

## Gradual Approach for The Management of Penile Strangulation by Metal Ring: A Case Report

Cesar Andrés Lamilla-Useche<sup>1</sup>, Gabriela Castañeda-Millán<sup>2</sup>, David Hernández-Aparicio<sup>2</sup> and David Andrés Castañeda-Millán<sup>1,3\*</sup>

<sup>1</sup>Urology Division. SEMEDES - Clínica del Occidente. Bogotá, Colombia.

<sup>2</sup>School of Medicine. Universidad Nacional de Colombia. Bogotá, Colombia.

<sup>3</sup>Urology research and innovation group. School of Medicine. Universidad Nacional de Colombia.

### \*Correspondence author

**David A. Castañeda-Millán**,  
Urology Division, Surgery Department,  
School of Medicine,  
Universidad Nacional de Colombia.  
Bogotá, Colombia  
ORCID: <https://orcid.org/0000-0001-9202-024>

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### Abstract

Penile strangulation by metal ring is a rare urological entity; it could be a truly urological emergency and requires a prompt resolution to avoid irreversible consequences. We present the case of a young male who received a successful gradual approach for the extraction of penile ring. This article provides to the readers some practical tips for the management of this rare condition.

**Keywords :** Diseases of the Penis; Penis; Male Genital Diseases; Wounds and Injuries.

### Introduction

Penile strangulation due to the placement of metal rings is an uncommon urological emergency (1); although its worldwide incidence is unknown, it is not an insignificant clinical entity (2). Healthcare professionals in the context of emergency care and urologists could be faced to this rare clinical situation during their careers, so it is important to know some clinical tips for the management of this entity.

Factors associated with these clinical scenarios may include atypical sexual practices in adults, psychiatric illnesses, and psychoactive substance use (3,4). Managing these cases can be challenging, and the collaboration of a multidisciplinary team may be necessary (5). It is crucial to provide an appropriate and timely intervention to prevent complications and irreversible sexual sequelae, such as surgical penile amputation, fibrosis of the cavernous bodies/permanent erectile dysfunction, sepsis, or even death (6,7).

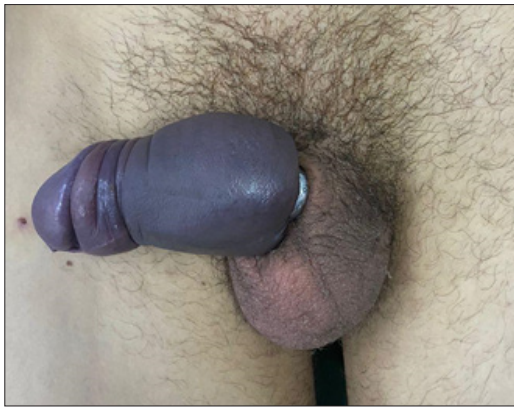
Metal objects like rings are often difficult to remove and typically requires cutting; currently, there is no consensus or clinical guidelines promoting a universal technique for approaching these cases (8). Therefore, it is important to be aware of the most useful strategies and tools available to provide a prompt solution to this problem, with the aim of preserving the patient's sexual integrity and minimizing clinical repercussions (9). Management modalities described in the literature include the string method, aspiration of cavernous bodies, ring cutting, and penile decompressive surgery (10,11).

In Colombia, as the rest of the world, there are no available official data to estimate the incidence of penile strangulation due to metal rings. To date, only one case has been documented in the year 2010 (12). This manuscript aims to present a case of penile strangulation caused by a metal ring, which was treated through surgery and ring cutting at a fourth-level medical center in Bogotá, and to provide management tools for the reader regarding this condition.

### Case Presentation

A 26-year-old homeless man presented to the emergency room due to penile pain and acute urinary retention with 24 hours of onset. During the assessment in the emergency department the patient reported the continuous use of a metal ring at the base of his penis for the past 10 days, however, by this time he was not able to remove it. This was not the first time which the patient used a penile metal ring. The patient had a long history of psychoactive substance use and didn't have any other medical disease.

During the physical examination penile strangulation caused by the metal ring was observed, classified as grade II according to the Bhat scale. The penis exhibited signs of ischemia, including a purplish color, congestion, edema, and poor perfusion in the middle and distal aspects including the glands (13). Additionally, it was evident that the patient had a distended bladder as a consequence of the obstructive phenomenon at the penile urethral level caused by the ring.



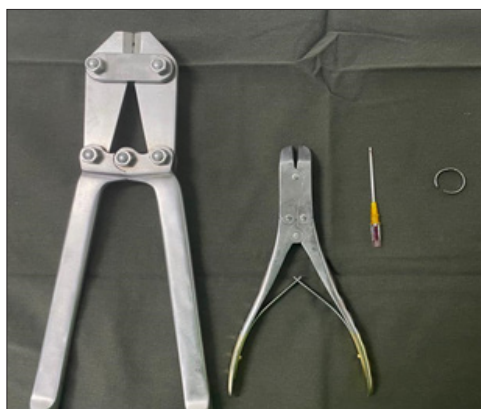
**Figure 1:** Penile signs of ischemia due to metal ring.

Due to the high risk of functional loss of the penis and the acute urinary retention, the removal of the metal ring was indicated in the operating room under general anesthesia.

A sequential approach to manage this condition was attempted, starting with manual compression of the penis to reduce edema. The penis was lubricated, and attempts were made to slide the ring using silk threads, but this attempt was unsuccessful. Then an attempt was made to cut the ring with forceps; however, venous congestion and inflammatory changes in the penis precluded the creation of a safe window for cutting the ring without additional injuries in the penile body.

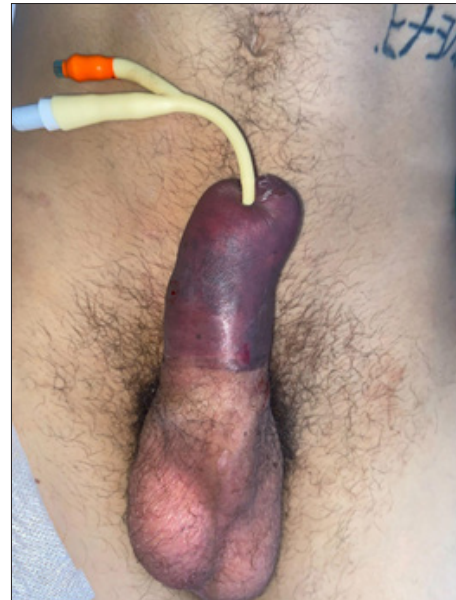
Therefore, a bilateral drainage of the cavernous bodies was performed distal to the ring using a 14 G needle, which successfully evacuated a significant retained amount of blood from the cavernous bodies, thus alleviating penile venous congestion. This maneuver allowed the advancement of a Kelly clamp between the lateral aspect of the penis and the metal ring, creating a safety space for the cutting of ring. Then, a cold-cut clamp was used to break the ring on its lateral aspect, achieving the release of the base of the penis and subsequent distal reperfusion.

Finally, a 16 French two ways Foley catheter was inserted into the urethra, clear urine drainage was obtained, and a compressive genital dressing was applied. At the end of the procedure no lacerations on the skin or signs of cavernous bodies/ urethral lesions were observed.



**Figure 2:** Instruments used to cut and remove the penile ring.

The patient did not experience postoperative complications, he had a satisfactory clinical course, and no immediate sequelae were observed. Improvement of genital edema and adequate distal penile perfusion were evident. The patient also received psychiatric, psychological, and social work assessments during their hospital stay. He was discharged two days after the surgical procedure with the recommendation of a urinary catheter for one week, while complete resolution of the genital inflammatory changes was achieved.



**Figure 3:** Genital clinical appearance - First postoperative day.



**Figure 4:** Genital clinical appearance - Second postoperative day.

In the postoperative follow-up, one week after the procedure, the urinary catheter was removed without complications. One month after the intervention, the patient was under the care of psychiatry and social work, had returned to his family's home, and was discharged by the urology service with good aesthetic and functional outcomes (no alterations in sensitivity, erection quality, or lower urinary tract symptoms were reported).



**Figure 5:** Genital clinical appearance - One month post surgery.

### Discussion

Penile strangulation due to foreign bodies is a urological emergency that involves acute vascular compromise of the penis, with the risk of progressing to ischemia and necrosis. The duration of this clinical condition increases the possibility of irreversible functional sequelae and even the loss of this organ (14).

The cause of this condition varies by age groups. In adults, the most common causes are related to sexual activity, psychiatric disorders, and psychoactive substance use (15). In children, it can occur accidentally, or can be seen in patients with psychiatric disorders, and occasionally result from inadequate management of enuresis and incontinence by parents (16).

Multiple objects used in different contexts have been described as causing penile strangulation. Among them: metallic rings, nuts, rubber bands, threads, and bottles have been reported (17). In this case, penile strangulation was reported due to the placement of a metallic ring.

Although clinical diagnosis is relatively straightforward through physical examination, it is common for it to be delayed because patients often seek medical attention late out of embarrassment, sometimes hours or even days after strangulation occurs, as was the case in the presented scenario (18).

Since 1991, the classification system proposed by Bhat has been used to categorize these lesions, as it facilitates the approach to managing these cases (19). This system is divided into five grades ranging from penile edema without skin lesions or ulcerations to gangrene, necrosis, or penile amputation (19).

The scale proposed by Bhat incorporates the patient's perception as one of the axes to determine the severity of strangulation, which can result in less precision due to the anxiety that the

event may cause or the analgesia for symptomatic control (20).

Grade 1	Edema of distal penis.
Grade 2	Edema of distal penis with decreased penile sensation.
Grade 3	Skin and urethral injury. Loss of sensation in the distal penis.
Grade 4	Complete division of the corpus spongiosum with urethral fistula and constriction of the corpus cavernosum.
Grade 5	Gangrene, necrosis, or amputation.

*Adapted from Bhat et al. (19)*

**Table 1:** Bhat Classification

Dawood et al. proposed a classification system based on physical examination, which facilitates clinical classification as it does not require additional studies and is not dependent on the patient's subjective perception (20). This classification is divided into three grades of injury based on depth, ranging from superficial tissue injury to deep tissue injury and loss of tissue, gangrene, or separation of the cavernous bodies (20,21).

Grade 1	Superficial injury with distal edema
Grade 2	Injury to corpora or urethra
Grade 3	Gangrene, amputation, or fistula.

*Adapted from Dawood et al. (20)*

**Table 2:** Dawood Classification

While the management of these cases is not universal, Puvvada et al. proposed a three-level gradual approach: Level I involve attempting manual extraction, lubricating with lidocaine jelly, and using the string technique with or without draining the cavernous bodies(22). If Level I is unsuccessful, Level II involves surgical intervention under anesthesia to remove the foreign body using low-power orthopedic tools. Finally, if Level II fails, Level III is employed, where high-power orthopedic tools are used (22).

Dawood et al. suggested a similar management approach, starting with attempting to slide the ring using lubricants. If it cannot be removed in this manner, the ring is cut. Multiple tools for this procedure have been described (20,22,23); therefore, it is recommended to use available tools, while considering the need to protect the underlying tissue from potential mechanical and thermal injuries (24). Surgery is reserved for the most challenging cases, and it includes lateral corporotomy (25,26).

In the case exposed, due to the duration of symptoms significant venous congestion and inflammatory changes in the penis were evident. The clinical findings were accorded to the grade II Bath scale. An initial approach was attempted but failed due to the inability to perform maneuvers without risk of additional injuries on the penile body. A simple bilateral percutaneous decompression of the cavernous bodies was performed, this maneuver facilitated the subsequent steps for cutting the metal ring. The approach offered to our patient resulted in good aesthetic and functional outcomes, as well as

the resolution of the urological emergency. It is important to note that the management of this clinical condition should be multidisciplinary including the psychiatric and psychological support, and should be considered a true urological emergency, because delays in the management of this patients can lead to ischemic or fibrotic changes and create irreversible functional and sexual consequences.

### Conflict of Interest

None to declare.

### Funding

None to declare.

### Ethical Responsibilities

In accordance with Colombian regulations (Resolution 8430 of 1993), this is a low-risk investigation, and informed consent for the treatment of clinical information was obtained for the publication of any potentially identifiable images or data included in this article. The principles of the Declaration of Helsinki were respected.

### Conclusions

The gradual approach is an effective alternative for the management of penile strangulation due to metal rings. Initiating management with manual extraction and sliding strategies and then progressing to percutaneous or more invasive surgical techniques helps reduce the risk of iatrogenic genital injuries and promotes the preservation of penile integrity.

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