



Case Report

# Successful Ventral onlay Peripheral de-Epithelialized Skin Graft for Reconstruction of Penile Urethral Defect Due to Fournier's Gangrene

Masaki Fujioka<sup>1\*</sup>, Toru Onita<sup>2</sup>

<sup>1</sup>Department of Plastic and Reconstructive Surgery, and Department of Plastic and Reconstructive Surgery, Clinical Research Center, National Hospital Organization Nagasaki Medical Center, Nagasaki, Japan

<sup>2</sup>Department of Urology, National Hospital Organization Nagasaki Medical Center, Nagasaki, Japan

\*Corresponding author: Fujioka Masaki, Department of Plastic and Reconstructive Surgery, National Hospital Organization Nagasaki Medical Center, 1001-1 Kubara 2 Ohmura City, Japan

Citation: Fujioka M, Onita T (2024) Successful Ventral onlay Peripheral de-Epithelialized Skin Graft for Reconstruction of Penile Urethral Defect Due to Fournier's Gangrene. J Urol Ren Dis 09: 1363. DOI: 10.29011/2575-7903.001363.

Received Date: 09 January 2024; Accepted Date: 08 January 2024; Published Date: 17 January 2024

## Abstract

**Introduction:** Urethroplasty using mucosal graft for urethral defects has become the gold standard. However, this method may not be the best surgical procedure due to its many associated complications, such as urine leakage, meatal stenosis, and donor site problems.

**Case Presentation:** A 57-year-old man had penile ulcers with severe inflammation and was diagnosed Fournier's gangrene. He underwent immediate debridement and a defect of the urethra 3 cm in the vertical direction was observed. For reconstruction of this defect, he underwent a skin graft using onlay peripheral de-epithelialized skin to prevent urine leakage. Urethral endoscopy confirmed that the urethra was completely epithelialized and not constricted, and he could urinate in a standing position without urine leakage. Conclusion: We believe that this method is an excellent surgical option for urethral defect reconstruction.

**Keywords:** De-epithelialized skin graft; Fournier's gangrene; Onlay skin graft; Penile urethral defect; Reconstruction of urethra

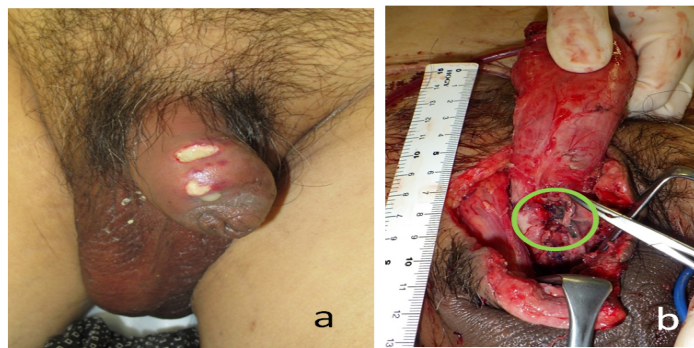
## Introduction

Fournier's gangrene is an acutely progressive soft tissue infection that develops in the perineum and is often life-threatening. [1,2] However, the penis itself is protected by a strong Buck's fascia, and so it is less likely to cause infection or necrosis. [3] We encountered a case in which Fournier's gangrene of the penile skin spread beyond Buck's fascia to the corpus cavernosum, leading to a urethral defect. Urethral reconstruction was performed with a ventral onlay skin graft, and good results were obtained by devising the use of peripheral de-epithelialized skin to improve the skin graft survival rate and prevent urine leakage.

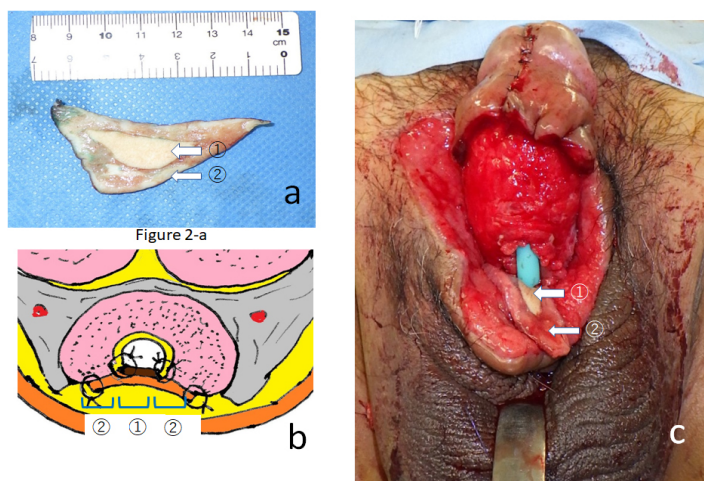
## Case Presentation

A 57-year-old man complained of penile pain and ulceration that had started 10 days earlier. □ He had type 2 diabetes with poor glycemic control. On initial examination, he had penile ulcers and swelling around the penis, and blood test results revealed a white blood cell count of  $14.6 \times 10^9/L$  and an acute rise of C-reactive protein (3.9 mg/dL), indicating severe inflammation (Figure 1-a). He underwent immediate wound management including drainage of pus, and wound cleansing. Subcutaneous necrotizing fasciitis spanned the entire circumference of the penis. In the ventral part of the penis, soft tissue infection extended to the corpus cavernosum, and a defect of the urethra 3 cm in the vertical direction was observed (Figure 1-b). High-dose antibiotics (clindamycin 1800

mg, Sulbactam / Ampicillin 12 g/day) and immunoglobulin were initiated. Methicillin-sensitive *Staphylococcus aureus* was isolated from the pus, blood, and sputum. The patient underwent free skin grafting on the granulation tissue of the penis after 10 days. For reconstruction of the 3X1-cm urethral defect, 6X4-cm full-thickness skin was harvested from the inguinal region, and the epidermis was stripped except for the central 3X1-cm part of the skin graft (Figure 2-a). By suturing the part where the epidermis was attached to the urethral edge of the urethral defect and further suturing the edge of the skin graft to the corpus cavernosum, the skin graft and fistula were brought into close contact to prevent urine leakage (Figure 2-b,c). Penile superficial wounds were resurfaced after 2 weeks, and the indwelling urinary catheter was removed after 3 weeks. Urethral endoscopy confirmed that the urethra was completely epithelialized and not constricted, and urination in a standing position was possible without urine leakage (Figure 3-a,b).

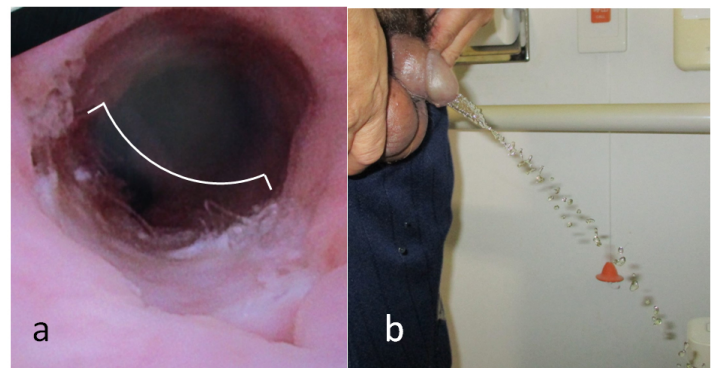


**Figure 1 a:** A picture of the first examination showed penile ulcers and swelling around the penis; **b:** An intraoperative view showed that debridement of infected tissue resulted in a 3-cm urethral defect on the ventral side of the urethra.



**Figure 2:** ① Full-thickness area of skin graft, ② Epidermis excision area of skin graft. **A:** This is a photograph of the skin graft

used as material for urethral reconstruction. Full-thickness skin is left in the central part of the skin graft, and the epithelium around it is absent. **B:** This is an illustration of urethral reconstruction. The full-thickness skin of the skin graft is attached to the urethral defect, and the surrounding de-epithelialized part is attached to the corpus cavernosum. **C:** This is a photo of the urethra being reconstructed. The full-thickness skin of the skin graft is attached to the urethral defect, and the part where the epithelium has been removed is sewn around it.



**Figure 3: a:** Urethral endoscopy, performed 3 weeks after surgery, showed satisfactory urethral reconstruction with a skin graft (area indicated by bar). **b:** The patient was able to urinate in a standing position 3 weeks after the operation, and no urine leakage was observed.

**Discussion**

Fournier's gangrene is associated with high mortality and also with acute fulminant infection of the genital and perineal regions, thus, aggressive removal of infected soft tissue are the first requirements for treatment. [1,2] It is usually caused by a polymicrobial infection that progresses to endarteritis obliterans with microthromboses along fascial plane. It begins in the genitalia or perineum and spreads along Buck's, Colle's, and Scarpa's fascias. [4] Buck's fascia is strong enough to limit the depth of tissue invasion in the presence of necrotizing infection of the genitalia. [3] Thus, Fournier's gangrene generally spreads along the fascia and causes infectious necrosis of the skin and soft tissues, so necrosis and infection of the corpus cavernosum and its deeper urethra are rare. Although, many researchers have reported reconstructive surgery cases for Fournier's gangrene, no damage to the corpus cavernosum and urethra was reported [5-7]. Bacteremia causes the formation of disseminated microthrombosis of the vessels that nourish the fascia. Therefore, the occurrence of bacteremia associated with Fournier's gangrene can cause ischemic necrosis of the fascia [8].

Niedrach WL et al. presented a case of corpora cavernositis, which spread from a perianal abscess by direct extension through

Buck's fascia. [9] Many abscesses of the corpus cavernosum have been reported in association with priapism, alprostadil or papaverine injections, trauma, penile prosthesis, tuberculosis, and intra-abdominal abscesses. [10,11] Urethroplasty using grafts for anterior urethral strictures has become the standard procedure. Buccal mucosa is most commonly used for substitution urethroplasty. [12] However, according to a past review report, 13-18% of patients who underwent mucosal graft urethroplasty exhibited extravasation requiring prolonged catheterization, and about 13% showed meatal stenosis. [13-15] Lumen N et al. also evaluated 58 patients treated with mucosa graft urethroplasty, and a successful result was achieved in only 50 (86.1%) patients. They also reported about donor site (oral) morbidity, whereby more than 30% of patients still complained of sensitivity disorders after 6 months. [16] Theoretically, it is desirable to reconstruct a urethral defect, which is a mucosal defect, with oral mucosa, which is the same mucosa. However, urethroplasty using the oral mucosa may not be the best surgical procedure due to its many associated complications.

We believe that urethral reconstruction with a de-epithelialized full-thickness skin graft that we have devised can reduce the above complications. First, the remaining epidermis is used to fill in the urethral defect and the surrounding denuded skin is sewn onto the outer surface of the ureter to prevent urine leakage. Similar to mucosal transplants, skin grafts are predicted to cause postoperative skin contractions. However, unlike the oral mucosa, a sufficient amount of skin can be harvested, and so postoperative urethral stricture can be prevented by reconstructing the defect sufficiently wide enough. In addition, the transplanted skin piece adheres not only to the back surface but also to the de-epithelialized surface. This creates favorable conditions for skin graft engraftment and is considered to help prevent postoperative skin graft contracture. Finally, using full-thickness skin as the reconstruction material, it is free from donor-related problems specific to oral mucosa harvest, such as numbness in the oral cavity, dysarthria, and difficulty in oral intake immediately after surgery.

## Conclusion

We used a ventral onlay peripheral de-epithelialized skin graft for a rare penile urethral defect caused by Fournier's gangrene and obtained satisfactory results. We believe that this method is a good surgical option for urethral defect reconstruction as it can reduce the occurrence of various complications caused by the conventional mucosal transplantation method.

## References

1. Ozkan OF, Koksak N, Altinli E, Celik A, Uzun MA, et al. (2016) Fournier's gangrene current approaches. *Int Wound J* 13: 713-716.
2. Gümüş M, Turkoglu A, Bozdağ Z, Ülger BV, Ağaçayak E et al. (2015) Fournier's gangrene: a summary of 10 years of clinical experience. *Int Surg* 100: 934-941.

3. Chennamsetty A, Khouddaji I, Burks F, Killinger KA (2015) Contemporary diagnosis and management of Fournier's gangrene. *Ther Adv Urol* 7: 203-215.
4. Louro JM (2019) Fournier's gangrene: 10-year experience of a plastic surgery and burns department at a tertiary hospital. *Acta Med Port.* 32: 368-374.
5. Huayllani MT, Cheema AS, McGuire MJ, Janis JE (2022) Practical Review of the Current Management of Fournier's Gangrene. *Plast Reconstr Surg Glob Open* 10: e4191.
6. Karian LS, Chung SY, Lee ES (2015) Reconstruction of Defects After Fournier Gangrene: A Systematic Review. *Eplasty* 15: e18.
7. Chen SY, Fu JP, Chen TM, Chen SG (2011) Reconstruction of scrotal and perineal defects in Fournier's gangrene. *J Plast Reconstr Aesthet Surg* 64: 528-534.
8. Ephimenko NA, Privolnee VV (2008) Fournier's gangrene. *Clin Microbiol Antimicrob Chemother* 10: 25-34.
9. Niedrach WL, Lerner RM, Linke CA (1989) Penile abscess involving the corpus cavernosum: a case report. *J Urol* 141: 374-375.
10. Dugdale CM, Tompkins AJ, Reece RM (2013) Cavernosal abscess due to *Streptococcus anginosus*: a case report and comprehensive review of the literature. *Curr Urol* 7: 51-56.
11. Gore TC, Schepcoff A, Sorresso D (2020) Corpus Cavernosum Abscess Secondary to Traumatic Perforation of Urethral Diverticulum. *Cureus* 12: e7032.
12. Horiguchi A (2017) Substitution urethroplasty using oral mucosa graft for male anterior urethral stricture disease: Current topics and reviews. *Int J Urol* 24: 493-503.
13. Abrate A, Gregori A, Simonato A (2019) Lingual mucosal graft urethroplasty 12 years later: Systematic review and meta-analysis. *Asian J Urol* 6: 230-241.
14. Das SK, Kumar A, Sharma GK, Pandey AK, Bansal H (2009) Lingual mucosal graft urethroplasty for anterior urethral strictures. *Urology* 73: 105-108.
15. Pal DK, Gupta DK, Ghosh B, Bera MK (2016) A comparative study of lingual mucosal graft urethroplasty with buccal mucosal graft urethroplasty in urethral stricture disease: an institutional experience. *Urol Ann* 8: 157-162.
16. Lumen N, Vierstraete-Verlinde S, Oosterlinck W, Hoebeke P, Palminteri E (2016) Buccal versus lingual mucosa graft in anterior urethroplasty: a prospective comparison of surgical outcome and donor site morbidity. *J Urol* 195: 112-117.