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Factors Affecting the Prognosis and Outcome of Fournier's Gangrene- An Analysis from Eastern India

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KEYWORDS
Fournier's Gangrene (FG); Polymicrobial; Mortality, Scrotum.

ABSTRACT
Background: This study intends to prospectively analyze the data of patients presenting with Fournier's Gangrene (FG) and compare the obtained data with existing literature to find the various factors affecting the prognosis and outcome in FG.
Methods: A prospective study was conducted on 64 patients (all males) with FG who attended the Department of General Surgery, ICARE Institute of Medical Sciences And Research Haldia West Bengal, over a period of 2 year from January 2021 to December 2022.
Results: The mean age of the patients was 56.06+/-15.52 years. Genital edema and discharge were present in all cases; the scrotum was involved in all cases, followed by the perineum (n=50, 78.12%). The mean pre-hospital delay time of the patients was 5.39 ± 2.29 days (range of 2–10 days). Etiologic causes were identified in 36 patients (56.25%) rest of the cases were of idiopathic origin. Polymicrobial in 49 patients (76.56%). Primary closure of the skin and soft tissues was the most common surgical technique used for all patients. The mortality seen was 18.75%
Conclusion: In conclusion, Fournier's Gangrene is a surgical emergency. Rapid and correct diagnosis of the disease with early stabilization is of paramount importance; various factors related to patients decide the prognosis and outcomes.

Introduction

(FG) is a necrotizing fasciitis of the perineal, genital, and perianal region, which is fatal due to a rapidly progressive course1. FG is of infective origin, where obliterative endarteritis plays a key role in its pathogenesis. Various synonyms have been used for FG, e.g.,' 'periurethral phlegmon,' 'streptococcal scrotal gangrene,' idiopathic Gangrene of the scrotum,' 'phagedenic and 'synergistic necrotizing cellulitis' 2.

Subjects of both genders and all ages may be affected; however, FG has more predilections for males over the age of 50 with a 10 times more common in males wrt to females. Early diagnosis remains crucial, due to high rate of fascial necrosis as high as 2–3 cm per hour3,4.. Polymicrobial infection is most commonly seen having synergism with several aerobic, or anaerobic microorganisms5, 6.

Various risk factors have been identified that cause the progression of the disease e.g. diabetes mellitus (DM),

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alcoholism, malnutrition, low socioeconomic status, neoplasm, chronic glucocorticoid therapy, immune-compromised states, Human immunodeficiency virus (HIV) infection, chemotherapy, radiotherapy, Cohn's disease7, and infected hydrocele8.

Apart from parameters of Fournier's Gangrene Severity Index (FGSI), chronic renal failure, pre-hospital delay time, the extent of the affected area, serum-blood urea nitrogen, and creatinine level are some of the factors that affected the prognosis of the disease9. Mortality rate has been shown to range from 7.5–8.8%, depending upon co-morbidities and severity of the disease10. FG is recognized in the International Classification of Disease as diagnosis code 49.3 according to ICD 10.11

The purpose of the present study was to prospectively analyze the data of patients presenting with FG so as to compare obtained data with the literature regarding the various factors affecting the prognosis and outcomes in patients with FG including FGSI score.

MATERIALS AND METHODS

A one-year prospective study was conducted on 64 patients with FG who attended the Department of General Surgery, ICARE Institute of Medical Science and Research, Haldia, west Bengal, from January 2021 to December 2022. The diagnosis of FG was made on the basis of clinical findings.

Inclusion Criteria: All patients with cellulitis, discharge, erythema, necrotizing fasciitis of the perianal and perineal region, skin necrosis, and ulcers were included in this study.

Exclusion Criteria: All patients with chemotherapy, long-standing diabetes mellitus [>10 years duration], immune-compromised states, radiotherapy, steroid therapy, as well as female patients, were excluded from the study.

The cases, after being stabilized hemodynamically, were subjected to detailed clinical examination, culture, and antibiotic sensitivity test from the wound swabs routine and special blood examinations and urine examinations. The cases were treated with medical therapy and surgically where required, depending upon the clinical condition of the patient.

Patients' data regarding age, sex, hospital presentation, ultrasound features of the inguinoscrotal region, anatomic distribution, pre-hospital delay time, predisposing factors, etiologic causes, treatment modalities, hospitalization time, and mortality rate were evaluated prospectively. Pre-hospital delay was defined as the time duration from the onset of symptoms until the patients were admitted to the hospital admission. Clustered data were analyzed statistically by paired T-test (two-tailed) and chi-square test with and without Yale's correction and online MedCalc's free statistical calculators.

RESULTS

Age: The age of the patients ranged from 23 to 83 years, with the highest incidence of FG observed in the age group of 41-60 years (n=30, 46.8%), and the mean age was 56.06+/-15.52 years. In this study, the mean age of survivors and nonsurvivors was 61.88 +/- 18.10 and 51.17 +/- 15.12 years, respectively.

CLINICAL FEATURES

Sl. No	Clinical Features	Number Of Patients [N]	Percentage
1	Genital Edema	64	100
2	Discharge	64	100
3	Skin Necrosis	60	93.75
4	Gangrene	60	93.75
5	Hyperemia	57	89.06
6	Pain	53	82.81
7	Crepitus	48	75
8	Pyrexia	33	51.56
11	Sepsis	31	48.43

Journal of Chemical Health Risks
www.jchr.org
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12	Urinary Retention	23	35.93
13	Fecal Incontinence	10	15.56

Table 1- The above table shows the distribution of clinical features in number and percentage

Anatomic Distribution: The most commonly affected area was the scrotum (n=64, 100%), followed by the perineum (n=50, 78.12%), penis (n=31, 48.4%), Inguinal region (n=20, 31.25%), thigh (n=9, 14%), abdomen (n=3, 4.6%). The TSBA involved was calculated by rule of nine (used for assessing the burn injury); the average was 2.87+/-1.5; in survivors, it was 2.1+/-0.79, and in nonsurvivors, it was 4.54+/-0.92%.

Ultrasound of inguinal scrotal region- almost all the patients had normal bilateral testicles and epididymis with emphysema in the involved soft tissues, scrotum (n=64, 100%), perineum (n=50, 78.12%), penis (n=10, 48.4%), Inguinal region (n=8, 31.25%), thigh (n=9, 14%), abdomen (n=3, 4.6%).

Sl number	**Region involved**	**cases**	**percentage**	**Ultrasound finding in soft tissue**
1	Scrotum	64	100	emphysema
2	Perineum	50	78.12	emphysema
3	Penis	10	15.65	emphysema
4	Inguinal Region	10	15.65	emphysema
5	Thigh	9	14.0	emphysema
6	Abdomen	3	4.6	emphysema

Table 1A- the above table shows ultrasound findings of the region involved

Pre-hospital Delay Time: The mean pre-hospital delay time of the patients was 5.39 ± 2.29 days (range of 2–10 days); in survivors, it was 4.32 +/- 1.64%, and in nonsurvivors, 8.83 +/- 1.13%. 16 (25.00%) patients had less than three days of duration of symptoms, 4-6 days in 26 patients (40.63%), 7-9 days in 16 patients (25%), and more than 9 days in 6 patients (9.3%).

Predisposing Factors: 43 patients had more than one predisposing factor for FG. Frequent alcohol consumption (n=37, 57.81%), smoking (n=39, 60.9%), and diabetes (n=33, 51.5%) were the leading factors. They were followed by cardiovascular diseases (n=11, 17.00%), obesity (n=7, 10.9%), and COPD (n=3, 4.6%).

Etiologic Causes: 36 patients (56.25%) had identifiable causes, and the rest of 28 patients (43.75%) were Idiopathic. Identifiable causes were local trauma (n=13; 20.3%), perianal source (n=10, 15.6%), dermatological causes (n=7, 10.9%), and previous surgery (n=4, 6.2%). Previous surgery included the removal of the lipoma, sebaceous cyst, and granuloma from the urogenital region, especially the scrotum. Urological instrumentation for urethral stricture causing urethral rupture, leading to FG, was seen in a couple of cases (3.13%).

Microbiology and Antibiotic therapy: 61 patients had positive bacteriologic cultures of the wound, and 3 patients had no growth. Polymicrobial infection was seen in 49 patients (76.56%). E. coli was the most frequently identified microorganism (n=30, 46.87%) in the polymicrobial group, and Streptococcus species was most common in the monomicrobial group of patients (n=12; 18.75%).

MICROBIOLOGY OF WOUND SWAB CULTURE

GROWTH TYPE	NUMBER (n = 32)	PERCENTAGE (%)	ORGANISM	NUMBER (n =)	PERCENTAGE (%)
Polymicrobial	49	76.56	E.coli	30	46.87
			Streptococcus	23	35.93
			Staphylococcus	18	28.12

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(2), 1132-1141 | ISSN:2251-6727

			Pseudomonas	15	23.43
			Enterobacter	11	17.18
			Proteus	7	10.93
			Klebsiella	4	6.25
			Bacteroides	2	1.92
			Total	52	100.00
Monomicrobial	12	18.75	Streptococcus	12	
No Growth	3	4.68			

TABLE –2 *The above table shows the microbiological characteristics of different wound swab cultures of patients with Fournier's gangrene in present study. The table also shows the number and percentage of the different micro-organisms isolated from monomicrobial and polymicrobial cultures in the present study.*

Empirical intravenous antibiotic regimens were given to patients depending on wound swab culture and sensitivity results; the most common antibiotics used in decreasing order were as follows imipenem-cilastatin + ciprofloxacin (n=28, 43.75%), piperacillin-tazobactam (n=14, 21.8%), piperacillin-tazobactam + Ciprofloxacin (n=12, 18.7%) Cefipime + Ciprofloxacin (n=5, 7.8%) and Cefipime + Linezolid (n= 3, 4.6%).

Surgical Management: After initial hemodynamic stabilization, most of the patients had multiple surgical debridements of necrosed tissue; 70.3% (n= 45) patients were debrided 3 - 4 times, 20.3% (n=13) patients were debrided 1-2 times and 9.3% (n=6) patients were debrided 5 – 6 times. The mean debridement in survivors was 3.96 +/- 1.68 times and nonsurvivors were 2.3 +/- 1.07 times.

45 patients (70.03%) were debrided within 8 hours of hospital admission, and 12 patients (18.74%) were debrided 8 – 24 hours; rest 7 patients were debrided after 24 hours of stabilization, Foley's Catheterization was done for urinary diversion in all cases: those who presented with FG after rupture urethra they were subjected to supra-pubic cystostomy. None of our patients needed colostomy for fecal diversion.

In the survivor group (n=24), secondary suturing (n=11, 45.83%) was the most common reconstruction procedure performed. Cases involving both the scrotum and penis were managed with secondary suturing of the wound of the scrotum and split-thickness skin graft of penile lesion (n=7, 29.1%). Six cases (25%) were managed with split-thickness skin grafts only. None of the patients required a reconstructive flap procedure.

Hospitalization Time: The mean hospitalization time of the patients was 24.39 [± 13.2 days.] days (range 8 - 45 days). The mean hospitalization time for survivors was 28.64 ± 11.44 days (range 16- 46 days), and nonsurvivors was 9.13 ±2.14 days (range 5-13 days).

PROGNOSIS AND OUTCOMES: The mortality rate seen in this study was 18.75% (n=12). The mean FGSI score was 7.76 ± 3.25, range, 5 – 12). The average FGSI score in the survivor group was 5.82 ± 1.19, and the nonsurvivors group was 12.68 ± 0.64. (FGSI score >9 = 14 cases and <9 = 50 cases). The mean serum albumin values were 2.78 +/- 1.17 gms/dl (range, 1 – 3.8 gms/dl); mean albumin levels in survivors and nonsurvivors were 3.25 +/- 0.78 and 2.18 +/- 0.21 gms/dl respectively. Most of the patients were anemic with mean hemoglobin values of 8.4 +/- 1.65gms /dl (survivor – 9.1 +/- 1.99 and nonsurvivors – 7.98+/- 1.36).

In this study, the various complication observed was, e.g., cosmetic deformity of the penis and scrotum (n= 27, 42.1%), graft failure (n= 11, 17.1%), and decreased sexual satisfaction in due course of time (n= 9, 14.06%). Of the 12 cases that didn't survive, ARDS with Septicemia (n=6, 9.37%), acute renal failure leading to Multi-Organ Dysfunction syndrome (n=4, 6.25%), and Diabetic Ketoacidosis with Severe Dyselectrolemia (n=2, 3.12%) were the common causes.

RESULTS SUMMARY

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(2), 1132-1141 | ISSN:2251-6727

Sl no	Result	Mean (n=64)	Survivors (52)	Non-survivor s (12)	P value
1.	Age (in years)	56.06+/-15.52	51.17 +/- 18.10	61.88+/- 15.12	P = 0.062
2.	Albumin (gm/dl)	2.78+/-1.17	3.25 +/- 0.78	2.1+/-0.21	P<0.0001
3.	Hemoglobin(gm/dl)	8.4+/-1.65	9.1+/-1.99	7.98+/-1.36	P<0.0695
4.	TBSA involved (%)	2.87+/-1.5	2.1+/-0.79	4.54+/-0.92	P<0.0001
5.	Serum urea	68.31+/-17.56	59.88+/-5.68	106.63+/- 10.43	P<0.0001
6.	Pre hospital delay (in days)	5.43+/-2.29	3.32+/-1.54	7.73+/-1.23	p< 0.001
7.	Number of debridement	3.44+/-1.13	3.96+/-1.68	2.3+/-1.07	P<0.0007
8.	FGSI Score	7.76+/-3.25	5.82 ± 1.19	12.68 ± 2.64.	P < 0.0001
1.	*Heart rate*	*116.44 +/- 13.62*	*102.83+/- 2.76*	*138.14+/-2.04*	*P<0.001*
2.	*TLC*	*21118.56+/-4418.40*	*17956.17+/- 1983.62*	*27803.75+/- 3065.93*	*P<0.001*
3.	*Temperature in Celsius*	*37.55+/-1.47*	*38.98+/-0.31*	*35.69+/-1.43*	*P<0.0001*
4	*Serum bicarbonate*	*22.15+/-4.89*	*25.19+/-3.61*	*16.65+/-1.60*	*P<0.0001*
5	*Serum sodium*	*133.17=/-4.91*	*131.15+/-1.66*	*122.00+/-1.51*	*P<0.0001*
6	*Serum potassium*	*3.64+/-0.74*	*3.53+/-0.55*	*2.06+/-0.60*	*P<0.0001*
7	*Serum creatinine*	*2.35+/-0.65*	*2.10+/-0.91*	*4.73+/-1.69*	*P<0.0001*
8	*Serum hematocrit*	*28.25+/-4.73*	*39.96+/-5.09*	*22.75+/-1.39*	*P<0.0001*
9	*Respiratory rate*	*28.00+/-4.81*	*22.23+/-3.98*	*31.53+/-1.51*	*P<0.0001*

Table 2A*: *The above table shows the Mean and standard deviation of variable influencing the morbidity and mortality in our along with survivor and non-survivor group.

RESULTS SUMMRAY B

Sl no	Result	Survivor (52)		Non-survivor(12)		P value
		yes	no	yes	No	
1	DM present	25	27	8	4	p < 0.1336
2	Alcohol consumers	28	24	9	3	P <0.6121
3	Sepsis present at admission	21	31	10	2	P< 0.01
4	Debridement <8hrs of admission	43	9	2	10	P <0.001
5	Fgsi score <9	50	2	2	10	P < 0.001

Table 2 B: *Table showing variables influencing morbidity and mortality in FG along with the P value.*

DISCUSSION

Fournier's Gangrene is a necrotizing fasciitis with very rapid progression involving the external genitals and perineum with male predisposition. It is a surgical emergency due to its rapid spreading nature of 2-3cm/hr. and high mortality rate. If not treated quickly, the mortality ranges from 18-36 %. It is usually a polymicrobial infection with synergistic action of both aerobic and anaerobic organisms 12-14

FGSI score:

It is a prognosis scoring system, in which 9 clinical parameters and their deviation from normal; primarily relating to the patient's metabolic status and the extent of the disease, a score of 9 or higher combined with advanced age correlated with increased mortality15.

Lin E et al. suggested that an FGSI score cutoff of 9 was an excellent predictor of the outcome of cases12. FGSI score > 9 correlates with mortality rate of 75%16, 46%17, 86%18whereas a FGSI score < 9 has survival rate of 78%16, 96%17, 95.7%18 in various studies

In our study, the FGSI score was a significant predictor of mortality.[FGSI score >/= 9 (n=12 cases) survivor 2/12, non-survivor 10/12and FGSI Score <9(n=52), survivor 50/52, non-survivor 2/22, p < 0.0001). The mortality rate in those with a FGSI Score of 9 or greater was 80% in our study. The average FGSI score was 7766 ± 3.25. The average FGSI Score in the survivor group was 5.82 ± 1.19, and the nonsurvivors group was 12.68 ± 2.64 (p=<0.0001). Except for hematocrit values, all

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www.jchr.org
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components of the FGSI Score were significant in our study.

FGSI Score in various studies[16, 12, 17, 20, 21, 22, 23, 24]

Sl No	Study	Year	FGSI Score		P Value	
			Survivors	*Non-survivor s*		
1	Laor et al[16].	1995	6.9 ± 0.9	13.5 ± 1.5	p = 0.005	
2	Yeniyol CO et al[28]	2004	3.0 +/- 1.8	12 +/- 2.4	P < /=0.0001	
3	Lin E et at[12]	2005	4.41+/-2.45	12.75+/-2.82	P<0.0001	
4	Corcoran AT et al[17]	2008	5.4 +/- 3.5	10.9 +/- 4.7	p = 0.006	
5	Ik Young Kim et al[21]	2011	4.7 +/- 0.4	9.3 +/- 3.2	P < 0.0001	
6	Longwang Wang et al[22]	2012	5.63±1.89	13.6±3.64	P < 0.0001	
7	RohanKhandelwal et al[12]	2013	3.8	9.4	NA	
8	Andrés GarcíaMarínet al[23]	2014	4	7	P=0.002	
9	El-Shazly et al.[24]	2014	6	10.26	P < 0.001	
10	IIMSR (present study)	2014	5.82 ± 1.19	12.68 ± 2.64.	P < 0.0001	

TABLE 3: *The above table shows the mean FGSI Score in survivors and non-survivor and the significance level (p value) [calculated by unpaired t test in various studies]*

FGSI Score is an objective and simple method to quantify the extent of metabolic aberration in patients presenting with FG12, but the major disadvantage of FGSI is that it is difficult to apply to patients at the time of admission because it includes many variables. In daily practice, a more simplified scoring system, consisting of fewer variables is needed1.

Other Factors:

Factors prognosticating the disease are lower serum albumin, total protein levels12, extent of body surface involvement (more than 5 percent body surface5 or more than 24 square meters19), serum glucose level >140 at the time of admission19, sepsis at presentation, interval between hospital admission and surgical intervention21, Uncontrolled diabetics, alcoholics with malnutrition, delayed diagnosis, extensive involvement25, repeated debridements26, low hemoglobin levels27 leads to higher morbidity and mortality rates in FG.

TBSA INVOLVED: Burn injury charts were used to assess the body surface area involved. The perineal region, including the scrotum, penis, and perineum, compromises 1% of the surface area, and each ischiorectal fossa accounts for 2.5%18.

Laor E et al. [1995] reported that the mean extent of body surface area involved among survivors and nonsurvivors was not statistically different (7.16 and 4.32%, respectively, p = 0.1)16. Increased mortality was seen when the patient had involvement of the abdominal wall (p = 0.004) or lower extremity (p = 0.005)17M EL Shazy et al. [2014] reported the BSA involvement in survivor and survivor groups to be 4.6% and 8 %, respectively, with p < 0.05 24. FG extending up to the abdominal wall has been associated with poor prognosis (p < 0.003; 50% in the nonsurvivors compared to 7% in the survivors) 26. The mean extent of body surface area involved among patients who died was greater and was significantly statistically different from that of those who survived (5.4% and 2.1%, P < or =0.0001)28.HariGopalVyas, Anup Kumar, Vimal Bhandari, et al. [2013] in their study reported a mortality rate of 9.09% in pts with scrotal involvement, 0% in scrotal and penile involvement, and 80% in the anterior abdominal wall and thigh involvement with a p-value of < 0.01 and considered the area of involvement as imp predictor of poor prognosis (Hazard Ratio of 4.9, 3.81 – 6.32 as95 % Confidence Interval and p-value < 0.001)29. Debridement range ≥3000 cm^2 (OR 5.22, compared with other operations)is significantly associated with a higher case fatality rate30.

In our study, the average TBSA involved was significant for the prediction of poor prognosis (overall mean=2.87 +/- 1.5 survivor group- 2.1+/-0.79 and nonsurvivor group-4.54 +/- 0.92 with p-value < 0.0001).

AGE: It has been considered as the strongest independent prognostic factor in various studies; younger patients have more survival chances than older patients10, 16. Sorensen et al. [2009] found that increasing age is the strongest independent predictor for mortality (Odds Ratio-4.0 to 15.0, p <0.0001)10. Similar results were described by El BachirBenjelloun et al. [2013] and Lin E et al. in their study12.

AGE IN SURVIVOR AND NON-SURVIVOR

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(2), 1132-1141 | ISSN:2251-6727

Sl No	Study	Year	AGE		P VALUE
			Survivors	Survivors	
1	Lin E et at[12]	2005	53.8+/-18.3	59.9+/-10.2	P < 0.05
2	DimitriosKoukouras et al.[35]	2011	49.8 +/- 17.2	52.28 +/-13.2	P = 0.45
3	El BachirBenjelloun et al.[26]	2013	44.36 +16.05	57.5 + 19.24	P= 0.0225
4	IIMSR (present study)	2023	51.17 +/- 18.10	61.88+/- 15.12	P = 0.062

TABLE 4: *The above table shows the mean age in survivor and non-survivor group in various studies and significance of age as predictor of poor prognosis*

In our study, age was not a significant predictor of mortality, which was similar to studies of Ik Yong Kim21, Yeniyol CO, Suelozgen T, Arslan M, et al. [2004]28 and Satyajeet Verma et al. [2012]32

BLOOD INVESTIGATIONS: Hematocrit, serum urea, serum sodium, and hypoalbuminemia are independent prognostic factors in various studies12, 32, 33. The concentration of serum creatinine >1.4 mg/dL and hemoglobin <10 g/dL in whole blood were associated with higher mortality rates27. As compared to the survival group, mortality was high in patients presenting with renal failure on admission (blood urea >0.5 g/l) (p < 0.001) and was considered to be important in predicting unfavorable outcomes in FG26.

In our study, the serum albumin levels and serum urea levels were found to be significant in predicting an unfavorable prognosis. However, hemoglobin level was an insignificant factor in predicting an unfavorable prognosis.

[(Mean serum albumin levels (n=64) was 2.78 +/- 1.17 survivor- 3.25+/- 0.78 and non-survivor - 2.1 +/- 0.21, p< 0.0001) ; (mean haemoglobin levels 8.4 +/- 1.65, survivor- 9.1 +/- 1.99and non-survivor - 7.98 +/- 1.36, p= < 0.0695), (mean urea levels- 68.31 +/- 17.56, survivor- 59.88 +/- 5.68 and non-survivor - 106.63 +/- 10.43, p< 0.0001)]

PRE-HOSPITAL DELAY TIME: Studies of Dimitrios Koukouras et al. [2009]34, El Bachir Benjelloun et al. [2013]26, and Yong Kim21have considered pre-hospital delay to be insignificant predictors of mortality in FG.

But, M El-Shazly et al. [2014]reported the mean duration of symptoms before admission to be significantly longer in the mortality group (3.86 days versus 1.96 days in the survival group) (p < 0.05)24. In our study, the pre-hospital delay was longer in the non-survival group and was a significant predictor of increased mortality. (Mean pre-hospital delay- 5.43 +/- 2.29, survivor- 3.32 +/- 1.54 and non-survivor-7.73 +/- 1.23, p= < 0.0001)

SEPSIS: Patients who had septicemic shock had at time of presentation had increased mortality due to FG35. More than 40 % mortality is reported in patients presenting with sepsis has been reported with 20% mortality in those without sepsis.19, 21 But, Satyajeet Verma et al. [2012] reported that sepsis at admission was not a predictor of the poor prognosis (survivor group 35/69 cases had sepsis and nonsurvivors group 15/26 cases had sepsis at admission, p=0.646)32. In our study, sepsis at the time of presentation was associated with poor outcomes (table 2A)

CO-MORBID FACTORS: DM has been one of the most common predisposing factors of FG, but some authors have considered DM not affecting the outcome of FG. Some studies have reported that both the number of debridements and duration of hospital stay are not affected by DM26, 36. Even Ik Yong Kim reported DM to be an insignificant predictor of increased mortality in FG. Others have reported a high mortality rate and considered a poor prognosis when FG is associated with systemic diseases such as uncontrolled diabetes 37. In our study results were similar to those above, and there was an insignificant factor of poor prognosis, [survivor group (n=52), with DM=25, without DM= 27; Nonsurvivors group (n=12) with DM=8, without DM=4, p = 0.1336].

TIME OF SURGERY: The duration between hospital admission and first debridement, although being an important prognostic factor, has not been discussed much in the literature. In some studies, the mean duration of symptoms between hospital admission and

Journal of Chemical Health Risks
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first debridement was significantly longer in the mortality group and found to be a significant factor of increased mortality24. In our study, time of surgery was a significant prognostic factor (debridement in survivor group (n=52) <8 hrs= 43 cases, > 8 hrs=9 case, Nonsurvivors group (n=12) <8 hrs=02cases, >8 hrs= 10 cases; p<0.0001).

NUMBER OF DEBRIDEMENTS:

Early and aggressive surgical debridement has a positive effect on survival5. Some studies reported the number of debridements as a significant predictor of the poor prognosis in their study (survivor group -7% and nonsurvivors group-58.8% underwent >1 debridement after admission, p <0.0532)31. However, it was considered insignificant in various studies21, 26. In our study, the number of debridements was a significant factor in predicting the poor prognosis (average debridement – 3.44 +/- 1.13, survivor- 3.96 +/- 1.68, nonsurvivors- 2.3 +/- 1.07, p<0.0007)

HOSPITAL STAY: The longer duration of the hospital stay (DOHS) has been considered a predictor of poor prognosis by most authors.

Sl no	Result	Mean (n=64)	Survivors (52)	Non-survivor s (12)	P value
1.	**El Bachir Benjelloun et al [2013][26]**	21	26	8	<0.001
2.	**M El-Shazly et al [2014]**[24]	22.24	22.24	14.28	<0.01
3.	**Eskita\csc\io\uglu et al.[2014]**[40]		33.73 +/- 17.3	61.6+/- 38.9	0.011
4.	**Present study**	24.39 +/- 13.2	28.64+/-11.44	9.13+/-2.14	<0.001

Table 5 *The above table shows duration of hospital stay as prognostic factor*

However Satyajeet Verma et al. [2012] reported hospital stay to be non-significant predictor of the poor prognosis(>30 days of DOHS survivor group 41.7% cases and nonsurvivors group 52.9% cases, p=0.639832)31. As reported by Gutiérrez-Ochoa J et al. aggressive therapy, age, co-morbidities and time of presentation are insignificant prognostic factors and there is no consensus on clinical variables for predicting FG results38.

CONCLUSION

In conclusion, Fournier's Gangrene is a surgical emergency; surgical debridement should be done after initial stabilization under antibiotic coverage. FGSI score, increased age, TBSA involved, pre-hospital delay time, the time between admission, sepsis at admission, and first debridement are important poor prognosis factors, along with elevated heart and respiratory rates, increased total leukocyte count, the rise of serum creatinine, urea, and potassium levels, decreased serum sodium, albumin, serum bicarbonate and also anemia. Overall, FGSI showed a higher correlation with mortality than any variable tested alone.

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