hydroxyapatite crystals of calcium phosphate and can involve any part of the skin[2]. Calcinosis cutis is classified into four major types according to etiology — dystrophic, metastatic, iatrogenic, and idiopathic[3]. Calcifications occur in a variety of other clinical settings. Dystrophic calcinosis is a form of calcification that is associated with infection, inflammatory processes, cutaneous neoplasm, or connective tissue diseases. Metastatic calcification results from elevated serum levels of calcium or phosphorus. These calcifications occur as complications in patients with hyperparathyroidism and end-stage renal disease[4]. Iatrogenic or traumatic calcinosis is associated with medical procedures. Idiopathic calcinosis cutis is cutaneous calcification of unknown cause with normal serum calcium, no history of local tissue injury, or systemic metabolic disorder[5]. Family history, history of trauma or injection, tropical or subtropical residence, number and location of calcium deposits, serum calcium and phosphate level, and autoimmune screening should be evaluated for the appropriate classification of a case[6].

We present a case study including three cases of idiopathic calcinosis cutis diagnosed on fine needle aspiration (FNA) cytology. All patients presented with a painless hard swelling. Cytological finding of amorphous granular material consistent with calcium salts and the appropriate clinical background led to the diagnosis of idiopathic calcinosis cutis in all three cases which were further confirmed by special stains on cytosmears. This study is aimed to raise doctors' awareness of the presentation, etiopathogenesis, and possible confirmation of diagnosis by fine needle aspiration cytology. This study also highlights the differential diagnosis for a correct interpretation of the cytological findings.

Case presentation

Case 1: A 60-year-old female presented with multiple painless slowly growing hard swellings in left thigh. Largest one measured about 3x4 cm for 5 years. Swellings were hard, irregular with no connection with the underlying bone. The nodule was located subcutaneously. Radiological survey showed calcified masses in the subcutaneous plain not attached to the underlying bone. FNA yield chalky white granular material.

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Case 2: A 55-year old female presented with a subcutaneous swelling cm on left inguinal region for one year. Ultrasonography showed a 3x2 cm calcific lesion in the subcutaneous tissue.

Case 3: A 70 year old female came with a swelling over the right gluteal region for several years. On examination a 1x1 cm firm, mobile, non-tender swelling was palpable.

Fine needle aspirations of the lesions were done in all the cases. There was a gritty sensation while needling and chalky white paste-like granular material was aspirated (Fig-1). Hematoxylin and Eosin stained cytosmears showed paucicellularity. The appearance of calcium deposits varied from amorphous intense pink to crystalloid pinkish granular material. The cellular components varied from negligible to the presence of a variable number of histiocytes, lymphocytes, and multinucleated giant cells (Fig-2). Alcohol-fixed smears were subjected to special stain, von Kossa silver stain that expressed brown to black colored calcium crystals which confirms the presence of calcium deposits (Fig-3). Based on these cytological findings, diagnosis of calcinosis cutis was provided.

In all the above cases there was no history of trauma or parenteral therapy or family history of similar lesions. The patients had no other swelling or cutaneous lesions. Clinically, there was no evidence of any inherited or connective tissue disorder. All biochemical and hematological investigations including serum calcium and phosphorus were within normal limits.

Figure 1: chalky-white material was aspirated by fine-needle aspiration

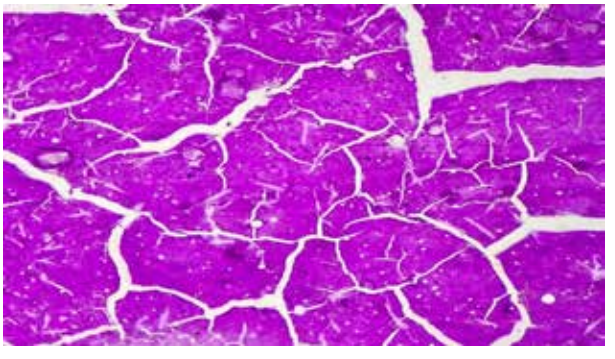

Figure 2: Cytological smears showing amorphous granular material (H and E stain, ×40)

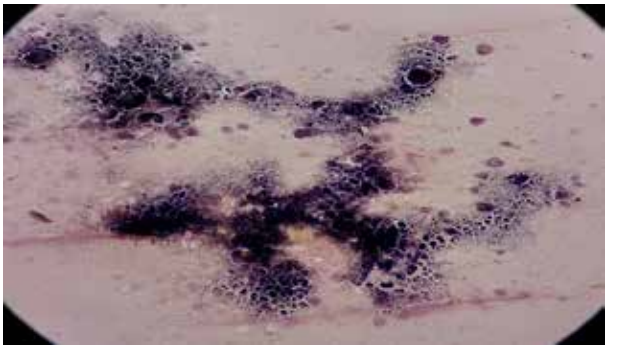

Figure 3: von Kossa silver stain showing black colored calcium crystals (von Kossa stain, ×40)

Discussion:

Several types of calcinosis cutis have been previously described. It is very important to identify the exact type of calcinosis so that an accurate treatment can be started for the effective management of the disease. Most lesions of calcinosis cutis develop gradually and are asymptomatic. However, evolution of the lesions depends on the etiology of the calcification. The patients with dystrophic calcification may provide a history of an underlying disease, a preexisting dermal nodule, or an inciting traumatic event. The patients with metastatic calcification most frequently have a history of chronic renal failure. Those who develop iatrogenic calcinosis cutis generally have a history of recent hospitalization. The cases of idiopathic calcinosis cutis are usually not associated with previous trauma or disease[4].

It is usually seen in the middle to elderly age group and is unusual in children[7]. All three cases of our study were elderly people. Although there is no gender predilection for calcinosis cutis, our cases were all female patients. The lesions of calcinosis cutis usually present as painless nodules or swellings anywhere on the body. Extremities and buttocks are the most frequently involved sites. The idiopathic calcinosis term is used in the absence of any identifiable cause of tissue calcification[8]. In the present study, a negative history of trauma and parenteral therapy or any preceding pathological lesion at the site, along with normal serum calcium and phosphorus levels clearly excluded the possibility of dystrophic, iatrogenic and metastatic causes. Here the pathogenesis of calcification is unknown.

When FNAC aspirates show abundant chalky white material, the differentials to be considered must include calcified fibrous pseudotumor, calcified epidermal cyst, sarcoidosis, tuberculosis, lymphoepithelial lesion, pilomatricoma, osteitis fibrosa cystica, and extraskeletal osteosarcoma. Calcified fibrous pseudotumor shows abundant hyalinized collagen, neurovascular bundles along with psammomatous calcification, and lymphoplasmacytic infiltrate[9]. Calcified tuberculosis

and sarcoidosis show a granulomatous reaction[10], whereas, calcified epidermal cyst shows anucleate and nucleate squames. Basaloid cells, ghost cells, and multinucleated giant cells are seen in pilomatricoma in addition to calcification[11]. Lymphoepithelial lesions show lymphoid cells along with histiocytes and calcification[12]. Extraskeletal osteosarcoma can be ruled out by careful clinical examination and the absence of any tumor cells. The clinical evaluation helps in the exclusion of osteitis fibrosa cystica. Reiter et al reviewed various conditions that may lead to skin calcification and provided information regarding laboratory tests required to differentiate different types of calcinosis cutis[3]. Shivkumar et al. studied the cytological features of idiopathic scrotal calcinosis and noted the presence of intense, basophilic, amorphous, and granular deposits surrounded by lymphocytes, histiocytes, and foreign body giant cells without any evidence of epithelial cells in the smears[13].

Keeping in mind the above differentials, we narrowed down to the diagnosis of calcinosis cutis in the above cases. Determining the exact type of calcinosis cutis is very important for accurate management. The patients should be evaluated for abnormalities of calcium and phosphorus metabolism and assessed for associated systemic conditions, such as collagen vascular diseases, renal insufficiency, and Vitamin D poisoning. Surgical excision is the treatment of choice for small calcified deposits and large localized lesions. This is not only curative but also allows for histopathological examination to confirm the diagnosis. For disseminated and extended disease, systemic therapy with warfarin, bisphosphonates, minocycline, intralesional corticosteroids, intravenous immunoglobulins, curettage, carbon dioxide laser, and extracorporeal shock wave lithotripsy is found to be beneficial[14,15,16]. In the present cases, serum calcium and phosphate levels were within normal limits. The patients had no history of trauma or topical injections at the site of the lesion. Other systemic illnesses were ruled out on evaluation. Hence, we categorized this lesion to be of idiopathic etiology.

Conclusion

Idiopathic calcinosis cutis is a benign condition, which mostly remains asymptomatic. Cytological findings in addition to serology and clinical evaluation help exclude the differentials and establish a conclusive diagnosis of this entity. FNAC is an easy, non-invasive, and quick method. If performed and diagnosed with accuracy this method can eliminate the need for more complicated invasive procedures since clinically idiopathic calcinosis cutis can mimic malignancy. It can also further aid in patient management.

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