



## Penile entrapment by metal ring: Case reports of effective non-surgical management

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### ABSTRACT

Penile strangulation by metal ring is a rare urological emergency situation which requires urgent intervention and treatment. We believe that an entrapped ring should be removed by the most efficient and if possible, a non-surgical method for better recovery. We present a case of penile strangulation caused by metal ring insertion. The metal ring was successfully removed using metal clamp. Penile strangulation by metal ring can be properly treated using available mechanical or electrical tools in a timely manner in the emergency setting.

### Introduction

Penile ring entrapment is a rare phenomenon. First described in 1755, it is applied mainly to enhance sexual performance by prolonging erections and for auto-erotic purposes. Penile entrapment may result in various degrees of vascular obstruction ranging from mild nonsignificant vascular obstruction that resolves after decompression to severe gangrene of the penis.<sup>1</sup> Various techniques have been described for removing constricting devices including lubricants, coiled strings, gauze, needle aspiration, and cutting of the ring itself.<sup>2</sup> Mechanical and electrical hardware might be used to remove objects made of hardened steel or iron that it can be done in both the emergency setting and operating room. This report aims to create awareness of penile ring entrapment in our subregion and to review the common methods of extrication. This method of extrication presented combines the merits of safety, efficiency, no morbidity, and early discharge from the hospital.

### Case presentation

A 40-year-old man presented to the emergency room with a bolt ring (Fig. 1) surrounding his penis. The man has inserted his penis into the bolt ring to add "extra-stimulation". After several hours, the penis size was swelling, but no pain was felt. He tried to cut the bolt ring using a metal saw and grinder but not successful. The patient then came to hospital twelve hours after the incident. The patient admitted that he delayed seeking medical attention due to embarrassment. In the emergency department, physical examination showed ecchymosis, edema, excoriation, and laceration on the penis surface. There was no hematuria

and urination was considered normal.

The emergency team has attempted to manually release the entrapped ring, but the patient requested the procedure to be conducted in the operating room setting instead. In operating room, the patient was put on a supine position. Sedation and lidocaine infiltration at the dorsal of the penis was done for anesthesia. Due to the thickness of the bolt ring, the main option was to use an electric grinder. Surgical clamp was placed under the ring to protect the underlying skin, and damp gauze was placed on the exposed skin to protect it from flying sparks.

After 2 hours, the bolt ring was finally removed with minimal bleeding. Blood aspiration from the penis was obtained, revealing low pH, high pressure of blood CO<sub>2</sub>, and low HCO<sub>3</sub>. Patient was then observed for another 2 days after surgery, then discharged after the edema significantly reduced (Fig. 2). At time of first-week follow-up, the penile size has turned to normal. The patient could void normally but have not attempted any sexual intercourse.

### Discussion

Penile strangulation is a rare urologic emergency due to attempt of inserting circular foreign objects with diameter matching or slightly smaller than the penis diameter. In most cases, this behavior was mainly motivated by the intent of sexual enhancement, self-treatment attempt of erectile dysfunction, and/or psychiatric disturbances. Patient may delay seeking medical attention due to embarrassment and patient's own attempt to release the entrapment individually.<sup>3</sup> In our cases, patient used a bolt ring of 1.5 cm in thickness and sook medical treatment more than 8 hours following a failed attempt of releasing the

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Fig. 1. Bolt ring after cut into two pieces.

strangulation.

Prolonged reduction of venous return may eventually result in distal penile edema from the entrapment site, blocked the arterial supply, and eventually damages the sensitive soft tissues of the male external genitalia.<sup>3</sup> After several hours of compromised circulation, penile strangulation may eventually lead to ischemic necrosis, urinary retention, fibrosis of the tissue, even multiorgan failure due to septic shock.<sup>4</sup> Bhat et al. have developed a grading system to describe the severity spectrum of penile entrapment (Table 1).<sup>3</sup>

There is no definitive neither universally accepted method of removing penile entrapment.<sup>5</sup> Understandably, urologists felt obligated to release the entrapment alone, but several authors have suggested that involvement of other individuals from other fields might be required.<sup>3,5</sup> Contribution from orthopedic or trauma surgery, even emergency or fire personnel might be valuable since they are more familiar and able to utilize the right tools (such as bolt and nut cutter) promptly, saving valuable time and preventing further damage to the penile tissue.<sup>5</sup>

Different devices may require different techniques of removal which determined by the material of the device, size of edema, degree of injury, and available tools. Penile aspiration might serve as initial management to reduce edema which will decrease shaft diameter and accommodate for easier removal.<sup>2</sup> In case of penile edema in which guide wire cannot be inserted between the object and penile skin, mechanical hardware such as chisel, saw, bolt-and-nut cutter, grinders, dental drills, and the string might be utilized to remove objects made of hardened steel or iron.<sup>2</sup> Ideally, the device should be cut in two different sites placed 180° apart which cut perfectly in half and provide the easiest access during removal.<sup>1</sup> In general, mechanical tools should be the preferred method of device removal where electrical/thermal tools are conserved when removal cannot be done by non-invasive mechanical methods due to the risk of burn injury, urethrocutaneous fistulas as well as urethral strictures.<sup>2</sup>

In circumstances where mechanical and electrical extraction tools

Table 1

Penile strangulation classification system.

Grade	Description
I	Distal penis edema. No evidence of skin ulceration or urethral injury.
II	Distal penile edema with decreased sensation. Injury to skin, constriction of corpus spongiosum. No urethral injury.
III	Injury to skin and urethra, without urethral fistula. Loss of distal penile sensation.
IV	Complete division of corpus spongiosum leading to urethral fistula and constriction of corpus cavernosum with loss of distal penile sensation.
IV	Gangrene, necrosis, or complete amputation of penis.



Fig. 2. Clinical appearances before and after removal of the entrapped bolt ring.

have failed and devitalized or gangrenous tissue exist, penile degloving and amputation might be conducted. Especially in Grade IV and V injuries, debridement and repair using tissue transfer techniques might be required although the risk of significant morbidity may persist due to the extent of tissue destruction.<sup>3</sup> Essentially, the primary aim of all treatments described is the preservation of organ function with the least possible complications by reestablishment of venous, lymphatic, and arterial flow which preserving the organ's anatomy and functionality.

### Conclusion

Penile strangulation by bolt ring is a rare urological emergency. Penile strangulation by bolt ring can be properly treated using available mechanical or electrical tools in a timely manner in the emergency setting.

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### Ethical approval

The authors declare that we obtained permission from ethics committee in our institution.

### Consent

Written informed consent for publication of this case report with

accompanying images was obtained from the patient.

### Author contribution

Both authors contributed to the collection of patient's data and writing process of the manuscript.

Maulidina Medika Rahmita: Conceptualization; Data curation; Investigation; Methodology; Resources; Validation; Visualization; Writing. Dyandra Parikesit: Supervision. Fina Widia: Supervision.

### Declarations of competing interest

There is no conflict of interest to disclose.

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