Inflammation and infection

A rare clinical case of penile gangrene in a patient with chronic renal failure and diabetes mellitus

V.R. Dunev^{a,*}, N.H. Kolev^a, P.P. Genov^b^a Medical University Pleven, “Georgi Kochev” 8A str., 5800, Bulgaria^b Dept. of Urology, UMHAT, “Kanev”, “Nezavisimost” 2 str., Ruse, 7000, Bulgaria

ARTICLE INFO

Keywords:

Penis
Gangrene
Calciphylaxis
Diabetes

ABSTRACT

We report here a case of penile gangrene due to penile calciphylaxis in a patient with diabetes mellitus and chronic renal failure. Initially the patient demonstrated dry gangrene of the glans penis, which turned to wet after partial amputation. The main cause of the gangrene was considered to be circulatory insufficiency induced by severe arteriosclerosis. Despite high mortality rate associated with ischaemic penile gangrene aggressive management is recommended for those who are not terminal.

Introduction

Penile gangrene is a disease difficult to be treated. Its genesis might be infectious, traumatic or vascular. Usually, diabetes mellitus causes vascular changes with subsequent vascular atherosclerosis and chronic renal failure. The calcium-phosphate metabolism is disrupted by small cell vessel calcification in 1–4% of cases.

Case presentation

A 63-year-old male was admitted to the Clinic of Urology at Medical University Pleven. The patient had a 22-year history of type 2 diabetes mellitus. He had been on insulin therapy since 1998. He reported that at the age of 33 he had survived myocardial infarction. In March 2014, haemodialysis treatment was started because of end-stage renal failure caused by diabetic nephropathy. In 2010, 2012 and 2013, the thumb of his left leg, his right - and left lower leg were amputated, respectively due to diabetic gangrene. In September 2015, he noticed a painless spot on the glans penis, the size of a lentils grain, which gradually grew larger and turned from brown to black [Fig. 1].

The physical examination showed a painful lesion (dry gangrene) on the dorsal part of the glans. Laboratory investigations: The white blood cells count was $11.2 \times 10^9/l$. Serum creatinine was $440 \mu\text{mol/l}$ after haemodialysis, K - 4.4 mmol/L . The blood glucose rate was maintained within the range from 8.7 mmol/l to 28 mmol/l , HbA1c - 11.69 . The rates of phosphorus and calcium in blood were 2.44 mmol/l and 1.66 mmol/l , iCa - 0.96 mmol/l , calcium phosphate product 50.6 dg/ml , GFR - $13 \text{ ml/min/1.73m}^2$. Parathyroid hormone 24.74 pg/ml . CT

results: The native CT revealed severe mesenteric vessel calcifications of the abdominal aorta, internal and external iliac arteries, femoral arteries as well as of the peripheral arteries, including the penile vessels [Fig. 2].

Clinical course

An amputation of the distal half of the penis was performed. Antimicrobial treatment according to the isolated microorganisms from the urine (*E. Coli* and *E. faecium*) was started. Seven days after surgery, a wet gangrene, engaging the operative wound and the underlying skin of the scrotum, appeared [Fig. 3].

Necrectomy and amputation of the proximal half of the penis was performed. Cystofix had to be placed because of the periodic intensive haematuria. The wound was left to secondary healing. After 10 days he had sudden death probably due to acute cardiac event and multisystem complications. Histological findings: Penile skin and cavernous bodies with extensive necrosis, central acute absceding inflammatory changes, scattered fresh and old arterial thrombi and microcalcifications, arteriosclerosis.

Discussion

Penile calciphylaxis is a rare condition. Usually, diabetes mellitus causes vascular changes with subsequent vascular atherosclerosis and chronic renal failure. Secondary hyperparathyroidism is a frequently encountered problem in the management of patients with chronic kidney disease due to hyperphosphatemia and vitamin D deficiency.

* Corresponding author. “Hristo Botev” 59 str., Pleven, 5800, Bulgaria.

E-mail addresses: v.dunev@abv.bg (V.R. Dunev), kolevmd@yahoo.com (N.H. Kolev), genov_p@abv.bg (P.P. Genov).

Fig. 1. Dry gangrene of the glans.

Fig. 2. Calcifications of the penile vessels.

Fibroblast growth factor is now considered to be the most important factor for regulation of phosphorus homeostasis¹.

Survival was better in patients who underwent parathyroidectomy (75%) than in those treated with local débridement or penectomy alone (28%). The overall mortality associated with this disease was 64% with a mean time to death of 2.5 months². With appropriate patient selection, surgical intervention can be successful and provide a better quality of life for those without terminal disease. Delaying intervention will usually require more extensive surgery and increase the risk of wound complications. However, observation is indicated for moribund hospitalized patients.³

Fig. 3. Wet gangrene of the genital region.

Conclusions

Parathyroidectomy, low molecular heparin and hyperbaric oxygen therapy are applied for the treatment of calciphylaxis and the hyperphosphatemia and hypocalcaemia correction. The surgical management of ischemic penile gangrene is necrectomy and later plastic reconstruction of the affected area.

Section headings

Inflammation and Infection.

Conflicts of interest

The authors declare that they have no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.eucr.2019.01.019>.

References

1. Saliba W, El-Haddad B. Secondary hyperparathyroidism: pathophysiology and treatment. *J Am Board Fam Med*. 2009 Sep-Oct;22(5):574–581.
2. Karpman E, Das S, Kurzrock EA. Penile calciphylaxis: analysis of risk factors and mortality. *J Urol*. 2003 Jun;169(6):2206–2209.
3. Weiner DM, Lowe FC. Surgical management of ischemic penile gangrene in diabetics with end stage atherosclerosis. *J Urol*. 1996 Mar;155(3):926–929.