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Scrotal dartos-fascio-myo-cutaneous flaps for penis elongation after catastrophic iatrogenic skin shaft sub-amputation: A case of recovery using an extremely adaptable flap

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ABSTRACT

INTRODUCTION: Genitalia are linked to self-esteem and male sexual identity, especially among young men, who sometimes require a surgical procedure to acquire more confidence. Among the surgical procedures requested for aesthetical purposes, circumcision is one of the most popular. Although it can be considered to be a simple surgical practice, it may cause severe complications such as penile skin necrosis.
PRESENTATION OF CASE: We report a case of a catastrophic situation after a circumcision performed on a 27-year-old HIV positive man resulted in a drastic reduction in the length of the penile shaft due to extensive skin loss; this was subsequently restored using dartos-fascio-myo-cutaneous flaps. Primary healing occurred in 10 days. No infection, dehiscence or flap ischemia were reported. Donor site morbidity was minimal. An adequate aesthetical appearance and satisfactory functional results were obtained.
DISCUSSION AND CONCLUSION: Various techniques are available for penile skin covering, such as skin grafts or cutaneous flaps. The skin of the scrotum seems to be the most suitable tissue to be used to reconstruct the skin covering of the shaft as it is the most similar. Dartos-fascio-myo-cutaneous flap is a single stage procedure that is easy and safe to perform. It can provide satisfactory cosmetic and functional results, offering a large amount of tissue, with minimal donor site morbidity.

1. Introduction

Genitalia are a key element for male self-esteem, especially among young men, contributing towards mental and physical balance, and influencing their social lives. Sometimes young men require surgical procedures to acquire more confidence with their genitalia [1]. The most popular surgical procedures requested are circumcision, penis elongation or enlargement. Although circumcision is considered to be a simple surgical procedure, it requires particular attention and accurate surgical planning to avoid major complications such as extensive penile skin loss [2–4].

Various techniques are available for penile skin covering such as skin graft or cutaneous flaps [4]. This specific surgery poses a particular challenge for plastic surgeons, regarding both aesthetical and functional aspects.

In this article, the authors describe the use of the scrotal dartos-fascio-myo-cutaneous flap to recuperate penile shaft length after a catastrophic iatrogenic skin penis sub-amputation that provoked a drastic reduction in the length of the penis of a young HIV positive individual who underwent surgery for aesthetical purposes.

2. Materials and methods

A 27-year-old HIV positive man underwent circumcision for personal aesthetical reasons. A day after the procedure, a full dehiscence of surgical sutures was reported, probably due to excessive tension at the skin flap. It was immediately repaired with an additional circular cutaneous removal to allow direct closure. 24 h later, it became obvious that recurrence of wound dehiscence had occurred for the second time.

In this case, no surgical repair was performed and the patient was admitted to hospital. Because of his HIV condition he was treated with antibiotic therapy: clavulanic acid + amoxicillin and levofloxacin and he was treated daily with local medical dressing to obtain a second intention repair.

Three months after his discharge he came to our attention because of a serious penile skin retraction. Most of the length of the penis was constricted inside the pubis. He also reported pain and constant sensation of tension in flaccidity; he found it impossible to achieve a full erection due to a mechanical retraction. This condition did not permit him to have normal sexual activities and

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Fig. 1. *Preoperative view showing the reduced length* of the penis. A cutaneous brownish ring 1,8 cm in width at the base of the shaft with some pillar elements. A pearly white scar connects the cutaneous ring with the semi-mucosa.

caused him extreme frustration. In addition, the patient was significantly dissatisfied with the aesthetical appearance of his penis because of a significant decrease in length even during flaccidity.

A local physical examination revealed that the length of penis in flaccidity was 2.7 cm. A cutaneous brownish ring 1.8 cm in width was present at the base of the shaft in which some pillar elements could be observed. A pearly white scar 1.7 cm in width connected this cutaneous ring with a normo-trophic semi-mucosa portion immediately beneath the gland.

During physical examination the consistency of the penis lacked elasticity, similar to a scar and it suggested secondary intention repair. Most of the penis length was constricted inside the pubis.

There is nothing to report regarding the scrotum and testicles.

2.1. Operative technique

The procedure was performed as a single stage. The patient underwent general anesthesia at his personal request. At first, the junction between the skin and the mucosa was separated. The constricted scar was removed and all the adhesion scar tissue that entrapped the penis inside the pubis was released. When the shaft was completely free to come out of the pubis, two scrotal dartos – fascia – myo-cutaneous flaps were harvested on the lateral part of the scrotum (Fig. 1). The flap pedicle base was 4 cm in width and 7 cm in length. The flap was planned in a racquet shape with the terminal part enlarged in order to completely wrap the entire circumference of the shaft.The flaps did not include the tunica vaginalis. They were rotated to cover the dorsal part of the shaft following the removal of two Burrow's triangles. The donor site was easily closed for primary intention. The ventral part of the neo-shaft was covered advancing the remaining part of the scrotum containing the median rafe. In order to stabilize the flap, it was anchored to the base of the shaft thus avoiding retraction.

An urethral catheter was left in and the penis was kept strictly in a vertical position for 5 post op days.

The preoperative length in flaccidity was approximately 2.7 cm and the result at the end of surgery was about 7 cm.

In order to reduce nocturnal erection, the patient received 100 mg of cyproterone acetate, starting from the first dayafter the operation, and 5 mg Diazepam before sleep (Fig. 2).

3. Results

Primary healing occurred in 10 days. No infection, dehiscence or flap ischemia was reported. Donor site morbidity was minimal. Suitable aesthetical appearance was obtained in terms of color match, consistency and acceptable penis length and girth. The patient stated that he was more confident with his penis after the surgical procedure. Functional results were also reported as satisfactory in terms of skin laxity, pliability, elasticity during erection, sensibility and penetration during sexual intercourse (Fig. 3).

Fig. 2. (A) Intra-operative view showing the shaft freed from the pubis that has regained its original length. Two dartos myo cutneous flaps are harvested from the lateral part of the scrotum. (B) The dartos myo cutneous flaps are rotated to cover the anterior surface of the shaft and sutured on the midline.

Fig. 3. 11 months post operative view showing the full recovery in length and girth of the penis. Evident the amount of tissue, elasticity pliability for an optimal functionality.

4. Discussion

Penile skin loss may occur as a consequence of trauma, carcinoma, infection, burns or iatrogenic causes such as excessive surgical excision during circumcision [5]. It can cause severe retraction of the penis provoking a dramatic decrease in length with intra pubis entrapment. This condition severely limits sexual function and seriously impairs the aesthetical appearance, affecting both the psycho-physical balance and social life of the patient.

A patient, with no local pathology, who underwent circumcision for aesthetical purposes that resulted in a mutilation due to an iatrogenic error, has very high expectations both for aesthetical and functional results. For these reasons, penile reconstructive surgery represents a particular challenge for the plastic surgeon.

Several techniques are available for recovery of the length of the shaft, such as skin grafts, local or free flaps. Skin grafts from non-hirsute areasare among the most popular methods. Their therapeutic success depends on the vascularization of the recipient area

and their engraftment. The stabilization of the skin graft during the healing is a crucial moment of this process and the medical dressing has a vital function. Infection and excessive tension must be avoided at all costs. Thin grafts heal more easily than full thickness grafts; they provide better cosmetic results but, on the other hand they have less elasticity, offering less resistance to sexual intercourse. They also have a higher risk of retraction, restricting the filling of corpus spongiosa. Full thickness skin grafts provide a better coverage quality but engraft with more difficulty [4,6,7]. The most common flaps used for skin cover of the penile shaft are local perforators flap from the lower abdomen. Among the free flaps, the radial forearm flap is the most popular. Nevertheless, their bulky nature may represent some difficulties during sexual intercourse and penetration. Furthermore, when they are wrapped around the penis they offer a poor aesthetical result because of their unnatural appearance [4,6,8].

Satisfactory reconstruction requires regaining a good aesthetical appearance, a valid recovery of functionality with redundant and durable skin envelope for complete erection providing acceptable sexual intercourse and satisfactory sensation. The scrotum seems to be the most suitable tissue to reconstruct the skin coverage of the shaft as it is the most similar. Its multi-origin vascular system provides its support basing each side on 4 different vessels: the anterior and lateral scrotal artery, the lateral branch of posterior scrotal artery and the septal scrotal artery. These vessels run through the Dartos fascia of the scrotum; it renders the scrotal dartos-fascio-myo-cutaneous flaps an axial flap. This subcutaneous network supports the vascular system of the scrotum very well, so that these flaps can be considered to be very resistant to ischemia, permitting wide variability in their planning both regarding dimension and shape [9,10]. The skin of the scrotum is the most similar to the skin of the shaft both for its color, thickness, elasticity and consistency. It can provide satisfactory cosmetic results offering a large amount of tissue. Its thinness, pliability and extensibility provide a better skin laxity during erection offering optimal functionality. Use of the skin of the scrotum provides the best reconstruction in length and girth, and has the best aesthetical and functional results. Donor site closure is easy. The scars in the scrotum are hardly visible when compared to other parts of the body, and donor site morbidity is very low. On the other hand, the scrotum has a very high density of hair. It may represent a serious disadvantage and may require laser removal [4,9]. This work is in line with the SCARE criteria [11].

5. Conclusion

To summarize, the authors believe that the dartos-fascio-myo-cutaneous flap works successfully for penile skin reconstruction. This method represents a single stage procedure that is easy and safe to perform. These flaps are axial flaps, based on a properly vascularized subcutaneous network that enablesa wide range of surgical planning regarding both dimension and shape. The quality of the skin tissue allows both satisfactory functional and aesthetical results with low morbidity of the donor site.

In conclusion, the authors believe that it is a versatile strip, first choice for like-for-like reconstruction of the shaft, particularly suitable as it offers excellent functional advantages that are also useful for restoring self-confidence to the patient.

Conflict of interest

The authors declare that they have no conflict of interest.

Sources of funding

The authors declare that they have no financial interest.

Ethical approval

All the procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The patient's consent was obtained for the case report.

Consent

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

Author contribution

All authors contributed to the paper.

Guarantor

Yes, the Guarantor accepts full responsibility for the work and conduct of the study, had access to the data, and controlled the decision to publish.

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