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Self-strangulation induced penile partial amputation: A case report

penile partial amputation

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Abstract

BACKGROUND

Traumatic amputation of the penis is a rare surgical emergency that is usually caused by self-mutilation, accidents, circumcision, assault and animal attacks. This study aimed to summarize our treatment experience involving penile reconstruction in a rare case of a [self](#)-strangulation induced chronic penile partial amputation.

CASE SUMMARY

A 22-year-old man presented with [self](#)-strangulation-induced chronic penile partial amputation for 3 mo where the penile proximal part was 1 cm from the pubis. Reconstruction methods included end-to-end anastomosis of the urethral mucosa, proximal anastomosis of the corpus cavernosum and tunica albuginea of the penis, and anastomosis of the deep dorsal vein, dorsal artery, and superficial dorsal vein. The patient urinated smoothly after the catheter was removed on Day 21. Three months after the surgery, the patient's penile preliminary cosmetic appearance was satisfactory, with occasional morning erections. The distal penile sensation was preserved, yet the erection hardness of the distal penis was not satisfactory.

CONCLUSION

Complete preoperative assessment and prompt surgical intervention decrease the loss of residual penile function.

Key Words: amputation; reconstruction; body dysmorphic disorders; psychological treatment

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Core Tip: We report a rare case of partial penile amputation. Through complete preoperative evaluation and appropriate surgical management, the patient's penile urination and erectile functions were preserved. At the same time, the importance of psychological intervention on the rehabilitation of patients with self-injury was further discussed.

INTRODUCTION

⁴ Traumatic amputation of the penis is a rare surgical emergency that is usually caused by self-mutilation, accidents, circumcision, assault and animal attacks.^[1] Penile self-mutilation is even rarer than that related to mental and mood disorders and is reported sporadically. Treatment of penile amputation requires stabilization of the patient and special attention to underlying psychiatric disorders. Therefore, for these patients, a detailed medical history should be taken to determine the patient's mental state in case later intervention management is necessary. Studies have shown that in most cases of self-amputation, resolution and treatment of psychiatric disorders usually results in a strong desire to preserve the penis. Studies have shown that, in most cases of self-amputation, resolution and treatment of mental illness usually results in a strong desire to preserve the penis.^[2]

Penile amputation as a surgical emergency does not require imaging most of the time.^[3] Patients often undergo surgery directly for emergencies, such as when there is edema, swelling, cyanosis, and severe pain caused by acute ischemia of the distal penis. In severe cases, the patient may even lose the penis permanently. However, the patient in our case delayed the golden time of treatment due to personal reasons. In this situation, adequate preoperative imaging evaluation, including penis flow ultrasound, penis nerve electrophysiology and urethroscopy evaluation, will greatly help the success rate of reconstruction and the recovery of urinary and erectile function.

CASE PRESENTATION

Chief complaints

A 22-year-old unmarried patient complained of “repeatedly tying his penis with rubber bands for more than 3 mo” and was admitted to the andrology ward of the Urology Department of the First Affiliated Hospital of Xinjiang Medical University.

History of present illness

The patient’s penis was partially amputated with a residual connection approximately 1 cm in diameter, and the penis leaked urine at the tied shaft.

History of past illness

The patient stated that he started to tie his penis with rubber bands discontinuously 3 mo prior. The initial binding site was approximately 2-3 cm proximal to the coronal groove of the penis, and the binding lasted for approximately one week, resulting in a defect approximately 1 cm deep in the first strangulation ring, so the patient temporarily released the tying rubber bands.

One week later, the patient rebinded the penis, which worsened his condition.

Personal and family history

The patient denied any family history of psychiatric illness. No autism-like manifestations were found during a consultation with a psychologist.

Physical examination

On genital examination, partial connections remained in the proximal penis (Figure 1). Postoperative follow-up showed that the penile wound was in good condition, the appearance was satisfactory, and the patient’s urination and erectile function were recovered (Figure 4).

Laboratory examinations

The patient's laboratory test results reveal no notable abnormalities.

Imaging examinations

Color Doppler ultrasonography indicated that the bilateral corpus cavernosum and corpus spongiosum were severed near the root of the penis; there was blood flow distribution in part of the cortex of the severed penis; part of the penile fascia at the part of the severed penile fascia was still continuous, and blood flow was seen in the continuous fascia. However, no obvious blood flow signal was found in the severed corpus cavernosum and corpus spongiosum (Figure 2).

Flexible cystoscopy (Video 1): Using a flexible cystoscope to enter the urethra, a circular stenosis could be seen in the urethra approximately 8 cm away from the external urethral orifice through which the flexible cystoscope could not pass. Meanwhile, the flexible cystoscope guide light could be seen outside the second strangulation ring.

FINAL DIAGNOSIS

The patient was finally diagnosed with strangulation-induced penile partial amputation.

TREATMENT

Considering that the patient's distal penile blood supply was still residual and that replantation might maintain good blood perfusion, we decided to perform penile reimplantation surgery with the core goal of maximizing the preservation of the patient's long-term urination and erectile function. The surgery was performed under general anesthesia by two urologists who were skilled in penile reconstruction surgery.

Preoperative observations: the penis was seen to be semidisconnected at the root, the penile corpus cavernosum and urethral sponge were disconnected, the disconnected stump had skin attached, and the urethra was narrowed at both ends of the dissection. The residual connecting tissues were hard in texture, and the thinnest diameter was approximately 7 mm. Ultrasound confirmed that there was a small amount of arterial blood flow signal inside the area. The arterial flow signal decreased after twisting the penis. A slight strangulation of the penile body was seen 2 cm from the

external urethra, the distal penile skin temperature was low, and the original skin recovered its red color slowly after pressing the glans, which was considered to be in an ischemic state.

Surgical procedure: Adequate preoperative disinfection of the surgical area was performed. The skin attached to the stump was circumferentially incised, the proximal urethra was freed, and the narrowed part of the urethra was excised to fully expose the normal urethra. The same approach was used for proximal dissection of the urethra and penile corpus cavernosum. Trabeculated epidermis at the site of the connecting tissue could be buried under the skin. Because the dorsal neurovascular bundle of the penis was surrounded by the middle dorsal segment of the Colles' fascia and tunica albuginea, the surrounding tissue was relatively tough. In this case, it did not get too much damage, which is the reason there was still a blood flow signal in the stump of the penis. After intermittently suturing the corpus cavernosum, mediastinum and urethra with absorbable sutures, a urinary catheter was placed, and the skin at both ends was trimmed and anastomosed. The continuity of the penile corpus cavernosum and urethra was completely restored, and the appearance of the penis was restored (Figure 3).

OUTCOME AND FOLLOW-UP

The catheter was maintained for 21 days after surgery. Postoperative follow-ups are shown in Figure 3. Three months after reconstruction, the preliminary cosmetic appearance was satisfactory with occasional morning erection. The patient had a grade 3 erection according to the Erection Hardness Score after papaverine was injected into the corpus cavernosum during the penile ultrasound examination (Figure 5). The patient was satisfied with the restoration of the reconstruction.

DISCUSSION

Penile amputation is a rare and challenging injury, similar to other traumatic penile injuries, including penile fracture, penetrating penile injuries and penile soft tissue injuries, and it is considered an emergency.^[4] However, cases of chronic strangulated

partial penile amputation have not been reported thus far. This case report may be the first to be reported. To this end, we reviewed the relevant literature to summarize key points and experiences in the treatment of acute penile trauma.

The most common complications after amputation penile reconstruction include skin necrosis, penile skin hypoaesthesia, urethral stricture, erectile dysfunction, and urethral fistula.^[1] Previous studies determined that immediate penile exploration and blood supply recovery are considered the most common and current management of penile amputation, with experts demonstrating that it leads to the fastest recovery in erectile function, urinary function and positive cosmetic outcomes.^[5] Based on the summary of relevant literature and case reports, we conclude that the amputation type, tissue defect area, ischemic time and urethral injury are factors that need to be evaluated before surgery. These factors have a significant impact on the success of penile replantation or reconstruction. It should be emphasized that a thorough physical examination should not delay surgical intervention, as better intraoperative examination can be achieved in the operating room.

Types of penile amputation include total and partial amputations. Although there are still tissue connections in partial penile amputation, the degree of tissue damage in partial penile amputation is sometimes more severe than that in total amputation. Morrison et al.^[6] concluded in their study, which critically appraises the current literature on penile replantation, that complete amputation seems to predict better sensory outcomes in a bivariate analysis. Complete penile amputation may give the surgeon better access to nerves for neuroorrhaphy, which ultimately could allow for better sensation. In particular, the asymmetry of the dissected tissue caused by strangulation will lead to poor postoperative anastomosis and affect the surgical effect. For total penile amputation caused by neat cutting, the wound conditions will be easier to manage, but total amputation usually means more severe ischemia.

To achieve the maximum restorative effect when facing cases with large tissue defects, local plastic correction is needed, which generally needs to be decided according to the patient's condition. Available choices include the abdominal wall under the island flap,

groin flap and other conditional flaps with less subcutaneous fat and no obvious variation in vascular distribution. Scrotal flaps are also used in a few cases. However, due to the large number of folds and pores of scrotal flaps, filled defects often have a poor appearance after repair, and obvious scarring remains.

The application of microsurgery downstream of free flap transplantation makes the reconstruction and repair of penile injuries with large tissue defects more diversified. At present, various free skin flaps, such as the radial free forearm flap, superficial inferior epigastric artery flap and superficial circumflex iliac artery flap, have been attempted for phallic construction, aiming at functional as well as cosmetic results.^[7]

According to reports in the literature, the survival rate was higher after replantation if the duration of warm ischemia was <6 h or the duration of cold ischemia was <16 h for the amputated organs.^[8] Previous studies have suggested that a total ischemic time of the penis below 15 h (mean 7 h) is associated with a successful outcome of penile replantation. Nader Henry *et al* reported a successful case of penile reconstruction after 23 h of ischemia.^[9] Although there is no unified standard for the golden time limit of ischemic time after penile amputation, the shorter the amputation time is, the higher the success rate of replantation and reconstruction.

A consensus in the contemporary literature acknowledges that microsurgical revascularization and approximation of the penile shaft structures provide early and adequate restoration of penile blood flow with the best outcome of penile replantation survival and erectile and voiding functions.^[10-12] For cases with urethral injury, adequate intraoperative evaluation was performed to clarify the type of urethral penile injury, including partial and complete rupture. According to the treatment principle of anterior urethral injury, a simple indwelling catheter and urethral repair were used.

Retrograde urethrocystography (RGU) can detect contrast agent leakage at the site of occult urethral rupture. Some authors consider RGU to be compulsory if a diagnosis of urethral rupture is suspected.^[13, 14] At the same time, RGU can also be used to evaluate and diagnose postoperative complications such as urethral fistula and urethral stricture.

The principles of penile reconstruction surgery are as follows: ² judiciously debride necrotic tissue, anastomose the severed urethra, repair the tunica albuginea and perform microsurgical repair for the dorsal nerves, arteries and veins.^[2, 15-17] In a review of the literature on reconstruction, Nicholas Ottaiano *et al* summarized that immediate reconstruction of penile injuries typically occurs by means of suspension or entrapment and can reduce complications.^[18] ³ Recent publications have investigated the anatomical approaches to penile allografts and suggested that connection of cavernosal, dorsal, and pudendal arteries would allow for optimal reperfusion.^[10, 19]

³ Previous studies have also suggested that microvascular repair yields superior outcomes, especially for venous outflow.^[20, 21] Babaei & Safarinejad *et al*^[22] summarized that although the initial reconstruction under direct vision had a good effect on the recovery of appearance and urination function in most cases, skin necrosis and other complications were also common. With the application of microscopic technology, reconstruction meets increasingly higher anatomical requirements, especially microsurgical anastomosis of penile blood vessels and nerves, which reduces the risk of penile skin necrosis.

² In addition, corporeal sinusoidal blood flow and its venous outflow are two critical factors for successful survival of penile replantation. Some ⁵ authors contend that the arteries do not provide a significant amount of vascular flow, add more operative time, and result in damage to the erectile tissue. However, studies have shown that erectile function remains in up to 86% and penile sensation ⁵ in up to 82% of patients who undergo microvascular reanastomosis of the dorsal arteries, although this may be diminished when compared with the preinjury state.^[23] Zhong's study also mentioned using hyperbaric oxygen to accelerate the healing process, which was of particular interest. Damage assessment of the arteries and veins along with microvascular reanastomosis is very helpful for surgical outcomes and reducing complications. Multiple venous anastomoses help to reduce venous congestion. Superficial veins help to ensure skin vitality as well as the integrity of the dorsal deep veins.^[24] ¹ Morrison *et al*.^[6] reviewed 74 published articles related to this topic and reported the outcomes and replantation-

related complications in 106 cases. Complete penile amputation accounted for 74.8% of these men, most of whom recovered micturition (97.4%) and erectile function (77.5%). Skin necrosis (54.8%) and venous thrombosis (20.2%) were the most common complications. Multivariate analysis indicated that anastomosis of a great number of the dorsal arteries and nerves was associated with better sexual function and recovery of urination along with normal sensation. Moreover, the number of anastomosed vessels was negatively correlated with adverse outcomes. During the perioperative period, routine observations include penile skin color, filling, overall vitality, temperature, and capillary refilling time.^[9] Arterial blood flow should be monitored using a hand-held Doppler device, and the observation time can be arranged according to the actual situation.

Whether it is penile amputation caused by accidental injury or self-harm behavior, it is very important to evaluate the patient's psychological and mental health during the whole treatment cycle, as well as the necessary psychological intervention. This is especially true for patients presenting with self-harm behavior.

Currently, the relevant surgical literature has not paid special attention to the mental health of such patients. However, it is very common for patients with penile amputation to experience a series of stress reactions after their injury. According to the severity of the patient's condition, personality characteristics, education level and other aspects, the clinical manifestations of this stress response can range from mild to severe, and psychological changes are common phenomena. In addition to negative emotions such as sadness and depression, increased psychological vigilance, avoidance, hyperactivity, anxiety, and impaired self-cognition may affect the treatment effect. In particular, the postoperative body image disorder makes the patient have an unacceptable aversion to the reconstructed and repaired penis, and in extreme cases, patients may self-harm again.^[25] Therefore, helping patients to establish a positive concept of coping with stress and conducting corresponding psychological counseling in a timely manner are indispensable for patients who have undergone penile reconstruction surgery in

receiving the reconstructed penis and for their physical and mental health recovery after surgery.

CONCLUSION

Penile amputation is a rare emergency in urology. It is necessary to evaluate the damage to the penis, and immediate surgical treatment is essential for the recovery of appearance, urination, and erectile function of the truncated penis.^[26-28] Reconstruction should be performed to the greatest extent possible, although very few patients may face delays in the optimal timing of treatment. At the same time, psychological concerns and treatment guidance for patients with penile amputation are also factors that need to be considered in clinical practice.

15%

相似度指数

主要来源

1	Xu-Dong Liu, Yan-Feng Li, Qi Wang, Yong Zhang, Yong Luo, Bo Zhou, Zao-Ming Huang, Zhi-Lin Nie, Ke Li, Qing-Xing Feng, Jun Jiang. "Microscopic replantation of completely amputated penis and testes: a case report and literature review", International Urology and Nephrology, 2020 <small>Crossref</small>	120 个字 — 4%
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