CLINICAL CASE

Penile necrosis due to calciphylaxis in a nephropathy patient

F. M. Bolio-Laviada\textsuperscript{a,*}, F. R. Zamora-Varela\textsuperscript{a} and R. Carvajal-García\textsuperscript{b}

\textsuperscript{a}Urology Specialty Residency, Hospital Regional “Dr. Valentín Gómez Farías”, ISSSTE, Guadalajara, Jal., Mexico
\textsuperscript{b}Urology Service Management, Hospital Regional “Dr. Valentín Gómez Farías”, ISSSTE, Guadalajara, Jal., Mexico

**KEYWORDS**

Penile necrosis; Calciphylaxis; Nephropathy; Mexico.

**Abstract**  Necrosis of the penis secondary to calciphylaxis is an infrequent entity that has been associated with chronic degenerative diseases due to intravascular calcium deposits. Few cases have been described in the literature. We describe herein the management of and complications in a 61-year-old man presenting with this pathology secondary to terminal chronic kidney disease.

The 61-year-old patient had a high smoking index of long progression and a past history of diabetes mellitus and high blood pressure, both uncontrolled, and terminal kidney disease presently being treated with hemodialysis. He also had a history of acute myocardial infarction (AMI), femoropopliteal bypass, and the amputation of the right lower extremity.

He first presented with glans penis necrosis that was treated with partial surgery, but upon observing urethral and surrounding tissue involvement, a lack of irrigation, and tissue infection, the decision was made to perform a total penectomy with perineal urethrostomy. The patient had the complication of Fournier’s syndrome with poor progression, resulting in his death.

Penile necrosis due to calciphylaxis is not very well known and its management is complicated due to the fact that the general condition of patients is poor. Partial or total phallectomy is a therapeutic option for this type of patient because they present with peripheral microangiopathy. However, there is a high complication rate due to complications from uncontrolled underlying pathologies.

**PALABRAS CLAVE**

Necrosis de pene; Calcifilaxis; Nefropatía; México.

**Resumen**  La necrosis de pene secundaria a calcifilaxis es una entidad infrecuente que se ha asociado a enfermedades crónico-degenerativas, por depósitos intravasculares de calcio. Pocos casos han sido descritos en la literatura. Se expone el manejo y las complicaciones de un paciente de 61 años con esta entidad, secundaria a insuficiencia renal crónica terminal.

Se presenta masculino de 61 años de edad, con índice tabáquico alto de larga evolución, con antecedente de diabetes mellitus e hipertensión arterial, ambas en descontrol, insuficiencia renal terminal tratada actualmente con hemodiálisis, así como antecedente de infarto agudo al...
Penile necrosis due to calciphylaxis in a nephropathy patient

Introduction

Necrosis of the penis is a rare entity associated with systemic diseases such as diabetes mellitus and high blood pressure, and even with the placement of a penile prosthesis. Intravascular calcium deposits in patients with advanced kidney disease, and the procedures of dialysis or hemodialysis, have been known to produce the pathology known as calciphylaxis. Few cases of patients with terminal kidney disease undergoing dialysis and presenting with this pathology have been described in the literature; there are more reports of its involving the distal portions of the extremities, buttocks, and thighs, often leading to amputation of the affected parts.

Systemic calciphylaxis affects 1% of the patients with end-stage renal failure. The involvement of the penis has been described in rare cases. The reported incidence of penile calciphylaxis is approximately 6%, mainly in diabetic patients with end-stage renal failure and calcium and phosphorus anomalies.

Case presentation

A 61-year-old man born in Mexico City and residing in Guadalajara, Jalisco, had a history of smoking 2 packs of cigarettes per day for 30 years, suspended 2 years ago, diabetes mellitus of 25-year progression treated with insulin lispro 24 IU-0.12 IU, and high blood pressure of 14-year progression, not currently treated. He also had an acute myocardial infarction (AMI) 12 years prior, under treatment with amiodarone; end-stage renal failure for the last 8 years treated with furosemide, hemodialysis since July 2012, 3 sessions per week. His past surgical history included cardiac catheterization 12 years prior, femoropopliteal bypass in December 2012, and supracondylar amputation of the right lower extremity in April 2013.

The patient's illness began with pain and color changes in the right lower extremity (rle). He was evaluated at the Angiology Department, detecting necrosis of the toes and the presence of gas that were managed with amputation of the rle. During his hospitalization he began to have a mild pain in his penis, edema and pruritus, change of color of the glans penis, dysuria, and a weakened urine stream; traces of scratching and dry necrosis of the glans penis with signs of associated infection were found and so antibiotic treatment was begun (figs. 1 and 2). The patient was programmed for a partial penectomy; during the surgery the corpora cavernosa were observed to be pale and not bleeding down to the base of the penis and infected tissues were also found, resulting in the decision to perform total penectomy (fig. 3) with perineal urethrostomy (fig. 4).

Figure 1 Necrosis of the penis.
Two weeks after surgery, the patient presented with a 10 x 15 cm sore that was oozing abundant fetid, purulent matter.

Laboratory tests: leukocytes 15,100/mm³, hemoglobin 8.3, hematocrit 26.7, platelets 275,000, glucose 105, urea 82, creatinine 3.70, Na⁺ 141, K⁺ 4.3, Cl⁻ 102, albumin 1.99, PT 20.6, PTT 72.5, Ca²⁺ 7.92 mmol/L, phosphorus 7.36 mmol/L.

Debridement was performed, exposing both testes and the pubic region.

During his hospital stay the patient had unsatisfactory progression. Both upper extremities presented with ecchymosis. The surgical wound remained open measuring 20 x 25 cm with scant serosanguineous secretion, no bleeding, and poor color. There was a pressure ulcer measuring 2 cm in diameter at the heel of the left lower extremity, the stump of the leg had necrotic edges of skin; due to his poor progression, the patient died one week later from severe sepsis.

Histopathologic report
Product of penectomy with elements of gangrenous balanitis associated with diabetic microangiopathy and dystrophic calcification (calciphylaxis).

Discussion
Calciphylaxis is a rare systemic condition seen in 1%-4% of the patients with end-stage renal failure in substitutive treatment. The clinical presentation is reddish spots on the skin and painful purplish lesions on the distal extremities, abdomen, buttocks, and breasts that progress to necrosis, gangrene, and autoamputation.

Clinical symptoms, in the majority of cases, are described in the literature as erythema in the penis with a progressive necrotic lesion in the glans penis that can involve the urethral meatus and obstruct it, in addition to presenting with penile pain, balanitis or phimosis, fever, and cardboard-like induration of the penis.6

A high mortality rate of more than 50% at 6 months has been described when penile necrosis presents in patients with diabetes mellitus and renal failure. Diabetes mellitus, systemic arterial hypertension, chronic kidney disease, and dyslipidemia accelerate the process of atherosclerotic angiopathy, and they are all important risk factors for this pathology.

The etiopathogenesis of necrosis of the penis is based on pathologies that affect the circulation of the penis, causing ischemia, necrosis, and infection as a secondary event in the majority of cases.1,7
Penile necrosis due to calciphylaxis in a nephropathy patient

The present case was of a diabetic patient with poorly controlled high blood pressure and end-stage chronic renal failure, undergoing hemodialysis. Penile necrosis in these kidney disease patients receiving renal replacement therapy has been attributed to ischemia caused by an accelerated calcification of the arteries. The intravascular calcifications can have their origin in hyperparathyroidism secondary to hyperphosphatemia. This hyperparathyroidism leads to increased intestinal absorption of calcium and its renal reabsorption. This state conditions the increase of calcium in the blood and its deposit into the tissues (calciphylaxis).

In these patients, ischemia is attributed to calciphylaxis that causes the dystrophic calcification of the small and medium-caliber arteries and of the tissues, resulting in necrosis with skin ulceration; in the histologic study of these lesions, calcifications are observed in the arterial walls, the corpora cavernosa, and the tissues.2,6

Treatment of this pathology is controversial. Some authors mention conservative management with antibiotic therapy and local debridement,7,8 whereas others agree on performing partial or total penectomy, depending on the damaged tissues, as well as the urinary diversion, whether abdominal or through perineal urethrostomy.7 The lesions begin as purplish papules, ulcerations, and scabs that lead to a high complication rate and sepsis.9

In the case reported herein, the patient underwent total penectomy with perineal urethrostomy due to the involvement of the tissues and urethra and poor response to the previous antibiotic treatment.

Conclusions

Penile necrosis in patients with end-stage renal failure is uncommon and is related to systemic calciphylaxis; diabetes mellitus is a co-factor in its pathophysiology. It presents in patients with end-stage renal failure undergoing renal replacement therapy that have data of media blood vessel calcification, intima blood vessel fibrosis, and tissue infection.

In this article we described a patient that presented with multiple uncontrolled associated pathologies, for whom radical surgical treatment was performed with a poor long-term outcome.

Conflict of interest

The authors declare that there is no conflict of interest.

Financial disclosure

No financial support was received in relation to this article.

References