

CASE SERIES

Penile Calciphylaxis: A Case Series in a Tertiary Hospital in the Philippines

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Penile calciphylaxis is a rare penile condition associated with end-stage renal disease and is found in 1-4% of hemodialysis patients. The condition has an overall mortality of 64%. Literature has yet to provide a gold standard for the management of this condition. The first case is a 58-year-old diabetic and hypertensive on hemodialysis who presented with ulcerating lesions on the penis. The patient underwent partial penectomy. The patient contracted pneumonia during recovery and expired 3 months after the procedure. The second case is a 56-year-old diabetic with end stage renal disease on dialysis who presented with dry gangrene of the penis. He underwent partial penectomy and was sent home after recovery.

Key words: Penile calciphylaxis, penile gangrene, partial penectomy

Introduction

Penile calciphylaxis is a rare penile condition associated with end-stage renal disease (ESRD). Found in 1-4% of ESRD patients undergoing hemodialysis¹, it presents with penile infection and gangrene. The disease is caused by a systemic disorder of the smaller capillaries, arterioles, and arteries of the penis. The overall mortality rate for penile calciphylaxis is estimated at 64%, with a mean time to death of 2.5 months.¹ Given the high mortality rate, there remains to be no consensus on the definitive management of these cases, specifically regarding penectomy. This study will present two cases of penile calciphylaxis, their management and outcomes, as well as the pertinent related literature.

Description of Cases

Case 1

A 58-year-old male came in to the hospital with a chief complaint of an ulcerating lesion

on the glans penis with associated pain for two months. The patient is also a known case of ESRD secondary to hypertensive nephrosclerosis, and has been on hemodialysis for 3 years. Upon presentation at the emergency room, the patient was conscious, coherent, and with stable vital signs. The pertinent physical examination findings include hyperpigmented calcified plaques with areas of ulceration on the glans penis (Figure 1), as well as similar-looking lesions on the anterior right leg and medial left leg.

Laboratory evaluation was done, and revealed the following: anemia - hemoglobin 60 g/L (140-180), elevated creatinine - 651 umol/L (46-92), hyponatremia - sodium 129 mmol/L (137-145), hyperkalemia - potassium 5.3 mmol/L, hypocalcemia - ionized calcium 4.3 mmol/L (4.4-5.4), and increased parathyroid hormone - PTH 136.0 ng/L (15-65).

The patient underwent partial penectomy, and the intraoperative findings were of a 3cm x 3cm ulcerative plaque with areas of necrosis on the dorsum of the glans penis. The patient tolerated the procedure well. Histopathologic analysis revealed

acute and chronic inflammation of the glans penis. The patient developed greenish discharge per the operative site on the 6th postoperative day, and the antibiotics were shifted up for broad-spectrum coverage. On the 30th postoperative day, the patient started experiencing dyspnea, as well as productive cough with blood-tinged sputum. The patient contracted pneumonia and was treated accordingly. The patient's condition progressively worsened, and on the 46th hospital day, the patient expired despite aggressive resuscitation.

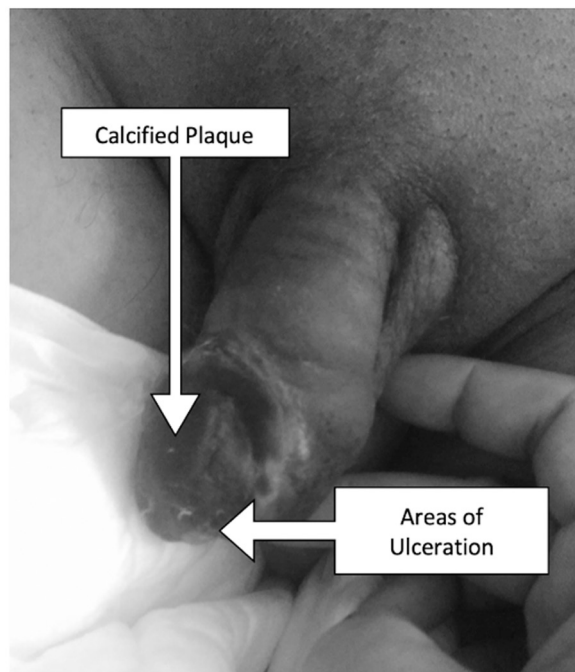


Figure 1. Penile calciphylaxis of case 1

Case 2

A 56-year-old male presented at the emergency room complaining of weakness. The patient was a known case of ESRD secondary to diabetic nephropathy and has been on hemodialysis for 6 years. On physical examination, the patient was revealed to have a dry gangrene encompassing more than half of the glans penis. He also had dry gangrene of both feet. The patient was referred to the Urology Service and subsequently advised penectomy. On work-up, the patient was noted to have the following: anemia - hemoglobin 54 g/L (140-180), leukocytosis - WBC 18.1×10^9

(4-10), elevated creatinine - 802 $\mu\text{mol/L}$ (46-92), hyponatremia - sodium 127 mmol/L (137-145), poor long-term glycemic control - HbA1c 10.2% (4.5-6.5).

The patient had started experiencing progressively worsening penile pain and underwent partial penectomy for the calciphylaxis. Intraoperatively, there was note of gangrene of the whole glans penis and a portion of the penile shaft. The patient tolerated the procedure well. The histopathology of the surgical specimen was consistent with gangrene. The patient made a complete recovery and was sent home.

Discussion

Penile calciphylaxis is a penile necrotic condition caused by medial calcification and intimal fibrosis of the small and medium arteries of the organ.¹ It is found mostly in ESRD patients on dialysis, but also occurs in those who have yet to undergo dialysis, and those that have had renal transplantation.² Although calciphylaxis is most commonly associated with ESRD, it has also been documented in patients with normal renal function.² Also termed as calcific uremic arteriopathy³ (CUA), calciphylaxis is necrosis most commonly found in the skin and subcutaneous tissues, but there have also been reports of the condition being found in the skeletal muscles, the joints, the lungs, the eyes, the breast, the pancreas, the intestines, even the heart.²

The presentation begins with violaceous, superficial, tender nodules in a livedo reticularis pattern with palpable calcium deposits or thickened blood vessels, progressing to ulceration, hemorrhage, and dry necrosis.² The necrotic areas can infect themselves, allowing progression into sepsis and death.³ As is seen with both of the cases discussed, the most common complaint of patients is severe penile pain refractory to analgesics.² The pathophysiology of calciphylaxis remains indefinite, but the prevailing theme is the uremic status of ESRD patients is the main factor in causing calciphylaxis in individuals.³ The most common finding is calcium deposition in the walls of the small-medium sized vessels.² Other problems such as bone mineral imbalance

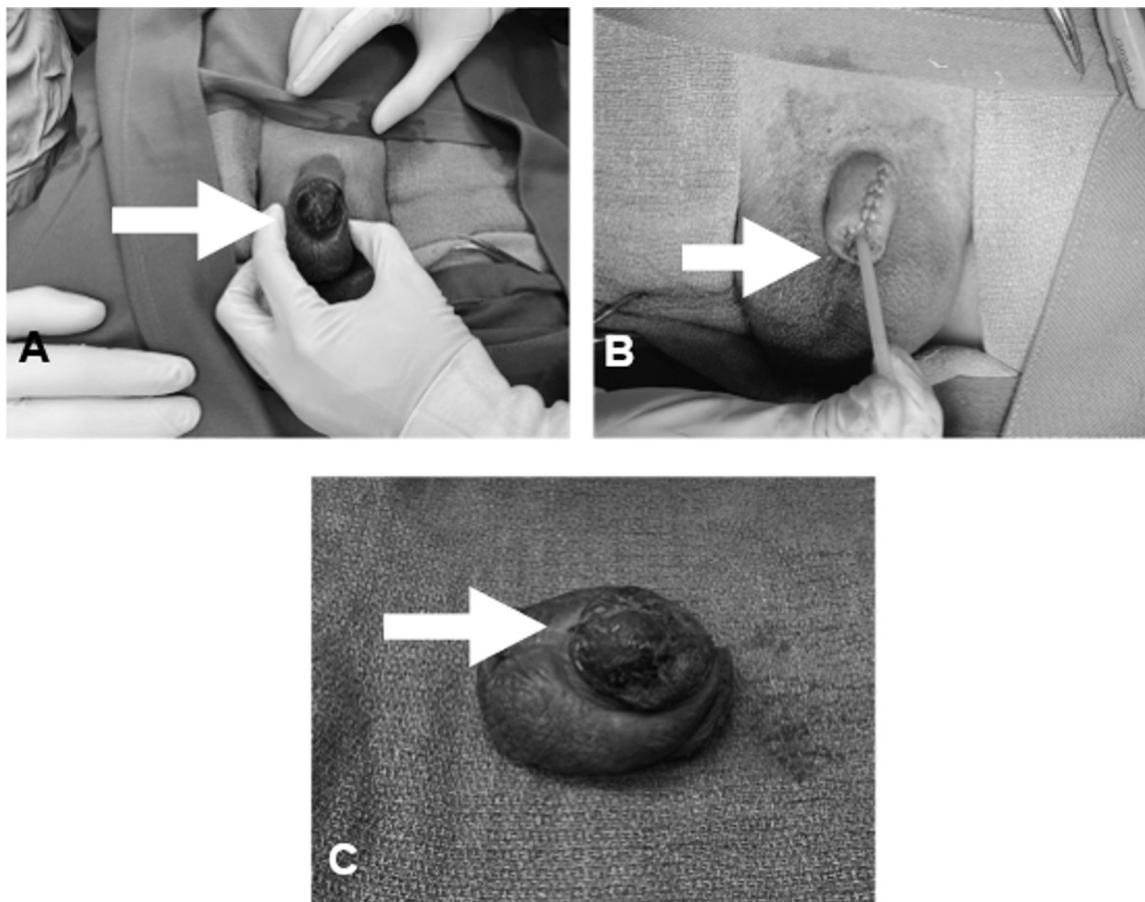


Figure 2. Images showing the patient's penis: (A) preoperatively with dry gangrene, (B) postoperatively after partial penectomy, (C) the excised glans and shaft

(elevated calcium, phosphate and iPTH) have also been mentioned as other possible inciting factors.³ A prior review of related literature has been done by Ti-Yuan, et al. in 2018, the most recent in regarding the topic. Fifty cases of penile calciphylaxis have been documented, all of whom have concurrent ESRD, 76% on hemodialysis, 74% with diabetes mellitus, an overall mortality rate of 56.5%, and a three-month mortality rate of 47.8%.¹ Despite the high mortality rate, there remains to be no consensus regarding the benefits of surgery. A study by Karpman, et al. showed that penectomy and/or local debridement alone had an overall survival rate of 28%.⁴ Instead, what was shown to have a significant benefit on patients was parathyroidectomy, which showed an overall survival rate of 75%.

A more recent meta-analysis however, has shown that there remains to be no mode of

treatment with a clinically significant effect on outcome, this despite including other non-surgical arms of treatment - cinacalcet (medication for secondary hyperparathyroidism, sodium thiosulfate, hyperbaric oxygen therapy, bisphosphonates, and parathyroidectomy.⁵ Another study by Cimmino, et al. showed that the biopsy of penile calciphylaxis is harmful and contraindicated, with most that underwent the biopsy experiencing disease progression.⁶ The dearth of large-volume studies indicates the need for further prospective studies with the aim of streamlining management principles and improving outcomes.

Conclusion

Penile calciphylaxis is a necrotic penile disease characterized by ulceration, hemorrhage and

dry necrosis. The condition precludes infection and probable sepsis and death. The majority of studies about penile calciphylaxis have described a mortality rate above 50%, as well as a very strong predilection for patients with end-stage renal disease. Several approaches have also been described in management, ranging from local debridement to parathyroidectomy. What is common among studies however, is the need for large volume studies for wider applications in terms of formulating guidelines for management.

References

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