

## A 3-YEAR EXPERIENCE OF OUTCOME AND MANAGEMENT OF FOURNIER'S GANGRENE IN A WESTERN AFRICAN HOSPITAL: A CASE STUDY

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### ABSTRACT

**Introduction:** Fournier's gangrene is a necrotizing soft tissue infection that involves the genitals, the perineum and/or the perianal region. The cause is mostly polymicrobial infection whose source may be genitourinary, colorectal, the skin or idiopathic.

**Objectives:** The study aims the description of the epidemiological profile, the clinical and the overview treatment of Fournier's gangrene in the department of urology at CHU Point G, one of the urban referral hospitals of Bamako in Mali.

**Methods:** This is a descriptive retrospective study carried out on 36 patients with Fournier's gangrene who were followed for a 3-years period from January 2008 to January 2015.

**Results:** The average age was  $52.75 \pm 18.03$  years (22-95; CI:95%). The most common presentations at the emergency department were: scrotal painful swelling (39%) and scrotal wound (25%). The duration of disease averaged  $22.66 \pm 22.96$  days. The average waiting time before treatment was 6 hours (88.9%); and the cause was in the urogenital system in 94.4%.

**Conclusion:** Fournier Gangrene is a frequent infectious disease in Africa. The diagnosis remains mostly clinical. The prognosis depends on the extension of the tissue damage and the rapidity of infection which must be adequately and appropriately adjusted to surgical treatment.

**Keywords:** Fournier's gangrene, Urethral stricture, Debridement.

### INTRODUCTION

Fournier's Gangrene (FG) is a necrotizing soft tissue infection of the genitals, the perineum, and the perianal region. The source of infection is polymicrobial in general, originating mostly from poor hygiene of the genito-urinary tract, the colorectal and perineal areas, or idiopathic in some cases. The prognosis can be fatal if untreated, and nowadays, the disease remains the most common cause of loss of tissue of external genitals and the anterior abdominal wall [1].

FG is rare in Europe and other developed countries, but still predominates in developing countries with an increasing case-related mortality. In fact, a survey done in Mali in 2003 in both the department of Surgery and the department of urology at the CHU Point-G, 6 cases of FG were reported with an annual cumulative frequency of 1.13% [2].

### RESUME

**Introduction:** La Gangrène de Fournier est une fasciite nécrosante génitale, périnéale et péri anale. Elle résulte d'une infection poly microbienne dont la source peut être génito-urinaire, colorectale, cutanée ou idiopathique

**Objectifs:** Décrire les aspects épidémiologiques, cliniques et thérapeutiques des gangrènes de Fournier dans le service d'urologie du CHU Point G

**Méthodes:** Il s'agissait d'une étude rétrospective et descriptive, réalisée du janvier 2012 à janvier 2015 soit une période de 3 ans, colligeant les dossiers médicaux de 36 patients.

**Résultats :** L'âge moyen était de  $52.75 \pm 18.03$  ans avec des extrêmes allant de 22 à 95 ans, le motif de consultation était représenté par la tuméfaction douloureuse des bourses (39%) et de la plaie scrotale (25%), Le délai de survenu de la maladie était en moyenne de  $22.66 \pm 22.96$  jours. Les patients, une fois au service étaient pris en charge dans les 6 heures dans 88.9%. L'origine urogénitale a été prédominante avec 94,4% de causes identifiées.

**Conclusion:** La Gangrène de Fournier est une pathologie fréquente ; son diagnostic est clinique, son pronostic dépend de l'étendu de la lésion et de la rapidité de prise en charge qui ; en effet doit être adéquate et adaptée à chaque forme clinique.

**Keywords:** Fournier's gangrene, Urethral stricture, Debridement.

Developing countries have the most important and interesting clinical case reports, though, provided the burden of the disease in such regions, many surveys and case series are reported in Africa but no consensus on the standard and adjusted surgical management of FG has been adopted. This survey report therefore suggests and discusses accurate management of FG provided the updated review of surgical approach to such necrotizing soft tissue infections.

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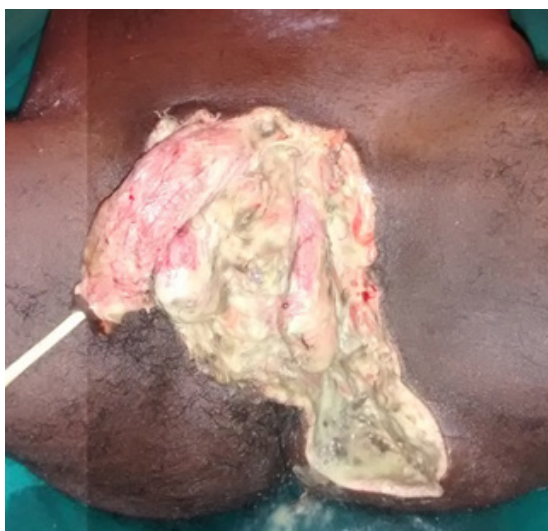
## METHODS

This descriptive and retrospective study conducted in the department of Urology of at "CHU Point G" in the capital of Mali, Bamako involved 36 patients with FG who were followed in the department. In fact, the survey covers a 3 years period from January 2012 to January 2015. The hospital follow up mostly with periodic clinical assessments were planned till complete recovery and rehabilitation evidenced.

Enrolled patients had consulted or had been followed for ulceronecrotic swelling of the external genital organs or the perineum (Figure 1a/1b), and on whom the working diagnosis was FG. Patients whose medical records had irrelevant or non-reliable data were excluded. Age, Gender, Profession, Length of stay, past medical history, investigations, the underlying causes and the specific treatment were both analyzed using Epi-Info 3.5.1



Wide inflammation of perineum : before surgical debridement (CHU Point G, Department of urology). **With Permission**



Serial debridement for ulceronecrosis of perineum (CHU Point G, Department of urology). **With Permission**

## RESULTS

Among the 36 patients included in the survey, the mean age was  $52.75 \pm 18.03$  years (22-29; CI:95%), the most affected groups had respectively 36 - 45 years and 46 - 55 years; and herein farmers were more burdened with 47.2%.

80.6% of patient's transfers came from primary and secondary level Health centers, and the transfer motives were respectively painful scrotal swelling (39%) and scrotal wound (25%) (Table 1). Most patients had no relevant past surgical history (75%) or past medical history (55.6%). The disease history before hospital transfer ranged  $22.66 \pm 22.96$  days; whom 36.6% presented within the first 7 days of symptom occurrence. The waiting time for surgical therapy was 6h in 88.9%. 52.8% had fever, and 36.1% had altered general status. 2 patients were diabetics, 1 patient with heart failure, 1 patient with HIV positive and 2 patients had paraplegia. Dysuria was the most common complaint, with some severe cases requiring urethral catheterization during the course of surgical management. 47.7% of patients had a fistulized abscess of the genital organs. The working diagnosis was: Scrotal gangrene (75%), and penilo-scrotal necrosis (11.1%) [Table II]; and, the source of infection was urogenital in 94.4% [Table III].

The hospital management of FG followed local guidelines for the medical and surgical treatment of FG. At arrival, patients were adequately resuscitated with crystalloids infusions and vasopressors when necessary. IV empirical antibiotics were immediately started with Ceftriaxone, Gentamycin and Metronidazole; which were replaced by target-antibiotic therapy after culture and sensitivity. The management of comorbidities was multidisciplinary with the support of the departments of internal medicine and Infectious disease.

Cultures were positive in 52.6% pus swabs, and *E. coli* was the most common isolated germs. Broad spectrum antibiotics were combined in 2 drugs-therapy regimen in most cases.

Surgical treatment with aggressive surgical debridement was performed in 80.6% and the extension of the debridement depended on the necrotized tissues, with eventual serial debridement if the necrotic areas progressed or involved larger areas to be debrided at once (Figure 2/3/4). Good outcome (adequate wound healing, clean granulating wound) at discharge was noted at 83.3%; 2 patients (5.6%) refused treatment, and 4 (11%) died during the course of hospital management.



**Figure 2.** Fournier gangrene after scrotal surgical debridement with foley urethral catheterization (CHU Point G, Department of urology). **With Permission**



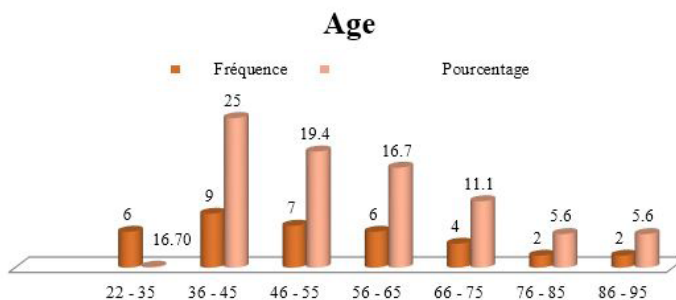
**Figure 4 :** 1 week after plastic surgery with delayed primary closure (CHU Point G, Department of urology). **With Permission**

The average length of stay was 33.5 days with 2 patients exceeding 3 months of hospital stay.



**Figure 3 :** 2 weeks evolution of surgical debridement of Fournier Gangrene with regular dressing twice per day / suprapubic catheterization (CHU Point G, Department of urology). **With Permission**

After adequate wound cleaning and eventually with tissue granulation, the defect was closed primary by plastic surgeons or with delayed primary closure if appropriate.



**Figure 5:** Age distribution among FG patients

**Table I : Main complaint**

Main complaint	Frequency	Percentage (%)
Perineal abscess	1	2,8
Scrotal abscess	1	2,8
Abdominal wall wound	2	5,6
Penile-scrotal wound	1	2,8
<b>Scrotal wound</b>	<b>10</b>	<b>27,8</b>
Scrotal purulent collection	6	16,7
Penile trauma	1	2,8
<b>Painful scrotal swelling</b>	<b>14</b>	<b>39</b>
<b>Total</b>	<b>36</b>	<b>100</b>

**Table II : Anatomical location**

Diagnosis	Frequency	Percentage (%)
<b>Scrotal Gangrene</b>	<b>27</b>	<b>75</b>
Abdominal wall gangrene with penile extension	1	2,8
Abdominal wall Gangrene	1	2,8
Penile-scrotal gangrene	4	11,1
Scrotal gangrene & Hydrocele	2	5,6
Perineal necrosis	1	2,8
<b>Total</b>	<b>36</b>	<b>100</b>

**Table III: Source of Infection**

Source	Frequency	Percentage (%)
Anorectal zone	1	2,8
External genitals trauma	1	2,8
<b>Urogenital disease</b>	<b>34</b>	<b>94,4</b>
<b>Total</b>	<b>36</b>	<b>100,0</b>

**Table IV : Overall Prognosis**

Evolution	Frequency	Percentage (%)
<b>Discharged</b>	<b>30</b>	<b>83,3</b>
Death	4	11,1
Refusal of treatment	2	5,6

## DISCUSSION

The surveyed population had a mean-age of  $52.75 \pm 18.03$  ranging between 22 to 95 years, and the most predominant group with 25% had between 36-45 years. Jarboui et al. (2007) reported similar results in Tunisia with a mean-age of 50.3 years [3], which was a higher age compared to Rimtebaye K. (2014) in Tchad [4] and S. Ullah (2009) in Pakistan [5] who had respectively a mean-age of 38.33 and 47 years. Thus, we note that FG is predominant in adult patients; and farmers are the most common diseased category with 47.2% due to poor hygiene and low socioeconomic status confirmed also in many reports where the scarcest social communities were more affected [5].

Time of symptoms onset extended at an average of  $22.66 \pm 22.96$  days with more than 36.6% occurring within 7 days, contrasting with results found by S. Jarboui (2007) [3] who reported an average of  $12,7 \pm 18,37$  days for the onset of symptoms. Herein, we found the late presentation of patients to the health centers for treatment; which can be explained by the population limited financial resources to seek for advanced care.

Patients received better specialized care within 6 hours of arrival to the hospital, and 88.9% were immediately admitted. The survey found that the earlier the surgical treatment, the better the prognosis ( $p=0.019$ ). Painful scrotal swelling and scrotal extravasation of pus were the most common complaint at arrival with respectively 39% and 25%; contrasting with S. Jarbaoui et al, (2008) [3] and S. Ullah (2009) [5] who reported scrotal pain the most common complaint, and G. Verna et al. (2004) [6] who reported scrotal swelling as the single overall most common complaint at first presentation at the health care center.

16.8% of patients had other associated diseases in addition to FG; herein, 2 patients had Diabetes mellitus, 1 patient with Heart failure, 1 patient was HIV positive, and 2 patients were paraplegic. Both the patients with other comorbidities were managed in a multidisciplinary approach. The study's rate of comorbidity is inferior to other reports where Diabetes Mellitus and immunodepression conditions were the most predominant [5] for instance Malnutrition, long term Steroids use, dialysis and alcoholism.

FG used to be described as idiopathic long time ago. Actually, it has been proved and we continue to notice that the most common cause of FG is an anorectal and/or urogenital and/or simply a localized skin infection [7, 8]. We reported 94.4% of cases with an urogenital source of infection, confirmed similarly with the most recent reports of FG [8]; though, D. Picraonos (1990) reported anorectal diseases to predominate with 30% prediction to perirectal abscess [9].

A. Mejean et al (2005) reports 76.4% of FG to be caused by urethral stenosis, followed by anorectal diseases with 14.8% [10]. Traumas, perineal surgeries or traumatic urethral catheterization are rarely reported to cause FG and often are complications of proctological or urogenital surgical procedures [11]. We found in our study 2.8% cases equally related to perineal trauma and urethral traumatic catheterization, and 8.3% after urethroplasty for urethral stenosis; though, K. Borki (2005) reports 18.9% due to urethral stenosis [11], and D. Picraonos (1990) reports 25%

from urethral traumatic catheterization [9].

The survey had many technical challenges that could have deflected on the expected results for instance the small sample size, the scarce patients' socio-economic status that limited the extension of all required investigations, and a sufficient admission period for an adequate complete hospital management. Fortunately, the hospital social department intervened to support patients for the required treatment and supported them during the long and difficult period of hospitalization. The culture and sensitivity of swabs were performed in all patients who underwent surgical debridement, but only 52.4% of them had conclusive results. No specific cause was found in 47.4% cases, and we considered them as primary FG which doesn't exhibit a clear source of infection. In fact, the study doesn't have evidence to confirm with accuracy the absence of causality; a fact that was previously reported [7, 10].

E.coli was the most common germ (31%), similar to results found by Z. Sanogo (2003) with 33.3% cultured E. coli in FG patients [2]. The culture was sterile in 47.4%. We did not have to perform blood cultures provided that all patients were on empirical antibiotics and didn't exhibit high fever in favor of high bacteremia; though systematic blood smear was done for patients who experienced transitory moderate fever to rule out malaria as the country is in an endemic zone for malaria. No imagery was performed on any studied patient.

8.4% FG were extending outside the anal, scrotal, and perineal areas. The current literature reports up to 54% extension of necrosis. This significant difference might be explained by the location of the necrosis in the anorectal sphere with involvement of abdominal wall, thorax, lumbar and thighs [11], elucidated by the anatomical continuity of the scarpa fascia from the abdominal wall, to the scrotum and thighs. Moreover, the necrosis could eventually extend higher up to the clavicles. 5.6% cases had extension of necrosis to the anterior abdominal wall (Figure 6), and Diabetes Mellitus was associated with the extension of necrosis to the abdominal wall in 2.8%; even if Palmer (1990) reported absence of association between the surface necrotized and the related mortality rate [12].



**Figure 6** : 1 week after plastic surgery extensive debridement with delayed primary closure (CHU Point G, Department of urology). **With Permission**

The surgical management of FG is related to the extension of lesions, the clinical description and presentation of the patient, and the associated comorbidities. The treatment should be implemented in emergency with adequate resuscitation, empirical antibiotics, and surgical debridement which has to be done the earliest possible to control the source of infection, and finally supplement with oxygen therapy if necessary. Herein, the multidisciplinary approach should be emphasized without delay [3].

Surgical debridement was performed in 80.6% of patients (Figure 6/7), and 63.9% had scrotal delayed primary closure.



**Figure 7** : Buttocks surgical debridement with plastic surgery (CHU Point G, Department of urology). **With Permission**

The wound healing process was achieved well supported with daily dressings; and only 3% required plastic surgery following aggressive surgical debridement. K. Borki et al (2005) in Maroc had 5% of good cosmetic outcome on patients who underwent plastic surgery debridement during the early period of surgical management [11].

Surgical debridement coupled with plastic reconstruction was expensive, and some patients could not afford the entire treatment, therefore unless high flow oxygen support recommended, Hyperoxid oxygen solution was applied locally on the necrotic wound till the clearance of all devitalized tissues [14]. G. Verna (2004) described the effect of hyperoxide oxygen solution only applied regular on the necrotic tissues, and, without surgical debridement, and it has resulted in satisfactory cosmetic expectations [6].

Many authors suggest Vacuum aspiration closure (VAC) as support to proper and quick wound healing and granulation tissue formation, therefore facilitating plastic reconstruction and decreasing wound contamination regarded the regular dressing changes; herein, the VAC is indicated mostly in widely extended wound with deep tissue defect [15, 16].

Urethral catheterization was systematically done in 38.9% patients to sustain dryness of lesions, local hygiene and monitoring of diuresis; but, some authors use foley catheter only in case of urethral involvement [7]. Open cystostomy was required in 13.9% in our study, but other reports mention systematic cystostomy for the management of FG [17].

We noted 11.1% of mortality related to FG in our study; and we believe that this high mortality is related to the associated poor prognostic predictive factors and the delay to consult the health centers for adequate care and treatment. The risk of mortality increased with delay of management ( $p=0.001$ ); and the poor prognostic predictive factors encountered in our study are: advanced age, diabetes, late consultation and delayed management, extension of necrosis to the abdominal wall, kidney failure at admission, number of iterative serial debridement, and septic shock (perioperative or postoperative alone).

Similar results were also reported in the previous literature, where the FG related mortality rate ranged between 3-45% [5]; and the description was mostly severe sepsis or septic shock. Early diagnosis and adequate timely surgical debridement in emergency were best single predictors to reduce drastically the high mortality encountered. The overall length of stay averaged 33.5 days in our study; which was reported by ST. Edino (2005) [10] and S. Ullah (2009) [5].

## CONCLUSION

Fournier's gangrene is a frequent pathology. Its diagnosis is predominantly clinical; and the prognosis is related to the extension of necrosis. The quick and timely adequate management has to be adjusted to the timely clinical picture of the patient.

**Informed consent and permission to use personal materials including unidentifiable pictures were obtained, and agreed to be used only for academic purpose.**

**Authors declare no conflictual interests to this survey and publication of its results.**

## REFERENCE

1. P. Sarkis ; F. Farran ; R. Khoury ; G. Kamel ; et Al. Gangrène de Fournier : revue de la littérature récente, Progrès en urologie (2009) 19, 75—84.
2. Sanogo ZZ1, Ouattara Z2, Yena S1, Doumbia D3, Coulibaly Y3, Tembely A.2, Sangaré D1, Soumaré S1 GANGRENES CUTANÉES, Mali Médical, 2003, P35
3. Slim Jarboui, Hichem Jarraya, Sami Daldoul et Al. Étude clinique et thérapeutique et analyse pronostique des gangrènes du périnée : A propos de 35 cas. Presse Med. 2008; 37: 760–766, doi:10.1016/j.lpm.2007.08.018.
4. Rimtebaye K, Niang L, Ndoye M, Gangrène De Fournier : Aspects Épidémiologique, Clinique, Diagnostique Et Thérapeutique Au Service D'urologie De N'Djamena. Uro'Andro-Volume-1 N° 2-Avril -2014
5. S. Ullah ;M. Khan; M. AsadUllah Jan, Fournier's Gangrene: A Dreadful Disease, Surgeon, 1 June 2009, pp. 138-42
6. Verna G, Fava F, Baglioni E, et Al ; Gangrène de Fournier : remarque sur deux cas cliniques. Annales de chirurgie Plastique et esthétique [Ann. Chir. Plast. Esthét...]. 2004, vol.49, no 1, pp. 37 – 42 [6pages]
7. BAURIENNE H, sur une plaie contuse qui c'est terminé par le sphacèle du scrotum J Med Chir Pharm. 1764:20:251- 253
8. Dahm P, Roland, Vaslef SN, Moon RE, Price DT, Georgiade GS et al. Outcome analysis in patient with primary necrotizing fasciitis of male genitalia. Urology 2000; 56:31- 36
9. FICHELE A, NIMIER M, infection des parties molles par synergie Bactérienne Ann. Fr. Reanim 1990; 9:269-274
10. ST Edino, AA Yakubu, A Obidiaso la gangrène de Fournier dans le centre Tertiaire de Nigeria. African Journal of Urology Vol. 11, no. 1 (2005): 1 – 5 Sur le Net 19 – 04 - 2005
11. K. Borki, Ait Ali, A Choho, M Daali, S. Alkandry, J Landrés gangrène périnéoscrotale : à propos de 60 cas e – mémoires de l'Académie Nationale de Chirurgie, 2002 ,1 (4) : 49 – 54 sur le net 19 – 04 - 2005
12. R. Vick, la maladie de Carson C. Fournier. Urol Clin North Am 1999; 841-849.
13. FICHELE A, NIMIER M, infection des parties molles par synergie Bactérienne Ann. Fr. Réanima 1990; 9:269-274
14. HUNALD F, SAMISON LH, RAKOTAORUIJAONA A, RANAIVOZANANY A : Multiple incisions étagées et tunnelisées de la Gangrène de Fournier extensive dans le service de chirurgie viscérale HJRA Antananarivo Madagascar à propos de deux cas. Médecine d'Afrique Noire 2006- 53 (1).
15. A. Stainier , B. Tombal et coll., Gangrène de Fournier sur escarre ischiatique : utilisation du pansement occlusif aspiratif et stratégie thérapeutique Progrès en Urologie (2007), 17,1000-1002
16. R. Czymek et al. Vacuum-assisted closure in Fournier's gangrene; The American Journal of Surgery (2009) 197, 168 –176
17. BURPEEJ.F et EDWARDS p :- Fournier gangrène .J. Urol., 1972,107, n.5, n 812-814.