



Inflammation and infection

Penile necrosis induced by rubber bands – Case report

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Penile strangulation is an unusual urologic emergency that can be caused from both pathologic and intentional penile constriction devices. Proper wound evaluation and wound care is of utmost important. 81-year-old African American male with a history of dementia who presented to the hospital with a severe case of penile strangulation and found to be in diabetic ketoacidosis. We review the classification system of penile strangulation injuries as well as suggest accelerated treatment strategies. Identifying underlying factors that could complicate wound healing is important when working up penile strangulation cases. Early surgical intervention is best treatment.

Introduction

Penile strangulation is an unusual urologic emergency that can be caused from both pathologic and intentional penile constriction devices (PCDs). The first case of this condition was identified in the literature in 1755, and numerous accounts of different objects used as PCDs and mechanisms of injury have been reported since.¹ Penile strangulation can occur pathologically as is common in children and infants from accidental strangulation from hair. In adults, PCDs in the literature comprise numerous objects such as rings, metal tubing, ball bearings, bottles, rubber bands and more. Use of these objects has been associated with desire for erotic or sexual gratification, incomplete understanding of health conditions, and underlying psychiatric disturbances.²

In the case of prolonged penile strangulation, ischemia can lead to irreversible cell death and necrosis. Gangrenous necrosis presents as a common complication and ischemic injury can lead to permanent injury

requiring significant wound debridement, skin grafting, and even penile amputation.¹ Herein, we report a case of penile strangulation using rubber bands and the resulting injury and treatment complicated by DKA.

Case presentation

An 81-year-old African American male with a past medical history of dementia and diabetes presented with two rubber bands wrapped at the base of his penis. Patient was found to be confused and in diabetic ketoacidosis with a glucose level of 600. Per patient's wife, the rubber bands had been there for 2–3 days. Patient denied any pain, urinary straining, frequency, urgency, or dysuria. On examination, the phallus was significantly edematous with no tenderness, erythema, or crepitus. There was some skin breakdown and changes of the glans, but no evidence of necrosis. Urology was consulted and the rubber bands were immediately removed. Toxicology was negative. UA was unremarkable.

Three days after presentation, a wound care consult demonstrated worsening edema of the penis with multiple partial thickness wounds some covered in yellow nonviable tissue extending from the base of the phallus to the tip with some linear partial thickness tissue losses. At this time, the patient's glucose was 301, protein 6.2, and albumin 3.0.

Five days after presentation, the patient's examination worsened, illustrating necrosis and crepitation of the skin of the penile shaft (Fig. 1). Infectious disease was consulted and placed the patient on linezolid, Zosyn, and clindamycin. He was then taken to the operating room for surgical debridement. Cystoscopy prior to the procedure was

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Fig. 1. Yellow nonviable tissue extending from the base of the phallus to the tip consistent with necrosis. (A & B: ventral aspect; C: dorsal aspect). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

unremarkable and a Foley catheter was placed. Electrocautery and sharp dissection were used to remove the necrotic skin, which was noted predominantly under the glans penis and right side of the penile shaft. The wound was irrigated with Pulsavac using bacitracin solution and covered with hydrogel and Kerlix. Wound care was continued for another five days.

Two days after the operation, patient's wound showed evidence of granulation and healing. The Foley was removed five days later, and the patient was discharged home. He failed to follow up two weeks later.

Discussion

Penile strangulation is an important but rare urological emergency, associated with numerous mechanisms of injury. Whether it be from Penile Hair Tourniquet Syndrome in young children, sexual and erotic acts in adolescents and adults, or even due to underlying psychiatric disorders, severe injury is often expected but avoidable with appropriate recognition and treatment.¹⁻³

To classify the extent of injury more accurately from penile strangulation, multiple authors have attempted to create a classification system for penile injury from strangulation. The most used and cited system was developed by Bhat et al. and is defined as follows:⁴

Grade 1 - Edema of distal penis.

Grade 2 - Injury to skin and constriction of corpus spongiosum, but no evidence of urethral injury. Distal penile edema with decreased penile sensation.

Grade 3 - Injury to skin and urethra but no urethral fistula. Loss of distal penile sensations.

Grade 4 - complete division of corpus spongiosum leading to urethral fistula and constriction of corpora cavernosa, with loss of distal penile sensations.

Grade 5 - gangrene, necrosis, or complete amputation of the distal penis.

In this case, the presentation to the ED was a grade 1 injury as there was significant edema and evidence of injury to the skin. However, there was no evidence of urethral injury based on examination and history of urinary symptoms at that time. As time progressed after initial

presentation, however, the injury demonstrated penile skin necrosis and a grade 3 categorization.

In many cases, the initial grade of injury at presentation of the patient after removal of the constricting device can be helpful to identify likely complications and future treatment plans.¹ However, a thorough evaluation of a patient's medical history and other comorbid conditions can help identify low-grade injuries that are more likely to progress to a state in which surgical intervention may be required. The patient in our case presented with DKA and a likely history of uncontrolled diabetes. The ischemic damage from strangulation compounded with poor blood flow to the ischemic tissue from the underlying diabetic vascular disease can lead to a progression to a necrotic or gangrenous state.^{1,5} In this case, the best management is early surgical intervention and debridement which can slow the progression of disease and reduce morbidity as reported in a series of case reports.⁵

Conclusion

Penile strangulation is a urologic emergency that requires immediate assessment of the injury and urgent intervention to prevent lasting damage. While the appearance of injury at initial presentation of the patient can help identify the likely progression of the case, identification of underlying factors that may complicate wound healing must be identified to properly manage care. Early surgical intervention in high grade injuries is the best mechanism to limit morbidity and mortality for these patients. With this case presentation, we highlight the importance of proper wound evaluation and care for penile strangulation with underlying comorbidities.

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Declaration of competing interest

The authors have no conflict of interest to declare.

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