Am J Clin Exp Urol 2022;10(3):194-198
www.ajceu.us /ISSN:2330-1910/AJCEU0142552

Case Report

Scrotal calcinosis: a case report and literature review

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Received February 25, 2022; Accepted May 26, 2022; Epub June 15, 2022; Published June 30, 2022

Abstract: Objective: To understand the clinical features of idiopathic scrotal calcium deposits, to improve the understanding of the disease, and to discuss its etiology, pathogenesis and scrotal reconstruction strategies in the course of diagnosis and treatment. Methods: To analyze the diagnosis and treatment of one case of idiopathic calcium salt deposition in the scrotum and to review the relevant literature. Results: The patient was a 55-year-old male with multiple yellowish-white nodules of varying sizes in the scrotum for more than 20 years, with hard nodules and no tenderness or ulcerative manifestations. Under subarachnoid anesthesia, the scrotum was reconstructed after surgical excision of all diseased nodes, and postoperative pathology was consistent with scrotal calcium salt deposition. Conclusion: Scrotal idiopathic calcium deposits is a rare skin conditions caused by insoluble calcium salts deposited in the scrotal skin tissue, for which surgical excision of the lesion is the main treatment modality with remarkable results. It needs to be differentiated from epidermoid cysts, multiple lipodystrophies of the scrotum, and scabies nodules.

Keywords: Scrotum, calcium salt deposition, pathology, treatment

Introduction

Calcium salt deposition, also known as calcium buildup, is caused by the deposition of insoluble calcium salt crystals in the human skin, subcutaneous and other superficial soft tissues, resulting in the formation of localized skin hard nodules, lumps or papules, etc. There are five subtypes usually without conscious symptoms: nutritional disorders (secondary to tissue damage with normal calcium and phosphorus levels), exogenous (a side effect of drug therapy such as bleomycin or poppy bases), idiopathic (no metabolic cause or tissue damage), metastatic (abnormal calcium and phosphorus metabolism in patients promoting calcium deposition), and calcification-resistant (calcification of small blood vessels and adipose tissue, manifesting as penile injury and scrotal nodules) [1]. Idiopathic scrotal calcinosis (ISC) is a specific type of scrotal calcinosis that is very rare and easily misdiagnosed. Definitive diagnosis depends on the pathological findings of the surgical specimen. The etiology and pathogenesis of ISC are still unclear, and the choice of therapeutic treatment options is controversial [2]. The author's department treated one case, which was initially considered to be a multiple scrotal lipodystrophy, and the lesion was surgically excised. The pathological findings of the specimen was scrotal calcinosis. Combining the case and reviewing the relevant literature, the following is reported.

Materials and methods

General information

The patient was a 55-year-old male who was admitted to the hospital with "multiple nodular scrotal masses for more than 20 years". The patient presented more than 20 years ago with multiple yellowish-white nodular masses of different sizes in the scrotum with no obvious cause, hard, partly smooth surface, individually uneven surface, slight itching, but no pain, no urinary frequency and urgency, no symptoms of carnal hematuria, had undergone scrotal mass excision in an outside hospital, postoperative pathology suggested sebaceous cyst (patient's self-report, no pathology report), and then the nodular masses in the scrotum recurred. At first, he did not pay attention to it, but the mass gradually increased in size thereafter, and he

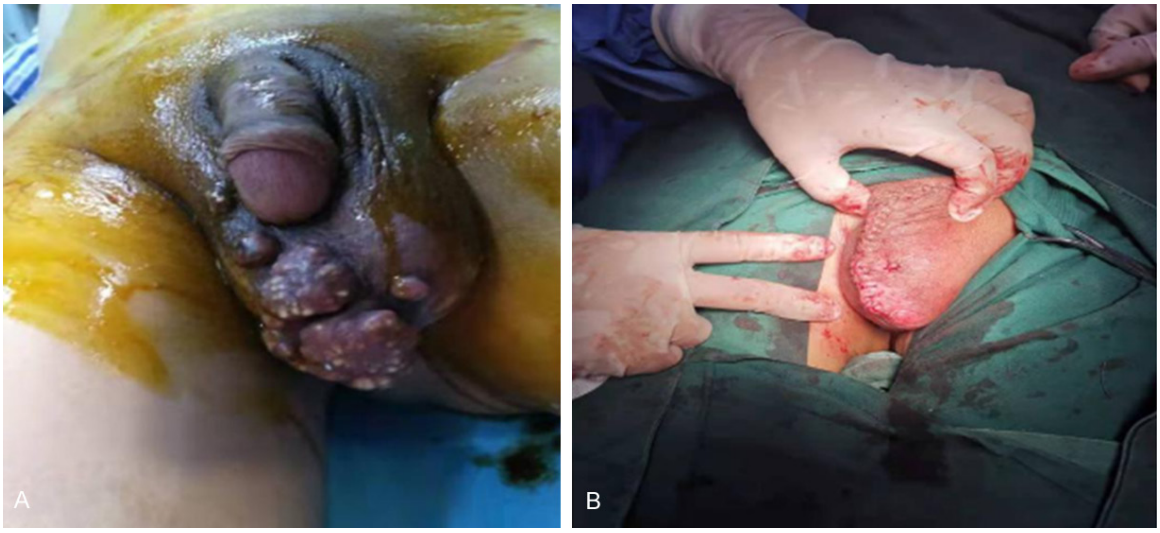

Figure 1. A. Preoperative scrotum; B. Postoperative scrotum.

came to our hospital in July 2019. The patient was admitted to the hospital with "multiple scrotal masses". Since the onset of the disease, the patient had no other discomfort, was in good health, had no cardiovascular, endocrine or digestive disorders, had no trauma to the scrotum, had no history of exposure to heavy metals, chemical substances or toxins, and had no similar patients in his family.

Physical examination and auxiliary examinations

The penis was well developed, the head of the penis was exposed, and the external urethral opening was free of redness and discharge. The scrotal skin showed multiple yellowish-white nodules with elevated surface, varying in size from as small as "rice grains" to as large as "broad beans", with some nodules fusing with each other, poor mobility, and no tenderness. There was no neoplasm at the anus, and no abnormality was detected on anal finger examination. Laboratory tests: blood cell analysis, urine sediment analysis, liver function, kidney function, electrolytes, and blood sedimentation were not abnormal; Imaging tests: orthopantomogram of the chest, 12-lead electrocardiogram, and whole abdomen ultrasound were normal.

Surgical treatment

The patient was operated under subarachnoid anesthesia and the scrotum was reconstructed after surgical excision of all diseased nodules. The lesioned nodules and the affected skin were excised, and the nodules were seen to reach the sarcolemma, the wound was sufficiently haemostatically healed, and the sarcolemma and skin were sutured in order to reconstruct the scrotum after trimming the edges neatly. Postoperatively, antibiotics were applied to prevent infection and symptomatic treatment, as shown in **Figure 1**.

Results

The postoperative pathology showed that it was consistent with scrotal calcium salt deposition, and a large calcification was seen microscopically with ectopic giant cell reaction at the margin, as shown in **Figure 2**. The patient was followed up by telephone after the operation without recurrence of localized scrotal cysts, and the follow-up time was 30 months, with satisfactory clinical treatment results.

Discussion

ISC is a rare benign disease characterized by multiple calcified nodules without any impairment of calcium and phosphorus metabolism [3], and is rare in clinical practice. ISC may be the result of local inflammation leading to a sudden increase in collagen synthesis around blood vessels and fat, which subsequently causes massive calcium deposition, or alternatively, these lesions may be considered to be the result of calcium deposition around the

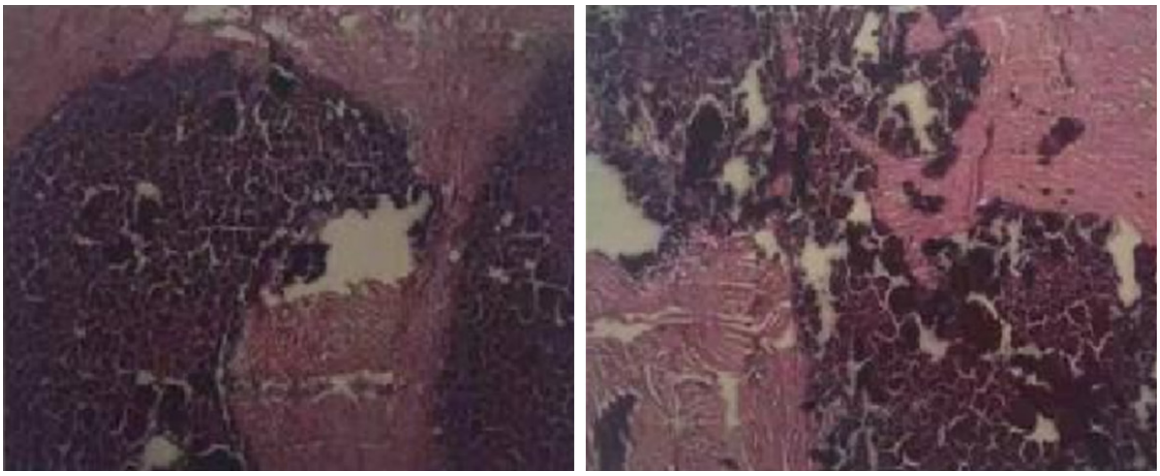

Figure 2. Postoperative pathology.

granulomatous reaction in the dermis [4]. There is still controversy as to whether it is idiopathic. A study by Ito et al. found a large number of small ductal structures with varying degrees of expansion around the nodules. Immunohistochemical staining and electron microscopic observation revealed that the nodule epithelium was connected to the ductal structures, suggesting that both differentiate from the same exocrine duct [5]. Therefore, it can be understood that its etiology may be exocrine duct milia (EDM) [6]. Dystrophic calcification may be the cause of exocrine duct milia. "Idiopathic" should only be applied to patients with an unknown etiology.

ISC specifically presents as multiple asymptomatic nodules of varying size in the scrotum and can occur in children as well as adults. The lesions appear as yellowish-white nodules of different sizes with small granules on the surface. Their pathological histology is typically characterized by calcified granular material in the dermis surrounded by fibroblast proliferation [7]. ISC needs to be differentiated from scrotal epidermoid cysts (ECs), also known as sebaceous cysts, which are the most common envelope cysts. Usually the vast majority of these cysts are benign, cysts filled with keratin and inflammatory reactions to cysts, which many physicians incorrectly diagnose as abscesses due to keratin outflow, which are incised and antibiotics are applied. Although ECs are considered benign, it has been reported that approximately 1% of these cases may develop into squamous or basal cell carcinoma [7]. ECs are seen in autosomal dominant Gardner and Gorlin syndromes, but most cases are seen in sporadic form. In addition, scrotal lipodystrophy multiplex is also a disease that needs to be differentiated. It can occur at any age with rubber-like hard nodules that squeeze out sebaceous or oily material, whereas scrotal calcinosis occurs most often in children or adults without a family history, with harder nodules that break down and exude sand-like particles or cheese-like material.

ISC is treated with follow-up observation, medication, laser or cryotherapy, and surgery. Although some scholars have tried to treat ISC with drugs such as corticosteroids, diltiazem, sodium edetate, and fibrin phosphate in combination with a low-calcium diet, only some patients can have some degree of improvement in their symptoms [8, 9]. Because of this, surgery is by far the most common clinical approach. Although surgical excision may have complications associated with surgery, the results are definitive and the recurrence rate is low. The complete surgical excision of the lesion and a variety of reconstructive repair techniques such as direct closure, transfer scrotal flap or skin grafting are chosen according to the scrotal defect to achieve a better postoperative appearance and satisfactory results, thus gaining the understanding and acceptance of the patient [10]. Therefore, surgical treatment is the only recommended treatment modality for ISC, and its main indications for surgical excision are the presence of clinical symptoms (pruritic symptoms, presence of

white material discharge, etc.) and/or the patient's expectation of a poor appearance [11].

In recent years, carbon dioxide laser has been proposed for the treatment of idiopathic scrotal calcinosis. The CO_2 laser is an ablative laser that can be used for the treatment of many dermatological conditions [12, 13]. Its wavelength is 10600 nm, and its energy is almost completely absorbed, reducing tissue damage [14]. The aesthetic results of CO_2 laser treatment are superior to traditional surgery, preserving the scrotal tissue with less risk of complications and scar formation. The use of CO_2 ultra-pulsed lasers is a fast and effective method of treating ISC, with an almost complete absence of scarring and other side effects such as hypopigmentation and the precision guaranteed by laser technology, which, together with the important proliferation of this laser in dermatology, makes this treatment a safe option for patients who want to avoid traditional surgery [15]. Meissner M has reported the application of an erbium YAG laser for the treatment of this condition, which can achieve similar results [16].

The size and number of nodules, whether they are infected or not, whether they affect sexual life or even produce psychological disorders vary among patients with this disease, so there are differences in the specific treatment indications and the choice of treatment. In the author's opinion, for patients with a small number of nodules, small size, similar to papules, and slow growth, they can be observed and followed up. On the contrary, if the nodules are large in number and size, gradually growing and fusing, or if the disease produces low self-esteem and affects sexual life, early treatment is recommended. Traditional surgical excision is currently the most common treatment method because of its precise results and low recurrence rate, although there may also be complications associated with surgery.

Conclusion

Scrotal idiopathic calcium deposits is a rare skin conditions caused by insoluble calcium salts deposited in the scrotal skin tissue, for which surgical excision of the lesion is the main treatment modality with remarkable results. It needs to be differentiated from epidermoid cysts, multiple lipodystrophies of the scrotum, and scabies nodules.

Acknowledgements

We would like to express our gratitude to all of the people who helped during the writing of this manuscript, and to the peer reviewers for their constructive opinion and suggestions.

Disclosure of conflict of interest

None.

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