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Original Research Article

A Prospective Clinical Study on Fournier's Gangrene and Its Management at Basaveshwara Teaching and General Hospital, Kalaburagi

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Abstract: The objective was Fournier's gangrene is a rare rapidly progressive, fulminant form of necrotizing fasciitis of the genital, perianal, perirectal regions. Several factors have been reported to contribute to the clinical outcomes. The primary aims of this study were to examine the clinical features of patients with Fournier's gangrene & evaluate the predictivity of Fournier's gangrene severity index score on the outcomes.This is prospective study of 18 months of 50 patients diagnosed & treated for Fournier's gangrene in Basaveshwar Teaching and General Hospital, 50 patients with Fournier's gangrene were included in the study. Data was collected from December 2013 to May 2015.The Perianal, perirectal abscess, scrotal abscess & urethral strictures were the leading etiological factors. Age between 51 -70 were most affected (62%) with mean age 55 years. Males are predominantly affected. People of lower socioeconomic status were commonly affected with 78% being farmers & laborers. Diabetes mellitus & alcoholism were the predominant risk factors Lowest FGSI score was 2 & highest was 14 with the mean FGSI score for survivors being 4.5±1.3 & in non survivors 11.5±1.3. T value 13.5279, p value< 0.05. The mean duration of hospital stay 30±16.Based on our study the co-morbid conditions & the extent of the disease at presentation are the most important factors determining the prognosis of Fournier's gangrene. FGSI Scores considered as an objective & simple tool to predict the outcome in the patients with Fournier's gangrene.
Keywords: Fournier's gangrene, Fournier's gangrene severity index (FGSI) score

INTRODUCTION:

Although the name is credited to a Parsian dermatologist and venerologist Professor Jean Alfred Fournier (1832-1914) it had been reported in 1764 by Bauriene. King Herod the great of Judae is suspected to have been affected by Fournier's gangrene in association with diabetes mellitus. Although the famous Persian physician Avicenna described the disease in 1877, it was Fournier in 1883, who was the first to describe the condition in a specific region of the body-namely the Scrotum. He used the term "Fulminant Gangrene" of the Penis and scrotum and his description was based on 5 young men with scrotal gangrene. The cardinal points of that description included:

1. Sudden onset of gangrene in healthy young men.
2. Rapid progression of gangrene
3. Absence of a definite cause.

Fournier's gangrene is an acute, rapidly progressive, and potentially fatal, infective necrotizing fasciitis affecting the external genitalia, perineal or perianal regions, which commonly affect men, but can also, occur in women and children. It derives its name from Professor Jean-Alfred Fournier (1832-1914) who was the first to describe the condition in a specific region of the body namely the scrotum[1]. It is an infection of the subcutaneous planes down to and sometimes involving the muscles of the perineum and genital tissues. The more generalized infection of the subcutaneous planes all over the body is termed as "Necrotizing Fasciitis".

It is an enigmatic to the Physician and an embarrassing to the patients. This disease is characteristic in its rapid onset and progress of the gangrene, which if not recognized or if overlooked by the surgeon can result in septicemia and ultimately death of the patients. The fatal course of Fournier's gangrene made it a threat due to its aggressiveness and ugly tendency to spread with high mortality in the elderly people.

It was given many terms to describe the disease process of which a few are "Periurethral Phlegm on", "Phagedena" and "Synergistic Necrotizing Cellulitis". Sensationalist, medical journalists have dramatized it by associating it with "flesh eating bacteria" [2, 3].

It has been speculated without proof, that there may be strong resistance to infection in these areas of that the organisms involved have low virulence for more severe sepsis. Early surgical debridement of necrotic tissues and antibiotics are fundamental in the treatment. Despite advanced management mortality is still higher in the advanced countries of America, Canada, and Europe than in the underdeveloped countries.The present study was undertaken to obtain data on the incidence, course of the disease, risk factors, predictive value of Fournier's gangrene severity index and the microbiological makeup in the disease with their response to various antibiotics and highlights about newer treatment modalities.

MATERIALS AND METHODS:

Source of data:

This clinical study was carried out on patients admitted in Basaveshwar Teaching and General Hospital, Gulbarga. From the above mentioned source of 50 consecutive cases were taken. Data was collected from December 2013 to May 2015.

All cases with necrotizing fasciitis involving genital, perianal and perineal regions will be obtained clinically and subjected for relevant investigations. The cases those confirmed as to be having Fournier's gangrene are included in the study.

The patients were selected as per above mentioned criteria. Informed consent was taken. Careful history along with through physical and general examination done.

The relevant investigations were done to achieve correct diagnosis FGSI scores are calculated based on clinical features and investigation. In the FGSI scores following parameters are measured - Temp, HR. RR, serum sodium, serum potassium, serum creatinine, serum bicarbonate levels, haematocrit, leucocyte count and the degree of deviation from normal is graded from 0 to 4. The individual values are summed to obtain the FGSI scores.

The FGSI scores were calculated at the time of admission and at the time of death [4, 5]. The data were evaluated. Stratified by whether the patients survived or dead. Stratification of patients according to FGSI scores at admission and final mean FGSIscores were considered in order to examine the predictivity of FGSI scores on clinical outcome.

The patients were operated on emergency basis and conservative treatment given. Operative findings were noted, follow up study was done and complications noted. For patients undergoing conservative line, manner of treatment and associated complications were noted. In case of death, cause of death was noted.

Table -1: Fournier Gangrene Severity Index

Variable	+4	+3	+2	+1	0	+1	+2	+3	+4
Temp: (°C)	>41	39-40.9	-	38.5-38.9	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Pulse rate	>180	140-179	110-139	-	70-109	-	55-59	40-54	<39
Respiratory rate (b/min)	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum Na^+(mmol/l)	>180	160-179	150-159	150-154	130-149	-	120-128	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/100ml)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Haematocrit	>60	-	50-59.9	46-49.9	30-45.9	-	20-29.9	-	<20
WBC (total / mm3 x 1000)	>40	-	20-39.9	15-19.9	3-14.9-	-	1-2.9	-	<1
Serum Bicarbonate (mmol/l)	>52	41-51.9	-	32-40.9	22-31.9	-	18-21.9	15-17.9	<15

RESULTS

This present study includes 50 cases admitted in Basaveshwar Teaching and General Hospital, Gulbarga during a period of eighteen months from December 2013 to May 2015.

Table -2: Age wise distribution

Age	Number of cases	Percentage (%)
11-20	0	0
21-30	2	4
31-40	6	12
41-50	6	12
51-60	15	30
61-70	16	32
71-80	5	10
Total	**50**	**100**

Mean age – 55±12.3997
Range- 31-75
T value – 1.28

In the present study maximum number of cases were in 61-70 age group (32%) followed by 51-60 age group (30%).In the study all the 50 patients were males.

Table -3: Distribution of patients according to occupation

Occupation	Number of cases	Percentage (%)
Farmers	24	48
Labourers	15	30
Factory workers	6	12
Others	5	10
Total	**50**	**100**

In this study most of them were Farmers 24(48%), 2nd common were Labourers 15(30%), 3rd common were factory workers 6(12%) and others were 5(10%). All the patients belonged to low socioeconomic class.

Table 4: Distribution of patients according to etiological factor

Etiology	Number of cases	Percentage (%)
Perianal / Perirectal	16	32
Scrotal abscess	11	22
Urethral stricture	07	14
Trauma	04	8
Idiopathic	12	24
Total	**50**	**100**

In this study the commonest etiology was perianal / perineal abscess 16 patients (32%); second commonest is idiopathic 12 (24%) then scrotal abscess; 11 patients (22%) followed by urethral stricture 07 patients (14%) and trauma 4 (8%).

Table 5: Distribution of cases according to symptoms

Symptoms	Number of cases	Percentage (%)
Fever	20	40
Nausea ,Vomiting	06	12
Scortal gangrene with pain and swelling	44	88
Hypotension, shock	4	8

In the present study the most common symptom is gangrene of the scrotum with pain and swelling 44 (88%); Next common is fever 20 (40%); followed by nausea and vomiting 06 (12%); Hypotension & shock 04 patients (8%). The duration of

symptoms before the patients sought medical help range from 2 to 10 days.

Table 6: Distribution of cases according to site of involvement

Site of involvement	Number of cases	Percentage (%)
Scortum	38	76
Inguinal region	04	8
Perineum	08	16
Anterior abdominal wall	0	0
Total	**50**	**100**

In this study the site of involvement was predominantly scrotum 38 cases (76%), 4 cases (8%) had involvement of inguinal region, 8 cases (16%) had involvement of perineum and in none of them anterior abdominal wall was involved.

Table 7: Distribution of patients according to Fournier's gangrene severity

FGSI scores	Number of cases	Percentage
2	3	6
3	7	14
4	10	20
5	7	14
6	10	20
7	2	4
8	0	0
9	0	0
10	4	8
11	2	4
12	2	4
13	2	4
14	1	2
Total	**50**	**100**

39 patients had FGSI score < 7; lowest FGSI score is 2 for 3 patients (6%); highest FGSI score was 14 for 1 patient (2%); 11 patients had FGSI scores > 10.The mean FGSI score is 6.04 ± 3.1872 and range 2-14. Mean FGSI score for survivals is 4.5128 ± 1.375 and range is 2-7.Mean FGSI score for non survivals is 11.545 ± 1.3 728 and range is 10-14. V value is 13.5279. P < 0.05.There is significant difference between FGSI scores of survivors and non survivors.

Cultural and sensitivity

The organism commonly isolated includes Ecoli, Pseudomonas pyocyaneus, Staphylococci either in combination or synergistic with other microbes. Klebsiella, and Bacteroides were also identified but in lesser frequency than the above organisms.

Culture and sensitivity revealed sensitivity to cefotaxime, metronidazole, piperacillin&tazobactum, Oflaxacin in majority of cases. Amikacin, Cefoperazone, Cefuroxime and cloxacillin sensitivity was seen in comparatively fewer cases. The commonest antibiotic resistance was to the older penicillin's (crystalline penicillin, procaine penicillin, ampicillin, amoxicillin and gentamycin).

Table 8: Distribution patients according to treatment

Technique	Number of cases	Percentage (%)
Conservative	02	4
Secondary suturing	18	36
Split skin grafting	12	24
Thigh implantation	07	14

In this study majority of cases were treated by secondary suturing 18 (36%) followed by split skin grafting in 12 patients (24%), thigh implantation in 07 patients (14%), conservative treatment in 02 patients

(4%).Hyperbaric oxygen therapy used as adjuvant with these surgical techniques to improve the outcome.

Table 9: Distribution patients according to mortality

Cause of death	Number of cases	Percentage
Septicemia	7	14
Renal failure	2	4
A.R.D.S	2	4
Total	**11**	**22**

In this study, septicemia was the commonest cause of death 7 patients (14%), 2 patients died due to renal failure and 2 patients died due to ARDS (Acute respiratory distress syndrome).Mortality was higher in the Fournier's gangrene associated with predisposing factors.

DISCUSSION

Fournier's gangrene is a rapidly progressing life threatening infection of genital, perianal and perineal regions. It is a fulminant form of necrotizing fasciitis leading to soft tissue necrosis. It usually arises from infections around the area like anorectal, genito-urinary and cutaneous sources.

It can progress towards the thigh and the abdominal wall through the facial planes. Patients usually present with erythema, pain and swelling of perianal, perineal with genital region. Most patients are associated with diabetes mellitus, alcoholism, immunosuppressive conditions.

Early detection and prompt treatment with aggressive surgical debridement undercover of antibiotics is required to achieve good results. Despite of this treatment mortality rates are very high.We evaluate our results and compared them with those obtained by various other studies. Our analysis is as follows.

Age distribution

SahinKabay*et al.;* in their study had 72 patients with range from 24 to 87 years the mean age of patients were 60.09 ± 13.6 years [6].

Unalp H.R *et al.;* in their study had 68 patients with range from 25 to 92 years. The mean age of patients was 54.7 ±15.6 years [6].

Ghnnam W.M in his review of 74 patients had a mean age of 51 ± 10.8years with range of 21 to 72 years [7].In our study we had 50 patients; the mean age of patients was 55 ± 12.39 years with a range of 31 to 75 years.Our results were close to UnlapH.r*et al.*[6]*;*

Sex Distribution

SahinKabay*et al.;* in their study had 93% males and 7% females [4]. Unalp H.R *et al.;* in their study had 86.8% males and 13.2% females [6]. GhnnamW.M in his study had only males [7]. The present study had only males.

Economic status

Most of the patients were fanners (48%) with labourers (30%). They belong to low socioeconomic status.

Ashok M Bhatnagar*et al.;* in their study most commonly associated it with low socioeconomic status.

Risk factors

Ghnnam W.M in his study noted co-morbid condition like diabetes mellitus (51.35%) [7]. Chronic 1iver disease 8.1%; Immuno-suppressive condition 5.4%, Idiopathic 32.43% and others 2.7%.SahinKabay*et al.;* in their study had co-morbid conditions like diabetes mellitus 45.83%, chronic alcoholism 8.3%, Idiopathic 25%[4]. In our study co-morbid conditions were observed like diabetes mellitus (46%); Alcoholism (24%) and Idiopathic are (20%).

Etiology

Ghannam W.M in his study observed the etiological factors like anorectal disorders (54.03%); perianal abscess (43.2%). Idiopathic (36.5%) [7]. SahinKabay*et al.;* in their study had the etiological factors like perianal abscess (25%); Scortum abscess 20.83% urethral stricture (15.2%)[4].

Ayumba*et al.;* in their study had genitourinary sources accounted for (42%) &extra-genitourinary (29.2%)[8]. In our study we had 16 patients (32%) with perianal abscess; 11 patients (22%) with Scrotal abscess; 07 patients (14%) with urethral stricture; 04 patients (8%) with trauma and 12 patients (24%) were idiopathic.

Clinical features

In our study the most common presentation was scrotal gangrene with pain & swelling in 44 patients (88%). then next common was fever 20 patients (40%) & other symptoms include nausea & vomiting 06 patients (12%). 04 patients (8%) presented with hypotension and shock.

Site of involvement

Ghnnam W.M in his study involvement of scrotum with perianal region bilaterally in 83%

involvement of lower abdominal in 13.5%; extension to femoral region in 2.7% [7]

In our study the commonest site of involvement was predominantly Scrotum 38 cases (76%), 04 cases (8%) had involvement of inguinal region, 8 cases (16%) had involvement of perineum and no one involve anterior abdominal wall.

Duration of Hospital stay

UnlapH.r*et al.;* in their study the mean duration of hospitalization was 23.4 ± 11.4 day with a range of 5-54 days [6].Ghnnam W.M in his study the mean hospitalization time was 9.2 ± 6.6 days with a range of 1-31 days [7].
XeropotamosNikolaosis et al in their study observed mean duration of hospitalization is 35 days and range is 8-62 days [9]. In our study 13 patients (26%) stayed for 31-40 days. 9 patients (18%) stayed for 51-60 days, 10 patients (20%) stayed for 21-30 days. 11 patients (22%), stayed for 0-10 days. Mean duration of hospital stay 30 ± 16.28 and range 1 -58 day.

FGSI scores

Unlap*et al.;* in his study had mean FGSI scores for all patients of 5.2 ± 3.2. Range (1-16) [6].Mean FGSI for patients who died or survived 11.7 ± 2.9 and range 7-16 or 4.4 ± 2.2 (1-12) respectively.Sahin*et al.;* in his study used FGSI score 10.5 as a cut-off point to predict outcome.

Patients with FGSI score of more than 10.5 had a 96% probability of death and those with FGSI score < 10.5 were associated with 96% probability of survival.

In our study mean FGSI score for all patients was 6.04 ± 3.18 (2-14).The mean FGSI score for survivals or non survivals was 4.51 ± 1.3 (2-7) or 11.45 ± 1.37 (10-14) respectively with T value of 13.52; with $p < 0.05$.

Organisms identified

The organism commonly isolated includes majority E.coli, then pseudomonas, pepto-streptococcus and staphylococci either in combination or synergistic with other microbes. Klebsiella and bacteroides were also identified but in lesser frequency than the above organism.

Culture and sensitivity revealed sensitivity to cefotaxime, metronidazole, piperacillin&tazobactum, ofloxacin in majority of cases. Amikacin, cefoperazone, cefuroxime and cloxacillin sensitivity was seen in comparatively fewer cases. The commonest antibiotic resistance was to the older penicillin's (crystalline pencillin, procaine pencillin, ampicillin, amoxicillin) and gentamycin.Our study is comparable to Ashok M Bhatnagar which showed that most common are E.coli, pseudomonas pyocyaneus and mixed organisms [10].

Treatment

In our study after surgical debridement, undercover of antibiotics & adjuvant hyperbaric oxygen therapy, infection was controlled, 18 patients (36%) required secondary suturing, split skin grafting in 12 patients (24%), thigh implantation done in 07 patients (14%) and conservative treatment in 2 patients (4%).

Debridement

Unalp H.R *et al.;* in his study had mean number of debridement's of 2 ± 0.82; range 1 to 4 [6]. Ghnnam in his study had multiple debridement procedures in 24 patients (32.4%) [7].XeropotamosNikolaos had meant aggressive debridements of 3 in the range (3-6) [9].In our study 20 patients (40%) underwent more than 2 debridements.

Mortality

Unlap*et al.;* had mortality of 10.3% [6]. Ghnnam in his study had 22% mortality rate [7]. SahinKabay*et al.;* in his stay had 40.3% mortality rate [4].

In our study we had death of 11 patients (22%). In this commonest cause of death was septicemia with 7 patients, then renal failure and ARDS with each 2 patients respectively.Total mortality 11 (22%).Our results were comparable to Ghnnam study.

CONCLUSION

The study was conducted at Basaveshwar Teaching and General Hospital Gulbarga for about 18 months December 2013 to May 2015 consisting of 50 patients.
From this study we conclude:-

1. Fournier's gangrene is either an idiopathic condition or secondary to adjacent infection or the operation performed. The disease is rapidly progressing, most commonly confined to the genitalia and inguinal region.
2. Commonest age group was between 40 and 60 years with average of 55 years.
3. More commonly affects in lower socioeconomic group.
4. Diabetes mellitus and alcoholism were significantly associated with thedisease.
5. FGSI score of <7 had better outcome, however FGSI score of >10 had high mortality (22%).
6. The mean duration of stay was 30 ± 16 days.
7. Older age group patients >50 years had significant mortality and morbidity.
8. No significant difference between age of survivors and non-survivors.
9. Significant difference between duration of hospitalization of survivors and non-survivors.

10. Significant difference between FGSI scores of survivors and non survivors.
11. Orchidectomy was not done in our study.
12. Adequate diagnosis is imperative, immediate, intense and aggressive therapy is necessary. Prompt surgical debridement and administration of appropriate antibiotics, daily dressings are necessary to lower mortality and morbidity.
13. Adjuvant hyperbaric oxygen therapy along with surgical debridement, daily dressing will improve the outcome.
14. Most of the defects can be closed secondarily while some need coverage by skin grafting.

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