International Surgery Journal
Syed TK et al. Int Surg J. 2019 Dec;6(12):4397-4401
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20195401

Original Research Article

Emergency management and it's effect on clinical profile of Fournier's gangrene in patients presenting at a rural setup

Tausif Kamal Syed[1]*, Dilip K. Apturkar[2], K. N. Dandekar[2]

[1]Departament of surgery, Al-Ameen medical college, Vijaypura, Karnataka, India
[2]Departament of Surgery, Pravara Rural medical college, Loni, Ahmednagar, India

Received: 25 September 2019
Revised: 20 November 2019
Accepted: 21 November 2019

***Correspondence:**
Dr. Tausif Syed Kamal,
E-mail: tausifsyedkamal@gmail.com

ABSTRACT

Background: Fournier's gangrene (FG) is a rare, rapidly progressive, necrotizing fasciitis of the external genitalia and perineum, leading to soft-tissue necrosis. Despite antibiotics and aggressive debridement, the mortality rate of FG remains high. This study describes our experiences in the management of FG and identifies prognostic factors.
Methods: It is a descriptive prospective study in 71 patients with FG treated at Pravara Rural Medical College and Hospital, Loni, who presented between September 2013 and September 2015.
Results: In the present series of 71 patients, 57% were between 50-70 yrs. UTI and alcohol consumption being most common co-morbid conditions and scrotal abscess (53.52%) being the most common presentation. Serum creatinine (p value 0.0008), total leucocyte count at presentation (p value 0.004) had a significant association with duration of recovery. The mean duration of stay was 16.08±3.28 days with a median of 15 days. The Fournier gangrene severity index score calculated was <9 in 59.15% of patients, and >9 in the remaining ≈40% with a mean of 8.309±3.49. A single mortality was recorded during our study.
Conclusions: Serum creatinine and total leucocyte count at presentation could play a pivotal role in not only initial emergency management but also as factors for monitoring the progress of treatment.

Keywords: Fournier's gangrene, Index, Fournier profile, Fournier gangrene severity index, Necrotising fascitis

INTRODUCTION

Fournier's gangrene (FG) is a fulminant form of infective necrotising fascitis of the perineal, genital, or perianal regions, which commonly affects men, but can also occur in women and children.[1,2]

Although originally thought to be an idiopathic process, the nidus is usually located in the genitourinary tract, lower gastrointestinal tract, or skin (Table 1). FG has been shown to have a predilection for patients with diabetes as well as long term alcohol misuse (Table 2); however, it can also affect patients with non-obvious immune compromise.[3,4] FG is a mixed infection caused by both aerobic and anaerobic bacteria flora.[4] The development and progression of the gangrene is often fulminating and can rapidly cause multiple organ failure and death. Because of potential complications, it is important to diagnose the disease process as early as possible. Although antibiotics and aggressive debridement have been broadly accepted as the standard treatment, the death rate remains high.

The study was done with the objective to study the clinical profile of FG, to study the effectiveness of Fournier gangrene severity index (FGSI) score at presentation as a prognostic tool and to study the individual variables of FGSI and their effectiveness in guiding treatment and prognosis.

Table 1. Common causes of FG.

Aetiology of FG	
Urology	**Anorectal**
• Urethral stricture • Indwelling catheter • Traumatic catheterisation • Urethral calculi • Prostatic biopsy • Vasectomy • Insertion of penile prosthesis • TVT procedure • Hydrocele aspiration • Delayed rupture of ileal neobladder • Intracavernosal cocaine injection • Genital piercing • Perineal trauma	• Perianal abscess • Rectal biopsy • Anal dilatation • Haemorrhoidectomy • Rectosigmoid malignancy • Appendicitis • Diverticulitis **Gynaecological** • Infected Bartholin's gland • Septic abortion • Episiotomy wound • Coital injury • Genital mutilation

Table 2: Co morbid factors for the development of FG.

Co morbid factors
Diabetes
Alcohol misuse
Immunosuppression
Chemotherapy
Chronic cortiosteroid use
HIV
Leukaemia
Liver disease
Debilitating illness

METHODS

The following study was carried out as an observational longitudinal study over a period of two years in patients presenting to Pravara Rural Hospital and diagnosed as suffering from FG during the period from September 2013 to September 2015. Measures of central tendency were used to analyze the quantitative data and multi-linear regression analysis for the qualitative data.

Patients diagnosed with FG are included in the study and Patients not suffering from FG were excluded.

Procedure

All male patients presenting to Pravara Rural Hospital irrespective of ages and diagnosed to have Fournier's gangrene on clinical signs and symptoms were included in the study. Patients were evaluated on clinical and serological basis to calculate the FGSI. The FGSI is a modification of the Acute Physiology and Chronic Health Evaluation II (APACHE) severity score (Table 3).[5]

The laboratory investigations were done for all patients that includes hemoglobin, hematocrit, TLC count, Serum electrolytes (Na+ and K+), renal function tests, liver function tests, urine routine microscopy, X-ray chest PA, X-ray abdomen erect, ultrasonogram of abdomen and pelvis and arterial blood gas analysis.

On the basis clinical signs and laboratory investigations FGSI score was applied to each case, and was subsequent scoring was carried out on post-op day 1, 3, 6 and so on until the day of discharge.

Patients required debridement of infected tissue and written/verbal/informed consent taken for the same. Pus and infected tissue were sent for culture and sensitivity.

Patients were started on empirical antibiotic regimen consisting of Amoxicillin clavulanate and Metronidazole for coverage of aerobic and anaerobic organisms. Fluid resuscitation with crystalloids was adequately done and urinary catheter was inserted in all the patients. Patients presenting with signs of sepsis, i.e., tachycardia >90, tachypnea >24, temperature >39 °C, TLC >12000 or <4000 were given on higher antibiotics like Piperacillin and Tazobactum/ Meropenem, with Metronidazole retaining its use for anaerobic coverage.

Debridement of all the infected tissue was done, subsequently twice daily dressings with periodic local de-sloughing was done. In all cases prior to the dressing the patients were given sitz bath with EUSOL. Wounds were thoroughly cleaned with hydrogen peroxide and povidone-iodine solution. Dressing was done with medicated paraffin gauzes.

Patients having co-morbidities such as Diabetes, acute renal failure, hypertension, hepatic dysfunction were managed accordingly.

Once granulation was noticed over the wounds the frequency of dressings was reduced to once daily with minimal use of hydrogen peroxide. Wounds achieving contraction between 50%-70% of original size were closed by secondary suturing or pouching, split skin grafts) for loss of skin over penile shaft (in two cases) was also done. Wounds with contraction of more than 70% of original size were allowed to heal primarily.

Throughout the course of treatment patients were evaluated clinically and serologically to calculate the FGSI until the day of discharge. Antibiotics were either changed or continued, as per sensitivity. Once the patients improved in their general condition with adequate healing of the wounds, patients were discharged and called on later date for follow up and suture removal in cases of secondary suturing.

Table 3: FGSI scoring table.

Physiological variables	+4	+3	+2	+1	0	+1	+2	+3	+4
Temperature (^{o}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 (BPM)	>180	140-179	110-139	-	70-109	-	55-69	40-54	139
Respiratory rate	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum K+ (mmol/l)	>7	6-6.9	-	5.5-5.9	3.5-5.4	3-3.4	2.5-2.9	-	<2.5
Serum Na+ (mmol/l)	>180	160-179	155-159	150-154	130-149	-	120-129	110-119	<110
Serum creatinine (mg/dl)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Hematocrit (%)	>60	-	50-59	46-49	30-45	-	20-29		<20
WBC ($\times10^3$ cells/mm^3)	>40	-	20-39.9	15-19.9	3-14.9	-	1-2.9		<1
Serum bicarbonate (venous)(mmol/l)	>52	41-51	-	32-40	22-31	-	18-21	15-17	<15

Statistical analysis

Measures of central tendency were used along with multiple linear regression analysis to evaluate the association between the variables and the outcome. The outcome being, number of days required for a patient to discharge.

RESULTS

In the present series of 71 patients, 57% were between 50-70 yrs, with UTI and alcohol consumption being most common co-morbid conditions and scrotal abscess (53.52%) being the most common presentation (Table 4).

Table 4: Causes of FG.

Genitourinary causes	Ano-rectal
Scrotal abscess (53.52%)	Peri-anal abscess (2.81%)
Urinary catheterisation (28.16%)	Ischiorectal abscess (5.63%)
Penile abscess (2.81%)	

The mean duration of onset before presentation was 8.84±2.93 days. The mean duration of stay was 16.08±3.28 days with a median of 15 days. The FGSI score calculated was <9 in 59.15% of patients, and >9 in the remaining ≈40% with a mean of 8.309±3.49. One patient died during the course of the study. Significant association was observed between Serum Creatinine, total leukocyte count and the duration of recovery, (p values 0.0008 and 0.004 respectively).

Table 5: Clinical and laboratory variables for survivors v/s deceased.

Variables	Mean (total)	Survivors (n=70)	Died (n=1)
FGSI	8.309±3.49	8.17 ±3.32	18
Age (yrs)	54±15.5	53.88±15.6	62
Temperature(^{o}C)	38.9±0.609	38.9±0.613	39
Heart rate	108±8.46	107.7±7.929	134
Respiratory rate	28.7±3.46	28.6 ±3.43	34
Serum K^+ (mmol/l)	4.42±0.744	4.4±0.725	6
Serum Na+ (mmol/l)	137.33±5.63	137.17±5.49	149
Serum creatinine (mg/dl)	1.585±0.406	1.56 ±0.38	2.8
Hematocrit	37.14±6.23	36.9 ±6.08	52
Total leucocytes count ($\times10^3$ cells/mm^3)	14.7±7.58	14.38±7.14	37
Serum bicarbonate (mmol/l)	17.8±2.35	17.85±2.36	16

DISCUSSION

FG, a necrotizing fasciitis of the male genitourinary tract was described in 1883 in five young men, with no apparent causal factor.[1] Since the initial publication the reported age of onset of FG has increased.

The present study was a single centre study with a single mortality among the subjects. Due to it being a single center study the causal factors were limited in their

spectrum. The single mortality recorded meant that we could not evaluate the predictive factors of mortality.

Although FG is predominantly a condition of elderly men, it can occur at any age, and ≈10% cases occur in females.[6] In the present study minimum age is 18 years with a maximum being 82 years. The mean age is 54 years and about 57% of them were in the age group of 50-70 yrs. Marco et al recorded a mean age of 59.2 years in their study. The mean age is comparable to the studies by Benjelloun et al and Spirnak et al in which the mean age was 54.5 years.[8,9]

In some studies, the mean ages were 55.8–63.5 years.[5,10-13] The reported age of patients with FG has progressively increased, from 40 years in the 1940s, 51 years in the 1950s and 55 years in the 1980s.[5,14] The median age of the present survivors (53.88 years) was significantly lower to the patient who died (62 years). Clayton et al and Laor et al found that patients who survived were significantly younger than those who died; conversely, other studies did not find such differences.[3,5,10,12]

The etiology of the disease varies and can be grouped in two categories, namely genitor-urinary and ano-rectal. In our series genitor-urinary causes were found to be predominant (84.49%) with scrotal abscess being the lead cause in 38 (53.52%) patients, followed by Urinary tract infections leading to peri-uretheral abscess being observed in 20 (28.16%) patients. Ano-rectal infections such as peri-anal abscess and ischiorectal abscess were also found in two (2.81%) and four (5.63%) patients respectively.

The clinical presentation of the disease starts with a prodromal period of genital discomfort or pruritis, followed by genital erythema, swelling. In our series the mean duration of onset was 8.84±2.93 days, nine (12.67%) patients presented early with an onset of 1-5 days from the time of presentation. These had localised infection at the site of portal of entry, while the ones presenting late; 47 (66.19%) between 6-10 days and 15 (21.12%) between 11-15 days, had a more established infection and spreading gangrene of the skin and subcutaneous tissue. Crepitus on presentation was present in two patients with only one of them returning a positive culture for *Clostridium* species.

All the patients were observed to have fever on presentation with 66.19% having temperatures between 38.9-39.9 ^{0}C and remaining having temperatures between 38-38.8 ^{0}C. Serum sodium and potassium were observed to be normal in majority 90.14% and 84.5% patients respectively. Mean serum sodium was observed to be 137.33±5.63 and potassium 4.42±0.744. Similarly, low serum bicarbonate levels on presentation were observed in 63patients (≈90%), which indicated presence of acidosis and gradual improvement in the parameter was noticed over the period. Although Marco et al observed low sodium and bicarbonate levels were associated with death.[7] However in our series serum sodium and serum bicarbonate levels were not observed to be of any significant impact on the recovery of patients (p values 0.29 and 0.9 respectively).

Renal functions were deranged in 77.42% with a mean serum creatinine of 1.585±0.406 on presentation, 7% of which had a serum creatinine of over 2 mg/dl. In our series serum creatinine had a significant association with the prognosis and recovery from the disease (p value 0.0008).

Sepsis at presentation was found in 66.1% of the patients. However, only one patient among them had accompanied septic shock and needed mechanical ventilation, who ultimately succumbed to the rapidly progressing infection with deteriorating vital functions and multi-organ failure.

Aggressive fluid resuscitation with specific therapy and higher antibiotics was needed in all the patients presenting with sepsis. FGSI was found to be higher in patients presenting in sepsis since the variables involved in the evaluation were also the factors affecting the score itself. Ultimately, occurrence of septic shock and need for postoperative mechanical ventilation, have been demonstrated as a powerful (even late) factors of mortality.[14,15]

Although FGSI did not show any direct correlation with mortality or length of hospital stay, it was observed that rate of improvement in the score indicated towards prognosis of the disease. In the present study, the mean FGSI on presentation was 8±3.49 for survivors and 18 for the lone mortality. 33.8% patients had an FGSI of 9-15 and 7% had >15. While Laor et al reported that a severity index above 9 indicates a 75% mortality probability, while under 9 indicates a 78% survival probability, in our series we observed a 100% recovery in the range of FGSI of <9 and 9-15.[5] There was a mortality of 1.4% among patients with FGSI >15 (Table 5).

In this series we observed that the FGSI on presentation had no significant relation to the duration of hospital stay, r (69) =0.217, p=0.06. The mean duration of hospital stay was 16.08±3.28 days with a median of 15 days. Although the combined score of FGSI variables was considered for initial evaluation, during the course of the study we observed only serum creatinine (p value 0.0008), total leukocyte count at presentation (p value 0.004) had a significant association with the duration of stay and recovery.

Antibiotic sensitivity patterns showed an amoxicillin-clavulanate as the most sensitive in 74.68% cases, however, amikacin (67.6%), gentamicin (52.11%), meropenem (50.7%) were also observed to be effective.

Co-morbidities pose an additional threat in patients suffering from FG. Diabetes mellitus has been found in

many studies as the leading co-morbid condition; however, in our series it constituted only 5.63% of the cases. Alcohol abuse and urinary conditions (78.87%) pre-dominated while 77.42% patients presented in renal failure. Immune-compromised status was observed in 2.81% of cases.

CONCLUSION

Serum creatinine and total leukocyte count at presentation could play a pivotal role in not only initial emergency management but also as factors for monitoring the progress of treatment.

ACKNOWLEDGEMENTS

Authors would like to thanks Dr. P. K. Baviskar, Dr. Mrs Meena H. Shaikh for the valuable inputs during the study. Dr. G. J. Jorwekar for guidance during drafting of manuscript.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Fournier JA. Gangrene foudroyante de la verge. Semin Med. 1883;3:345.
2. Mallikarjuna MN, Vijayakumar A, Patil VS, Shivswamy BS. Fournier's gangrene: current practices. ISRN Surg. 2012;2012.
3. Clayton MD, Fowler JJ, Sharifi RO, Pearl RK. Causes, presentation and survival of fifty-seven patients with necrotizing fasciitis of the male genitalia. Surgery, Gynecol Obstetr. 1990;170(1):49-55.
4. Thwaini A, Khan A, Malik A, Cherian J, Barua J, Shergill I, Mammen K. Fournier's gangrene and its emergency management. Postgraduate Med J. 2006;82(970):516-9.
5. Laor E, Palmer LS, Tolia BM, Reid RE, Winter HI. Outcome prediction in patients with Fournier's gangrene. J Urol. 1995;154(1):89-92.
6. Eke N. Fournier's gangrene: a review of 1726 cases. Br J Surg. 2000;87(6):718-28.
7. Luján Marco S, Budía A, Di Capua C, Broseta E, Cruz FJ. Evaluation of a severity score to predict the prognosis of Fournier's gangrene. BJU Intern. 2010;106(3):373-6.
8. Benjelloun EB, Souiki T, Yakla N, Ousadden A, Mazaz K, Louchi A, Kanjaa N, Taleb KA. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. World J Emergency Surg. 2013;8(1):13.
9. Yeniyol CO, Suelozgen T, Arslan M, Ayder AR. Fournier's gangrene: experience with 25 patients and use of Fournier's gangrene severity index score. Urol. 2004;64(2):218-22.
10. Patrick Spirnak J, Resnick MI, Hampel N, Persky L. Fournier's gangrene: report of 20 patients. J Urol. 1984;131(2):289-91.
11. Tuncel A, Aydin O, Tekdogan U, Nalcacioglu V, Capar Y, et al. Fournier's gangrene: three years of experience with 20 patients and validity of the Fournier's gangrene severity index score. European urol. 2006;50(4):838-43.
12. Corcoran AT, Smaldone MC, Gibbons EP, Walsh TJ, Davies BJ. Validation of the Fournier's gangrene severity index in a large contemporary series. J Urol. 2008;180(3):944-8.
13. Kabay S, Yucel M, Yaylak F, Algin MC, Hacioglu A, Kabay B, et al. The clinical features of Fournier's gangrene and the predictivity of the Fournier's Gangrene Severity Index on the outcomes. Intern Urol Nephrol. 2008;40(4):997-1004.
14. Roghmann F, von Bodman C, Löppenberg B, Hinkel A, Palisaar J, Noldus J. Is there a need for the Fournier's gangrene severity index? Comparison of scoring systems for outcome prediction in patients with Fournier's gangrene. BJU Intern. 2012;110(9):1359-65.
15. Verma S, Sayana A, Kala S, Rai S. Evaluation of the utility of the Fournier's gangrene severity index in the management of Fournier's gangrene in North India: A multicentre retrospective study. J Cutaneous Aesthetic Surg. 2012;5(4):273.

Cite this article as: Syed TK, Apturkar DK, Dandekar KN. Emergency management and it's effect on clinical profile of Fournier's gangrene in patients presenting at a rural setup. Int Surg J 2019;6:4397-401.