Rare case of gangrene of penis in a patient with chronic kidney disease on dialysis

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ABSTRACT

Gangrene of the penis in patients with chronic kidney disease undergoing haemodialysis is a rare occurrence. Such patients often have associated comorbidities such as type II diabetes mellitus and systemic hypertension, along with secondary hyperparathyroidism leading to dystrophic calcification. These conditions accelerate the process of atherosclerosis, which, along with calcium deposition, causes partial or complete obstruction of the blood vessel lumen, leading to ischaemic necrosis at the tip of the penis. This adds to the pre-existing morbidity and mortality in such patients. In most cases, appropriate medical management is advocated to prevent the deposition of calcium in the lumen.

Introduction

Gangrene of the penis in patients with chronic kidney disease on dialysis is a rare occurrence, with about 11 cases reported in literature. This is often a result of secondary hyperparathyroidism leading to dystrophic calcification of the vessels supplying the penis, causing thrombosis or complete luminal occlusion leading to gangrene. Early identification and treatment can reduce significant morbidity and mortality associated with the condition. Here we present our experience with a case of gangrene of the tip of the penis in a patient with chronic kidney disease. The patient had associated co-morbidities of diabetes mellitus and hypertension. He was on regular haemodialysis for the underlying ESRD.

Case report

65-year-old male patient known case of type II diabetes mellitus, systemic hypertension with chronic kidney disease on haemodialysis presented to our urology OPD with complaints of blackish discolouration and pain at the tip of the penis since 4 months. There was no history of discharge, bleeding or trauma preceding the complaints. The patient also has an associated history of difficulty in passing urine. On examination, there was an area of blackish discoloration over the tip of the penis measuring 2 × 2 cm approximately, covering the external urethral meatus partially (Fig. 1). The area of gangrene was tender, with no local rise of temperature. Below the area of discoloration, minimal purulent discharge was noted (Figs. 2 and 3). Examination of the abdomen, scrotum, testis and perineum was found to be normal. On routine blood tests, serum calcium was 10.8 mg/dL and phosphorus was 7.4 mg/dL which was higher than the laboratory cut-off values. A biopsy was done outside, which was suggestive of calcification and complete luminal occlusion of the arteries. Parathormone levels were not assessed in this patient as he was on haemodialysis for 7 years with urine output less than 25 ml/day for the last 1 year. As the patient was relatively anuric, it was decided against surgical management. We decided to treat conservatively, and encouraged patient to follow up on an outpatient basis. The patient was reviewed after 1 month and we found no progression of the gangrene.

Discussion

Gangrene of the penis in a patient with chronic kidney disease or end-stage renal disease (CKD or ESRD) is a rare occurrence, usually as a result of dystrophic calcification of the vessels causing significant luminal occlusion. This is often secondary to elevated serum Parathormone or PTH, serum calcium and phosphorus levels. There are only about 11 reported cases in the literature. In cases of wet gangrene, patients often present with features of Fournier's and are usually rapidly progressive in nature1. This is a rare but potentially life-threatening complication of ESRD2 but can be due to Cholesterol crystal embolism or Diabetic microangiopathy. In such patients, clinical suspicion of melanoma must be present, which most commonly presents at the glans.

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as a hyperpigmented irregular lesion, similar to the necrotic area in the event of ischaemia. In case of diabetic microangiopathy leading to gangrene, a superadded infection can lead to wet gangrene, causing purulent discharge and swelling of the penis and scrotal skin, progressing to sloughing off the skin.

Patients with ESRD on maintenance haemodialysis often have bony abnormalities and calcium deposits in soft tissues. These are usually limited to the arterial system but can occur in other areas such as eye, viscera or skin. Secondary hyperparathyroidism in patients with CKD is seen in about 75% cases, and the incidence is reported to be decreased in those undergoing regular haemodialysis or patients following renal transplantation. It is observed that the calcification thus formed spontaneously resolves in such individuals. In secondary hyperparathyroidism, serum calcium and phosphorus exceeds the normal plasma solubility, usually when the combined level is more than 60–75 mg/dL, causing precipitation of calcium phosphate crystals in the arterial lumen and walls. The deposition of these crystals in the media causes reactive changes in the connective tissue alone with intimal hyperplasia. Presence of type II diabetes mellitus in combination with ESRD, there is rapid luminal narrowing leading to ischaemia and subsequent necrosis due to diabetic microangiopathy and accelerated atherosclerosis. Our patient also gives the associated history of long term smoking, which also aggravates pre-existing atherosclerosis.

Prevention and early treatment of the vascular and connective tissue calcification depend on the timely diagnosis and control of the underlying secondary hyperparathyroidism. Adequate supplementation of calcium and phosphorus levels helps in suppressing the parathyroid gland. There are alternative options of oral phosphate binders helps decrease absorption from the gastrointestinal tract and prevent precipitation of calcium phosphate crystals.

If the above mention treatment options fail or the disease is progressive despite timely treatment, surgical options may be considered. Subtotal parathyroidectomy has been done for patients in the past, however, the outcome and its role in the treatment of penile gangrene is controversial. A review conducted by Gipstein and team analysed 11 cases of penile gangrene, of which 10 underwent subtotal parathyroidectomy. Seven of these patients were found to have an adequate reversal of the ischaemic changes over the penis.

It is essential to recognise this complication especially in young patients with ESRD as it adds to significant morbidity and mortality.

**Conclusion**

Here we present a case of gangrene of the penis secondary to dystrophic calcification of the arteries. This patient has elevated serum calcium and phosphorus. In view of high morbidity and mortality associated with this condition, it is essential to identify such cases at the earliest and aggressively manage the underlying secondary hyperparathyroidism.
Fig. 2. Gangrene at the tip of the penis with non-occlusion of external urethral meatus.
Fig. 3. Gangrene at the tip of the penis with no features of necrotising fasciitis.
Conflicts of interest

We have no conflict of interest to declare.

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