










Genital reconstruction and urethral plasty after Fournier's gangrene and urethral fistula

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Abstract

Fournier's syndrome is necrotizing fasciitis of the soft tissues of the perineum. Diagnosis is clinical, and treatment involves stabilization, antibiotics, and debridement of necrotic tissue, which can lead to esthetic and functional sequelae that may be corrected later. A 62-year-old male presents for genital reconstruction due to post-Fournier gangrene penile scarring with an inter-scrotal urethrocutaneous fistula. A term-to-term urethral plasty, bilateral testicular descent, and penile ascent are performed. The available information on reconstructive surgery for external genitalia following Fournier's gangrene is insufficient to establish a standard approach.

Keywords: Fournier's gangrene. Urethral fistula. Genital reconstruction. Urethral plasty.

Introduction

Fournier's syndrome is described as necrotizing fasciitis of the soft tissues of the external genital organs, the perianal region, the perineum, and sometimes the abdominal wall, leading to thrombosis of the subcutaneous vessels and necrosis of the adjacent skin¹, caused by a polymicrobial infection generated by aerobic and anaerobic bacteria. In which the following stand out: *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus*, *Klebsiella*, *Streptococcus* species, *Staphylococcus aureus*, *Enterococcus*, *Clostridia*²⁻⁴.

It affects both sexes, with a male predominance in a 10:1 ratio; it is present in all ages, although it is reported more in patients over 50 years of age with a history of diabetes mellitus, acquired human immunodeficiency

syndrome, alcoholism, genitourinary infections, malignancies, and liver and kidney diseases⁵. This surgical emergency has an incidence of 1.6 cases/100,000 inhabitants, and its mortality exceeds 40% due to septic shock^{6,7}. It is associated with other etiologies such as anal abscesses, hemorrhoidal pathology, anal fistulas, and rectal carcinomas^{2,5}.

The diagnosis is mainly clinical, and X-ray, ultrasound, computed tomography, and magnetic resonance imaging are used for initial evaluation and exclude diagnoses such as scrotal abscess, balanitis, pyoderma gangrenosum, polyarteritis nodosa, and ecthyma gangrenosum^{2,3}. Treatment is based on hemodynamic stabilization, administration of broad-spectrum antibiotics, and surgical debridements that

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result in a substantial loss of tissue that will be corrected later with reconstructive procedures such as primary closure, scrotal advancement flaps, fasciocutaneous flaps, myocutaneous flaps, testicular transposition, skin grafts and phalloplasty^{8,9}. The reconstruction of this type of patient due to the characteristics of the tissues is extremely complex and not only depends on the skill and resources of the surgeon but also on the binomial.

Case report

A 62-year-old male patient, originally a resident of the State of Mexico, with no chronic degenerative history. With a history of obstructive prostatic growth that does not respond to medical treatment (α -blocker). It was decided to perform transurethral resection of the prostate with a noticeable lesion from the urethra to the rectum (urethrorectal fistula) and subsequent Fournier's gangrene, requiring surgical washing, debridement of the external genitalia, and intestinal diversion with colostomy of the descending colon. The patient continued with conservative treatment until the wound was closed by second intention, presenting genital dysmorphism (public testicles and penile descent) and urethrocutaneous fistula (Fig. 1).

The patient underwent a scheduled surgery in which the suspensory ligament was released, preserving the dorsal neurovascular complex, with penile ascent and bilateral testicular descent (Fig. 2), in addition to anterior urethral plasty by primary closure in two planes, with foreskin closure in one plane and scrotum flap and terminal urethral plasty simultaneously (Fig. 3). The transurethral catheter was preserved for 4 weeks with subsequent spontaneous urination and no evidence of leakage in the ventral region of the penis. He presented an adequate transoperative and post-operative evolution with remission of urethrocutaneous fistula as well as adequate scarring and improvement of the appearance of the male external genitalia, in addition to preservation of erectile function, assessed by the International Index of Erectile Function-5 scale (Figs. 4 and 5).

Discussion

The reconstruction of the male genital area is complex due to its anatomy and the considerations that are made to preserve its functionality. Lesions after Fournier's gangrene represent a greater surgical challenge, which

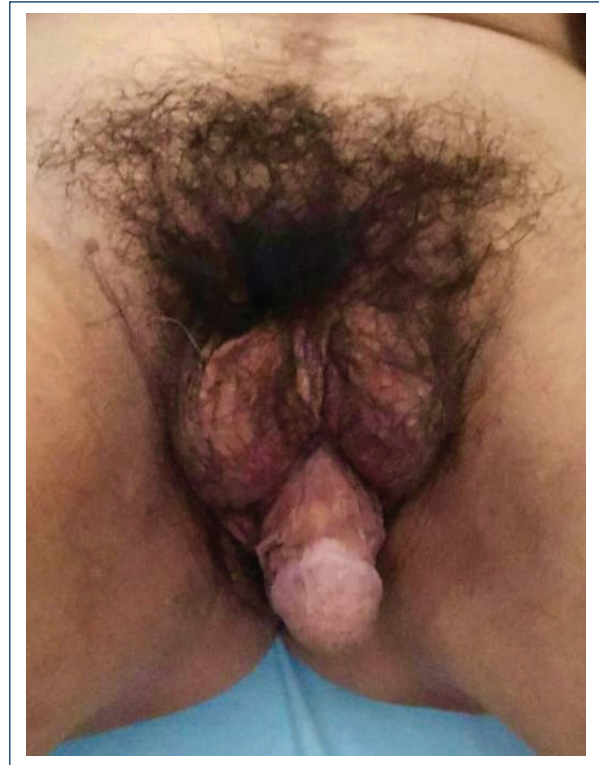


Figure 1. Post-Fournier scarring of the lower penis to the testicles.

increases with the number of structures affected (decreases the success of the procedure). To increase the success rate of surgery, it is important that unfavorable factors such as ischemia, infection, and fibrosis are reduced.

Early and repeated debridement is a measure to treat Fournier's gangrene, adequate resection of non-viable tissues determines patient survival, and a window of adjacent healthy tissue should be included to limit infection¹⁰. Before reconstructive surgery, bacterial cultures should yield negative results, and if not, antibiotic therapy should be given depending on the microorganism that is colonizing the tissue¹¹. It is also important to follow the basic principles of reconstructive surgery, such as tension-free, ischemia-free, and infection-free sutures. Moreover, maintaining the use of foreign bodies (transurethral catheter) for as little time as possible. Calderón in 2021¹² specified that for wounds with 2 cm involvement, it is more likely to achieve coverage by primary closure or partial skin grafts, while larger defects with 4-5 cm involvement will require fasciocutaneous or musculocutaneous flaps for coverage.



Figure 2. Release of the suspensory ligament preserving the dorsal neurovascular complex, with penile ascent and bilateral testicular descent.



Figure 4. Penis after surgical reconstruction.



Figure 3. Urethral plasty, testicular descent, and Dartos flap.



Figure 5. Adequate transoperative and post-operative evolution with remission of the urethrocutaneous fistula as well as adequate healing.

Therapeutic procedures for Fournier syndrome cause esthetic and functional sequelae in the perineum area and even the abdomen. Reconstructive surgeries are chosen according to the properties of each case, considering: location, depth, size, function of the affected structures, and tissue arrangement^{9,10,13}. Singh, in 2016, described the characteristics for the best results in a Fournier post-gangrene genital reconstruction surgery: a single procedure, preservation of function, natural appearance of the wound, minimal post-operative complications, and primary wound closure. The use of vacuum-assisted closure to increase the probability of graft engraftment demonstrated a positive effect on healing because it reduces the engraftment time and favors the vascularity of the lamina¹².

Conclusion

The information reported on reconstructive surgery of the external genitalia after Fournier's gangrene, associated with urethral lesions and its management, is insufficient to establish a standard approach since variables such as associated urethral lesions and patient comorbidities must be considered. In addition to considering that the characteristics of the tissue

make it an extremely complex intervention in which the surgeon's resources, skill, and experience have a great influence.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence.

The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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