



SCROTAL RECONSTRUCTION FOLLOWING FOURNIER'S GANGRENE WITH PEDICLED GRACILIS MUSCLE FLAP WITH SPLIT SKIN GRAFT – A CASE REPORT

Surgery

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ABSTRACT

Fournier's gangrene is an acute necrotizing infection of the soft tissues involving the external genitalia and perineal region resulting in full thickness loss of the scrotum exposing the testes. Reconstruction of these defects are challenging post multiple debridements often causing the testes to expose. The use of pedicled gracilis muscle flap with a split skin graft achieves an aesthetically acceptable scrotum with minimal donor site morbidity. The gracilis muscle flap creates a pliable and soft consistency scrotum akin to the original scrotum. In major defects with large testes, bilateral gracilis muscle flaps would be necessary.

KEYWORDS

Fournier's gangrene, scrotal reconstruction, gracilis muscle flap, aesthetic

INTRODUCTION

Fournier's gangrene is a rare and acute soft tissue necrotizing infection involving the perineum and the external genitalia, commonly occurring in men resulting in a extensive loss of scrotal wall with exposure of the testicles. (1) Infection is most often polymicrobial, arising from the colorectal or urogenital tracts. (2,3) The single greatest predisposing factor for disease development is diabetes mellitus, found in up to 66% of affected patients, others being alcoholism and obesity. (3-5) Serial debridement is done to remove all necrotic tissues, control the rapid spread of the infection and ensure a wound bed suitable for coverage. (6) Reconstruction of the scrotal and perineal region following a large defect is a challenging for the reconstructive surgeon. (7) The main objectives is to create a scrotum which is cosmetically acceptable, sensate and durable and restoring the psychological and social confidence of the patient. (1) Many methods have been used to achieve soft tissue cover following Fournier's gangrene but they are all associated with their benefits and drawbacks. The burying of the testes in the thigh has been associated with repeated trauma to the testes, testicular atrophy and unpleasant aesthetic appearance. (8,9) The undermining of the remnant perineal skin has yielded good results but only when half the scrotum is involved. (10) The use of skin graft alone has been widely done but cannot be used solely for major scrotal loss as it adheres to the testes showing its outline and less cosmetically acceptable. Due to these drawbacks, fasciocutaneous, musculocutaneous or muscle flaps are preferred for a better appearance and psychological outcome. (9) The use of gracilis muscle flap in the reconstruction of large scrotal defect described in this report has the advantage of creating a pliable and soft feel like that of the original scrotum, the muscle conforming to the shape of testes and with minimal donor site morbidity. Orticochea in 1972 was first to describe the gracilis flap. (11) It is Type II Muscle flap getting its blood Supply from the medial circumflex femoral artery or direct branch of profunda femoral artery and minor perforators. (12,13)

Case Report

Patient noticed swelling of the scrotum – 3 days, insidious in onset and

progressive in nature. There is history of pricking pain, and fever. There is no history of vomiting or difficulty in micturition. The patient is a recently diagnosed diabetic not on treatment. A clinical diagnosis of Fournier's gangrene was made. Emergency debridement of gangrenous scrotal wall done exposing underlying healthy testes by the surgeon and referred to us for scrotal reconstruction after settling of the acute episode. Now, the patient presented to us with a post infective post surgical raw area scrotum and perineum. We planned for debridement followed by pedicled gracilis muscle flap and SSG for secondary suturing for perineum. Under aseptic precautions, gracilis muscle flap marking was done in the right thigh. Incision was made and the muscle was identified and disconnected near its insertion. The flap was raised as a pedicled flap. The flap was tunneled from right thigh and brought to scrotal region. The exposed testes were covered with the gracilis muscle flap with SSG which was harvested from the right thigh and fixed with 3-0 vicryl. The flap donor site was closed primarily in layers with 3-0 vicryl and skin staplers. Scrotal dressing was done. Post-operative period was uneventful with excellent skin graft take.



Fig. 1 – Picture showing exposed testis

Fig. 2 – Picture showing the incision to harvest gracilis



Fig.3 – Gracilis muscle tunnelled & brought near testes**Fig. 4** – Testes wrapped by Gracilis**Fig. 5** – Immediate post-op picture after applying SSG

DISCUSSION

Locoregional flaps have been a safe and effective method of coverage for large soft tissue defects of the scrotum, without the risk of tissue retraction. (10,14-16) Considerations should be given while selecting a donor flap site such as functional, aesthetic, and psychological implications. (5) There are functional and aesthetic benefits to applying gracilis muscle flaps for the reconstruction of the scrotum. (5,14-17) The gracilis muscle is a well-vascularized donor that leads to better adaption to recipient surfaces and hence decrease the rates of seromas and hematomas. (10,16,17) This vascularization also provides increased resistance to infection, the ability to perform early reconstruction leading to shortened hospital stays and improved quality of life. (5,15-18) As the bulkiness of the donor muscle is often a cause of aesthetic concern, it has been well documented that muscle flaps undergo a great deal of atrophy following denervation compared to fasciocutaneous flaps. (19) Also, these patients may have a higher risk of developing nosocomial, multi-drug resistant infections due to severe granulocytopenia. (20,21) Creta et al. found that more serious infection with monomicrobial *Pseudomonas aeruginosa* was more common in those with an underlying hematological disease when compared to the general population of Fournier's gangrene patients. (22) Muscle and myocutaneous flaps like gracilis, rectus abdominis, split gluteus maximus flaps are required for large skin defects to eliminate the dead space. (23) The pedicled or free greater omental flap as well as scrotal tissue expansion have also been used for reconstruction. (24,25) The gracilis muscle flap was one of the first musculocutaneous flaps to be described in early 1970's by Mcraw and is a versatile pedicle flap from medial thigh used to cover defects in groin, perineum and scrotum. It is a type II muscle flap according to the Mathes and Nahai classification. The dominant pedicle, located proximally is the ascending branch of the medial circumflex femoral artery and the minor pedicles located distally are the 1st and 2nd branches of superficial femoral artery. It can be raised as a myocutaneous flap with a skin paddle or as muscle flap. It can be proximally or distally based. (26) The gracilis muscle is a well vascularised, reliable and an easy to harvest flap situated close to the perineal and scrotal area to be covered. The gracilis muscle flap has good vascularisation of tissues and therefore provides greater resistance to bacterial inocula in contaminated wounds. (23) The donor site can be closed primarily with minimal donor site morbidity. Due to these advantages, the gracilis muscle flap is an ideal and good choice for scrotal reconstruction for defects secondary to Fournier's gangrene. The only disadvantage of the gracilis myocutaneous flap is an unreliable skin paddle particularly along the distal third of the muscle. (27) Using a gracilis muscle flap with SSG in our patient eliminates the risk of skin paddle loss, yet still provides well vascularised bed of tissue with great chances of good graft take. Quilting further aids good graft application and good graft take on a rather uneven surface.

CONCLUSION

The pedicled gracilis muscle flap is a versatile and reliable flap for coverage of large scrotal defects with deep cavities secondary to Fournier's gangrene. It provides good durable soft tissue coverage for the scrotal contents. The gracilis muscle is well vascularised which provides a good bed for skin graft take and provides greater resistance to infection in contaminated wounds.

REFERENCES

1. Katusabe LJ, Balumuka D, Hodges A. Scrotal reconstruction with a pedicled gracilis

muscle flap after debridement of Fournier's gangrene: a case report. *East Afr Med J*. 2013; 90(11):375-378.

2. Chernyadyev SA, Ufimtseva MA, Vishnevskaya IF, et al. Fournier's gangrene: literature review and clinical cases. *Urol Int*. 2018;101:91-97.
3. Hong KS, Yi HJ, Lee RA, Kim KH, Chung SS. Prognostic factors and treatment outcomes for patients with Fournier's gangrene: a retrospective study. *Int Wound J*. 2017;14:1352-1358.
4. Sorensen MD, Krieger JN. Fournier's gangrene: epidemiology and outcomes in the general US population. *Urol Int*. 2016;97:249-259.
5. Ferreira PC, Reis JC, Amarante JM, Silva AC, Pinho CJ, Oliveira IC, da Silva PN. Fournier's gangrene: a review of 43 reconstructive cases. *Plast Reconstr Surg*. 2007;119:175-184.
6. Kim SW, Kim BJ, Seul CH. Scrotal reconstruction using gracilis muscle flap in Fournier's gangrene. *Plast Reconstr Surg*. 2006;118(4):152-153.
7. Chen SY, Fu JP, Chen SG. Reconstruction of scrotal and perineal defects in Fournier's gangrene. 2011. *J Plast Reconstr Aesthet Surg*. 2011; 64:528-534.
8. Islam MT, Dey PK, Kamal AHM, Uddin MF. Evaluation of scrotal reconstruction with thigh flap. *Bang Med J Khulna*. 2017;50:13-17.
9. Karki D, Patel PK, Narayan RP. Penoscrotal defect: a functional, esthetic, and psychological challenge. *Plast Aesthet Res*. 2016;3:64-67.
10. Karian LS, Chung SY, Lee ES. Reconstruction of defects after Fournier's Gangrene: a systematic review. *E Plasty*. 2015;15:155-169.
11. Orticochea M. The musculo-cutaneous flap method: an immediate and heroic substitute for the method of delay. *Br J plast surg*. 1972;25(2):106-110.
12. Mathes SJ, Nahai F. Clinical atlas of muscle and musculocutaneous flaps. St Louis: Mosby; 1979.
13. Macchi V, Vigato E, Porzionato A, et al. The gracilis muscle and its use in clinical reconstruction: an anatomical, embryological, and radiological study. *Clin anat*. 2008;21(7):696-704.
14. Tran NV. Scrotal and perineal reconstruction. *Semin Plast Surg*. 2011;25:213-220.
15. Singh A, Ahmed K, Aydin A, Khan MS, Dasgupta P. Fournier's gangrene. A clinical review. *Arch Ital Urol Androl*. 2016;88:157-164.
16. Chabak H, Rafik A, Ezzoubi M, Diouri M, Bahechar N, Chlihi A. Reconstruction of scrotal and perineal defects in Fournier's gangrene. *Mod Plast Surg*. 2015;5:23-27.
17. Mallikarjuna MN, Vijayakumar A, Patil VS, Shivswamy BS. Fournier's gangrene: current practices. *ISRN Surg*. 2012;2012:942437.
18. Lee SH, Rah DK, Lee WJ. Penoscrotal reconstruction with gracilis muscle flap and internal pudendal artery perforator flap transposition. *Urology*. 2012;79:1390-1394.
19. Kääriäinen M, Kauhanen S. Skeletal muscle injury and repair: the effect of disuse and denervation on muscle and clinical relevance in pedicled and free muscle flaps. *J Reconstr Microsurg*. 2012;28:581-587.
20. D'Arena G, Pietrantonio G, Buccino E, Pacifico G, Musto P. Fournier's gangrene complicating hematologic malignancies: a case report and review of literature. *Mediterr J Hematol Infect Dis*. 2013;5:0.
21. Albasanz-Puig A, Rodríguez-Pardo D, Pigrau C, et al. Necrotizing fasciitis in haematological patients: a different scenario. *Ann Hematol*. 2020;99:1741-1747.
22. Creta M, Sica A, Napolitano L, et al. Fournier's gangrene in patients with oncohematological diseases: a systematic review of published cases. *Healthcare (Basel)*. 2021;9.
23. Shih-Yi Chen, Ju-Peng Fu, Tim-Mo Chen, Shyi-Gen Chen. Reconstruction of scrotal and perineal defects in Fournier's gangrene. *J plast Reconstruct aesthet surg*. 2011; 64: 528-534.
24. Darren NG, Cheuk B, Tang, Sritharan S, Kadirkamathan and Makarand Tare. Scrotal reconstruction with a free greater omental flap. *Microsurgery*. 2010;30:410-413.
25. David E Rapp, Alvin B Cohn, Lawrence J Gottlieb, Mark B Lyon, and Gregory T Bales. Use of tissue expansion for scrotal sac reconstruction after scrotal skin loss. *Journal of Urology*. 2005; 65:1216-1218.
26. Zol B, Kryger, Mark Sisco. *Practical plastic surgery*. 2007;618-619.
27. Honda Hsu Chih Ming Lin, Tzong-Bon Sun, Li-Fu Cheng, Sou-Hsin Chien. Unilateral gracilis myofasciocutaneous advancement flap for single stage reconstruction of scrotal and perineal defects; *Journal of plastic, reconstructive and aesthetic surgery*. 2007;60: 1055-1059.