

Reconstruction of Scrotal and Perineal Defects in Fournier's Gangrene

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Abstract

Fournier's gangrene described in 1883 by Jean Alfred Fournier, still poses etiopathogenic, evolutive and therapeutic problems. This is a therapeutic emergency; early diagnosis, medical and surgical treatments contribute to reducing mortality rate. Tissue defect engendered by infection and/or by its excision requires morphological and functional reconstruction. The choice of the reconstruction technique depends on several parameters: early or delayed coverage, the size of the defect, the local capital skin and the patient's general condition. Through this study involving 95 cases of scrotal and perineal gangrene treated at the National Center of Burns and Plastic Surgery of Ibn Rochd University Hospital of Casablanca over a period of 10 years (2004-2014), we report our approach in the surgical management of defect secondary to Fournier's gangrene.

Keywords

Fournier's Gangrene, Scrotal and Perineal, Flap, Scrotal Advancement

1. Introduction

Since its first description by Jean Alfred Fournier in 1883 under the title of fulminating gangrene of the penis [1], Fournier's gangrene (FG) which is defined as an acute dermo-hypodermic bacterial infection necrotizing with fast and unpredictable evolution to necrosis of scrotal and perineal tissues, still poses etiopathogenic, evolutive and therapeutic problems. Whether primitive or secondary to uro-genital, colorectal or perineal infection, Fournier's gangrene remains a serious affection by its local, regional and general complications. The mortality rate varies between 20% and 80%. It is a therapeutic emergency; early diagnosis and appropriate treatment contribute to reducing mortality [2]. The defect engendered by infection and/or its excision requires surgical recon-

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struction that aims to repair both morphology and function. Through this work involving 95 cases of perineal scrotal gangrene treated at the National Center of Burns and Plastic Surgery in Ibn Rochd University Hospital of Casablanca, we report our experience and approach in the surgical management of perineal and scrotal defects secondary to Fournier’s gangrene. Criteria that follow.

2. Materials and Methods

Our study is retrospective descriptive over a period of 10 years (2000-2014) involving 95 patients, performed at the National center of burns and plastic surgery of IBN Rochd University Hospital of Casablanca. The Data were collected from medical records of patients and we analyzed the indications and results in patients followed in our center. The study included all patients with Fournier’s gangrene who received a multidisciplinary treatment combining intensive care measures with triple antibiotherapy (aminosid-Imidazole-Amoxicillin-Clavulanic AC), an initial surgical treatment and a time of early or delayed reconstruction. The results of the reconstruction, according to the technique used, the location and extension of the defect were evaluated by functional and aesthetic objective criteria.

3. Results

All patients underwent surgical debridement of necrotic soft tissue of the scrotum and/or perineum. 72 patients (76% of the cases) required one or more iterative debridement. The average area of the defect caused by the debridement was 105 cm². Our surgical indications summarized in **Table 1** had emerged from early or delayed character of coverage, the size of the defect and the local tissue capital; When early reconstruction was indicated in 23 patients (a quarter of our patients), the myocutaneous gracilis flap was privileged. For patients who received delayed reconstruction, secondary healing was reserved for small defects or in patients with high anesthetic risk patients (10 cases; 10.5% of patients); a scrotal advancement and secondary suture were possible in 24 patients in whom the size of the defect did not exceed 50% of the surface of the scrotum; When the defect was extended to the scrotum, perineum and/or abdominal wall, reconstruction using skin graft was performed in 16 patients. 16 patients (17% of cases) underwent a reconstruction by internal fasciculate thigh flaps when the defect exceeded 50% of the scrotum and extended to perineum without reaching the root of the thigh nor abdomen, and 7 patients were reconstructed by myocutaneous gracilis flap for uneven defect increasing the risk of formation of a dead space. We noticed simple operative follow-ups in more than 80% of cases and minor postoperative complications such as suture release (5 cases), partial flap necrosis (3 cases) and partial lysis of the skin graft (2 cases) which were managed by secondary healing. **Table 2** sums up postoperative complications met in our series.

4. Discussion

The management of perineal and scrotal gangrene combines intensive cares measures (management of hydro-electrolytic troubles, management of renal, hepatic and respiratory failure) a triple-antibiotherapy probabilistic at start and then adapted to the results of bacteriological samplings and surgical debridement in emergency combined or not digestive derivation depending on the localisation and an urinary catheter or cystostomy in case

Table 1. Reconstruction techniques of scrotal and perineal defects in Fournier’s gangrene in our study.

Reconstruction	Technique	Case	%
Early	Musculo-cutaneous flap (Gracilis)	23	24.2%
	Secondary healing	10	10.5%
	Avancement scrotal	24	25.2%
Delayed	Skin graft	16	16.85%
	Fascio-cutaneous thigh flap	16	16.85%
	Musculo-cutaneous flap (Gracilis)	6	6.3%

Table 2. Postoperative complications in our study.

Suites	Case	%
Simple	83	87.4%
Infection and suture release	5	5.3%
Hematoma	3	3.14%
Flap partial necrosis	2	2.1%
Partial lysis skin graft	2	2.1%

of urethral affection [3]. The initial surgical debridement consists of a wide excision of all necrotic tissue going through healthy tissue in the periphery and in depth.

We performed a wide excision and early reconstruction by a musculocutaneous flap (gracilis) in 24% of our patients. In fact, when the patient's general condition, quality of initial debridement and locoregional possibilities (slightly extended gangrene) allow it, early coverage was carried out. A musculocutaneous flap called for. We think that this approach has several advantages compared to conventional approaches; on one hand, the muscle adapts itself better to surfaces which reduces the rate of postoperative complications (seroma, hematoma), and it also limits the extension of the septic process by bringing trophic muscular tissue well vascularized, more resistant to infection and enabling the diffusion of antibiotics. On the other hand, early reconstruction reduces the healing delay and duration of wound care; this shortens the stay in hospital and improves the quality of life of the patients.

In other situations, which represent the majority (insufficient initial debridement, hemodynamic instability) reconstruction is postponed. We will use iterative debridement (second looks) for better control of the infection. Regular dressings are made to speed up debridement of necrotic tissue at start and favouring granulation and then cicatrization. Negative pressure dressings (VAC) have their indication and would be efficient in the treatment of slightly extended Fournier gangrene. Likewise, Hyperbar Oxygen (HBO) can be discussed for its pro-healing action and anti-infections action against anaerobic bacteria such as Clostridium [4]. We do not dispose HBO or VAC and they were not practiced in any patient in our series. The coverage of the defect called for different techniques of plastic surgery: secondary healing, advancement flap, thin skin graft, full thickness skin graft, local or regional flap. The choice of technique will depend on the size of the defect and the local tissue capital. Contrarily to testicular burying, Repair would be both morphological and functional aiming at not only to recreate a néoscrotum but to reduce the risk of sterility secondary to traumas to which the testicles are submitted during movements [5] [6] (Figure 1).

Secondary healing is a simple means favored by the vascular richness of the scrotum and by its regenerative capacity. It should be reserved to small size defect or in patients with high anesthetic risk due to the extended time for healing, the risk of secondary infection and retractile phenomena often leading to scrotal deformation. The scrotal advancement flap benefits of the extensibility of the scrotum. The unaffected scrotal skin will be advanced to cover the defect. This applies to isolated small to moderate scrotal defect losses $\leq 50\%$ [7]. The skin graft is a safe means of coverage that is technically easy to implement provided that the tunica vaginalis is preserved [8]. It allows a rapid coverage of wide defect extending to the abdominal wall, the sidewalls or thighs. This technique would be less providing of sterility secondary to the increase of testicular temperature. However, it has some drawbacks: the graft is sometimes difficult to apply in uneven area and the technique remains purveyor of retractions and ulcerations. It is therefore preferable to graft the testicles and perineum in total skin that has less tendency to retract. The fasciocutaneous flaps have the advantage compared to the skin graft to cover large perineal and scrotal defect without tendency to retraction. The pudendal and anterolateral thigh flaps [9]-[12] and Mc Gregor flap [13] are interesting alternatives according to the defect localisation. They give a satisfactory functional and cosmetic result with less donor site morbidity compared with a musculocutaneous flap. When the perineal and scrotal defect is deep and uneven a muscular transfer is often necessary. It allows defect filling without dead space. However, its thickness is sometimes the cause of a cosmetic disgrace. The musculocutaneous flap of gracilis muscle is the most used [14] [15], the abdominal rectus flap has also been described in this indication [16].

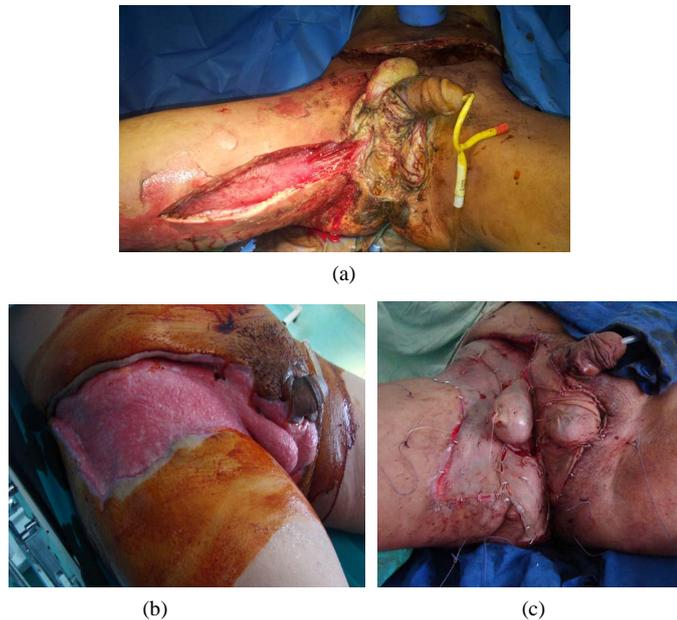


Figure 1. (a) Fournier gangrene with extension to the right thigh and abdomen that required to discharge incision; (b) Loss of inguinal and scrotal substance budding post gangrene Fournier; (c) Skin graft coverage with semi-thick skin harvested from the ipsilateral thigh.

5. Conclusion

The périnéoscrotale gangrene is a serious condition often involving the vital prognosis of the patients. Its prognosis depends on the earliness and quality of initial management. The repair aim is to obtain coverage that is both functional and aesthetic. The choice of technique depends on several parameters: early or delayed coverage, the size of the defect, the local capital skin, general condition of the patient and the surgeon's practices. A quick and good coverage mainly using musculocutaneous flap, helps to improve the quality of life of patients and reduce the cost of care.

Disclosures

The author has no financial or commercial interest to declare in relation to the content of this article.

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