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## Penile reconstruction in a newborn following complicated circumcision: A case report

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## ABSTRACT

**INTRODUCTION:** Grade V post-circumcision penile injury is known as “total phallic loss”. It is usually seen with the use of mono-polar electro-cautery for circumcision resulting in penile necrosis. We report on a newborn treated by release of the subcutaneous corporal remnant and explain why this option should be considered of choice in cautery-related Grade V injuries.

**REPORT OF A CASE:** A 25-day old Saudi Arabian newborn with Grade V penile injury underwent reconstruction at our tertiary-care center. Upon exploration, the remnant part of the penis under the suprapubic skin was 2.6 cm. This included the root of the penis (estimated to be 1.8 cm long in the newborn) as well as an extra 0.8 cm of corporal length from the pendulous part of the penis which has retracted under the skin. Full release of the suspensory ligament was done. The result at 6 months was satisfactory both functionally and cosmetically.

**DISCUSSION:** Options of management of Grade V injuries include sex-reassignment, phallic reconstruction using flaps, and release of the subcutaneous corporal remnant. We demonstrate that the latter option should be considered of choice in cautery-related Grade V injuries because there is usually preservation of the most proximal part of the corpora of the shaft which becomes retracted under the skin. Hence, the released remnant is of adequate length.

**CONCLUSION:** Post-circumcision Grade V penile injuries of the newborn are best reconstructed with release of the subcutaneous corporal remnant. The neophallus is erectile and has an acceptable length and appearance.

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## 1. Introduction

Although circumcision is considered a safe and simple procedure, several complications have been reported. Gee and Ansell [1] reported on the complications of circumcision in 5521 newborns and documented a complication rate of 0.2%. The most common complication was hemorrhage followed by infection, dehiscence, excessive skin removal, iatrogenic fistula formation, and amputations of the glans [1]. Deaths and amputations proximal to the glans are rare [2] and neither were seen in the series of Gee and Ansell [1].

Post-circumcision penile injuries may be graded into 5 grades [2]: Grade I is skin deficiency; Grade II is isolated urethral injury; Grade III: partial or complete loss of the glans; Grade IV: is amputation at the level of the shaft; and Grade V is total phallic loss [2]. Total phallic loss is usually seen with the use of mono-

polar electro-cautery for circumcision resulting in penile necrosis. Penile reconstruction of Grade V injuries is a challenge in the newborn; and options include: sex-reassignment, phallic reconstruction using flaps, and release of the subcutaneous corporal remnant. We present a case treated with the release procedure and document a satisfactory result. Our case is unique because it demonstrates its feasibility in the newborn and shows that the release in cautery-related Grade V injuries usually results in a reconstructed penis of adequate length. Although the injury by the cautery results in total shaft skin necrosis, there is usually preservation of the most proximal part of the corpora of the shaft which becomes retracted under the skin. The combined length of this preserved shaft corpora and the corpora of the root of the penis makes the final length adequate. The work has been reported in line with the SCARE criteria [3].

## 2. Case report

A 25-day old Saudi Arabian newborn was referred to our tertiary-care hospital with post circumcision total phallic loss following circumcision (Fig. 1). The baby was born vaginally after a

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Fig. 1. Pre-operative appearance.

full-term pregnancy and circumcision was done at birth at a local hospital using mono-polar cautery. The deep burn to the glans and shaft of the penis was noted immediately after surgery. A suprapubic catheter was inserted. No surgical debridement was done and the deep burn was treated with daily dressing awaiting spontaneous separation of the necrotic tissue. Upon separation of the necrotic tissue, the injury was graded as Grade V (Fig. 1). At our hospital, several options of management were discussed with the parents. Sex reassignment was not accepted because of religious reasons. Hence, three other options were discussed: delayed (after puberty) reconstruction using the standard radial forearm free flap, immediate penile/urethral reconstruction using a pedicle groin flap, and release of the subcutaneous corporal remnant. The latter option was chosen.

A lazy S incision was made superiorly from the stump to the suprapubic area; and a longitudinal incision was made inferiorly towards the midline scrotal raphe. The corporal remnant was exposed. Identification of the suspensory ligament was done by dissection along the corpora from distal to proximal direction until the site of insertion of the ligament to the symphysis pubis.

The corporal remnant was 2.6 cm long, which was thought to be adequate once completely released. Full release of the suspensory ligament was done under loop magnification. Care was taken to avoid injury to the deep dorsal vein piercing the ligament. Caudal positioning of the remnant brought it from the normal high android position to a low gynecoid position; and this allowed the released remnant to be more protrusive. All dissections were done with a urethral catheter in place to protect the bulb. Two rotational flaps from the scrotum were used to cover the pubic bone. The exteriorized corporal remnant was covered with a full-thickness skin graft. The graft was harvested from the right groin and the donor site was closed primarily. The skin graft was sutured to the base of the scro-



Fig. 2. Immediate post-operative appearance.

tal flaps, to the stump, and to the urethral meatus. A longitudinal ventral slit was made at the meatus before suturing the edges of the skin graft in order to avoid a circular repair because circular repair is known to predispose to meatal stenosis (Fig. 2). The suprapubic catheter was removed at 10 days and the urethral catheter was removed at 3 weeks. There was complete skin graft “take” on the new shaft; but there was some graft “loss” at the stump. Erection was preserved and a strong stream of urine was observed (Fig. 3). The patient was discharged from hospital one month after surgery and was followed up monthly in the clinic with specific attention to the development of meatal stenosis, scar contracture, and healing of the area of graft loss at the distal penile stump. The patient was last seen at 6 months after surgery. The stump has re-epithelialized and there was no evidence of meatal stenosis. The parents were satisfied with the result (Fig. 4).

### 3. Discussion

The main message of our report is that “post-circumcision total phallic loss” (or Grade V penile injuries) may be reconstructed in the newborn by release of the subcutaneous corporal remnant. Although this management was previously discussed in the literature [2], our case demonstrates that the subcutaneous corporal remnant is of adequate length in cautery-related Grade V injuries. Despite the total loss of the penile shaft skin, a variable length of the corpora of the pendulous shaft is preserved and retracts subcutaneously. This makes the total length of the completely released corporal remnant adequate. The penis is divided into two parts: the root and the pendulous parts [4]. The length of the root is 1/3 of the total length [4]. Our baby was Saudi Arabian; and Asian babies are known to have similar penile lengths to Caucasians babies [5]. In the full-term newborn, the mean penile length is 3.6 cm  $\pm$  0.4 cm of standard deviation [5,6]. This means that the normal root of the penis has a mean length of 1.8 cm in the newborn. The length of the remnant part of the penis in our case was 2.6 cm (1.8 cm representing the root and an extra 0.8 cm of corporal length from the pendulous part which has retracted under skin). We considered this length adequate because it is greater than the lower cut-off limit for the definition of micropenis in the full-term newborn which ranged in the literature from 2.1 to 2.5 cm [5,6].





**Fig. 3.** Appearance 3 weeks after surgery following removal of the urethral catheter. Note the erected penis and the strong stream of urine (arrow). Also note the complete skin graft “take” on the shaft, and the partial graft “loss” at the stump.

We consider the release procedure to be choice in the management of post-circumcision Grade V injuries. We also stress that this should be done in the neonatal period and show that the reconstruction is fairly simple. Another advantage of the release procedure is that it can be utilized for lesser grade injuries in both children and adults [7]. We reviewed the literature for other options of management of Grade V injuries. Some authors recommended feminizing genitoplasty in infancy and raising the child as a female [8,9]. However, social and psychological issues remain a concern with sex re-assignment [10]. Another option is to reconstruct a new penis similar to phallic reconstruction in adults. This can be done using pedicle abdominal / groin flaps or free flaps [11,12]. However, the reconstruction is usually delayed till late childhood and this has a major psychological impact; in addition to concerns regarding the non-erectile neophallus and regarding growth.

Surgical technical tips are important to ensure a successful result following the release procedure. Loop magnification should be used while dividing the suspensory ligament to preserve the deep dorsal vein piercing the ligament since it is the main venous drainage of the neophallus. The deep artery of the penis supplying the corpus cavernosum and is responsible for erection as well as the artery of the bulb supplying the corpus spongiosum / urethra do not pierce the suspensory ligament and are relatively safe during the dissection. Coverage of the pubic bones following the release is best done by local scrotal or suprapubic skin flaps; and coverage of the released corpora is best done with full-thickness skin grafts. Finally, the slit made in the urethral meatus prior to suturing of the skin graft reduces the risk of meatal stenosis.



**Fig. 4.** Appearance after 6 months.

#### 4. Conclusion

Post-circumcision total phallic loss is usually secondary to the use of mono-polar cautery during circumcision and its management in the newborn is a challenge. Release of the subcutaneous corporal remnant should be considered the management of choice because it is feasible in the neonatal period and the reconstruction (scrotal flaps and full-thickness grafts) is relatively simple. Furthermore, the neophallus is erectile. The relatively short neophallus is a disadvantage, but an acceptable length and appearance could be obtained.

#### Conflict of interest

None.

#### Funding

None.

#### Ethical approval

The study was approved by the research committee, National Hospital (Care), Riyadh, Saudi Arabia.

#### Consent

Written informed consent was obtained from the father for publication of this case report and accompanying images. A copy of the written consent is available for review by Editor-In-Chief of this journal on request.

**Authors' contribution**

All authors contributed significantly and in agreement with the content of the manuscript. All authors participated in data collection and in writing of the manuscript.

**Registration of research studies**

Not relevant here.

**Guarantor**

M.M. Al-Qattan.

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