Original Article

Aesthetic Reconstruction of Scrotum after Founiers Gangrene using Laterally based Medial Thigh Fasciocutaneous Flap

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Introduction : Fournier's Gangrene is a rapidly progressive necrotising faciitis affecting the genital region, perineum, perianal region and the abdominal wall. It can have an adverse effect on the functional and psychological aspects of the patient. Many flaps are available for the defect coverage.

Aim : The aim of this prospective study was to analyse the effectiveness of laterally based medial thigh flap for scrotal reconstruction. This is a fasciocutaneous flap just below the Scrotum which covers moderate to large sized scrotal defects successfully.

Methods and Materials : This study was done at a teaching hospital in South India on patients with major scrotal defects secondary to Fournier's Gangrene. Ten patients with major scrotal defects secondary to Fournier's gangrene were subjected to reconstruction of scrotum by medial thigh fasciocutaneous flap.

Results and Conclusions : All ten flaps survived and provided a durable and aesthetic cover for exposed testes. Only one flap had necrosis of distal 2cm, which was successfully managed by secondary suturing. The donor areas were primarily covered with placement of a small graft near the base of the flap, which healed well with an inconspicuous scar. In conclusion, the laterally based medial thigh fasciocutaneous flap provides excellent closure for extensive scrotal skin loss. It is a robust flap, easy to mobilise, rarely undergoes necrosis, provides a sensate cover with excellent aesthetic results. The technique is simple, less time consuming and can be easily incorporated by plastic Surgeons and General Surgeons.

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Key words **: Fournier's Gangrene, Fasciocutaneous flap, Scrotal reconstruction, Medial thigh flap.**

Fournier's Gangrene is an acute, rapidly progressive and potentially fatal, infective necrotising fasciitis affecting the external Genitalia, perineal or perianal regions[1]. Fournier's gangrene was first described by Jean Alfred Fournier in 1883[2]. Injury to the perineal area continues to be the most frequent reason for the entry of bacteria that mediates the infectious process[3].

Fournier's Gangrene presents with major soft tissue loss and may even be lethal[4]. Since the testes have an independent blood supply, they are spared and remain exposed[5]. Fournier's Gangrene can lead to an extensive skin loss involving the Scrotum, Penis, Thighs and Lower abdomen. After thorough surgical debridement, major scrotal and perineal defects along with exposed testes have to be dealt by Plastic Surgeons[6].

Different surgical procedures were used to cover the exposed testes. Earlier methods for testicular salvage were: covering with skin grafting, burying them underneath the medial thigh skin, tissue expansion of adjacent tissues and use of local fasciocutaneous or musculocutaneous flap[4].

Editor's Comment :

- Aggressive debridement and appropriate antibiotic cover followed by regular dressings is the mainstay of management in Fornier's Gangrene involving scrotum.
- Durable and aesthetic cover of the exposed testicles is the need of the hour after proper debridement.
- Laterally based Medial thigh flap is a suitable option to cover the exposed testicles and also gives good aesthetic outcome.

Reconstruction of the Scrotum is important for Functional, Cosmetic and Psychological reasons[7]. The scrotal region requires durable coverage as it is an essential gland that produces sperm and is the representative organ of masculinity[8]. Early scrotal coverage with single-staged sensate flap that provides complete and adequate protection of exposed testicles is the ideal choice[9].

The aim of the present study was to evaluate the effectiveness of laterally based medial thigh fasciocutaneos flap in reconstruction of Scrotum in patients with Fournier's Gangrene.

Materials and Methods

This prospective study involves ten patients of

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Fournier's Gangrene undergoing laterally based medial thigh fasciocutaneous flap for reconstruction of Scrotum. Ethical Committee clearance was taken from the institution before commencement of the study. All patients were referred from the Department of General Surgery after thorough debridement and proper antibiotic treatment. The patients were aged between 38 and 62 years with the average being 51.3. Among the subjects, seven also had involvement of other areas like perineum, perianal region and lower abdomen along with exposed testes. Five patients had associated Diabetes Mellitus. Three with extensive perianal and lower thigh involvement had undergone Diversion Colostomy to accelerate wound healing. Consent was taken from all the subjects for inclusion in the study.

Pre-operative Preparation :

Antibiotics were administered as per Culture and Sensitivity Reports. Diabetes was controlled using insulin therapy. Thrice daily saline dressing was done to reduce the bacterial colonisation of the wound before Surgery. All the subjects were catheterised using Foley's indwelling catheter. Groin area was inspected to rule out bacterial or fungal infection. Bowel preparation was done in all except those who had Colostomy.

Surgical Technique :

Patient was made to lie down in supine position and a folded linen or sand bag was placed below the same thigh for comfortable access to medial aspect of thigh. Thorough saline wash was given to scrotal, perineum and perianal region. Wound margin was freshened (Figs 1a & 1b). Dimensions of the defect were measured in two dimensions. Template was designed as per the dimensions of the defect. Before making incision for the flap, reverse planning was done several times using the template, to confirm the reach of the flap. Template was placed just below the defect over the medial thigh. The flap margins were marked. The superior margin of the flap corresponded with inferior border of the defect. The medial vertical margin was also marked as per template. The inferior margin was marked parallel to the superior margin. Lignocaine and adrenaline injection was infiltrated beneath the flap to reduce bleeding. The flap elevation was started from medial to lateral direction. Deep fascia was incised; tagging sutures were taken between deep fascia and dermis to prevent shearing of septo-cutaneous perforators. Flap was raised above adductor muscle of the thigh. Septo-cutaneous perforators, while elevating the flap were cauterised using bi-polar diathermy. After sufficient elevation of the flap, it was inset to the scrotal defect. A dependent suction drain was used routinely in all cases. In the donor area, distal portion was primarily closed and proximal part near the base of the flap was grafted. Bolster dressing was applied over skin graft. Remaining defects over thigh, perianal, or lower abdomen were either closed primarily or skin grafted. Padded scrotal dressings were applied (Figs 2a & 2b).

Postoperative Care :

The patients were positioned in the supine position to avoid compression and traction on the flap. Flap was inspected on second day; however, the graft bolster dressing was kept undisturbed. Graft dressing was opened on fifth day and staples were removed and patient was discharged with regular follow-up. All the cases were followed for six months (Figs 3a, 3b & 3c).

Results

Ten laterally based medial thigh fasciocutaneous flaps were performed to reconstruct Scrotum in patients

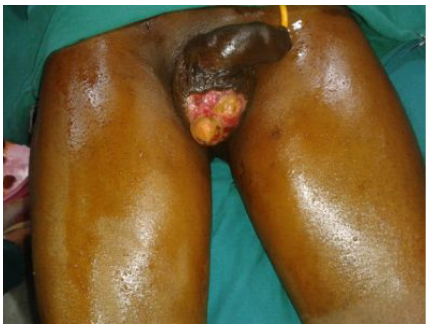

Fig 1a — Scrotal defect

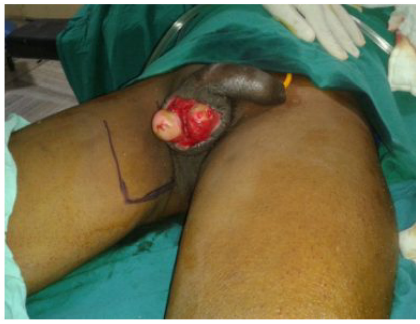

Fig 1b — Flap marking

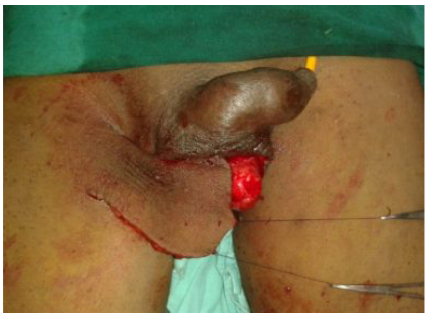

Fig 2a — Elevation of the flap

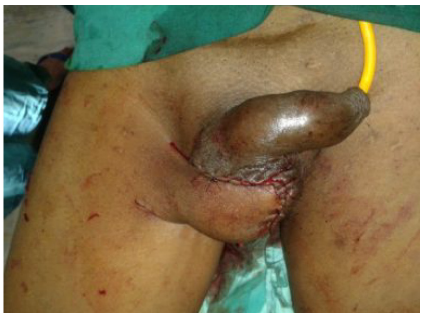

Fig 2b — Flap inset

with Fournier's Gangrene. The subjects were followed up for six months. The wounds healed satisfactorily in all patients included in the study. There was partial flap necrosis of two cm in one patient requiring debridement and secondary suturing. Minor graft loss over the donor area was noticed in one patient, which healed by secondary intention in three to four weeks. Sutures were removed after two weeks. Flap fused well with the native Scrotum and suture line was inconspicuous after six weeks. The suture line mimicked the normal anatomical median raphe in those patients, where half of the Scrotum was reconstructed by flap. The crude touch and pressure sensation over the flap was almost equal to that of native Scrotum. Normal hair growth was noticed on the flap after four weeks. All subjects were happy about the cosmetic appearance of the Scrotum. The details of patients are mentioned in Table 1.

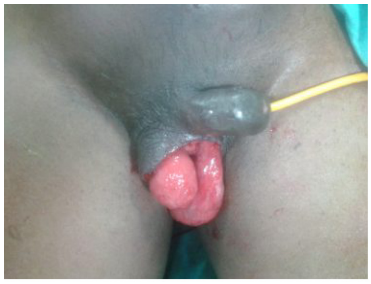

Fig 3a — Defect exposing testes

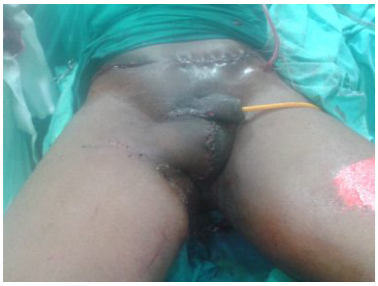

Fig 3b — After flap cover

Fig 3c — Follow up after 6 months

Discussion

Many surgical options have been used to reconstruct exposed Testes in Fournier's Gangrene. Reconstruction of the Scrotum is vital for functional, aesthetic and psychological reasons[6]. The ideal reconstructive approach would seem to incorporate the following flap features: A single stage procedure, excellent flap reliability, sensate flaps with potential for normal function, minimal donor-site morbidity and simplicity[6].

Scrotal cover using split skin grafting leads to graft loss and subsequently shrinkage of Testicles[4]. Aesthetically, skin graft is not acceptable to the patients and skin graft will remain as an anaesthetic patch. Moreover, normal hair growth will not be present over grafted skin. The placement of Testes in medial thigh leads to exposure of Testes to core body temperature and may affect Spermatogenesis. Other issues like dragging pain while walking and cycling and later leading on to Testicular Atrophy has been reported[10].

The problems associated with this procedure are constant pain caused by mechanical trauma and Testicular Atrophy[11]. Laterally based medial thigh flap is a reliable fasciocutaneous flap, which can be performed in reasonable short operative time for defects of any size. The donor scar and grafted areas are hidden in the medial aspect of the thigh.

The fasciocutaneous flap of the medial thigh has rich blood supply due to the presence of branches of the femoral artery (internal and circumflex pudendal), making the flap very safe even in diabetic and vasculopathic patients[11].

Flap should be planned immediately at the lower border of the defect; the inferior margin of the defect forms the superior border of the flap. This step prevents the skin bridge between the defect and the flap. The width of the flap corresponds to the width of the defect.

The minor drawback of this technique is that, the inset of the flap is deficient at the root of the Scrotum. Postoperatively, patient experiences serous discharge from this part for a period of two to three weeks. Some patients also complained of mild dragging pain in this region due to attachment of the flap medially. Flap division and inset done under Local Anesthesia relieved both the above problems.

In the surgical technique explained by Ayad, *et al*[6], the dominant pedicle is located over the apex of the femoral triangle 6-8 cms below the inguinal ligament. There is a need for Doppler examination before starting the procedure to locate the pedicle. After elevation of the flap from distal to proximal direction, careful dissection is required to prevent the injury to the pedicle. Our technique does not require either Doppler examination or

Table — *Patient demographics of Fournier's Gangnrene in our hospital*

Age	Site	Flap dimension)	Complications	Hospital stay
44	Scrotum	8 X 5 cm	Nil	18
42	Scrotum & penis	9 X 4 cm	Nil	13
38	Scrotum	7 X 5 cm	Nil	10
48	Scrotum & abdomen	8.5 X5.5 cm	2cm flap necrosis	16
56	Scrotum & perineum	7.5 X 5 cm	Nil	18
61	Scrotum, perianal & ABD	9.5 X 6 cm	Partial graft loss	12
58	Scrotum & penis	8 X 6.5 cm	Nil	19
54	Scrotum	6 X 3.5 cm	Nil	11
50	Scrotum, perineum & penis	8.5 X 5 cm	Nil	14
62	Scrotum, ABD & perineum	9 X 5.5 cm	Nil	16

meticulous dissection of the flap.

Mageed, *et al*[4] have explained their technique of anteromedial fasciocutaneous thigh flap in which the flap is proximally based and longitudinally oriented and the base of the flap was drawn on the anteromedial aspect of thigh at the level of the inguinal crease. The vascular supply to this flap is the rich suprafascial plexus of vessels present at the anteromedial thigh. However, this technique requires bilateral flaps to cover larger defects.

Pudendal thigh flap provides good quality skin and good support. Even though there is need for bilateral flaps, primary closure of the donor area is an additional advantage of this flap[10]. Fasciocutaneous thigh flaps can cover medium to large-size defects. The pedicled antero lateral thigh perforator flap is another good alternative for reconstruction of extensive defects of penoscrotal area[2]. Fasciocutaneous medial thigh flap was sufficient for the defects in our study group.

The advantages of our technique are :

- Single stage reconstruction of scrotal defect of any size using one flap only.
- Restoration of normal skin color and hair on the Scrotum, as the flap is designed from adjacent area.
- Preservation of sensation over the flap.
- Donor area is hidden in the medial aspect of the Thigh.
- Durable cover to the exposed Testicles.
- Good aesthetic result.

Conclusion

Early recognition and diagnosis, followed by Emergency Surgery, are the keys to treating these cases and for prevention of Systemic Sepsis, Potential Organ Failure and Death[12]. The laterally based medial thigh fasciocutaneous flap provides excellent cover for extensive losses of scrotal skin. It is a very robust flap, can be easily mobilized, rarely undergoes Necrosis, and provides sensate cover and excellent Aesthesis. The technique is simple, less time consuming, does not require complex flap planning, and hence can be easily incorporated by Plastic Surgeons and General Surgeons as well.

References

1 Smith GL, Bunker CB, Dinneen MD — Fournier's gangrene. *Br J Urol* 1998; **81:** 347-55.
2 Lin CT, Chang SC, Chen SG, Tzeng YS — Reconstruction of perineoscrotal defects in Fournier's gangrene with pedicle anterolateral thigh perforator flap. *ANZ J Surg* 2016; **86(12):** 1052-5.
3 Eke N — Fournier's gangrene: a review of 1726 cases. *Br J Surg* 2000; **87:** 718-28.
4 El- Mageed MA — Evaluation of the Anteromedial Thigh Fasciocutaneous Flap for Scrotal Reconstruction. *Egypt J Plast Reconstr Surg* 2007; **31(2):** 149-55.
5 Hallock GG — Scrotal Reconstruction Following Fournier Gangrene Using the Medial Circumflex Femoral Artery Perforator Flap. *Ann Plast Surg* 2006; **57(3):** 333-5.
6 Ayad WM, Al-Shahat OA, Zaied E, Albanooby T, Taman E — *Egypt J Plast Reconstr Surg* 2011; **35(1):** 129-32.
7 Yu P, Sanger JR., Matloub HS, Gosain A, Larson D — Anterolateral Thigh Fasciocutaneous Island Flaps in Perineoscrotal Reconstruction. *Plast Recosntr Surg* 2002; **109 (2):** 610-6.
8 Mauro V — Fasciocutaneous flap of the inner thigh for scrotal reconstruction in Fournier syndrome. *Rev Bras Cir Plást* 2011; **26(4):** 707-9.
9 Hallock GG — Scrotal reconstruction following Fournier's gangrene using the medial thigh fasciocutaneous flap. *Ann Plast Surg* 1990; **24:** 86-90
10 Mopuri N, O'Connor EF, Iwuagwu FC — Scrotal reconstruction with modified pudendal thigh flaps. *J Plast Reconstr Aesthet Surg* 2016; **69(2):** 278-83.
11 Monteiro E, Carvalho P, Costa P, Ferraro A — Inner Thigh Lift Flap for Fournier gangrene of the scrotum. *Plast Reconstr Surg* 2002; **110(5):** 1372-3.
12 Tomar SS — Fournier's gangrene - Not a stigma for surgery with newer surgical reconstruction of scrotum. *Indian J Surg* 2010; **72(Suppl 1):** 339-40.