

## CASE REPORT

# Severe Penile Erosion Secondary to Penile Strangulation for 10 Years, A Reconstructive Urological Challenge

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Complications arising from simple surgical procedures such as circumcision are uncommon. When a person devoid of surgical training performs these procedures, severe problems usually occur. This is a rare case of a 23-year-old, Filipino male with severe penile shaft erosion secondary to chronic penile strangulation from complications of circumcision. A two-stage procedure was planned for this patient involving removal of the constricting object, debridement and anastomosis of the penile shaft. Postoperatively, there was good penile erectile function and an aesthetically acceptable form.

**Keywords:** circumcision complications, chronic penile strangulation, penile shaft erosion, penile reconstruction

## Introduction

Circumcision among Filipino males is essentially considered to be a rite of passage for cultural reasons of masculinity and tradition with over 90% undergoing the procedure. There are two ways by which circumcision is performed in the country, one is by a trained medical professional and another is community-based. The community-based practice is common in rural areas and is performed by untrained laymen in public places using ordinary devices such as a kitchen knife, a razor and a piece of wood.<sup>1</sup> Literature reports incidence rates of short and long term complications for unqualified individuals performing circumcisions to be as high as 50%.<sup>2</sup> Complications such as skin bridge, urethrocutaneous fistula, penile shaft erosion or sepsis have been reported.<sup>2,3</sup>

This paper would like to highlight the first reported case of a circumcision complication

progressing to penile strangulation and severe penile shaft erosion for 10 years. It proposes to emphasize the dangers of circumcision being performed by people devoid of surgical training and the importance of patient education in wound care. It also aims to showcase the surgical challenge of correcting the penile defect left behind by a chronically-infected wound. Also, it focuses on the success of this case in doing a macroscopic penile repair and replantation to restore penile erectile function.

## The Case

This is a case of a 23-year-old, Filipino male, single, who consulted because of an infected and chronically strangulated penile shaft. History started ten years prior to consult when the patient underwent circumcision by a local village circumciser and a piece of cloth used as a

compressive dressing for the wound. Post operatively the patient had difficulty in removing the cloth bandage. No proper wound care and no medical consult was done at this time. Five years prior to consult, the cloth bandage migrated from distal penile shaft to the penile mid shaft. The patient noted progressive penile erosion with urine leaking from the site of cloth attachment. Still no medical consult done at this time because the patient claimed to be ashamed of his condition. Four days prior to consult, there was purulent discharge from the wound site with severe penile tissue loss surrounding the cloth. There was persistence of the leakage of urine from the area. The patient now experienced fever and chills, hence consult was done at a local health center. The patient was then transferred to our institution for further evaluation and management.

Review of systems for this patient was unremarkable. There was no personal history or family history of hypertension, diabetes, asthma, cancer, psychiatric illnesses, or developmental delays.

Physical examination of the genital area revealed bilaterally normal testis with an intact scrotum. The penile mid shaft, approximately 2-3 centimeters from the penile base, was noted to be severely strangulated circumferentially by a foul smelling 1 cm piece of cloth. The area

surrounding the cloth had signs of granulation and severe fibrosis. Erosion of the cloth through the urethra, corpus spongiosum and both corpora cavernosa was observed. Only a 1 cm piece of penile tissue containing the dorsal penile vessels together with 1-2 centimeter penile skin attached the distal penile shaft to the proximal penile shaft. The patient was continent with urine coming out of the eroded urethra located at the mid shaft on micturition.

On admission, the patient had laboratories and ancillaries done revealing systemic infection. The patient was immediately scheduled for emergency surgery and referred to Psychiatry for further management. Psychiatric evaluation revealed no psychiatric illnesses present and no developmental delays.

A two stage procedure was performed for penile reconstruction. The first stage of the operation involved diverting the urine by inserting a French 16 suprapubic tube catheter. Next, careful dissection and excision of the infected tourniquet cloth was done. After the removal of the cloth, identification of both the proximal and the distal urethral opening was done. A Foley catheter French 18 was passed through the glans penis and then inserted onto the distal urethral opening going up into the bladder. (Figure 2) The patient was then put on a two week course of intravenous empiric antibiotics.

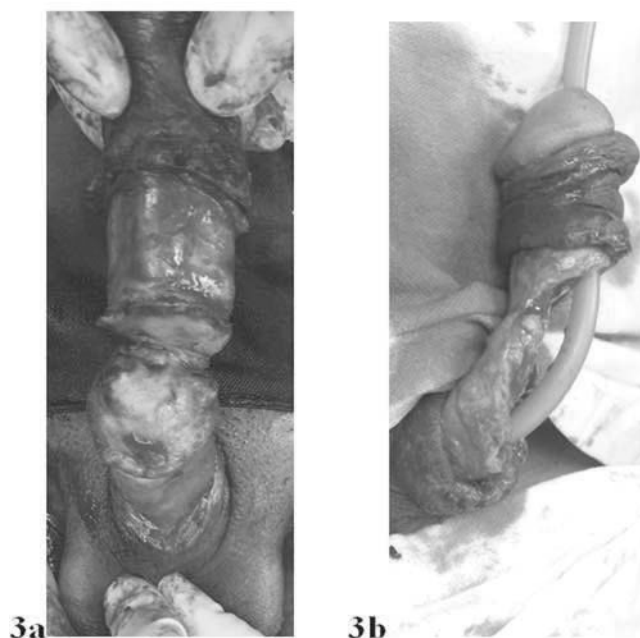


**Figure 1.** Penile shaft with cloth tourniquet. 1a-dorsal view, 1b-lateral view



**Figure 2.** Suprapubic tube cystostomy with indwelling Foley catheter, 2a-ventral view, 2b-lateral view.

After two weeks of intravenous antibiotics, the second stage procedure was carried out. Surgical dissection and degloving of the proximal and the distal penile shaft was done. (Figure 3a) A French 16 Foley catheter was inserted into the glans penis up to the mid shaft penile defect. Another French 16 Foley catheter was also inserted from the distal penile urethra up to the bladder. Careful debridement, meticulous separation and excision of the fibrotic tissue from mid shaft of the penis was performed until healthy tissue margins were obtained. Preservation of the attached dorsal penile tissue and its blood supply was a critical step. Dissection and isolation of the proximal urethra, distal urethra and corpus spongiosum was done. A French 18 Foley catheter was then passed from the fossa navicularis up to the urinary bladder. (Figure 3b) Vicryl 4-0 stay sutures were placed on the proximal and the distal ends of the urethra with spatulation of both ends. Primary anastomosis of both urethral ends was done using Vicryl 4-0 absorbable sutures, using the Foley catheter French 18 as a guide (Figure 4). Two sides of the corpora cavernosa were then anastomosed macroscopically with simple interrupted Vicryl 4-0 absorbable sutures. The corpus spongiosum was mobilized, wrapped and sutured in place at the urethral anastomosis site. Hemostasis followed by skin closure using Vicryl 4-0 absorbable sutures was done.



**Figure 3a.** Degloving of proximal and distal penile shaft ventral view, 3b. Post debridement of fibrotic tissue with Foley catheter lateral view.



**Figure 4.** Spatulation and urethral anastomosis.

Intravenous antibiotics were continued post operatively until the day of discharge. There was venous congestion of the ventral penile shaft proximal to the anastomosis seen on the fourth

to sixth postoperative day. (Figure 5). This was an expected outcome for cases of penile replantation.<sup>4</sup> The surgeons opted to be conservative with the management and no immediate intervention was done. The patient was sent home on the sixth postoperative day and advised to take oral antibiotics with weekly follow up visits.



**Figure 5.** At the 6th postoperative day with ventral distal penile shaft edema.

On the first follow up week, there was decreased edema of the ventral penile shaft proximal to the anastomosis. The second follow up week showed resolution of the edema of the ventral penile shaft. Removal of the urethral catheter and a retrograde urethrogram was done. Dilatation of the anastomotic site was documented on the retrograde urethrogram with passage of the contrast material up to the bladder. (Figure 6) Good urinary flow, penile tumescence on stimulation with ejaculation and a slight ventral penile shaft curvature was observed on the third week post operation. (Figure 7) Sensation on the distal penile shaft was surprisingly intact.

## Discussion

The penile anatomy is made up of distinct compartments such as two-paired cavernosa and



**Figure 6.** Retrograde urethrogram 2 weeks' post operation



**Figure 7.** Penile erection 3 weeks post operation

a corpus spongiosum. The paired corpora cavernosa is separated by a septum but is permeable distally and each corporal body contains within them a cavernosal artery. Each of the cavernosal bodies are encased within a tough connective tissue layer known as the tunica albuginea. Buck's fascia surrounds both corpora cavernosa and splits to surround the corpus spongiosum ventrally.<sup>5</sup> Aside from the cavernosal arteries, the corpora cavernosa also contains smooth muscles that play a role in the erection of the penile shaft.<sup>6</sup>

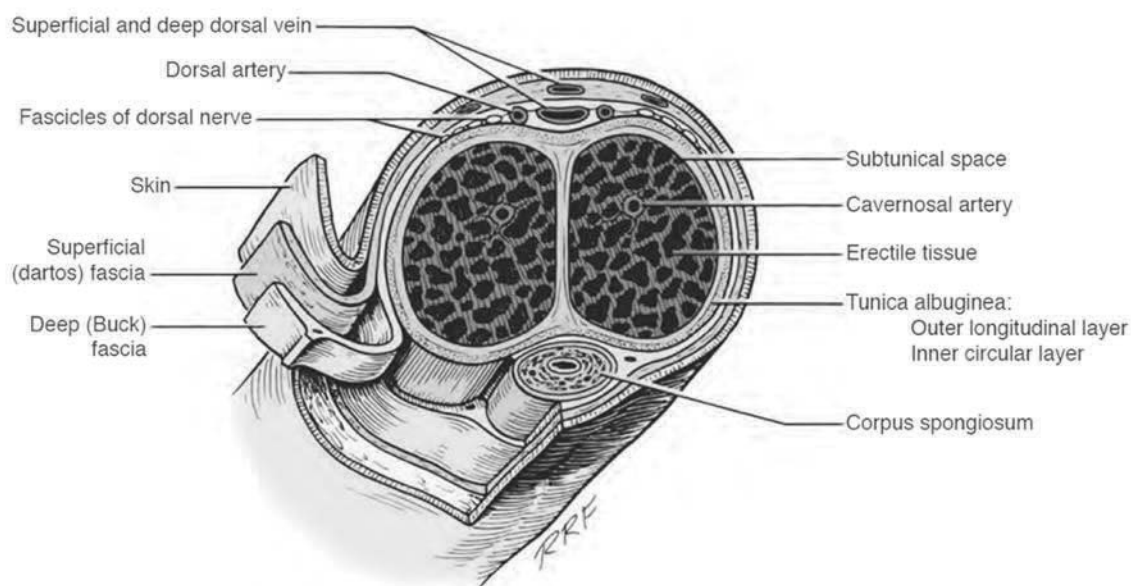
The corpus spongiosum on the other hand contains the urethra. The most distal expansion of the corpus spongiosum is termed the glans penis. The penile shaft superiorly is termed the dorsum while the inferior aspect is called the ventrum.<sup>5</sup> (Figure 8)

Arterial blood supply to the penis comes from a superficial arterial system from the external pudendal arteries and a deep arterial system that arises from each side originating from the internal pudendal arteries. The bulbourethral artery penetrates the perineal membrane where it enters the corpus spongiosum from above to supply the corpus spongiosum, glans and urethra. The cavernosal artery lies at the center within the corpus cavernosum. The dorsal artery of the penis travels between the dorsal vein and the dorsal penile nerve.<sup>5</sup> Venous drainage of the penis is via a superficial dorsal vein located external to Bucks fascia and a deep dorsal vein beneath Bucks fascia travelling in between the corporeal bodies.<sup>5</sup> The erection of the penile shaft involves sinusoidal relaxation, arterial dilatation and venous compression.<sup>6</sup> The dorsal nerves are the sensory innervation of the penis that travel alongside the dorsal arteries. Small branches of the perineal nerve supply the ventrum of the penis and the glans distally.<sup>5</sup> The remaining

attached vasculature and nerve supply located at the dorsum of the penis was able to supply the distal segment of the severely eroded penis in the case presented but was not sufficient to provide adequate erection.

In the developed world, complications from circumcision are an uncommon finding. According to western data, complication rates vary between 0.2 to 5%.<sup>2</sup> These rates increase up to 95% when untrained individuals perform the operation.<sup>7,8</sup> There is no local data available in the Philippines at this time to demonstrate the statistical complications of circumcision. It is also important to point out that patients should also be well-educated on how to do postoperative wound care at home. This may decrease complications which warrant surgical re-intervention.

Penile strangulation due to a foreign body is a rare occurrence, with only a few reported cases in literature.<sup>9</sup> This is usually brought about by self-placement of constricting objects for eroticism in adults<sup>9</sup> or may be due to mental retardation in children.<sup>10</sup> In a small subset of patients with penile strangulation, an underlying psychiatric illness is usually discovered and it is always pragmatic to have immediate psychiatric evaluation and counselling.<sup>11</sup>



**Figure 8.** Cross section penile anatomy (From Campbell M, Wein A, Kavoussi L, Walsh P. Campbell-Walsh Urology. 11th ed. Philadelphia: Elsevier; 2016. p. 512).

Patients who present with chronic penile strangulation usually come in with varying levels of injury from swelling to necrosis or gangrene.<sup>11</sup> In 1991, Bhat, et al. presented a useful grading system for penile injuries. The grading system is divided into five categories ranging from penile edema to gangrene.<sup>12</sup> The group of Silberstein, et al. in 2005 further simplified this grading system into low-grade penile injuries which require no further intervention after removal of the constricting object and High-grade penile injuries which require further surgical intervention after removal of the constricting object.<sup>13</sup> (Table 1). The degree of penile injury is usually dependent on the type of constricting device used. Based on reports, nonmetallic constricting devices were usually associated with high grade penile injuries (77.77%) compared to metallic items (22.22%).<sup>13</sup> The severity of clinical presentation is also determined by the duration of incarceration. High grade injuries are seen in patients who presented after 72 hours compared to patients presenting within 72 hours.<sup>13</sup> Based on the aforementioned classifications, the case presented with a Grade 4, high grade penile injury due to the nature of the constricting non-metallic object and the longer duration of incarceration (10 years).

In terms of patient voiding or continence, Silberstein, et al. illustrated that patients with penile injuries had normal voiding in 37.7%, urinary retention in 19.6% and insufficient data in 42.6% patients<sup>13</sup> while Trivedi, et al. showed that 1 patient needed catheterization and another underwent suprapubic tube cystostomy.<sup>9</sup> No voiding dysfunction was observed in the case

presented however the investigators deemed it fit to place a suprapubic tube cystostomy prior to further surgical correction.

The management of penile strangulation offers a challenge to urologists because no specific treatment option is available. Each case has a different treatment approach depending on the presentation. There are several techniques for the removal of the constricting object but the main objective is to do speedy identification and prompt decompression.<sup>9</sup>

Penile replantation follows the basic principles of surgery by first doing an adequate debridement of necrotic tissue until there is beefy red healthy tissue noted prior to performing an anastomosis.<sup>14</sup> The first reported case of macroscopic replantation was done by Erich, et al. in 1929. Careful approximation of the penile structures was done in this technique with no neurovascular repair. The functional and final cosmetic results were satisfactory and only necrosis of the skin was reported.<sup>15</sup> Microvascular replantation by Cohen, et al. soon followed in 1977. It was reported in a literature review by Halдар, et al. that approximately 80 cases underwent replantation and 50 of these cases underwent macroscopic replantation.<sup>16</sup> Blood flow after macroscopic repair was theorized to be restored due to the spongy tissue of the penis according to Mendez, et al.<sup>17</sup> The technique of macrosurgical repair depends on corporal sinusoidal blood flow with the distal part, with authors recommending urinary diversion via a suprapubic tube cystostomy.<sup>18</sup> Microsurgical repair on the other hand, depends on the expertise of a microsurgeon, microscope and instruments.<sup>19</sup>

**Table 1.** Penile injury grading system by Bhat, et al. and Silberstein, et al.

| Bhat, et al. (1991)   | Silberstein et al (2005) |
|---|--------------------------|
| Grade 1: Edema of the distal penis; no evidence of skin ulceration or urethral injury   | Low-grade penile injury  |
| Grade 2: Injury to the skin and constriction of the corpus spongiosum but no evidence of urethral injury; distal penile edema with decreased penile sensation |                          |
| Grade 3: Injury to skin and urethra but no urethral fistula, loss of penile sensation   |                          |
| Grade 4: Complete division of corpus spongiosum leading to urethral fistula and constriction of corpus cavernosum with loss of distal penile sensation        | High-grade penile injury |
| Grade 5: Gangrene, necrosis or complete amputation of the penis   |                          |

**Table 2.** Outcomes between macro and microsurgical repair by Mensah, et al. in 2007

| Outcomes             | Macrosurgical Repair | Microsurgical Repair |
|----------------------|----------------------|----------------------|
| Penile blood flow    | Satisfactory         | Excellent            |
| Erectile function    | Adequate             | Satisfactory         |
| Voiding function     | Satisfactory         | Satisfactory         |
| Cosmesis             | Satisfactory         | Satisfactory         |
| Penile sensation     | Decreased            | Satisfactory         |
| Penile skin necrosis | High                 | Low                  |
| Fistula Formation    | High                 | Low                  |

According to Morrison, et al. positive outcomes during microsurgical penile replantation are affected by the complete penile amputation, the number of nerves coaptated and the anastomosis of the superficial dorsal artery.<sup>20</sup>

A successful replantation consists of adequate sensation, full return of erectile function and minimal postoperative complications.<sup>21</sup> The most common complications of penile replantation include the following: skin necrosis, abscess, hematoma, urethral fistula, urethral stenosis, decreased penile sensation, erectile dysfunction, and curvature of the penis.<sup>22,23</sup>

A study by Mensah, et al. in 2017 summarized the outcomes between macrosurgical and microsurgical repair based on previous studies.<sup>24</sup> (Table 2).

It can be clearly seen from the data that microsurgical repair is still superior compared to macrosurgical repair. However, microsurgical repair would entail special training and instruments. Macrosurgical repair may be an option where microsurgical expertise or instruments are not available.<sup>19</sup> Given the limited resources and capabilities, a macroscopic surgical replantation of the penile shaft was done instead. Despite the limitations, a satisfactory outcome was however, achieved. This success can be attributable to the preservation of the attached penile dorsal tissue containing the dorsal vessels and nerves. Amidst the plethora of possible postoperative problems, the present case was fortunate enough to only have the curvature of the penis as a complication. This complication encountered by the urologist was aesthetically satisfactory according to the patient and no further correction was warranted.

## Conclusion

Circumcision, despite being a simple surgical procedure should be done by trained medical professionals to prevent or minimize complications. Penile strangulation can be considered a major complication of circumcision. Several techniques are available to treat this problem but there is no single treatment option that will dictate management of penile strangulation. Prompt surgical removal of the constricting instrument and repairing the penile injury thereafter is an acceptable way of handling this complex case. Lastly, a macroscopic penile replantation could still be an option for underdeveloped countries to restore penile function.

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