



# International Journal of Surgery Science

E-ISSN: 2616-3470  
P-ISSN: 2616-3462  
© Surgery Science  
www.surgeryscience.com  
2020; 4(4): 211-214  
Received: 08-08-2020  
Accepted: 04-09-2020

**Dr. Shweta R Verma**  
3<sup>rd</sup> year Resident, Department of  
General Surgery, Dr. DY Patil  
Hospital, Navi Mumbai,  
Maharashtra, India

**Dr. Anuradha Panchal**  
Professor, Department of general  
Surgery, Dr. DY Patil Hospital,  
Navi Mumbai, Maharashtra, India

**Dr. Aashay Shah**  
Assistant Professor, Department of  
General Surgery, Dr. DY Patil  
Hospital, Navi Mumbai,  
Maharashtra, India

**Dr. Chandan Singh**  
Department of general surgery  
Dr. DY Patil Hospital,  
Navi Mumbai, Maharashtra, India

**Dr. Adeel Ansari**  
2<sup>nd</sup> year Resident, Department of  
General Surgery Dr. DY Patil  
Hospital, Navi Mumbai,  
Maharashtra, India

**Dr. Raj Gautam**  
Associate Professor, Department of  
General Surgery, Dr. DY Patil  
Hospital, Navi Mumbai,  
Maharashtra, India

**Corresponding Author:**  
**Dr. Raj Gautam**  
Associate Professor, Department of  
General Surgery, Dr. DY Patil  
Hospital, Navi Mumbai,  
Maharashtra, India

## Surgical management of Fournier gangrene

**Dr. Shweta R Verma, Dr. Anuradha Panchal, Dr. Aashay Shah,  
Dr. Chandan Singh, Dr. Adeel Ansari and Dr. Raj Gautam**

DOI: <https://doi.org/10.33545/surgery.2020.v4.i4d.559>

### Abstract

**Background:** Fournier's gangrene (FG) is a debilitating type of infective necrotizing fasciitis of the perineal, genital, or perianal regions. Despite the rarity of this disease, unfavorable -prognosis related to this disease depends much on the timing of medical care. Hence; the present study was undertaken for assessing and summarizing data of surgical management of 30 patients of Fournier gangrene.

**Materials & methods:** Thirty patients who presented with clinical signs and symptoms suggestive of FG were enrolled. Emergency debridement of all the patients was carried out under the cover of broad spectrum antibiotics. Tissue samples were subjected to analysis for culture and antibiotic sensitivity testing. At the time of first debridement, hydrogen peroxide was used, followed by Eusol dressings until slough had separated. This was followed by Povidone Iodine dressings until the wound was healthy and ready for graft. Fournier's Gangrene Severity Index (FGSI) was assessed. Surgical management procedures employed were recorded separately and follow-up was done.

**Results:** Mean age of the patients was 58.4 years. Diabetes was found to be present in 66.67 percent of the patients. Mean FGSI score was found to be 3.96. Mean number of debridements was found to be 4.69. Fever, scrotal pain and headache were the most common symptoms encountered in the present study. Mean duration of hospital stay was 30.1 days. Partial thickness skin grafting was done in 36.67 percent of the cases while thigh pouch reconstruction was done in 20 percent of the cases. Secondary suturing was done in 53.33 percent of the cases. Multiple additional incisions on inguinal region and psoas for draining abscess were done in 12 patients. Mortality was nil in the present study.

**Conclusion:** Adequate debridement along with surgical therapy results in significant favorable outcome in FG patients. Also, mortality can be significantly reduced by achieving with rapid diagnosis and carrying out urgent surgical debridement of all necrotic tissues under cover of adequate antimicrobial therapy.

**Keywords:** Debridement, Fournier Gangrene, Necrotizing

### Introduction

Fournier's gangrene (FG) is a debilitating type of infective necrotizing fasciitis of the perineal, genital, or perianal regions, which routinely commonly affects males, but can also occur in females and children <sup>[1, 2]</sup> Despite of the fact that this pathology is eponymously credited to the Parisian venerologist Jean- Alfred Fournier, who described it as a fulminant gangrene of the penis and scrotum in young men, Baurienne in 1764 and Avicenna in 1877 had enumerated the same disease earlier. With the passage of time, many terminologies have been used to designate this clinical entity including idiopathic gangrene of the scrotum, periurethral phlegmon, streptococcal scrotal gangrene, phagedena, and synergistic necrotising cellulitis <sup>[2-4]</sup>.

Diagnosis is based on clinical signs and physical examination. Radiological methods may help to delineate the extent of the disease but false negatives may happen. Despite the rarity of this disease, unfavorable -prognosis related to this disease depends much on the timing of medical care. The treatment delay is accompanied by a high lethality, reaching 90%, due to the development of septic shock and its associated complications.<sup>5</sup> Hence; the present study was undertaken for assessing and summarizing data of surgical management of 30 patients of Fournier gangrene.

### Materials & methods

The present study was commenced in the department of general surgery of the medical institute and it includes assessment of data of surgical management of 30 patients of Fournier gangrene. All the patients who presented with clinical signs and symptoms suggestive of FG were enrolled

in the present study. Complete demographic and clinical details of all the patients were recorded. Blood samples were obtained and complete hematological and biochemical analysis of all the patients was carried out. Emergency debridement of all the patients was carried out under the cover of broad spectrum antibiotics. Tissue samples were subjected to analysis for culture

and antibiotic sensitivity testing. At the time of first debridement, hydrogen peroxide was used, followed by Eusol dressings until slough had separated. This was followed by Povidone Iodine dressings until the wound was healthy and ready for graft. Fournier's Gangrene Severity Index (FGSI) was assessed based on criteria previously described in literature [6].

Physiological variables	High abnormal values			Normal values			Low abnormal values		
Assigned numerical score	4+	3+	2+	1+	0	1+	2+	3+	4+
Temperature °C	>41	39-40.9	-	38.5-38.9	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Heart rate	>180	140-179	110-139	-	70-109	-	56-59	40-54	<39
Respiratory rate	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum sodium (mmol/l)	>180	160-179	155-159	150-154	130-149	-	120-129	111-119	<110
Serum potassium (mmol/l)	>7	6-6.9	-	5.5-5.4	3.5-4	3-3.4	2.5-2.9	-	<2.5
Serum creatinine (mg/100 ml)	>3	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Haematocrit %	>60	-	50-59.9	46-49	30-45.9	-	20-29.9	-	<20
Leukocytes (total/mm <sup>3</sup> ×1000)	>40	-	20-39.9	15-19.9	3-14.9	-	-	1-2.9	-
<1 Serum bicarbonate	>52	41-51.9	-	32-40.9	22-31.9	-	18-21.9	15-17.9	<15 (venous, mmol/l)

Surgical management procedures employed were recorded separately and follow-up was done. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Univariate regression was used for evaluating the level of significance.



**Fig 1:** Preoperative image of Fournier gangrene with perianal abscess



**Fig 2:** Postoperative image



**Fig 3:** After meticulous dressing



**Fig 4:** After dressing with eusol

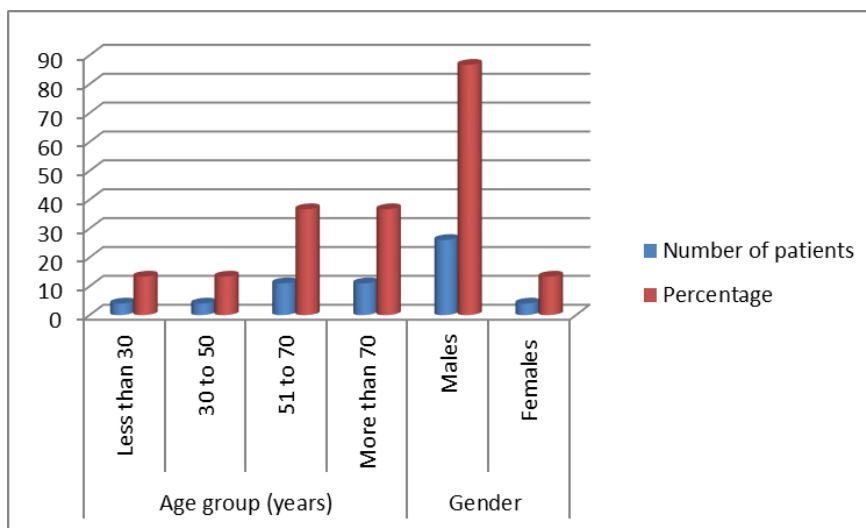


**Fig 5:** After VAC dressing

**Results**

In the present study, a total of 30 patients of FG were enrolled. Mean age of the patients was 58.4 years. Majority of the patients (73.34%) belonged to the age group of more than 50 years. Majority of the patients were males. Mean duration of the disease was 4.92 days. Diabetes was found to be present in 66.67 percent of the patients. Mean FGSI score was found to be 3.96. Mean number of debridements was found to be 4.69. Fever, scrotal pain and headache were the most common symptoms encountered in the present study. Mean duration of hospital stay was 30.1 days. Partial thickness skin grafting was done in 36.67 percent of the cases while thigh pouch reconstruction was done in 20 percent of the cases. Secondary suturing was done in 53.33 percent of the cases. Multiple additional incisions on inguinal region and psoas for draining abscess were done in 12 patients. Mortality was nil in the present study.

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**Graph 1: Demographic data**

**Table 1: Duration of disease**

Duration of disease	Number (days)
Mean	4.91
SD	1.36

**Table 2: Distribution of patients according to diabetic status**

Diabetic status	Number of patients	Percentage
Diabetic	20	66.67
Non-diabetic	10	33.33

**Table 3: Clinical presentation**

Clinical presentation	Number of patients	Percentage
Increase in scrotal volume	8	26.67
Fever	19	63.33
Localized pain	17	56.67
Headache	14	46.67
Pruritus	9	30
Nausea and vomiting	7	23.33
Sacral ulcer	8	26.67

**Table 4: Surgical parameters**

Parameters	Number of patients	Percentage
Number of debridements (Mean ± SD)	4.69 ± 0.96	
Duration of Hospital stay (Mean ± SD)	30.1 ± 12.8	
Operative procedure	Partial thickness skin grafting	11 / 36.67
	Thigh pouch reconstruction	6 / 20
	Delayed primary suturing	7 / 23.33
	Secondary suturing	16 / 53.33
Multiple additional incisions on inguinal region and psoas for draining abscess	12	40

**Discussion**

Fournier’s gangrene is a rare, necrotising fasciitis of the external genitalia, perineal or perianal regions. The disease has a higher incidence in males and risk factors for development include diabetes, HIV, alcoholism and other immune-compromised states. Early surgical debridement of necrotic tissues and antibiotics are fundamental in the treatment of FG. Despite advanced management mortality is still high and averages 20%–30% [7-9]. Hence; the present study was undertaken for assessing and summarizing data of surgical management of 30 patients of Fournier gangrene.

In the present study, mean age of the patients was 58.4 years. 73.34% of the patients belonged to the age group of more than 50 years. Majority of the patients were males. Mean duration of the disease was 4.92 days. Diabetes was found to be present in 66.67 percent of the patients. Several authors state that the most important parameters that predict outcome of FG are hemostatic abnormalities at presentation with this disease and renal failure (Ersoz F *et al*, Laor J *et al*). Diabetes mellitus is reported to be present in 20–70% of patients with FG and chronic alcoholism in 25–50% of FG patients, with some authors reporting increased mortality in patients with diabetes (Yanar H *et al*, Mallikarjuna MN *et al*) [7-10]

In the present study, fever, scrotal pain and headache were the most common symptoms encountered in the present study. Our results were in concordance with the results obtained by previous authors who also reported similar findings. Ferreira and colleagues reviewed 43 cases and found the most common presentations were scrotal swelling, fever and pain. In another review of 70 patients, Ersay and colleagues found the most common presentation was perianal/scrotal pain (79%) followed by tachycardia (61%), purulent discharge from the perineum (60%), crepitus (54%) and fever (41%) (Ersay *et al* 2007; Mallikarjuna *et al* 2012). Crepitus of the inflamed tissues is a common feature due to the presence of gas-forming organisms.

As the subcutaneous inflammation worsens, necrosis and suppuration of subcutaneous tissues progresses to extensive necrosis. Patients can rapidly deteriorate as sepsis and multiorgan failure, the most common cause of death in these cases, develop<sup>[11-14]</sup>. Fournier gangrene is a true urological emergency. The disease process is managed with both surgical interventions and medical resuscitation as patients will often be septic. Medical intervention revolves around the initiation of empiric broad-spectrum antibiotics while awaiting culture sensitivities. Surgical intervention is predicated on radical, wide resection of necrotic, gangrenous tissue. The time of presentation to surgical intervention has had associations with improved prognosis; therefore, efforts should be made to minimize this time. Surgical debridement is based on the separation of the skin and subcutaneous tissue with debridement halting when the skin and subcutaneous tissue can no longer be easily separated<sup>[13, 15]</sup>.

In the present study, Mean FGSI score was found to be 3.96. Mean number of debridements was found to be 4.69. Mean duration of hospital stay was 30.1 days. In a previous study conducted by Oguz A *et al*, authors presented clinical experience of 43 patients with FG treatment. Mean FGSI was lower in survivors in comparison with nonsurvivors. They conclude that FGSI is an important predictor in the prognosis of FG. Vacuum-assisted closure (VAC) should be performed in compliant patients in order to enhance patient comfort by reducing pain and the number of dressings<sup>[16]</sup>.

In the present study, Partial thickness skin grafting was done in 36.67 percent of the cases while thigh pouch reconstruction was done in 20 percent of the cases. Secondary suturing was done in 53.33 percent of the cases. Multiple additional incisions on inguinal region and psoas for draining abscess were done in 12 patients. Mortality was nil in the present study. The basis of treatment is an early and aggressive radical action with surgical debridement, as has been documented that once it establishes this gas gangrene often advance to 1cm for hours, so that once the diagnosis is essential to the surgical debridement and as early as the Fournier's gangrene is dynamic sometimes you cannot remove 100% of the necrotic tissue with the first debridement, for this to be very aggressive so it is not uncommon for patients requiring more a surgical debridement before being considered as resolved infection<sup>[15-17]</sup>.

Our results were also in concordance with the results obtained by Kuzaka B *et al* who reported analysis of management of 13 cases of Fournier's gangrene. They concluded that favorable outcome of FG treatment with low morbidity and no mortality can be achieved with rapid diagnosis, urgent surgical debridement of all necrotic tissues, and broad-spectrum empirical antimicrobial therapy, usually with combined antibiotics, against aerobic and anaerobic bacteria.<sup>18</sup> In addition to broad-spectrum parental antibiotics, early and aggressive surgical debridement has been shown to improve survival in patients presenting with FG as patients often undergo more than one debridement during their hospitalization [Corman *et al*. 1999; Chawla *et al*. 200]<sup>[15, 19]</sup>. Oymacı E *et al* reviewed the diagnostic and treatment methods that effect mortality in sixteen patients with Fournier's gangrene. The mean Fournier's gangrene severity index (FGSI) of surviving patients was  $3.84 \pm 1.77$ , and  $7.66 \pm 0.57$  in fatal cases. The mean length of hospital stay was 25.5 days (2-57) and duration of hospitalization was significantly longer in survivors. The delay in diagnosis and higher FGSI may be responsible for worsening of prognosis and mortality in Fournier's gangrene<sup>[6]</sup>.

## Conclusion

From the above results, the authors concluded that adequate debridement along with surgical therapy results in significant favorable outcome in FG patients. Also, mortality can be significantly reduced by achieving with rapid diagnosis and carrying out urgent surgical debridement of all necrotic tissues under cover of adequate antimicrobial therapy. However; further studies are recommended.

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