

Case Report

Penile Strangulation: Message in a Bottle

Murthy VenkataRamana Kusuma*, Maria AroojMirza, and Rowan Gerard Casey

Department of Urology, Colchester Hospital University Foundation Trust, UK

***Corresponding author**

Murthy VenkataRamana Kusuma, Department of Urology, Colchester Hospital University Foundation Trust, UK; Tel: 00447428158764; Fax: 0044 12067 4220; Email: Kusumauro@gmail.com

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OPEN ACCESS**Abstract**

Penile strangulation is a rare urological emergency typically caused by metallic and non-metallic devices often inserted over the penis for autoerotic purposes. Prompt removal of the agent is fundamental to prevent detrimental consequences of prolonged penile strangulation such as penile ischaemia, gangrene and amputation. We report a case of a 69 year old man who presented to accident and emergency following 36 hours of penile entrapment by commercial plastic bottle neck causing penile strangulation. Successful removal of the device was achieved with the aid of two ring cutters and metal wire pliers. The patient made an uneventful recovery. We also review the literature and summarize the management of this rare condition.

Keywords

- Penis
- Strangulation
- Pent ethylene-terephthalate
- Ring cutter

INTRODUCTION

Penile strangulation represents a rare urological emergency and a challenge for the urologist as each case is different, no universal method of management exists, and time is of the essence. Delayed presentation is likely to sustain higher grade injuries and in some cases death [1]. We report a case of strangulation of the penis by a hard commercial plastic bottle neck successfully removed in accident and emergency.

MATERIALS AND METHODS

A 68-year-old gentleman presented to accident and emergency 36 hours following entrapment of his penis in a pentaethylene-terephthalate (PET) bottle. The penis was inserted in the bottle for autoerotic purposes. The neck of the bottle which contains numerous hard ridges ensures a tight hold for the bottle cap. In the emergency department, the wide portion of the bottle was cut to enable urine to pass through. On examination, the plastic bottle neck was impacted on the shaft of the penis (Figure 1). The penis and glans distal to the shaft appeared edematous and on palpation felt extremely tender. The patient was sedated with intravenous 2mg midazolam and a penile ring block using 0.25% levo-bupivacaine was administered all under continuous respiratory and cardiac monitoring. Initially, an attempt was made to cut the plastic with scissors but this proved challenging as the neck of the bottle was very hard due to the ridges. A sterile ring cutter was then implemented to cut the plastic; however, this too was ineffective. Subsequently, pliers were introduced under the rim of the bottle neck and a small cut made initially to accommodate the larger ring cutter (Figure 2). This time, the ring cutter proved to be very effective and slowly with the help of the pliers, the remains of the impacted bottleneck were cut. The plastic did not slide easily and required two artery forceps



Figure 1 Strangulated penis by impacted bottle neck and the devices used for removing it.



Figure 2 Process of cutting with ring cutter to remove the hard plastic bottle neck.

to separate and remove the two cut ends safely without causing any damage to the penis. He was discharged the following day without any complications.

DISCUSSION

Strangulation of the penis may occur in age group. In infants and young children, the foreign body is usually a string, thread or hair tied around the penis. Non-accidental incarceration by caretakers attempting to prevent nocturnal enuresis in the child has been documented. In adolescents, the leading cause is masturbation and sexual curiosity. Whilst in the middle-aged and elderly population, etiology includes enhancement of sexual performance, self-treatment of erectile dysfunction and psychiatric illness [2].

A plethora of objects causing penile strangulation has been reported in the literature including nuts, bolts, ball bearings, loop wrenches, rubber bands, bottles, iron and steel rings, a hammer-head, steel washers and even an iron pipe [3].

The constricting object once placed over the flaccid or semi-erect penis may cause oedema and thus becomes difficult to remove. A penile compartment syndrome may develop as the venous and lymphatic outflow becomes occluded distal to the foreign object which when followed by an arterial inflow obstruction promotes tissue ischemia and necrosis. Alternatively, the device may block the venous return without arterial involvement causing massive engorgement secondary to lymph edema and necrosis resulting from anoxia due to venous stasis [2].

A wide spectrum of mechanical penile injuries exists including skin ulceration, urethral injuries and fistulae, gangrene, and auto-amputation. Bhatt et al graded such injuries according to severity (Table 1), [4]. The incidence of high-grade injuries reported was 14.2% versus 67.2% for low-grade injuries. A greater number of high-grade injuries have been associated with non-metallic objects as compared to metallic objects (77.2% vs. 22.2%) [5]. The exact mechanism remains unclear, however, it has been speculated that the often elastic nature of the non-metallic object causes more constriction of the penis [6].

Management consists of immediate decompression of the strangulated penis to ensure a free blood flow and uninhibited maturation. If the urethra is intact, a Foley catheter is recommended for grades I and II, while suprapubic catheterisation is recommended for grades III-V [7]. Management may be divided into four main principles; the string technique and its variants with or without aspiration of blood from the glans, aspiration

techniques, cutting devices and surgery. Surgical techniques are typically reserved for the advanced grades (Grades IV and V).

Table 2 depicts an array of incarcerating objects successfully managed with various techniques.

The choice of method depends on the type and size of the constricting device, incarceration time, and trauma grade, patient's ability to remain calm, and the tools available to presenting physicians. Cutting devices include various tools such as ring and bolt cutters, orthopedic saws and drills. Personal protective equipment is essential in order to prevent harm to self. Indeed, conjunctivitis in the operating physician from metal sparks injury has been reported [6] Furthermore, the cutting process may result in iatrogenic penile injury thus, the urethra should be evaluated radio logically especially when the device has cut or ulcerated the skin. In our case report, the use of pliers and a ring cutter served as effective tools to successfully retrieve the impacted bottleneck from the entrapped penis.

The duration of the incarceration correlates with the severity of the clinical presentation. Silberstein et al reported an increased number of high-grade injuries when patients presented after 72 hours (29.1%) as compared to patients presenting within 72 hours(0%) [5]. Thus, prompt removal of the incarcerating device remains the primary objective in the management of penile strangulation.

Complications of penile strangulation may be severe and lead to different degrees of vascular obstruction leading to oedema, maceration, local infections, Fournier's Gangrene, fistulae, penile necrosis with or without the involvement of the urethra. Late complications include penile shaft fibrosis and erectile dysfunction [3,6].

Penile strangulation is generally an acute condition; however rare cases of chronic penile strangulation have been reported. Chronic penile strangulation is usually caused by the inappropriate usage of devices developed for autoerotic purposes to prolong erections. It typically results in penile lymph edema, voiding dysfunction, urinary infections, skin ulcerations, necrosis, and urethrocutaneous fistulae [21]. Death, though rare, has been reported as a result of the delay in seeking medical attention. In one case, the adult male presented 10-14 days after the incarceration by the plastic bottle neck and later developed penile necrosis, sepsis with multi-organ involvement. Autopsy findings revealed penile strangulation, penile necrosis, acute pyelonephritis, and bronchopneumonia [1].

Table 1: Bhat et al., Classification of penile strangulation injuries [4].

Grade	Description
I	Edema of the distal penis. No evidence of skin ulceration or urethral injury.
II	Injury to skin and constriction of corpus spongiosum but no evidence of urethral injury. Distal penile edema with decreased penile sensation.
III	Injury to the skin and urethra but no urethral fistula. There is a loss of distal penile sensation.
IV	Complete division of corpus spongiosum leading to urethral fistula and constriction of corpus cavernosa with the loss of distal penile sensation.
V	Gangrene, necrosis, or complete amputation of the distal penis.

Literature search of the various penile strangulation devices and method of management

Table 2: A literature search of successful removal of various objects using a wide array of instruments.

Author	Age	Object	Duration	Method
Gan W et al (8)	19	metal axletree	2 weeks	Deglove operation
Dong C et al (9)	64	Metallic ring	12 hours	O-O silk method; 22 G needle puncture at 3 sites distal foreskin
Xu T et al (10)	36	Steel hoop	10 hours	2 longitudinal incisions on the right side of corpus penis and Left side glans penis. Orthopedic fret-saw and pinchers
Ooi C K et al (11)	60	Metallic ring	unknown	MIDAS REX Metal Cutter
Chennamsetty A et al (12)	49	Metallic ring with peripheral cogs,	1week 2 days	Large orthopaedic cutter
Sinha et al (13)	38	Metal Nut	8 hours	Aspiration of 66ml blood
Patel et al (14)	45	2 Metal radiator clamps	6 months	orthopedic wire cutter
Vahasarja et al (15)	40	Loop wrench	5 hours	String, glans aspiration
Greenspan et al (16)	40	Steel ring	7 hours	Dremmel moto tool with grinder
Darby et al (17)	53	7 metal rings	unknown	MIDAS REX Pneumatic drill
Talib RA et al (18)	52	Metallic ring	8 hours	Handheld rotating saw equipped with a metallic blade
Pinggera GM et al (19)	67	Wedding ring	11 hours	Ring cutter
Fikret H et al (20)	7	Cotton thread	12 hours	Scissors, circumcision

The outcome, even after long periods of penile strangulation is often good. In one case series, 13% of patients had lasting complications whereas in another up to 30% had serious complications such as urethrocutaneous fistulae or penile amputation [3].

CONCLUSION

In conclusion, strangulation of the penis is a rare urological emergency which requires immediate treatment to prevent serious complications of ischemic necrosis and autoamputation. The management of penile strangulation may be challenging as the devices used may not be readily available in accident and emergency requiring creativity, resourcefulness, perseverance, and patience.

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