ORIGINAL ARTICLE

Fournier's Gangrene 5-Year Experience and Validity of Fournier Gangrene Severity Index

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ABSTRACT

Objectives: To evaluate the validity of Fournier gangrene severity index in the assessment of disease severity.

Materials and Methods: This Retrospective study was conducted in Pakistan Institute of Medical Sciences Islamabad. In this study we enrolled 35 patients with FG. The primary outcome in our study was mortality rate. Fournier's Gangrene Severity Index was used to evaluate the severity of disease. The patients were divided into two group survival group and deceased group.

Results: Total 36 patients with FG were enrolled, 80.6% were male and 29.4% were female with mean age of 43.30 ±10.5 years. The mortality rate was 19.4%. 41.7% patients had DM, 22.2% patients were smoker and 13.9% patients had high blood pressure. 61.1% cases had anal pain while 33.3% had scrotal pain. The patients were also distinguishing on the basis of origin and it was found that Proctological (72.2%), Urological (19.4%) and Gynecological (8.3%). Using an FGSI cut-off value > 9.5, we find out that the mortality rate was significantly higher in the group with a FGSI score >10 (100%).

Practical implication: In this study we find out that FGSI is a reliable and excellent tool for the initial diagnosis of disease. So this study will help the clinical practicner to easily and at initial stages diagnose the disease.

Conclusion: It is concluded that FGSI is a reliable and excellent tool for the initial diagnosis of disease.

Keywords: Fournier's gangrene, Fournier's gangrene severity index, mortality

INTRODUCTION

Fournier's gangrene (FG) is a life-threatening disorder, described for the first time by Baurinne (1764) and later on termed by French dermatologist Jean Alfred Fournier (1883) [1, 2]. This fulminant infection is characterized by necrotizing fasciitis of perianal and genitourinary regions (3). It is rapidly developed in soft tissue as infection. Every case has its own clinical presentation, but most of the cases have been presented with oedema, erythema, pain, and fever [4]. There are so many diseases that cause and play its role in the development of FG. These factors and diseases are as follow: urethral strictures, local trauma, diabetes mellitus and tumor. This condition may develop at any stage of life including neonatal period of life and affect both gender equally [1, 2]. In spite of advancement in the development of medical therapy, the mortality rate of FG has been reported as 30-50% (4-6). Loar et al.[7] have designated gangrene severity index of Fournier (FGSI) to foresee and determine the prognosis of the FG's patients. This severity index is very useful for assessing the prognosis of FG. FGSI consists of 9 points as a cutoff score. FGSI is a numerical score calculated by a combination of clinical and laboratory assessments i.e temperature, cardiac rate, respiratory rate, blood electrolytes, creatinine level, and hematocrit [8, 9]. There are 75% chances of death in patients with a FGSI score >9, and those patients who have ≤9 score have chances of 78% of survival [10]. Some authors support this statements but some other authors stated that FGSI scores were similar between survivors and non-survivors patients [11, 12]. The main aim and objective of the present study was to evaluate the validity of Fournier gangrene severity index in the assessment of disease severity that will help the doctors to easily and at time diagnose the disease.

Objective: To evaluate the validity of Fournier gangrene severity index in the assessment of disease severity.

MATERIALS AND METHODS

Study Design: Retrospective study

Setting: This study was conducted at Pakistan Institute of Medical Sciences Islamabad.

Sample size: A sample size of 36 were calculated by using WHO sample size calculator taking:

Confidence level (1-α): 95%
Absolute precision (d): 10%
Anticipated population proportion (P): 23% [13]

Duration of the study: Duration of the study was 5 years (Jan 2018 – Dec 2022).

Sampling Technique: Consecutive nonprobability sampling technique was used for the recruitment of the sample.

Inclusion Criteria:

- Patients with a perineal gangrene regardless of the primary cause.
- Patients of 20 to 70 years of age.
- Both genders.

Exclusion Criteria:

- Patients with periurethral and scrotal abscesses if there was no evidence of extension to soft-tissue or necrosis.
- Patients who presented with perineal suppuration without a true gangrene.

Table 1: The Fournier's Gangrene Severity Index

Variable	High abnormal values				Normal	Low abnormal values			
	+4	+3	+2	+1	0	+1	+2	+3	+4
Temperature (°C)	>41	39-40.9	-	38.5-35.9	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Heart rate (beats/minute)	>180	140-179	110-139	-	70-109	-	55-69	40-54	<39
Respiration rate (breaths/minute)	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum Na (mmol/L)	>180	160-179	155-159	150-154	130-149	-	120-129	111-119	<110
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 creatinine (mg/100 mL, x2 for acute renal failure)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Hematocrit (%)	>60	-	50-59.9	46-49.4	30-45.9	-	20-29.9	-	<20
White blood cell count (total/ mm^3 x1000)	>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

METHODS

In this Retrospective study a total of 36 patients were enrolled. The patient's record were collected from the hospital from Jan 2021 – Dec 2022. In this study the primary outcome was mortality rate. Data was collected on predesign investigative sheets. The below 9 parameters were used to evaluate the FGSI: temperature, respiratory rate, hear rate, sodium (Na), potassium (K), creatinine, serum bicarbonate, leukocyte count and haemocrit. The cutoff score was 9, gauged from 0 to +4. For statistical analysis of the data, SPSS version 23.0 was used.

RESULTS

In this study we enrolled 36 patients with mean age of 43.30 years. 80.6% were male and 19.4% were female (Table 2, Fig 1-0).

Table 2: Distribution of Patients According to Gender with Mean Age (n=36)

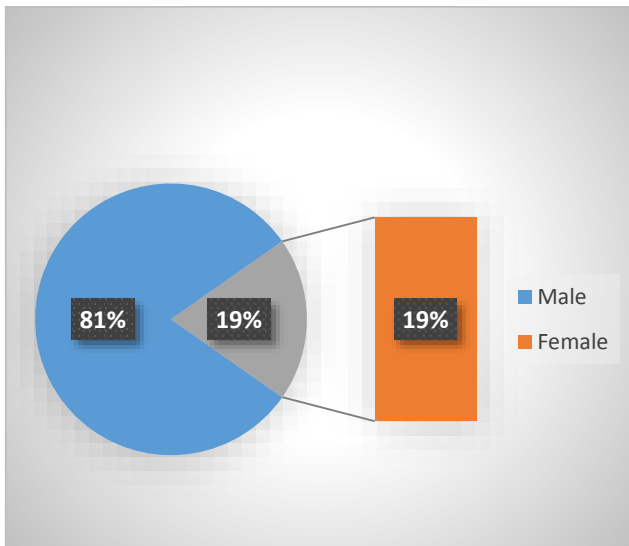| Variable	Frequency	Percentage
Gender:		
Male	29	80.6
Female	7	19.4
	Mean	SD
Age (Years)	43.30	10.5

Fig 1: Distribution of Patients on The Basis of Gender

In this study 41.7% patients had DM, 22.2% patients were smoker and 13.9% patients had high blood pressure. 61.1% cases had anal pain while 33.3% had scrotal pain. The patients were also distinguishing on the basis of origin and it was found that Proctological (72.2%), Urological (19.4%) and Gynecological (8.3%). The mortality rate was found 19.4% (Table 3-0)

Table 3: Distribution of Patients According to Patient History, Complaints and Origin (n=35)

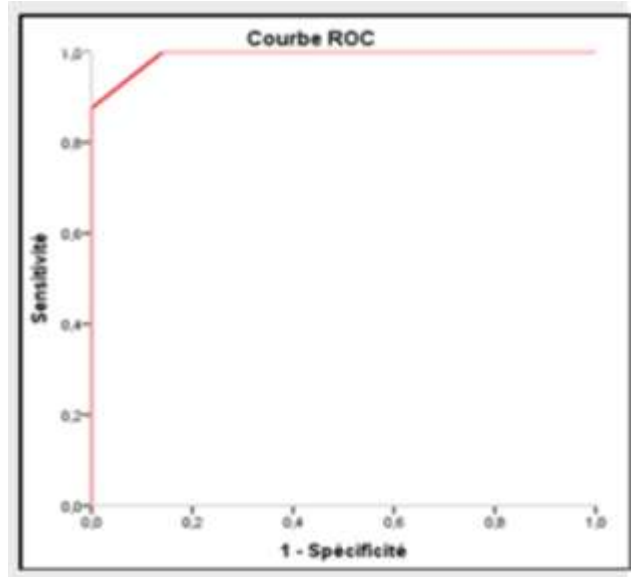| Variables	Frequency	Percentage
Patient history		
DM	15	41.7
Smoking	8	22.2
High blood pressure	5	13.9
Complaints		
Anal pain	22	61.1
Scrotal pain	12	33.3
Origin		
Proctological	26	72.2
Urological	7	19.4
Gynecological	3	8.3
Mortality	7	19.4

Fig 2: Receiver operating characteristic curve

Comparison of the two groups of patients according to FG severity score settings were presented in table 4-0 with p-value of <0.05 were considered as significant.

Table 4: Comparison of The Two Groups of Patients According to Severity Score Settings (n=36)

Variables	Group A (n=29)	Group B (n=7)	P-Value
Temperature (°C)	38.41±0.94	38.42±0.78	0.97
Heart Rate	96.4±2.86	106.4±4.85	0.00
Respiratory Rate	22.03±0.94	22.45±0.53	0.29
Blood Sodium (mmol/l)	137.27±1.55	128.14±1.06	0.00
Blood Potassium (mmol/l)	3.53±0.45	3.37±0.94	0.53
Blood Creatinine (mg/100ml)	1.15±0.25	2.08±0.43	0.00
Hematocrit (%)	37.20±1.26	32.00±2.38	0.00
WBC	17916.3±37.7	16032.8±24.2	0.00
Bicarbonate (mmol/l)	23.37±1.08	16.71±4.42	0.00

DISCUSSION

Fournier's Gangrene is a rapidly progressive and life-threatening disorder [14]. It is a urological emergency worldwide. FG has a high mortality and morbidity rate so it is very important to diagnose it as earlier as possible and treat it on priority bases to save life. Its mortality rate ranges from 7–75% [15]. FG, first described as a rapidly progressing idiopathic infection, includes any necrotising infection of the external genitals and perineum in both men and women. It is usually a polymicrobial infection whose probable physiopathology is due to endarteritis obliterans of the small and superficial veins, resulting in gangrene. Despite aggressive wide-spectrum antibiotic treatment, aggressive surgical debridement, intensive care and anaesthesia, the mortality rates are as high as 43% in some series [2]. In this study the mortality rate was 19.4%. This rate is resembles by other previous studies [15]. In another study conducted by Ahmed Itaimi et al. stated that the mortality rate was 23% [13]. A study conducted by Satyajeet Verma [2] stated that 26.6% mortality rate. Those patients who will have FGSI score greater than 10 have 100% chances of death [16]. For the prognosis and severity of the FG, the FGSI scoring system is considered as a best tool. In this system the clinical parameter after admission in the hospital were used for the evaluation process. Laor et al. developed this scoring system that help the doctors in early diagnosis of the disease [16]. Treatment for FG must be started as early as possible. Early and aggressive debridement and use of

wide-spectrum antibiotics are the gold standard for decreasing the mortality and morbidity. In this study we divided the patients in two group one was survival group termed as Group A and the 2nd one is deceased group termed as group B. In this study we determined that those patients who have FGSI >10 have 100% mortality rate in this study. The cut off value was set to 9 in most series [17].

Regarding the diagnosis of FG, some other scoring systems were also introduced in the literature. In a study [17] using the Uludag FGSI score (UFGSI), in which two other parameters such as age and extension of the disease were added to the old FGSI score. Arora et al [13]. also stated that FGSI is a valid index and a useful marker for the identification and diagnosis of patients. All the 9 parameters of FGSI score are directly associated with the patient's mortality so it highlighted the validity of index [18]. Moudouni et al [18], stated that >9 score of FGSI patients had 38.4% mortality rate. There are number of studies who supported the validation of FGSI [13, 19].

CONCLUSION

It is concluded that FGSI remains a simple and best diagnosing approach to determine the initial severity of the FG. Among other scoring system it is more reliable and valid tool for the diagnosing of disease.

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