

## The Role of Fournier's Gangrene Severity Index as a Predictor of outcome and a Tool for Optimum Management of Patients with Fournier's Gangrene : A Prospective Clinical Study at a Tertiary Care Center

Rohan Khandelwal

Consultant - Onco-plastic Breast Surgeon, W Pratiksha Hospital, Golf Course Extension Road, Sushant Lok Phase 2, Sector 56, Haryana 122002.

### Abstract

**Background:** Fournier's gangrene is a potentially fatal acute, necrotizing fasciitis of the scrotum and perineal region associated with a synergistic bacterial infection of the subcutaneous fat and superficial fascia with a mortality rates ranging from 20-30%. **Aims and objectives:** The study was carried out with the objective to assess the role of Fournier's gangrene severity index (FGSI) as a predictor of outcome in patients with Fournier's gangrene. **Materials and Methods:** A prospective study was carried out on 54 consecutive male Fournier's gangrene cases. The data was collected in the Department of Surgery, Vardhman Mahavir Medical College, Safdarjung Hospital. All patients were treated with broad spectrum antibiotics and serial surgical debridements. **Results:** Age of the patients varied from 27 yrs to 62 yrs with the mean duration of stay being 19.6 days. Mortality rate observed in our study was 17(31.5%) out of the 54. 38.9%(21) of the cases were diabetic and 51.9%(28) were alcoholics. 22(40.7%) cases had no significant history before the development of the disease, whereas 32(59.3%) had some predisposing condition prior to onset of gangrene. Majority of our patients 24(44.4%) had a polymicrobial infection with *Pseudomonas aeruginosa* 11(20.4%) being the next most common organism. The Fournier's gangrene severity index score in the survivors (n=37) varied from a score of 1 to 7 compared to the non survivors in whom it was more than 7. All 17 cases who succumbed to the disease had an average Fournier's gangrene severity index score of 9.4 (Range: 8-18) at the time of admission. The average FGSI score in the survivors was 3.8 (Range 0-7). **Conclusions:** Fournier's

gangrene still persists in our country and is a lethal condition, if not treated early and energetically. Diabetics are more susceptible to developing the disease and more often than not there is a definite predisposing factor before the onset of disease. Most of the cases have poly-microbial infection and some secondarily get infected by hospital acquired organisms. Fournier's gangrene severity index is a simplified way of comparing patients with the disease and also has significance in predicting outcome and guiding management.

### Background

Fournier's gangrene is an uncommon, rapidly progressive infection of the male genital, perineal and perianal regions with occasional extension to the abdominal wall. It is characterized by a synergistic, necrotising fasciitis leading to the thrombotic occlusion of small subcutaneous vessels and the development of gangrene, which contributes to the rapid spread of infection [1]. Majority of patients with Fournier's gangrene are immuno-compromised [2]. Diabetes Mellitus, obesity, peripheral vascular disease, local trauma, urethral stricture and perianal disease have been cited as the main predisposing factors [3-5].

Fournier's gangrene is a life threatening illness requiring emergency surgery, despite which the patient may still not survive. Mortality rates as high as 20 to 30 percent have been described in some studies [3]. Certain factors influencing the survival of these patients, primarily relating to the patient's metabolic status and the extent of the disease, were evaluated by Laor *et al.* from which the Fournier's gangrene severity index (FGSI) was formulated [6]. In FGSI, nine parameters are measured and the degree of deviation from normal is graded from 0 to 4. The individual values are summed to obtain the FGSI score (FGSIS). These parameters are: temperature, heart rate,

**Corresponding Author: Rohan Khandelwal**, Consultant - Onco-plastic Breast Surgeon, W Pratiksha Hospital, Golf Course Extension Road, Sushant Lok Phase 2, Sector 56, Haryana 122002.

E-mail: [rohankhandelwal@gmail.com](mailto:rohankhandelwal@gmail.com)

respiratory rate, levels of serum sodium, potassium, creatinine and bicarbonate, haematocrit and leukocyte count. In a study by Yeniyol *et al.* the accuracy of this index was tested. They found that the duration of symptoms before presentation was statistically important [4]. Out of the nine parameters, temperature, heart rate and respiratory rate were considered to be the most important by these authors. In patients who died, however, all the parameters were abnormal. The authors also found that lower serum albumin and total protein levels indicated the degree of debilitation and a poor prognosis. Lin E,

Yang S, et al. suggested that a FGSI cutoff of 9 was an excellent predictor of outcome of cases [7]. However, early diagnosis and treatment and the arrest of the gangrene at an early stage markedly improve outcome. A study carried out by Tuncel et al. on 20 Fournier's gangrene patients concluded that FGSI did not predict the disease severity and the patient survival.

There is lack of Indian literature on the use of Fournier's Gangrene Severity Index as a prognostic marker in cases.

**Table 1:** Fournier's Gangrene Severity Index Parameters

Physiologic Variables	High abnormal values				Normal 0	Low Abnormal Values			
	+4	+3	+2	+1		+1	+2	+3	+4
Temperature(c)	>41	39-40.9	-	38.5-39	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Heart Rate	>180	140-179	110-139	-	70-109	-	55-69	40-54	<39
Respiratory rate	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum sodium (mmol/L)	>180	160-179	266-159	350-354	130-149	-	120-129	111-119	<110
Serum Potassium (mmol/L)	>7	6-6.9	-	5.5-5.9	3.5-5.4	3-3.4	2.5-2.9	-	<3.5
Serum Creatinine(mg/100/ml*2 for acute renal failure)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Hematocrit	>60	-	50-59.9	46-49.9	30-45.9	-	20-29.9	-	<20
WBC(total/mm*1000)	>40	-	20-39.9	15-19.9	3-14.9	-	1-2.9	-	<1
Serum bicarbonate(venous, mmol/l)	>52	41-51.9	-	32-40.9	22-31.9	-	18-21.9	15-17.9	<15

## Aims and Objectives

The study was carried out with the objective to assess the role of Fournier's gangrene severity index (FGSI) as a predictor of outcome in patients with Fournier's gangrene.

## Materials and Methods

A prospective study was carried out on 54 consecutive male Fournier's gangrene cases at the Department of Surgery, Vardhman Mahavir Medical College, Safdarjang Hospital. After taking an informed consent from the patient, detailed history and physical examination were recorded. The duration of the study was one year. The diagnosis of Fournier's gangrene was made by the attending physician. The site, extent and origin of the ulcers were documented. Foci of infection in their perineum and anorectal regions were sought. All patients were treated with empirical broad spectrum antibiotics (combination of a 3<sup>rd</sup> generation cephalosporin, an aminoglycoside & metronidazole or clindamycin) and serial surgical debridements. Initial debridement was carried out under general or regional anesthesia followed by serial bed side debridements under sedation. Urinary and fecal diversion was carried out

in patients with urethral and anal involvement. Tissue and swabs for culture were sent in an appropriate manner before starting the patients on antibiotics. Anaerobic cultures were not sent. After receiving the culture sensitivity reports, antibiotics were changed accordingly. FGSI was calculated in all the patients at the time of admission.

## Results

The age of the patients varied from 27 yrs to 62 yrs (mean 46.3 yrs). The mean duration of hospital stay was 19.6 days (Range: 5-31 days). 17(31.5%) out of the 54 patients succumbed to the disease. 38.9%(21) of the cases were diabetic and 51.9%(28) were alcoholics. 9 patients (16.7%) had a history of predisposing perineal or rectal abscess, 6(11.1%) had a history of burning micturition, 6(11.1%) cases had a history of urethral instrumentation prior to the development of symptoms, 5 (9.3%) had a history of perineal itching prior to the development of the gangrene, 3(5.6%) had a history of hemorrhoid surgery prior to development of symptoms and 3 case (5.6%) had a history of hydrocele operation before the onset of disease. The rest of the 22(40.7%) cases had no significant history before the development of the disease. 29(53.7%) patients required urinary diversion along with 11(20.3%) patients who required

fecal diversion (colostomy). No orchidectomies were carried out during debridements.

24 (44.4%) had a polymicrobial infection, 11 (20.4%) had *Pseudomonas aeruginosa*, 7(12.9%) had *Klebsiella* species, 5(9.3%) had *Proteus mirabilis* and 7(12.9%) cases had contaminants in the cultures. In 23(42.5%) patients the antibiotics were changed based on the culture sensitivity reports.

The Fournier's gangrene severity index score in the survivors (n=37) varied from a score of 1 to 7 compared to the non survivors in whom it was more than 7. All 17 cases who succumbed to the disease had an average Fournier's gangrene severity index score of 9.4 (Range: 8-18) at the time of admission. The average FGSI score in the survivors was 3.8 (Range 0-7).

### Review of Literature

Study	Country	N	Mortality Rate	Mean duration of Hospitalization (days)
Present Study (2009)	India	54	31.5%	19.6
Tuncel et al. (2006) [8]	Turkey	20	30%	-
Brissiaud et al. (1998) [9]	Senegal	44	34%	42
Clayton et al. (1990) [10]	Chicago	57	18%	48
Hosseini et al. (2006) [11]	Iran	12	16.7%	24.9
Picramenos et al. (1995) [12]	Greece	10	30%	38
Corcoran et al. (2008) [13]	USA	68	10%	

### Conclusions

Fournier's gangrene is still a life threatening disease requiring early diagnosis and aggressive management. Diabetics are more prone to suffer from Fournier's gangrene and most of the cases (59.3%) have a predisposing event before the onset of the disease. The cases have either polymicrobial infection (44.4%) or get secondarily infected from hospital acquired organisms. The Fournier's gangrene severity index is an easy score to calculate at the time of admission can help determine the prognosis and hospital course of a case.

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