



## EFFECTIVENESS OF SINGAPORE FLAP FOR PERINEAL RECONSTRUCTION OF A FOURNIER'S GANGRENE IN A TERTIARY CARE HOSPITAL

### General Surgery

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### ABSTRACT

**Introduction:** Fournier's gangrene (FG) is an acute, rapidly progressive, and potentially fatal, infective necrotizing fasciitis affecting the external genitalia, perineal or perianal regions, which commonly affects men, but can also occur in women and children<sup>1</sup>. Scrotal raw areas are a source of morbidity and of great concern to the patients inflicted with this problem. Most of the cases of scrotal raw area are seen as a result of diabetic patients who develop Fournier's gangrene and require radical debridement. Fournier's gangrene is usually a consequence of a polymicrobial infection with *E. coli* (aerobic), bacterioids (anaerobic) and streptococci (aerobic and anaerobic)<sup>2</sup>.

**Materials and Methods:** This case series is intended to present the results of scrotal reconstruction in 3 cases of Fournier gangrene case of using Singapore flaps and it was compared with other cases to review the outcome and recommendation for future use. A total of 03 patients were included in this study. All patients were male, with total or near total scrotal defects following debridement of Fournier's gangrene. Two patients had near total scrotal defects and one patient had total scrotal defects. Bilateral pudendal thigh flaps (Singapore flaps) were used to reconstruct the scrotal defects in all cases.

**Results:** Triple antibiotic combined with radical debridement is the mainstay of treatment. There have been many advances in management of Fournier gangrene including use of vacuum assisted closure and hyperbaric oxygen therapy. Bilateral pudendal thigh flaps (Singapore flaps) is now giving promising result in such cases. The flap survival rate was found to be 100% in all cases and none of the postoperative patients required revision of the flap. At the one month postoperative visit, all patients presented with stable, viable flaps. All flaps proved to be exceptional color matches to the surrounding tissue and demonstrated excellent pain and light touch sensation. All patients reported high levels of satisfaction in regards to the esthetic appearance as well as the functionality and sensation of their new scrotum. Reconstruction of perineal defects using skin grafts, flaps, and urethral reconstruction using gracilis flaps can reduce the morbidity associated with FG and provide acceptable functional and aesthetic outcomes.

**Conclusions:** Singapore flap reconstruction is a very versatile technique and can be achieved as a single stage procedure. We have concluded that the Singapore flap is a superior choice in scrotal defect coverage and reconstruction due to the excellent clinical results as well as the patient's satisfaction in regards to the procedure outcome.

### KEYWORDS

Fournier gangrene, Singapore flap, perforator flaps, perineal reconstruction

### INTRODUCTION

Fournier's gangrene is an acute, rapidly progressive, and potentially fatal, infective necrotizing fasciitis affecting the external genitalia, perineal or perianal regions, which commonly affects men, but can also occur in women and children. There has been an increase in number of cases in recent times. Scrotal raw areas can be a source of morbidity and of great concern to the patients inflicted with such a problem. The Singapore flap, which is a pedicled pudendal fasciocutaneous flap from the thigh, is used for vaginal / scrotal reconstruction in the case of vaginal agenesis, perineal wound closure, rectovaginal fistula repair, Fournier gangrene and disorders of sexual differentiation. Possible complications include flap loss or necrosis, wound dehiscence, neovaginal stenosis or prolapse, infection, hair growth, and dyspareunia.

The aim of this retrospective study was to analyze the effectiveness of Singapore flap closure of Fournier gangrene in a Tertiary Care Hospital in a multidisciplinary 600 bedded multispecialty public hospital in Delhi NCR.

### OBJECTIVES

**The objectives of the study were :**

- Effectiveness of Singapore flap for perineal reconstruction of Fournier's Gangrene
- To suggest its use in future perineal reconstruction of Fournier's Gangrene.

### MATERIAL & METHODS

This was a retrospective cross-sectional study of Singapore flap for perineal reconstruction of Fournier's Gangrene. A total of 03 patients were included in this study. All patients were male, with total or near total scrotal defects following debridement of Fournier's gangrene (Figure 1). The patient's ages ranged from 25 to 65 years old. All the cases were managed by Wide surgical debridement of all infected tissues and a wound swab was sent for culture and sensitivity. Twice daily povidone iodine based wound dressing was done after the saline

and hydrogen peroxide wash. One patient had pseudomonas growth managed by application of 1% acetic acid soaked gauze for 5 minutes. All patients received intravenous clindamycin, which was then changed in some cases based on the sensitivity results. Surgical planning was deferred until the wound was clinically clean and the repeated wound swab did not show any bacterial growth. All cases were managed with bilateral Singapore flap (Pudendal thigh flap) which is based on the posterior scrotal artery from internal pudendal artery and innervated by the pudendal nerve and cutaneous branches from the posterior cutaneous nerve of the thigh.

The flap presented here is based on a dense network of perforating vessels of the perineal region and proximal portion of the thigh, as well as the deep branches of the internal pudendal and external pudendal arteries. It is extracted from the medial portion of the root of the thigh, with a longitudinal axis located between the ischial tuberosity and internal femoral condyle; moreover, it has an adequate size to cover the defect and allow for primary closure of the donor area.

The perforator of the flap was marked preoperatively using a hand held Doppler. It was consistently found to be located in the vicinity of the ischial tuberosity. The flap was designed in an inverted 'U' shape with length up to 15 cm and width 6-8 cm; in order to aid in the primary closure of the donor site defect. The patients were put in lithotomy position, following the preoperative marking (Figure 2).

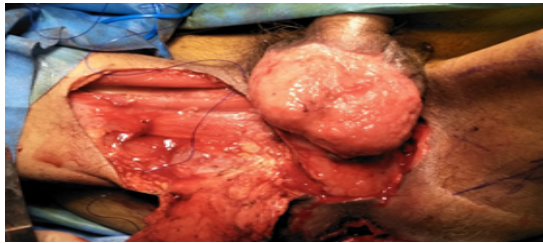


**Figure 1: Fournier gangrene**

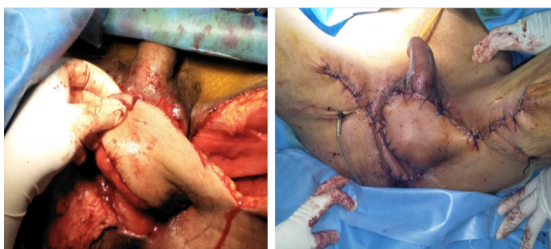
**Figure 2 : preoperative marking**

In each case, lidocaine with adrenaline solution was used for infiltration along the incision lines. The incision was made laterally and deepened to the fascia without incising it. Prior to incision of the fascia, 5 cm of dissection was performed, and then the fascia was incised and included in the flap. This was done to avoid bulkiness in the distal part of the flap.

The donor area was closed primarily in 2 layers once the flap was raised. The flap was then inset to the defect and secured in place by suturing in layers. Two closed suction drains were placed in the donor area in all cases as shown in figure 3, 4 & 5 ). On average, the drains were removed after 48 hours.



**Figure 3 : Construction of Singapore flap**



**Fig 4 & 5 : Singapore flap for perineal reconstruction of a Fournier's Gangrene**

All patients received postoperative prophylactic antibiotics in the form of intravenous cefazolin for 48 hours, followed by oral cephalexin for one week. Patients were discharged on the second or third postoperative day, and they all had their first postoperative visit in the outpatient clinic one week later.

#### RESULTS:

Surgical reconstruction of near total or total scrotal defects using the Singapore flap was done for 03 patients who underwent debridement as a treatment for Fournier's gangrene. The flap survival rate was found to be 100% in all cases and none of the postoperative patients required revision of the flap. 01 patient had mild SSI managed by culture sensitive antibiotic.

#### DISCUSSION

Fournier syndrome was described in 1883 by Jean Alfred Fournier-a French dermatologist specializing in venereal diseases-as a rapidly progressing infection of the perineum and the abdominal wall that extends to the scrotum and penis through the dartos fascia. Fournier stated that there were three characteristic findings of this syndrome: sudden onset in young and healthy males, rapid progression, and absence of a specific etiologic agent<sup>1</sup>. The etiology of this disease is controversial. Fournier originally reported cases with no known etiology. Currently, approximately 25% of the cases still remain idiopathic, although there are many predisposing factors, such as diabetes mellitus and paraphimosis<sup>2</sup>. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) is a robust laboratory measurement score capable of determining even clinically early cases of necrotizing fasciitis<sup>3</sup>. The Uludag Fournier's gangrene severity index is used to calculate severity. The pudendal thigh flap which is also known as the Singapore flap, is an excellent choice for reconstruction of major scrotal defects. It restores the scrotum with like tissue and provides excellent sensation to the neo-scrotum. The Singapore flap is based on the cutaneous vessels and results in good coverage of the scrotum. However, it has a short pedicle and does not reach the dorsal region of the penis. In this case, it is necessary to add a skin graft to the penis. The Singapore flap, which is a pedicled pudendal fasciocutaneous flap from the thigh, is used for vaginal reconstruction in the case of vaginal agenesis, perineal wound closure, rectovaginal fistula repair, and disorders of sexual differentiation. It may also be used to reconstruct

the vagina following pelvic exenteration in the case of gynecologic malignancy. Possible complications include flap loss or necrosis, wound dehiscence, neovaginal stenosis or prolapse, infection, hair growth, and dyspareunia<sup>6</sup>.

#### CONCLUSION:

Singapore flap reconstruction is a very versatile technique and can be achieved as a single stage procedure. It allows for exceptional color match and excellent sensation for both pain and light touch in the new scrotum<sup>7</sup>. The patients in this study have attested to a high level of satisfaction in regards to esthetics and functionality of the new scrotum, and therefore, we have concluded that the Singapore flap is a superior choice in scrotal defect coverage and reconstruction. The fasciocutaneous flap proposed provides easy and quick reconstruction of the cases that present with necrotizing fasciitis and that require reconstruction. Hence Effectiveness of Singapore flap for perineal reconstruction of a Fournier's Gangrene is established and it is recommended for its use in future perineal reconstruction of a Fournier's Gangrene.

**Source of Support:** Nil

**Conflict of Interest:** None

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