Facteurs prédictifs de mortalité dans la gangrène de Fournier

Predictive factors of mortality in Fournier's gangrene

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RÉSUMÉ

Prérequis : La gangrène de Fournier constitue une pathologie rare mais grave, responsable d'un taux élevé de mortalité. Plusieurs facteurs prédictifs de mortalité ont été déjà déterminés à partir de séries rétrospective mais ces facteurs varient le plus souvent entre les différentes études.

But : Le but de ce travail est d'étudier les caractéristiques cliniques et thérapeutiques des patients présentant une gangrène du périnée afin de déterminer les facteurs prédictifs de mortalité.

Méthodes : Il s'agit d'une étude rétrospective qui a colligé tous les patients admis au service de chirurgie 'B' de l'Hôpital Charles Nicolle pour gangrène de Fournier durant la période allant du 1er Janvier 2000 au 31 Décembre 2010. Le diagnostic a été retenu devant la constatation de nécrose au niveau du périnée. Pour tous les patients, les données cliniques et thérapeutiques ont été notées. Une étude comparative a été ensuite réalisée entre le groupe des survivants et le groupe des décédés.

Résultats : Quarante et un patients ont été inclus. L'analyse univariée a identifié comme facteurs prédictifs de mortalité: l'extension en dehors du périnée (p=0,002), le sepsis sévère et/ou le choc septique (p=0,006), fréquence cardiaque supérieure à 90/min (p=0,009), globules blancs supérieur à 20000/mm3(p=0,009). L'analyse multivariée a retenu l'extension en dehors du périnée comme facteur indépendant de mortalité (p=0,004).

Conclusion : L'amélioration du pronostic de gangrène du périnée passe par un diagnostic précoce avant l'extension des lésions en dehors du périnée qui est associée avec un risque élevée de mortalité en dépit d'une prise en charge optimale.

Mots-clés

SUMMARY

Background: Fournier's Gangrene is a rare but serious condition accounting for a high death rate. Several predictive factors of mortality have been reported from retrospective series but more often these factors vary from one study to another.

Aim: The aim of this work is to assess the clinical and therapeutic characteristics of patients treated for Fournier's gangrene in order to determine the predictive factors of mortality.

Methods: The study enrolled retrospectively all patients admitted in the surgery 'B' unit of Charles Nicolle hospital for Fournier's gangrene during the period ranging between January, 1st, 2000 and December, 31st, 2010. The diagnosis of Fournier's gangrene has been retained each time a tissue necrosis has been noted in perineum, whether during physical examination or intraoperatively. For all patients, clinical variables and treatments were collected. A comparative study was carried out between the group of survivors and deceased.

Results: Forty one patients have been included. The univariate analysis identified the following predictive factors of mortality: extension of lesions outside the perineum (p=0,002), severe sepsis and/or a septic shock (p=0,006), heart rate greater than 90/min (p=0,001), white blood cell count higher than 20000/mm3 (p=0,043) and urea level higher than 7 mmol/l (p=0,009). The multivariate analysis retained the extension of gangrene beyond the perineum as an independent predictive factor of mortality (p=0,004).

Conclusion: Improving prognosis of Fournier's gangrene requires early diagnosis ahead of the extension of lesions beside the perineum which is associated with a higher mortality risk despite optimal care and treatment.

Key-words

Fournier's Gangrene is an acute dermohypodermitis with primary or secondary necrotizing cellulitis of the perineum [1]. It is a rare but serious condition accounting for a high death rate ranging between 16 to 40% [2,3]. This rate remains high despite the progress achieved these last years at both diagnostic and treatment levels, notably in matters of intensive care [3].

The aim of this work is to assess the clinical and therapeutic characteristics of patients treated for Fournier's gangrene in order to determine the predictive factors of mortality.

METHODS

It is a retrospective study that enrolled all the patients admitted in the surgery 'B' unit of Charles Nicolle hospital for Fournier's gangrene during the period ranging between January, 1st, 2000 and December, 31st, 2010. The inclusion criteria were as follows: (1) Age ≥ 16 years, (2) patients diagnosed with Fournier's gangrene. The diagnosis has been retained each time a tissue necrosis has been noted at the level of the perineum, whether during physical examination or intraoperatively, (3) hospital admission during the study period.

For each patient record, we have noted the anamnestic data regarding age, sex, past medical history, factors of poor healing as well as symptoms and the duration of their evolution before admisssion. The reported clinical data were haemodynamic status, location and extent of the skin lesions at the level of the perineum. The severity of sepsis has been estimated according to the Levy classification [4] and Fournier's Gangrene Severity Index [5] was considered for assessing the severity of the disease. The surgical procedures and findings have been noted as well as the number of operating room revisions.

The primary outcome measure was the mortality which has been defined as any death happening during hospitalization or within the 30 days following operative procedure.

All the data have been entered into a statistical analysis software SPSS (Statistical Package for the Social Science version 21). A descriptive study has been worked out followed by a comparative study between the group of survivors and that of those who died. The qualitative variables have been expressed through their percentages and the quantitative variables through their averages with standard deviations when distribution is Gaussian, otherwise by their medians with the extremes.

Comparisons have been made through the chi-square test for qualitative variables and the student t-test for quantitative variables. A difference was considered as significant if the p value was ≤ to 0,05 with a confidence interval of 95%. The variables identified by the univariate analysis have been introduced into a logistic regression model to determine predictive factors of mortality.

RESULTS

Forty one patients have been included in the study: 28 men and 13 women. The median age was 50 years [20-84]. The symptoms were isolated perineal pain in 17% of cases and pain associated with fever in 83% of cases. The median time of admission to hospital in relation to the onset of symptoms was 10 days [3-60]. However, among the 41 patients, 59% consulted a physician the first day when symptoms appeared and 90% have consulted at least once before their admission without any diagnosis retained. In addition to the unawareness of the diagnosis, 46% of patients have wrongly been put under antibiotic treatment.

As regards past medical history, 54% of patients presented diseases in which diabetes prevailed in two thirds of cases. Cardiovascular history and kidney failure were present in the remaining cases. As regards poor healing factors, 15 patients were diabetic and four on corticosteroids.

Upon admission, 16 patients presented severe sepsis whereas three were in septic shock. The skin lesions at the level of the perineum were inflammatory in 51% of cases and with necrosis in the remaining cases. There was an extension of lesions beside the perineum in 24% of cases (Table 1, figure 1). As regards the etiology, the initial port of entry was perianal infection in 95% of cases and skin infections in the remaining cases. No further exploration or imaging was performed preoperatively. Regarding the Fournier's Gangrene Severity Index, score calculation was not possible due to lack of some biological variables including serum bicarbonate and serum creatinine.

Table 1: Extension of skin lesions on physical examination

skin lesions	n	%
Localized to the perineum	31	76
Extended outside of the perineum	10	24
• Abdominal wall	6	-
• Lower limbs	3	-
• Abdominal + lumber wall + lower limbs	1	-

Figure 1 : Extended Fournier's gangrene to the left thigh

All the patients underwent preoperative intensive care associating volemic expansion and antibiotic treatment. Antimicrobial therapy was empirical covering anaerobic bacteria, gram-negative bacilli and gram-positive-cocci. The combination penicillin-gentamicin metronidazole was prescribed in 73% of cases. Ofloxacin was used when patients were allergic to beta-lactam antibiotics. The most frequent bacterial

organisms cultured from the wound sites were Escherichia coli (88%) and Enterococcus faecalis (30%). The other organisms were Proteus mirabilis, Klebsiella pneumoniæ and Bacteroides fragilis. One patient died a few hours after admission, before being operated on, of a septic shock. For the remaining 40 patients, surgery consisted in large incisions, debridement and necrotic tissue excision (Figure 2).

Figure 2 : Excision and debridement of a Fournier's gangrene with extension to the left lower limb

The percentage of necrotic area compared to body surface area could not be calculated due to lack of data. A deterioration of the haemodynamic status happened in four patients, which required recourse to cardiotonics and mechanical ventilation post-operatively. A colostomy was performed in four cases due to the presence of extensive perineal lesions in three cases and to poor healing following a dressing always soiled with fecal matters in one case. The median number of revisions in the operating room was two [1-20]. A single patient who had an important loss of tissue has been treated by hyperbaric oxygen therapy. Skin grafts have been performed in three patients within periods ranging from 1 to 2 months.

Six patients died providing a death rate of 15%. The death reasons were a septic shock related to the Fournier's gangrene in five cases and a nosocomial bronchopneumonia in one case.

The comparative study between survivors and deceased groups showed that these two groups were comparable regarding age, sex, medical history and functional signs (Table 2). The delay of admission was longer in the group of deceased patients but without significant difference (p=0,601). The necrosis of tissue was also more noticed in the group of deceased patients but without significant difference (p=0,093). The univariate analysis identified the following predictive factors of mortality: 1) extension of lesions outside the perineum (p=0,002), 2) severe sepsis and/or a septic shock (p=0,006), 3) heart rate greater than 90/min (p=0,001), 4) white blood cell count higher than 20000/mm3 (p=0,043) and 5) urea level higher than 7 mmol/l (p=0,009). The multivariate analysis has allowed to retain the extension of the gangrene beyond the perineum as an independent predictive factor of mortality with p=0,004 and OR=30 ; IC 95% [2,73-328].

Table 2 : Comparative study between survivors and deceased groups

	Survivors n=35	Deaths n=6	p
Age	49	47	0,764
Sex (H/F)	24/11	4/2	1,000
Symptoms			
Isolated pain	6	1	0,602
pain + fever	29	5	0,601
Admission delay (days)	9	12	1,000
Poor healing factors	16	3	0,093
Skin necrosis	15	5	0,001
Pulse > 90/min	8	6	0,386
Systolic Blood Pressure < 90 mm Hg	2	1	0,006
Severe sepsis and/or septic shock	13	6	0,002
Extension of lesions outside the perineum	5	5	0,043
White blood cell count > 20000/mm3	10	4	0,009
Serum urea > 7 mmol/l	6	4	0,801
Number of revisions in the operating room	1,5	2	

DISCUSSION

Our study allowed us to highlight the prognostic importance of the extension of gangrene beyond the perineum which increased to 30 times the risk of mortality. This extension has been favoured by a late care whose main reason was, in most cases, a wrong diagnosis.

Indeed, the delay of admission in relation to the start of signs was 10 days. This delay is longer than that reported in a recent literature review (6 days) [3]. The inadequate knowledge of the diagnosis of perineal gangrene could be explained by the fact that this disease can have an insidious start that finds expression in a mere pruritus or a feeling of tightness at the level of the external genital organs whereas the physical examination is poor [6]. Our series showed the difficulty to make a diagnosis at the early stages of the disease since the diagnosis has not been made in any of the 24 patients who consulted the very day when signs started to appear. Therefore, the contrast between loud functional signs and soft physical signs in the beginning should suggest the diagnosis without delay. This difficulty of diagnosis has led to the working out of scores allowing the early detection of tissue necrosis and thus to differentiate perineal suppurations from subclinical gangrenes [7,8]. It is at this early stage that morphological explorations such as ultrasound scan, CT scan and MRI are indicated, since they might show gas effusion at the level of soft tissues which cannot be detected through physical examination [9].

The extension of necrotic skin lesions has been, in our study, the independent factor predictive of mortality whose risk was multiplied by 30 in case of extension beyond the perineum. Dahm [10] has shown that the mortality risk was almost inexistent in the cases where necrosis was lower than 3% of the body surface area whereas the prognosis was poor in case of necrosis exceeding 5% of the body surface area. The prognostic value of the necrosis extension has been reported by several authors [9,11-13] , including some who outpointed the pejorative nature of the presence of a myonecrosis [12,13].

The extent of initial surgical debridement has been described as a prognostic factor [14]. This may help explain the relatively lower mortality rate in our series (15%) compared to that reported in the literature (16 to 40%) [2,3] despite a longer delay of medical management. Indeed we performed an aggressive surgical debridement for both necrosed tissues and tissues with doubtful viability, even though this led to larger tissue loss.

Other factors of poor prognosis have been reported but not found in all the series such as age, diabetes and the proctologic starting point of gangrene [2,3]. The same is true for severity scores such as Fournier's Gangrene Severity Index [5] whose value greater than 9 seems to be in relation with a death probability of 66,7 to 87,5% [15-17]. We could not calculate this score in our study for missing data.

As regards hyperbaric oxygen therapy, it would allow in theory an improvement of healing , a potentiation of the effects of antibiotics together with a direct anti-infectious effect on anaerobic germs [18]. However, no controlled study has shown efficiency in addition to surgery and antibiotic treatment [19].

CONCLUSION

Fournier's gangrene is a serious condition whose death rate remains high. Improving prognosis requires early diagnosis ahead of the extension of lesions beside the perineum which is associated with a higher mortality risk despite optimal care and treatment. The place of hyperbaric oxygen therapy in this therapeutic arsenal remains to be proved through randomized studies.

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