



EFFICACY OF SKIN GRAFTING PROCEDURE IN FOURNIER'S GANGRENE OF SCROTUM

Plastic Surgery

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ABSTRACT

Fournier's gangrene is a rapidly progressive necrotizing fasciitis of perineum. This is an uncommon disease, but it is relatively more in India. Studies on Split skin grafting were not much available in India. I evaluated the results of split skin grafting surgery for scrotal defects following Fournier's gangrene.

17 patients were treated from January 2015 to December 2019. Patients were followed up for 6 months.

Mean age of the patients was 48 years. Mean size of perineal raw areas was 6.5x7.2 cm². Complete exposure of both testes was present in 9 patients. Patient satisfaction score was found very well in 12 patients. Good contour and texture of scrotum was found in 16 patients. Healthy scar and good colour were found in 14 patients. Scrotal raphy was present in 12 patients.

Skin grafting surgery of scrotal defect following Fournier's gangrene is a simple, safe, cost effective and aesthetically acceptable procedure. Proper testicular apposition with absorbable sutures also improved the aesthetic appearance of the scrotal raphy

KEYWORDS

Fournier's gangrene; Scrotal defect; Split skin grafting; Assessment

INTRODUCTION:

Fournier's gangrene is a necrotizing fasciitis of the perineal area. This is an uncommon rapidly progressive disease due to a synergistic infection, thrombotic occlusion and gangrene [1]. It is relatively more common in India. This results in loss of skin and subcutaneous tissue in the perineal area specially in scrotum. It is more common in patients with diabetes mellitus, impaired immunity, alcoholism, inflammatory anorectal diseases, urinary incontinence[2]. It requires early diagnosis and proper management for the favourable outcome. The necrosis involves the scrotum and it does not include the testis and/or spermatic cord [3]. However, the exposure of the testis can cause severe functional, aesthetic and psychological harm to the patient. Reconstructions should give aesthetically acceptable appearance, durable coverage and good physiological function. Small defects are closed primarily or healed on conservative treatment. There are different surgical procedures to cover large scrotal defects. Local flaps are used to cover it. Testes are also buried in the surgically made thigh pockets [4]. Scrotal reconstruction with flaps is a complex procedure provides bulky durable cover of scrotum [5]. Testicular burial technique in thigh causes atrophy and injury to testes [6] and is not cosmetically acceptable. Skin grafting with split skin graft (SSG) is a relatively simple cost effective procedure [7]. Aim of this study is to evaluate the efficacy of skin graftings procedure in scrotal defects of Fournier's gangrene and to find out the aesthetic outcome.

PATIENTS AND METHODS:

17 patients out of 35 patients with Fournier's gangrene attending in the department of Plastic Surgery, Gauhati Medical College & Hospital from January 2015 to December 2019 were included who were treated with split skin grafting. Ethical clearance was taken from Institutional Ethics Committee. 18 patients with scrotal defects less than 4x4 cm² in size were treated conservatively. Detailed clinical history was taken (Table 1). Etiology of the disease was evaluated. Bacteriological study of the wounds and routine investigations of patients were also done. Patients were stabilized. Wound debridements were done in one or two settings. Wound dressings were continued till formation of healthy granulation tissue which took 1-3 weeks. Consent for surgery and photography was taken. Patients were put for surgery under spinal anaesthesia.

Scrotal wound was prepared. Gap between testes was reduced by testicular approximation by absorbable sutures and this gave a good surgical scrotal raphy. Split skin graft was harvested from thigh. Graft was applied over the scrotal wound and fixed to the base with 4-0 absorbable quilting sutures. Operated scrotal area was properly bandaged with optimum pad. Postoperative dressing was opened on 6th, 10th, 14th day and then alternate day for 21 days. Urinary catheter was removed on 10th day except one patient due to presence of urinary problems. Donor site was opened on 14th -18th day. Then patient was advised to clean the surgical area daily, to apply moisturizing lotion/cream twice daily and to wear adequate scrotal support for 6 months. Patients were discharged with regular follow up.

We evaluated the skin grafted scrotal areas on 4th week, 12th week and

on 6th month. We recorded color, texture, sensation, quality of scar of grafted area, contour of the scrotum, testicular sensation and presence of scrotal midline raphy. We recorded patient satisfaction score. The aesthetic assessment was done separately by a surgeon and by an independent observer on the basis of colour, contour, quality of scar, texture, midline raphy and general appearance of the scrotum. Then we took a final average score from the assessments of both.

Table 1 Clinical findings of patients of Fournier's gangrene treated with skin grafting

Sl. No.	Findings	Patients number
1.	Age	Range = 32year to 75 years. Mean age: 48 years.
2	Clinical findings	Pain 17 Fever 11 Swelling 17 Erythema 17 Crepitus 5 Tachycardia 11 Shock 3
3	Ulceration /Raw area	Scrotum alone 8 Scrotum and penis 3 Scrotum and thigh and abdomen 1 Scrotum and medial thigh 1 Scrotum and pre-anal area 4
4	Aetiology / Pre disposing factors	Scrotal trauma 3 Perianal abscess 5 Diabetes Mellitus 2 Alcoholism 2 Malignancy 1 Urethral stone 1 Unknown factor (Idiopathic) 3
5	Bacteriology	E. coli 4 Klebsiella sp. 6 Klebsiella sp. and Proteus mirabilis 2 Klebsiella sp. and Fungus 1 Staphylococcus aureus 3 No growth 1
6	Wound Debridement	One setting 11 Two settings 3
7	Size of ulcer/raw area on the day of surgery	Smallest size- 4.2x4.3 cm ² Largest size – 8.0x 9.4 cm ² Mean size – 6.5x7.2 cm ²
8	Complete exposure of both testes	9

RESULT:

The clinical findings and results of surgical procedures (**Table 1&2**), (**Fig 1- 3**) were evaluated. Total 17 patients were treated with skin grafting. Age ranges from 32 years to 75 years with mean age of 48 years. All patients came from poor and lower middle class socioeconomic family. Clinical findings like pain, swelling and erythema of scrotum were found in all patients, tachycardia and fever in 11 patients and shock in 3 patients. Ulceration was found in the scrotal area in 8 patients, scrotum with pre-anal area in 4 patients, and scrotum with penis in 3 patients. One patient had scrotal ulceration extending to upper thigh. Scrotal ulceration was extended to thigh and abdomen in 1 patient. As a predisposing factor of Fournier's gangrene perianal abscess was found in 5 patients, scrotal trauma in 3, Diabetes Mellitus in 2, alcoholism in 2, malignancy in 1, urethral stone in 1, and unknown cause in 3 patients. On bacteriological study of wound swab we found Klebsiella in 6 patients, E coli in 4, Staphylococcus in 3, Klebsiella with Proteus in 2, Klebsiella with Fungus in 1, and negative growth in 1 patient. We did radical wound debridement in one setting in 11 patients and in two settings in 3 patients. On the day of surgery the

smallest size of the raw area was 4.2x4.3 cm², largest size 8.0x9.4 cm², and mean size was 6.5x7.2 cm². Complete exposure with almost hanging of both testes was seen in 9 patients.

Mean postoperative dressing period was 21 days, and mean postoperative hospital stay was 15 days. Testicular sensation was present in all patients. Sensation over the grafted scrotal area appeared at 3rd month and gained full sensation at 6th month to all patients. Activity of daily living (ADL) was found good in all patients at 3rd month. Complication was seen 3 patients. Skin graft loss was seen in two patients and infection in one patient treated with regular dressings and proper antibiotics. We found very good satisfaction in 12 patients, good in 4 patients, and fair in one patient. We evaluated final aesthetic assessment of skin grafting surgery based on assessments of surgeon and independent observer to each patient. Good contour and texture was found in 16 patients, healthy scar and good colour in 14 patients. Scrotal midline raphy was present in 12 patients. Overall general appearance of scrotal area was found good in 15 patients.

Table 2 Postoperative assessment of patients of Fournier's gangrene treated with skin grafting

	Findings		Patients no.
1	Total postoperative hospital stay (Mean- 15 days)	1 – 14 days	11
		15 -21 days	6
2	Total postoperative dressings (Mean- 21 days)	1 – 14 days	2
		15 -21 days	9
		More than 21 days	6
3	Testicular sensation	Present	17 (100 %)
4	Sensation of grafted area at 6 months	Present	17 (100 %)
5	Activity of daily living (ADL) at 3 months	Good	17 (100 %)
		Bad	0
6	Complications	Graft loss (2), Infection (1)	
7	Patient satisfaction score assessment	Excellent	0
		Very good	12
		Good	4
		Fair	1
		Bad	0
8	Aesthetic assessment by a surgeon and by an independent observer (based on findings of both)	General appearance of scrotum	Good
			Fair
			Bad
		Quality of scar	Healthy
			Unhealthy
		Contour	Good
			Fair
		Colour	Good
			Fair
		Texture	Suppleness
			Induration
		Midline raphy	Present
			Fairly present



Fig. 1 Clinical pictures of Fournier's gangrene of a 50 years old patient presented with pain, fever, loss of scrotal skin with exposed both testes. Escherichia coli was found in the wound. One setting of **debridement** was done on 2nd day of reporting. Split skin grafting was done after 12 days of dressing. a, picture on the day of reporting; b, preoperative picture; c, postoperative picture with satisfactory outcome

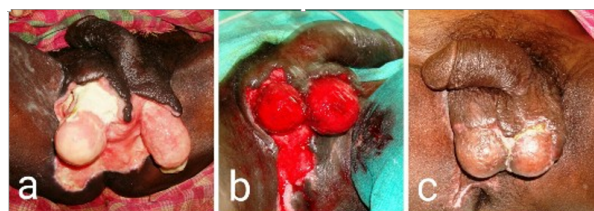


Fig. 2 Clinical pictures of 42 years old patient reported with complete loss of skin of scrotum and pre-anal area. Testes were exposed and widely separated. There was history of scrotal swelling 14 days back followed by loss of skin. a, picture on the day of reporting with **widely separated testes**. Surgery was done after 5 days of daily dressing. b, intraoperative picture. **Testicular approximation** was done with absorbable suture. Pre-anal area was closed with secondary suture. Split skin graft was harvested from thigh and applied over the scrotal raw area. c, postoperative picture at 6 months with good aesthetic result; x, preoperative picture of a **45 years old patient** presented with scrotal raw area with exposed both testes with history of pain, fever, scrotal swelling and scrotal erythema 20 days back. Wound was prepared for split skin grafting. **Both testes were surgically approximated**; y, postoperative picture after 3 weeks

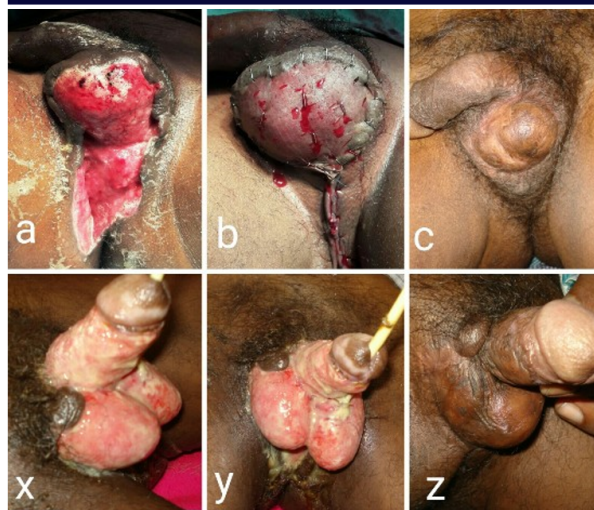


Fig. 3 Clinical pictures of 37 years old patient reported with loss of skin of **scrotum and pre-anal area**. There was history of scrotal swelling 17 days back followed by loss of skin. a, picture on the day of reporting. Surgery was done after 3 days of daily dressing. b, intraoperative picture.. Pre-anal area was closed with secondary suture. Split skin graft was harvested from thigh and applied over the scrotal raw area. c, postoperative picture at 6 months with good aesthetic result; x & y, pictures on the day of reporting of 43 years old patient with complete **loss of skin of scrotum and penile shaft**. There was history of pain, fever, erythema of genital area and peno-scrotal swelling 10 days back followed by loss of skin. Patient was alcoholic. Klebsiella species was found in the wound.. Surgery was done after 7 days of daily dressing. Split skin graft was harvested from thigh and applied over the scrotal and penile raw areas. z, postoperative picture at 6 months with acceptable result

DISCUSSION:

Fournier's gangrene is a rapidly progressive necrotizing fasciitis due to polymicrobial infection, thrombotic occlusion, and gangrene of skin, subcutaneous tissue, and musculatures of the perineal area. Name of this disease come from French venereologist - Jean Alfred Fournier. He made a report on a case of gangrene on a young man's genital area in 1883 [1, 8]. Testes are not involved due to separate blood supply [9]. Diabetes mellitus, malignancy, impaired immunity, alcoholism, inflammatory anorectal diseases, perineal trauma, and perianal abscess are the predisposing factors. This starts with weakness, fever, chill, pain and redness of the scrotal area. There is gradual increase of temperature and pain. Patient may undergo septic shock. There is appearance of swelling of perineal area followed by gangrene and loss of skin at around 6th day. The common microbiological agents in this synergistic infection are *E. coli*, *Proteus*, *Klebsiella*, *Staphylococcus*, *Streptococcus*, anaerobes and fungus.

In this study, mean age of patients was 48 years. Prohorov AV found average age 50.9 years in his study [10]. Most common predisposing factor was peri-anal abscess in our findings. Taken et al [11] also found perianal abscess and Diabetes Mellitus. Kincius et al [12] got Diabetes Mellitus. Most common microbial was *Klebsiella* in our study. Kincius et al got *Proteus Mirabilis*. In this study proper antibiotic therapy and radical debridement was done to 14 patients. Split skin grafting was done after the formation of granulation tissue. It showed very successful results. It was easy to perform, cost effective, less disabling to patient and less hospital stay. Norton K [13] also got same findings. It was also aesthetically acceptable. Izadi et al [6] found good result with skin grafting when scrotum was affected less than 50%. Akilov O et al [14] also showed acceptable results with skin grafts. Hesselfeld-Nielsen *et al.* [15] had reported scrotal reconstruction with STSG with excellent results except for the lack of cremasteric suspensory function which was taken care of easily by ordinary tight underpants. Gonzalez *et al* [16] concluded that the modality of choice for scrotal reconstruction should be split skin grafting.

CONCLUSIONS:

Fournier's gangrene is a rapidly progressive infection. Early debridement, a broad-spectrum antibiotic therapy and surgical intervention is necessary to reduce the disability and mortality. Skin grafting on a granulating raw area of scrotum is a simple, safe, cost

effective, aesthetically acceptable surgical procedure with less hospital stay. Proper testicular apposition with absorbable sutures also improved the aesthetic appearance of scrotal raphy

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