**Name of Journal:** *World Journal of Clinical Cases*

**Manuscript NO:** 70970

**Manuscript Type:** CASE REPORT

**Using a fretsaw in treating chronic penial incarceration: A case report**

Zhao Y *et al*. Fretsaw treating chronic penial incarceration

Yi Zhao, Xiao-Qiang Xue, Hou-Feng Huang, Yi Xie, Zhi-Gang Ji, Xin-Rong Fan

**Yi Zhao, Xiao-Qiang Xue, Hou-Feng Huang, Yi Xie, Zhi-Gang Ji, Xin-Rong Fan,** Department of Urology, Peking Union Medical College Hospital, Beijing 100730, China

**Author contributions:** Zhao Y and Xue XQ are co-first authors who contributed equally to this work, reviewed the literature, acquired the data, and contributed to manuscript drafting; Huang HF, Ji ZG, and Xie Y contributed to manuscript drafting; Fan XR managed the patient, performed the operation, and was responsible for the revision of the manuscript for important intellectual content; All authors issued final approval for the version to be submitted.

**Corresponding author: Xinrong Fan, MD, Associate Professor, Surgeon,** Department of Urology, Peking Union Medical College Hospital, No. 1 Shuaifuyuan Road, Dongdan, Dongcheng District, Beijing 100730, China. fxr\_pumch@163.com

**Received:** August 21, 2021

**Revised:** November 4, 2021

**Accepted:** December 7, 2021

**Published online:** January 14, 2022

**Abstract**

BACKGROUND

Penial incarceration (PI) is a rare situation. It is usually caused by a foreign object that strangulates at the base of the penis. PI may derive from pranks, sexual demand, mental disease, or intention to prohibit urinary disease. Generally, these situations are emergent and immediate treatments are needed. Cases of chronic PI are less reported, and their treating methods are yet to be discussed.

CASE SUMMARY

We reported a case on treating a 73-year-old male who had PI with a metallic hoop for 3 mo. After multidisciplinary consultation, the operation was performed successfully with the help of a fretsaw. Despite the chronic strangulation, the prognosis of the patient was satisfying. To the best of our knowledge, this case was rare and precious as it featured the longest strangulating time, which might enlighten the treating process of future PI cases. Also, we have reviewed and summarized major published cases to encapsulate appropriate approaches when facing diverse strangulation situations.

CONCLUSION

The selection of surgical tools depends on the material of the strangulating objects, the availability of equipment, and the severity of the penial damage. The urination function may not be affected after 3 mo of incarceration as in our case, whilst prudent preoperative measures and multidisciplinary evaluations are always essential. Although using a fretsaw is comparatively slow, it is safe and feasible to treat metallic penial incarceration.

**Key Words:** Penial incarceration; Chronic penial strangulation; Fretsaw; Surgical treatment; Literature review; Case report

**©The** **Author(s) 2022.** Published by Baishideng Publishing Group Inc. All rights reserved.

**Citation:** Zhao Y, Xue XQ, Huang HF, Xie Y, Ji ZG, Fan XR. Using a fretsaw in treating chronic penial incarceration: A case report. *World J Clin Cases* 2022; 10(2): 747-752

URL: https://www.wjgnet.com/2307-8960/full/v10/i2/747.htm

DOI: https://dx.doi.org/10.12998/wjcc.v10.i2.747

**Core Tip:** Penial incarceration is a rare clinical situation. We report a case of chronic penial incarceration, where a multidisciplinary task force was established for surgical strategy planning. We adopted the orthopedic fretsaw to split the metallic hoop. The patient reported no complications 1 year after the surgery. As the treatment of penial incarceration has not been summarized yet, we also performed a mini review of the literature regarding the treating approaches under certain circumstances. This case was unique because it featured the longest reported strangulating time, and it offered some first-hand experience on treating chronic penial incarceration.

**INTRODUCTION**

Penial incarceration (PI) is a rare clinical situation that was firstly reported in 1755[1]. It is usually caused by a foreign object that strangulates at the base of the penis[2]. PI may derive from pranks, sexual demand, mental disease, or intention to prohibit urinary disease[1]. In most cases, the strangulating objects block venous and arterial blood supply and result in ischemic necrosis. Hence, PI usually requires immediate intervention to save the penis function[1,3]. Depending on the material and hardness, strangulating objects can be either metallic or non-metallic[4]. Studies report that PI is usually caused by non-metallic foreign objects in younger patients, such as hair and rubber bands. In contrast, in elderly patients, metallic foreign objects are more likely to be found[5].

Herein, we report a rare case of a patient with chronic PI for 3 mo. The strangulation was treated by operation successfully, and the patient’s penial function was not affected. Published approaches on evaluating and treating PI are reviewed, and our experience on this case is shared.

**CASE PRESENTATION**

***Chief complaints***

A 73-year-old man visited the outpatient department of our hospital with a copper hoop strangulating the base of his penis.

***History of present illness***

The patient reported that he accidentally put the copper hoop on his penis 3 mo ago, and it was challenging to remove. As there was no acute pain, bleeding, or any other uncomfortable symptoms at that moment, he decided to do self-observation rather than visit the emergency department. During his observation period, he found that his penis gradually became swollen, and thereafter urination gradually became arduous. After 3-mo-long self-observation, he decided to visit the outpatient department of our medical center on his own.

***History of past illness***

The patient reported multiple comorbidities, including diabetes, high blood pressure (up to 190/110 mmHg), and coronary heart disease with four stents implanted. The patient took aspirin and clopidogrel routinely for secondary prevention purposes.

***Personal and family history***

The patient had no markable personal and family history.

***Physical examination***

Physical examination demonstrated a swollen penis at the distal end of the metallic ring, no skin necrosis or numbness was reported, nor stinky odor smelt. The copper hoop was 40 mm in the external diameter, with a 10 mm width and a 2 mm thickness (Figure 1).

A close physical examination found that the metallic hoop could be rotated slightly at the incarceration location. However, it could not be removed directly whatsoever. The patient’s vital sign was stable.

***Laboratory examinations***

Nothing abnormal was shown in the laboratory examinations.

***Imaging examinations***

No specific imaging examination was taken for diagnostic purposes as the diagnosis was not ambiguous.

**MULTIDISCIPLINARY EXPERT CONSULTATION**

Aspirin and clopidogrel were ceased 7 d before the operation. Both the cardiology department and anesthesia department regarded the risk to anesthesia as acceptable for surgery. Firefighters stated that they had no experience in handling such cases.

Dentists suggested that the fixed dental drill might be an alternative, as they had previously tested its efficiency and feasibility on a stainless steel nut. It could cut a 1 mm deep gap on the nut within 25 s and should be capable to drill the softer copper hoop in this case. However, since the head of the dental drill was easily destructed, this plan was eventually abandoned.

Considering the familiarity with available equipment in the operating room, we also invited several scrubbing nurses for surgical instrument preparation. The fretsaw, which had been commonly used in the field of orthopedics and neurosurgery, was recommended.

**FINAL DIAGNOSIS**

The final diagnosis of the presented case was chronic PI with a metallic hoop.

**TREATMENT**

We wrapped the distal penis with a bandage preoperatively to alleviate regional edema and placed a thin catheter between the penis and the hoop as a retraction. The catheter was pulled out intraoperatively, and then a condom was cautiously placed. Nevertheless, because of the edema of the prepuce, we failed to take the hoop off by hand, even with lubrication.

Therefore, penile aspiration was performed to reduce the edema. Meanwhile, we exploited a pincher to fix the hoop, an intestinal spatula to protect the underlying skin, as well as sterile water for cooling secondary heat damage. A video clip of the surgical procedure could be found online as the *Supplementary Material*. The foreign object was finally removed after 100 min of fretsaw cutting (Figure 2). There was scarcely any bleeding during the surgery. A urinary catheter was indwelled in case of temporary dysuria. The catheter was withdrawn and the patient was discharged in good condition 2 d after surgery.

**OUTCOME AND FOLLOW-UP**

There were no complications like dysuria, erectile dysfunction, urinary irritation, or urethral fistula through telephone follow-up at the exact time of 1 mo and 1 year after surgery.

**DISCUSSION**

PI is an urgent situation. If treated untimely, it can result in devastating consequences, as the persistent constriction might lead to genital vascular occlusion, further causing skin loss, urethral-cutaneous fistula, erectile dysfunction, and even penile loss[6]. Given that no particular tool has been designed for relieving the strangulation and occasionally the patient is too old with severe comorbidities, a multidisciplinary team, sometimes including firefighters, physicians, and scrubbing nurses, is suggested to be established.

Albeit cases of penial strangulation and its treatments had been sporadically reported, there are no universal treating protocols due to the differences in patient status, strangulating object, and medical conditions. Various objects could induce the strangulation of the penis. Based on the material, they could be roughly classified as metallic and non-metallic[7]. Trivedi *et al*[3] suggested that the duration of incarceration was an essential factor affecting the prognosis. Namely, if the penile strangulation cannot be relieved in time, then it may lead to irreversible ischemic necrosis, gangrene of the penis, penile self-amputation, urethral fistula, and penile erectile dysfunction.

As far as we are concerned, the penis injury can be divided into different grades, varying from edema, skin loss, urethral fistula, and complete amputation[8], that is: Grade 1: simple distal prepuce edema without penile skin ulcer or urethral injury; Grade 2: skin injury and cavernous compression, penile prepuce edema, accompanied by decreased sensation, but no urethral injury; Grade 3: urethral injury, loss of distal penile sensation, but no urinary fistula; Grade 4: the rupture of the cavernous urethral body and result in urinary fistula, further compression of the penile cavernous body with loss of sensation; and Grade 5: necrosis or spontaneous disconnection of the distal end of the penis.

In our experience, anti-infection and decompression are basic principles to deal with such cases. At the same time, the severity of strangulation is mainly related to the foreign object itself, such as hardness, size, and smoothness. More specifically, when the surface between the incarcerating object and the penis is not smooth or too tight, the penis would present acute edema, ulcer, and even necrosis. However, long-term strangulation may only cause edema of the prepuce and local skin superficial ulcer when the incarceration is not severe, rather than penial necrosis and urinary fistula. This situation might be partial because at this time penial and urethral cavernous bodies are shielded from edematous skins.

Generally, the treatment attempts we take should minimize the trauma to local tissues[9]. Applying lubricating oil with appropriate traction to remove foreign objects directly is preferred. For those with severe incarceration and noticeable swelling, penis piercing could be performed. The piercing sites could be either the edematous skin, the subcutaneous skin, or the penial and urethral cavernous body when necessary[10].

For less likely removable strangulating objects, direct cutting is recommended. Under these circumstances, the hardness and thickness of the material should be taken into consideration. For non-metallic incarcerations, such as hair tourniquet syndrome[11], rubber bands for disease prevention[2], plastic bottles for sexual entertainment[12], or seal rings[13], the treatments are reported to be comparatively more straightforward. However, as the strangulating objects had a certain degree of deformability, it is crucial to restore the deformed penis after removing the strangulating objects. Due to the metallic hoop’s hardness and thickness, treatments on metallic incarcerations are more complicated. Previous literature mentioned various surgical tools, mostly from orthopedics and dentistry, such as motor-operated emery wheel machine, metal cutter, grinder, hacksaw, fretsaw, industrial-grade steel bolt cutters, and marble cutting tool[4,14,15]. In extreme cases such as strangulation by axletree[16] or hammerhead, cautious planning is needed before violent cutting. The heat originating from the persistent cutting procedure could cause burn injury even with additional irrigation. Subsequently, the operation might be performed in a de-gloving way[16], which can be composed of three steps: (1) De-gloving the skin distal to the strangulated area until the coronal part; 2) Moving the constrictive object towards the distal end; and 3) Suturing the edge of the skin back.

Extra operations are required in exceptional situations, such as PI with shallow ulcerations or urinary tract fistulae. Ulceration indicates the necrosis of penial skin or partial corpus cavernosum. Thereafter, the necrotic part needs to be debrided first. However, if the wound defect is too large to be sutured, a skin graft with radial forearm flap neophallus might be required. If deep necrosis is found in the urethra, partial or entire penectomy might be necessary[9,17,18].

There were three main benefits of using a fretsaw in this case. First, compared with a dental drill and other electric equipment, the initiation, cessation, and alteration of cutting direction could be adjusted more responsively when deploying a fretsaw. Second, there would be no inertia and electric sparks because hands drove the fretsaw. Last but not least, because the cutting direction was from the inner layer to the outer surface, the accidental injury caused by the damage of the metal structure would be avoided.

Nevertheless, the cutting efficiency of using a fretsaw is comparatively low, as it is purely powered by hands. Continuously cutting for several minutes is tiring, and thereafter loss of controllability might occur. Similar to other methods, thermal damage could not be avoided. Hence, an assistant must continuously spray normal saline with a syringe to cool the metal surface.

Several limitations should be noted. First, due to the rarity of PI, more cases are awaiting to be summarized to increase credibility and generality. Specific consideration should be taken regarding patient status, the degree of edema, and the material of the incarcerating object. Systematic reviews are called for to establish higher-level evidence. Second, specific steps, in this case, could be optimized, such as a bacterial culture could be performed in the case of severe postoperative skin infection, and the postoperative daily observation of the wound might be better recorded.

**CONCLUSION**

In conclusion, the selection of cutting tools depends on the strangulating object and the availability of equipment. Meanwhile, the concrete operation also relies on the severity of penial damage. The urination function may not be affected after 3 mo of incarceration like in this case, but prudent measures and sufficient preparations should be taken preoperatively. Even though using a fretsaw in treating PI is comparatively less efficient, it is feasible and safe.

**REFERENCES**

1 **Ivanovski O**, Stankov O, Kuzmanoski M, Saidi S, Banev S, Filipovski V, Lekovski L, Popov Z. Penile strangulation: two case reports and review of the literature. *J Sex Med* 2007; **4**: 1775-1780 [PMID: 17888068 DOI: 10.1111/j.1743-6109.2007.00601.x]

2 **Yoshida T**, Watanabe D, Minowa T, Yamashita A, Miura K, Mizushima A. Penile strangulation intentionally using a rubber band to prevent the development of penile cancer. *Urol Case Rep* 2019; **27**: 101003 [PMID: 31467859 DOI: 10.1016/j.eucr.2019.101003]

3 **Trivedi S**, Attam A, Kerketa A, Daruka N, Behre B, Agrawal A, Rathi S, Dwivedi US. Penile incarceration with metallic foreign bodies: management and review of literature. *Curr Urol* 2013; **7**: 45-50 [PMID: 24917757 DOI: 10.1159/000343554]

4 **Patel NH**, Schulman A, Bloom J, Uppaluri N, Iorga M, Parikh S, Phillips J, Choudhury M. Penile and Scrotal Strangulation due to Metal Rings: Case Reports and a Review of the Literature. *Case Rep Surg* 2018; **2018**: 5216826 [PMID: 29780654 DOI: 10.1155/2018/5216826]

5 **Lu Y**, Tan TW, Lau KW. Successful removal of a penoscrotal constricting ring in a 49-year-old male. *Asian J Urol* 2017; **4**: 262-264 [PMID: 29387560 DOI: 10.1016/j.ajur.2017.01.003]

6 **Puvvada S**, Kasaraneni P, Gowda RD, Mylarappa P, T M, Dokania K, Kulkarni A, Jayakumar V. Stepwise approach in the management of penile strangulation and penile preservation: 15-year experience in a tertiary care hospital. *Arab J Urol* 2019; **17**: 305-313 [PMID: 31723448 DOI: 10.1080/2090598X.2019.1647677]

7 **Xu T**, Gu M, Wang H. Emergency management of penile strangulation: a case report and review of the Chinese literature. *Emerg Med J* 2009; **26**: 73-74 [PMID: 19104114 DOI: 10.1136/emj.2008.062877]

8 **Bhat AL**, Kumar A, Mathur SC, Gangwal KC. Penile strangulation. *Br J Urol* 1991; **68**: 618-621 [PMID: 1773293 DOI: 10.1111/j.1464-410x.1991.tb15426.x]

9 **Campbell K**, Terry R, Yeung L. Surgical reconstruction and follow-up of penile strangulation injury. *Urol Case Rep* 2018; **19**: 6-8 [PMID: 29888174 DOI: 10.1016/j.eucr.2018.02.005]

10 **Osman I**, Muñoz AM, Lozano JM, Ortega CJ, Cruz N, Medina RA. Penile incarceration secondary to a ring. *Urol Int* 2010; **85**: 245-246 [PMID: 20714123 DOI: 10.1159/000318680]

11 **Acimi S**. Penile strangulation by hair. *Pediatr Surg Int* 2014; **30**: 729-732 [PMID: 24879557 DOI: 10.1007/s00383-014-3523-9]

12 **Agarwal AA**, Singh KR, Kushwaha JK, Sonkar AA. Penile strangulation due to plastic bottle neck: a surgical emergency. *BMJ Case Rep* 2014; **2014** [PMID: 25427935 DOI: 10.1136/bcr-2014-207338]

13 **Valderrama-Illana P**, Abad-Menor F, Puche-Sanz I, Pareja-Vilchez M, Cozar-Olmo JM. Penile Strangulation Caused by a Seal Ring. *Arch Sex Behav* 2016; **45**: 3-4 [PMID: 26502282 DOI: 10.1007/s10508-015-0649-3]

14 **Li C**, Xu YM, Chen R, Deng CL. An effective treatment for penile strangulation. *Mol Med Rep* 2013; **8**: 201-204 [PMID: 23652299 DOI: 10.3892/mmr.2013.1456]

15 **Singh I**, Suman D, Gupta S, Garg G. Penile strangulation by multiple steel ball bearings: desperate situation-desperate measures. *BMJ Case Rep* 2018; **2018** [PMID: 30344163 DOI: 10.1136/bcr-2018-227586]

16 **Gan W**, Yang R, Ji C, Lian H, Guo H. Successful remove of a metal axletree causing penile strangulation in a 19-year-old male by degloving operation. *Case Rep Med* 2012; **2012**: 532358 [PMID: 22924045 DOI: 10.1155/2012/532358]

17 **Saiad MO**. Penile injuries in children. *Turk J Urol* 2018; **44**: 351-356 [PMID: 29932405 DOI: 10.5152/tud.2018.92231]

18 **Zaghbib S**, Chakroun M, Saadi A, Boussaffa H, Bouzouita A, Derouiche A, Ben Slama MR, Ayed H, Chebil M. Severe penile injury due to condom catheter fixed by a rubber band: A case report. *Int J Surg Case Rep* 2019; **64**: 120-122 [PMID: 31634783 DOI: 10.1016/j.ijscr.2019.10.009]

**Footnotes**

**Informed consent statement:** Informed written consent was obtained from the patient for publication of this report and any accompanying images.

**Conflict-of-interest statement:** The authors declare that they have no conflict of interest.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: https://creativecommons.org/Licenses/by-nc/4.0/

**Provenance and peer review:** Unsolicited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review started:** August 21, 2021

**First decision:** November 1, 2021

**Article in press:** December 7, 2021

**Specialty type:** Urology and nephrology

**Country/Territory of origin:** China

**Peer-review report’s scientific quality classification**

Grade A (Excellent): 0

Grade B (Very good): 0

Grade C (Good): C, C

Grade D (Fair): 0

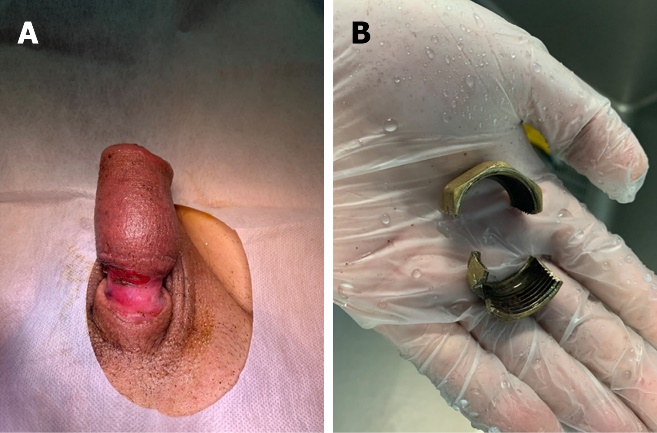
Grade E (Poor): 0

**P-Reviewer:** Hazafa A, Oura S **S-Editor:** Wang JL **L-Editor:** Filipodia **P-Editor:** Wang JL

**Figure Legends**



**Figure 1 Preoperative view of the penis.**



**Figure 2 Postoperative images.** A: Penis after the removal of strangulation; B: A view of the cut hoop.



Published by **Baishideng Publishing Group Inc**

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** bpgoffice@wjgnet.com

**Help Desk:** https://www.f6publishing.com/helpdesk

https://www.wjgnet.com



**© 2022 Baishideng Publishing Group Inc. All rights reserved.**