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RESEARCH ARTICLE

FOURNIER'S GANGRENE OF THE EXTERNAL GENITALIA: PLASTIC RECONSTRUCTION BY THIN SKIN GRAFT

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Abstract

To present our contribution to surgical reconstruction ofFournier's Gangrene of the External Genitalia (FG-EG), depending on the lesions.This is a retrospective study of 32 patients initially treated in the urology department of the Mohammed VI University Hospital of Marrakech, between January 2016 and December 2021. The mean age of the patients was 51. (30-72) years. All were men. All of them presented an infectious picture, thirteen of them were treated by hydroelectrolytic resuscitation and tri-antibiotic therapy. The skin lesions observed concerned the external genitalia (EG) in 08 cases (25%), then the scrotum and perineum in 24 cases (75%). All skin lesions were stripped, followed by local dressings. Thus, 28 patients (87.5%) had healed after a thin skin graft taken from the inner thigh, and 04 patients (12.5%) presented with a graft release and were then led in directed healing. Gangrene of the external genitalia FG-EG is a serious condition, which realizes, on the one hand, a toxi-infection treated by resuscitation and tri-antibiotic therapy, on the other hand, more or less extensive skin lesions requiring debridement, stripping, dressing, and then a plastic surgical reconstruction that restores an adequate penoscrotal environment that does not compromise the quality of sexual intercourse as well as the reproductive function of the testicles, especially in the young subject.

Introduction:-

Gangrene of the external genitalia is a necrotizing fasciitis of the perineal region, which affects mostly men of all ages, and exceptionally women [1–5].

The treatment of Fournier's gangrene must be multidisciplinary, initiated as a matter of extreme urgency and carried out under close supervision in an intensive care unit. This treatment is medical on the one hand, with administration of a broad antibiotic therapy, and surgical on the other hand, with a complete debridement of the necrotic tissues [1,3,5]. This multidisciplinary therapeutic management may be associated with remote surgical reconstruction [1,5,6].

The purpose of this study is to present our contribution to the surgical reconstruction of the Fournier's Gangrene of the External Genitalia, depending on the extent of the lesions, in order to restore an adequate environment that does

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not compromise the quality of sexual intercourse as well as the reproductive function of the testicles.

Patients And Methods:-

This is a retrospective study that collected 32 records of patients who presented with perineo-scrotal gangrene retained in our study. These patients were initially hospitalized in the urology department of the Mohammed VI University Hospital of Marrakech (Morocco), between January 2016 and December 2021, and were all men.

Inclusion criteria:

All living patients who presented with perineoscrotal gangrene, with a Fournier gangrene severity index (FGSI < 9) and after undergoing all stages of treatment: hydroelectrolytic resuscitation, skin debridement, dressing until wound budding, spontaneous healing or plastic reconstruction, and then definitive healing with log sheets evaluating patient management, follow-up, and satisfaction were included in the study (32 patients).

Non-inclusion criteria:

All patients who died during resuscitation, with severely impaired general condition and significant metabolic disorder.

Parameters studied:

- Epidemiology: such as, age, time of admission, length of hospitalization, etiologies;
- Clinical: such as medical history, clinical signs, description of lesions, as well as associated affections, with a notion of alcoholism and smoking, of unspecified daily quantity [6–18];
- Complementary examinations: specifically, the blood count, the blood ionogram, the creatininemia, the bacteriological samples of the wounds, the HIV serology, the glycemia and the spermogram.

Treatments performed:

Medical treatment

It was instituted according to the following scheme:

- Parenteral antibiotic therapy from the outset, more or less adapted to the antibiogram, until the patient's general condition improved (fever fell, normal diet resumed), then oral relay for 10 to 21 days depending on the clinical course.Parenteral antibiotic therapy consisted of a combination of three antibiotics: a beta-lactam antibiotic, in particular third-generation cephalosporins (2 to 4 g/d until apyrexia was obtained), an aminoglycoside (150 to 300 mg/d for seven days) and a metronidazole (1.5 g/d for 10 days) Antibiotic therapy was most often used in conjunction with surgical procedures;
- A medical resuscitation made of hydroelectrolytic rebalancing, sometimes of isogroup isorhesus blood transfusion;
- Depending on the comorbidities, insulin therapy (in case of diabetes)and antihypertensive treatment (in case of hypertension) were associated with this protocol.

Surgical treatment

It consisted of:

- Evacuation of purulent collections and excision of all necrotic tissue [Figure 1]. All our patients have benefited from surgical treatment. This treatment was performed under general anesthesia or spinal anesthesia. It consisted of a flattening with excision of the integuments and all necrotic tissues. Additional excision of new necrotic areas was undertaken if necessary.

Figure 1:- Appearance that has evolved favorably after debridement-excision and daily care.

- Local care: daily dressing with a red Betadine sitz bath for seven to 25 days, depending on the size, location and appearance of the lesions, combined with more or less oxygenated water washing, then if the wound is clean, we continue the dressing with greasy tulle every 2-3 days until we obtain a wound ready for reconstruction;
- Plastic reconstruction was based on release-consolidation of the testicles and coverage by thin skin graft taken from the inner thigh was performed when the wounds were clean and well budded [Figure 2], after assessment, CPA and local samples;

Figure 2:- Consolidation of the testicles and coverage by thin skin graft.

- As for the patients who presented a gangrene on retention of urine by stenosis of the urethra, a urinary derivation by cystostomy was associated, then a cure of the stricture carried out at a distance, after complete healing of the plastic reconstruction.

Results:-

Epidemiological aspects

- Age: Fournier's Gangrene of the External Genitaliaaffected adult men with a mean age of 51 [30-72] years, of which 56.29% were under 50 years of age;
- Etiologies: gangrene was caused by urological and proctological diseases, and in 61% of cases, no etiology was found.
- 61% of cases, no etiology was found as presented in Table 2.

Diagnostic aspects

- Consultation time and length of hospital stay
- The average time to consultation for patients was 7.40 days (extremes: 3 and 16).
- The duration of hospitalization varied, from 18 to 102 days, with an average of 32 days.

Medical history
- 15 cases, or 35.71% of patients, had chronic diseases such as diabetes and hypertension.
Ultimately, the patients are divided according to etiologies and medical history.

Clinical signs
- All the patients presented with scrotal pain, infectious syndrome and skin necrosis.

Location of lesions
- The lesions involved the OGE in 25% of the cases, then the scrotum and the perineum in 75% of the cases, including one case with wide regional extension.

Biological data
- 78% of the patients had a hyperleukocytosis greater than 10,000 [10,000-17,000] elts/mm3.
- 71% of cases were anemic with a mean hemoglobin level of 9.1 [4.9-11.9] g/dl.
- Cytobacteriological examination of the pus could only be performed in 10 patients (32%). The germs isolated were Klebsiella pneumoniae (02 cases), Levinea (one case) and Staphy- lococcus aureus associated with Pseudomonas aeroginosa (07 cases). The other examinations were negative.

Therapeutic aspects
Medical treatment:
- Medical treatment with triantibiotic therapy and hydroelectrolytic resuscitation allowed for effective treatment of the infectious syndrome in all our patients; 05 patients with anemia of less than 9 g/dl had blood transfusions as well as iron supplementation. All this allowed a good recovery of the general state and contributed to a good evolution of the lesions under dressing, thus favouring the surgical reconstruction which gave a good result in terms of effective healing and total cure [Figure 3].

Surgical treatment:
- The 32 patients were cured and healed after a skin graft taken from the inner side of the thigh for a perineopenoscrotal lesion on the one hand, and for a penile lesion on the other hand which gavesatisfactory aesthetic and functional results[Figure3].

Figure3:- Surgical reconstruction with satisfactory aesthetic and functional results.

Discussion:-

Epidemiological aspects
In our series, Fournier's Gangrene of the External Genitaliaaffects young adults with a mean age of 51 years, in contrast to Maghrebian, Western and Japanese authors who report a mean age of 55 to 59 years [1,2,5,7–9]. The time to admission was also longer in our study than in the Western and Japanese series. These differences could be explained by the difference in socio-economic and cultural levels. Indeed, the majority of our patients lived in poor social and economic conditions and more than half were admitted with a delay of more than one week after the onset of symptoms.

The analysis of the patients' histories most often finds associated factors that would favor the infection and the constitution of gangrene [5,10,11]. These factors were, in our work, infection, but mainly diabetes and alcoholism.

Authors have also reported these same factors and corticosteroid therapy, which act by causing a state of decreased immune defenses and vascular thrombosis [3,10–14]. As also reported by Vanden-Bempt et al [15], the microorganism Actinobaculum schaali is also responsible for FG-EG. Apart from these intercurrent conditions, in our study,Fournier's Gangrene of the External Genitalia was caused by urethral strictures, anorectal abscesses and finally by simultaneous surgical treatment of a prostate adenoma associated with urethral strictures in one patient. In 61% of the cases, no etiology or contributing factors could be found. In this series, 25% of the cases of FG-EG were secondary to an identified cause or morbid condition that must be sought in all cases of pelvic-perineal gangrene; these causes are often reported in the literature [2,4,11]. However, we believe that there are many causes, but they are sometimes undeclared, such as in young patients (sexual practices), or unnoticed due to lack of investigation (minimal trauma or neglected dermatosis of the EG). When faced with a FG-EG, a cause must be sought.

Thus, FG-EG described as idiopathic (Fournier's disease) in the old studies appears more and more today in almost all the recent studies as a gangrene predominantly secondary to a urogenital, anorectal, dermatological, post-traumatic or postoperative cause [7–18]. Idiopathic or secondary, FG-EG or Fournier's disease is, from our point of view, one and the same disease with the same therapeutic scheme, as also reported by other authors [17–19].

Diagnostic aspects

The diagnosis of FG-EG is confirmed mainly by clinical examination, but in case of doubt, scrotal ultrasound is used to confirm the diagnosis according to some authors [19]. Magnetic resonance imaging allows a precise assessment of the extent of the gangrene and its starting point [19,20]. In our series, we never used imaging, as the clinical context was obvious, as reported by other authors [5,6]. All our patients were seen at the stage of advanced gangrene, evident on inspection. Pain and necrosis of the bursa as well as an infectious syndrome were present in all our patients. However, the 12 patients with idiopathic gangrene had less extensive skin lesions and did not present a purulent collection. Gangrene secondary to urethral strictures has a peculiarity, it starts with an infiltration of urine in the pelvic-perineal subcutaneous cell-fat tissue, which is easily resolved in early cases, after the placement of a suprapubic catheter, and often gives less extensive lesions.

Biological data

Various bacteria were isolated on cytobacteriological examination of the pus collected from our patients. Most of them were gram-negative bacilli and gram-positive cocci. The bacteria frequently found in the literature were Escherichia coli, Bacteroides, S. aureus, Proteus, P. aeroginosa and Enterobacter [8,12,13]. Some of our patients had severe anemia, corrected by transfusion. The other vital functions were only slightly disturbed.

Therapeutic aspects

The therapeutic management of FG-EG combines excision of necrotic tissue, resuscitation and broad-spectrum probabilistic antibiotic therapy administered on admission [8,17,18]. This is a wide excision taking all the necrotic tissues to the healthy area [18,21]. This radical attitude has the advantage of slowing down the evolution of the lesions and limiting the number of repeat surgeries, under general anesthesia. For some authors, excision should be sparing and limited to frankly necrotic tissue to allow subsequent islands regeneration of perineal skin without skin graft[21,22].

Bladder catheterization was performed in 100% of our patients, as soon as antibiotic therapy and resuscitation were initiated. For some authors, the bypass should be done by cystocatheter to avoid the risk of ascending infection during urethral soundings [23].

We have never resorted to colostomy, as advocated by some authors, to avoid soiling of the perineal wounds. Indeed, from one author to another, the lesions, the treatment, the results are variable and often not very comparable because the series are also variable and often of varying sizes, due to the fact that FG-EG remains a rare disease.

Antibiotic therapy was most often administered in triple combination [3–24]. Indeed, the bacteria usually isolated in FG-EG are sensitive to this combination [8,17]. This is an initial combination that could be adapted or modified according to the clinical evolution and bacteriological data.

The plastic reconstruction in our work was done when the wound was clean, with a budding barely flush with the skin edges, avoiding poor quality retractile tissue, witnessing a long term directed healing. All skin detachments

were tension-free, and were sutured simply by bringing the edges together. A thin skin graft from the anteromedial aspect of the thigh was used to cover the extensive scrotal lesions and another case of penile lesion.

Some adjuvant treatments, such as hyperbaric oxygen therapy and honey, giving good results according to some authors [7,14,24], were not used in our department. Our patients did not have respiratory distress requiring oxygen therapy.

The prognostic results of the medical-surgical treatment were satisfactory due to the multidisciplinary management of the patients, whose comorbid conditions and etiologies were correctly managed. This good result in our series is firstly related to the selection of patients whose gangrene severity index was less than or equal to 9, and as reported by most authors [7,25], the probability of patient survival is very high, greater than 80%, when the score is less than or equal to 9. This good outcome is also related to the youth of the patients as well as to early consultation.

The aim of this selection was to homogenize and harmonize our series in order to highlight the epidemiological, diagnostic, therapeutic and evolutionary characteristics of living patients. These characteristics in this study were the youth of the patients, the early management of the gangrene, the hemodynamic and poly-visceral disorders of little importance and the definitive cure.

Indeed, if Fournier, in 1883, described from five cases this gangrene as fulminant and idiopathic, in young patients [3], what is the current profile of patients who suffer from fulminant gangrene, fatal, especially in Morocco, despite the progress of resuscitation and the use of the antibiotic discovered in 1928 by Alexander Fleming [26], in the treatment of FG-EG

Conclusion:-

FG-EG is a serious condition, which on the one hand results in a toxic infection treated by resuscitation and tri-antibiotic therapy, and on the other hand in more or less extensive skin lesions requiring plastic surgical reconstruction. The scrotal surgical sutures are done without tension and the graft is performed with thin skin, so as to restore an adequate penoscrotal environment that does not compromise the quality of sexual intercourse as well as the reproductive function of the testicles, especially in the young patient.

Conflicts of Interest:
The authors declare no conflicts of interest.

Author contributions:
All authors contributed to the conduct of this work. They also declare that they have read and approved the final version of the manuscript.

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