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Study of the Simplified Prognostic Scoring System in Patients with Fournier's Gangrene

Bansal AR, Punith M, Bansal M, Garg P

Abstract

Aim and Background: Fournier's gangrene is an acute necrotising fasciitis affecting the perineal, perianal regions and genitalia. Cornerstones in treatment of Fournier's gangrene are urgent necrotic tissue debridement, broad-spectrum antibiotics and resuscitation. Despite advanced management policies, mortality from Fournier's gangrene is still high. Various scoring systems are in vogue nowadays to evaluate prognosis in such patients. We evaluated simplified prognostic scoring system to determine the risk of morbidity and mortality in such patients.

Patients and Methods: A total of 40 patients were classified according to age, body mass index, early/late detection, areas involved and comorbidities. An eight- scale simplified prognostic scoring system with maximum score of eighteen points denoting highest risk of mortality and minimum score of eight points carrying relatively lower risk of mortality was evaluated. Patient's data was collected and analysed using Wilcoxon signed-rank test and Student's t-test and p value <0.05 was considered statistically significant.

Results: Out of 40 patients, 5 patients (12.5%) presented with Grade I (8-10 points), 27 patients (67.5%) presented with Grade II (11-14 points) and 8 patients (20%) with Grade III (15-18 points). Patients with grade I had lesser hospital stay compared to those with grade II and III. Mortality was observed in three patients, who were late presenters with extensive disease and belonging to grade III group.

Conclusion: The present study reveals that increasing age, high BMI >30, multiple co-morbidities and late presentation with multiple area involvement are associated with high morbidity and increased mortality. Prompt early diagnosis and management may improve the morbidity and mortality of these diseases.

Key words: *Fournier's gangrene; simplified; prognostic scoring system; mortality*

Introduction

Fournier's gangrene (FG) is an acute, rapidly progressive and potentially fatal, necrotising fasciitis of infective aetiology affecting the scrotum and penis, perineal and perianal regions [1]. Systemic comorbidities are very commonly found in patients with Fournier's gangrene such as diabetes mellitus (most common association), malignancy and malnutrition [2]. Also patients suffering from HIV, leukaemia, liver failure, colorectal cancer, patients on chemotherapy or any immunosuppressants are at increased risk [3]. Various indices are used nowadays to determine the prognostic severity in patients with Fournier's gangrene, as these patients have high morbidity and mortality, even with aggressive surgical treatment in the form of extensive necrotic tissue debridement, along with appropriate doses of broad-spectrum antibiotics and resuscitation with fluids [1,4]. Commonly used indices are Fournier's Gangrene Severity Index [5], Uludag Fournier's Gangrene Severity Index (UFGSI) [6] and Charlson Comorbidity Index [7]. However, the above three scoring systems are complicated enough. In this study, a simple scoring system based on eight clinical parameters known as Simplified Prognostic Scoring System was evaluated to determine the risk of morbidity and mortality in such patients.

Patients and Methods

Forty patients presented with manifestations of Fournier's gangrene were evaluated using a predesigned proforma and followed up until the time of discharge. Patients were included in the study after informed written consent and those presenting with scrotal swelling like hydrocele, pyocele and torsion of testis were excluded.

The questionnaire applied to all patients included age, BMI, temperature, pulse and BP recorded, early, delayed or late presentation, whether single or multiple areas were involved and any comorbid medical illness at the time of pres-

Department of Surgery, Pt. B. D. Sharma PGIMS Rohtak, Haryana, India

Corresponding author: Bansal AR
Tel.: +919812424341, e-mail: drarbansal@hotmail.com

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entation. Disease detection was considered early, delayed, or late according to clinical presentation. Early presentation was considered when there were features of cellulitis such as pain, redness, swelling, and crepitus but without obvious gangrene. Delayed presentation was considered when patient had fever above 38°C, tachycardia, offensive wound discharge and cutaneous gangrene. Late presentation was considered if patient had also systemic manifestations of septic shock along with the above presenting features. The extension of disease was further subdivided into either single or multiple sites involvements. Single primary site was one that was confined to the scrotum and multiple sites included extension till thigh, inguinal and anterior abdominal wall or perineum (in females). Comorbid medical illnesses were traced as diabetes mellitus or any other concomitant diseases such as ischemic heart disease, chronic renal failure, cirrhosis or chronic alcoholism. Patients were classified according to the Simplified Scoring System of Table 1[8].

The patients were classified into three grades of severity; grade I from 8-10 points, grade II from 11-14 points and grade III from 15-18 points.

Table 1. *Simplified scoring system of Fournier gangrene was classified according to the following points:*

1. Patient's age: ≤ 50 years = 1 point ≥ 50 years = 2 points
2. BMI: BMI < 30 = 2 points BMI > 30 = 3 points
3. Temperature: < 38°C = 1 point > 38°C = 2 points
4. Pulse: 100 beats/min = 2 points
5. Systolic blood pressure: > 90 mm Hg = 1 point < 90 mm Hg = 2 points
6. Presentation: Early = 1 point Delayed = 2 points Late = 3 points
7. Area involved: Single = 1 point Multiple = 2 points
8. Comorbidity: DM = 1 point Multiple = 2 points

Patients with score of 8-10 points [grade I] carried a lower mortality rate and less hospital stay than those with score of 11-14 points [grade II] and score of 15-18 points [grade III].

Patients with a maximum score of eighteen points were considered as denoting the highest risk of mortality and those with a minimum score of eight points as carrying a relatively lower risk of mortality.

All patient data were collected and analysed by using Wilcoxon signed-rank test and the Student's t-test. All data was expressed as the mean±standard deviation. p value of less than <0.05 was considered statistically significant.

Results

Patients presenting in emergency department were screened according to the above scoring system. The average age range of patients was 40-70 years and a BMI >30 (Table 2).

Clinical parameters in the form of temperature, pulse and blood pressure were recorded for each patient at the time of presentation. Sixty five percent of the patients had temperature >39 Celsius and pulse rate >100bpm and systolic blood pressure <90 mmHg.

Patients were subsequently classified as early, late and delayed according to their toxic state along with other clinical parameters like fever (>38 Celsius) and tachycardia (>100/min) with systemic manifestations of shock.

Twenty six out of 40 patients reported within early onset (65%) of the symptoms, while six (15%) showed delayed presentation whereas eight patients (20%) presented late with features of septic shock (Figure 1).

The extension of disease was sub divided to either single primary, or multiple sites. The majority of the patients (60%) had disease process confined to scrotum or perineum (females). A percentage of 22.5% of patients had pathology extending till inguinal region and anterior abdominal wall and rest patients (17.5%) had disease extension to the thigh (Figure 2).

Comorbid illness most commonly associated was dia-

Table 2. *Patients distribution regarding their ages, BMI* and DM***

Age	>50	21	52.5%
	<50	19	47.5%
BMI	<25	2	5%
	25-30	15	37.5%
	>30	23	57.5%
DM		28	70%

** BMI Body Mass Index*
*** DM Daibetes Mellitus*

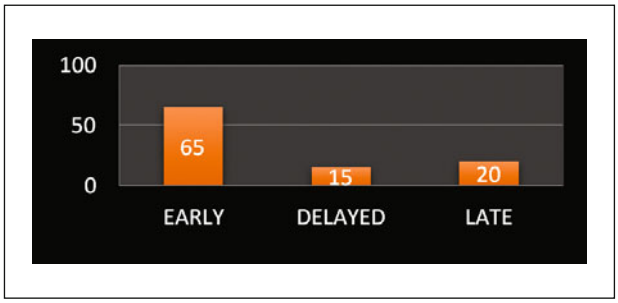

Figure 1. Patients distribution in relation to time of their presentation.

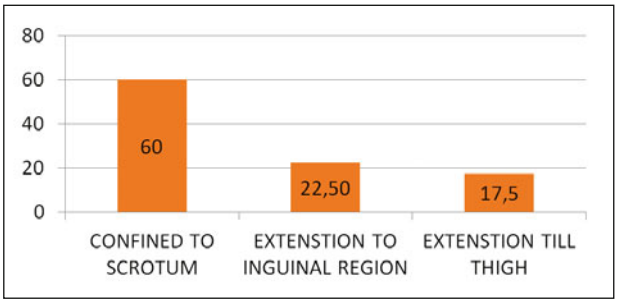

Figure 2. Patients distribution in relation to the primary site of the disease.

betes mellitus in 70% of the patients. Other comorbidities included chronic renal failure, hepatic failure, IHD, HIV and chronic alcoholism (Figure 3).

Five patients presented with grade I severity score, 27 patients with severity score grade II and the remaining eight patients were allocated in grade III severity score group (Figure 3).

In the present study, three patients died as a result of their disease. All of them had multiple underlying risk factors as it is depicted in Table 3.

Discussion

Fourniers gangrene is a progressive and fulminant necrotising fasciitis of the genital and perineal regions

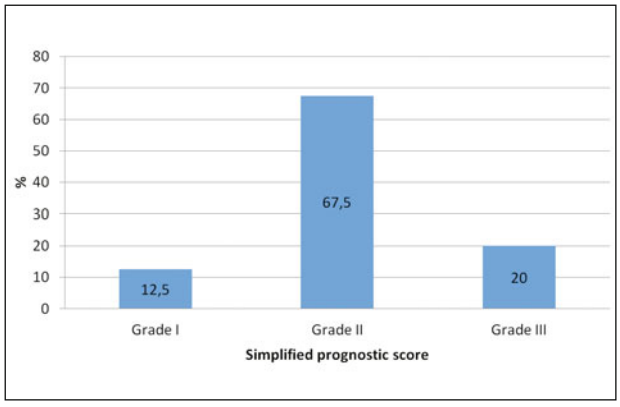

Figure 3. Distribution of patients according to scoring grade.

that may extend to the abdominal wall between the fascial planes.[1]There are two important validated scoring systems for outcome prediction of Fournier's gangrene. These systems are Fournier's Gangrene Severity Index (FGSI) [5] and Uludag Fournier's Gangrene Severity Index (UFGSI)[6]. Fournier's Gangrene Severity Index (FGSI) was described by Laor et al [9]. This index includes nine metabolic and physiologic parameters. Laor et al found that a FGSI score greater than 9 indicated a 75% likelihood of mortality while a score of 9 or less was associated with a 78% likelihood of survival. However, this scoring system lacks the timing of patient presentation, BMI, and medical co morbidity that has been included in simplified scoring system. Yilmazlar et al [6] suggested a new scoring system, the Uludag FGSI (UFGSI), adding the age and the extent of the disease scores to the FGSI. Some studies revealed that FGSI scores were sensitive and specific for predicting mortality rate and on comparing UFGSI to FGSI, it was concluded that despite including more variables, the UFGSI does not seem to be more powerful than FGSI.

Other system commonly used is the Charlson comorbidity index (CCI). This index has a range from 0-37 and it is estimated by the presence of 19 comorbid conditions. These conditions are: myocardial infarction, CVA,CHF, PVD, dementia, chronic pulmonary disease, connective

Table 3. *Mortality rate in relation to age, BMI and time of presentation.*

Variables		Age		BMI			Time of Presentation			
		≤50	≥50	<25	25-30	>30	Early	Delayed	Late	Total
No. of Patients	N	18	22	2	14	24	26	6	8	40
Mortality	N	0	3	0	0	3	0	1	2	3
	%	0	13.6%	0	0	12.5%	0%	16.60%	25%	--
P value		0.03(S)		<0.002(S)			0.04 (S)			

tissue disease, ulcer disease, mild liver disease, diabetes, hemiplegia, renal disease, diabetes with end organ damage, leukaemia, lymphoma, severe hepatic disease, AIDS and metastatic solid tumour [7].

The simplified clinical prognostic scoring system was advocated by Saber et al with a maximum score of 18 points that refer to the highest risk of mortality and a minimum score of 8 points carrying a lower risk of mortality [18]. This system which contains patient's age, body mass index, temperature, pulse rate, systolic blood pressure, and time of presentation, the involved body region and comorbidity has been evaluated in the present study.

Age is one of the major risk factors for morbidity and mortality and in the present study, 55% of patients were >50 years of age. This finding is in agreement other studies as well [1,8,10,11].

In the present study, 24 (60%) patients presented with a high BMI of > 30. Also, all 3 patients who died during the course of treatment had a BMI of >30. This was due to strong relationship of obesity with other medical co morbidities like DM, hyperlipidaemia, and hypertension (metabolic syndrome) [13,14]. This result came in agreement with Wang et al and Kara et al that consider obesity as important risk factor for outcome prediction patients with Fournier's gangrene [12,13].

Eight of our patients presented late with multiple areas of involvement. The late time of presentation was associated with a significant mortality due to extensive spreading of disease and overwhelming sepsis [14].

The relation between extension of the disease beyond the primary site and the mortality rate is controversial. Benjelloun et al report that the spread of the disease is related to a higher mortality rate, while Vyas et al reported that the extension of the disease does not relate to a poor outcome [16]. Aly Saber et al found that the extension of the Fournier's gangrene to the abdominal wall and thighs is a predictor of mortality [8,14,16].

In the present study, associated medical illnesses like diabetes mellitus, chronic renal failure, chronic liver disease, hypertension were associated with a higher mortality rate [14]. Other studies reported that various comorbidities are known to be associated with Fournier gangrene, of which DM is the most common as in our study hyperglycemia is associated with detrimental effects on cellular immunity, increased susceptibility to infections and is associated with more progressive fatal outcome due to impairment of chemotaxis, phagocytosis and neutrophil dysfunction [17]. In Aridogan et al and other studies, majority of the patients had DM [1].

Increased age, BMI > 30, multiple comorbidities, late presentation with delayed time between the first symptom and surgical intervention and extensive disease involving multiple areas of body were major factors for mortality. In this study the overall mortality rate was 7.5% and all patients had a grade III severity score. There are studies where mortality ranges from 20 -50% [14,18,19].

Conclusions

From the present study can be concluded that an increased age along with a high BMI >30, multiple comorbidities and particularly late presenters with multiple area involved are associated with high morbidity and an increased risk of mortality. The manifestations of the disease and the involvement of a variety of systems sometimes delay recognition. So the crucial points in the management of this infection remains early diagnosis, wide and repeated surgical debridements, and appropriate antibiotic therapy [20].

Ethical Approval – Informed Consent: *The authors declare that the study has been approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Also all patients gave their written informed consent prior to their inclusion to the study.*

Conflict of interest: *The authors declare that there is no conflict of interest.*

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