FOURNIER'S GANGRENE – SURGICAL CONSIDERATIONS

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Abstract

Fournier's gangrene (FG) is a galloping form of necrotizing infectious fasciitis located in the perineal, genital or perianal regions. Methods: The medical records of 10 patients with FG between 01 January 2003 to 31 January 2020 who presented in the Emergency Department at the St. Spiridon University Hospital Iasi were reviewed retrospectively. Results: All patients were males, with a mean age 51 years (range 24 years–78 years). One of the most common predisposing factors was diabetes. The mean time of symptoms prior to referral to treatment was 11 days, ranging from 4 days to 25 days. We performed a radical surgical debridement, requiring up to 5 surgical interventions consisted of excision of all necrotic tissue. In 3 patients (30%) after initial radical debridement, underwent loop colostomy for fecal diversion. Orchiectomy was performed unilaterally for gangrenous testis in one case. We registered mortality in 2 cases with FG extended to the abdominal wall. Conclusions: FG is still a fulminant disease, with a high mortality rate and prolonged hospitalization. Prognostic factors for mortality are advanced age, renal failure, extension to the abdominal wall, septic shock, and postoperative mechanical ventilation. Early diagnosis and aggressive treatment are essential for a good prognosis.

Keywords: Fournier's gangrene, necrotizing fasciitis, surgical debridement

Introduction

Fournier's gangrene (FG) is a galloping form of necrotizing infectious fasciitis located in the perineal, genital or perianal regions [1]. The condition is progressive and potentially lethal. The progression of infection at the level of scrotum, penis, or perineum involving Gram-Positive organisms, enteric bacilli, or anaerobes, can cause systemic symptoms, sepsis and possibly the death of the patient. FG is essential to be recognized in the Emergency Department, because only an early intervention is a key component in the treatment [2].

Methods

The medical records of 10 patients with FG between 01 January 2003 to 31 January 2020 who presented in the Emergency Department at the Saint Spiridon University Hospital Iasi were reviewed retrospectively. After analyzing the results, we tried to identify the risk factors and prognostic indicators of mortality. All patients with FG underwent one

or more, up to 5 surgical debridement of necrotic tissues.

Results

All 10 patients were males, with a mean age of 51 years (range 24 years–78 years).

The most common predisposing factor was diabetes mellitus present in 7 cases (70%) and anorectal cancer in 2 cases. In all cases, as an associate factor, low socio-economic status was recognized. Local changes at the clinical examination was present in all cases with skin erythematous, edematous, cyanotic, indurated and gangrenous, a faeculent odor was present secondary to infection with anaerobic germs and crepitus. The other frequently encountered symptoms at the time of admission was deterioration of the general status (60%), fever (80%), perineal and genital pain (100%), septic shock (50%).

The average time of symptoms prior to referral to treatment was 11 days, ranging from 4 days to 25 days.

Hyperleukocytosis (> 10.000/mm3) was discovered in all cases and in 3 patients (30%) the degree of anemia was severe necessitating blood transfusion. Renal failure on admission (blood creatinine > 1.2 g/l) has been identified in 5 cases (50%). Computer tomography of the pelvis was performed only in 5 cases. FG was restricted to the perineal area in 7 patients (70%) and in 3 patients (30%) gangrene was extended to the abdominal wall. Escherichia Coli, Bacteroides and Clostridium were the most frequent bacterial organisms cultured.

Aggressive fluid resuscitation was applied in all cases and they were treated mainly with triple parenteral broad-spectrum antimicrobial agents, using a third-generation cephalosporin, an aminoglycoside, and metronidazole, and hemodynamic support when necessary.

Continuous monitoring, mechanical ventilation and inotropic support were required in 2 patients with cardiopulmonary failure due to sepsis. We performed a radical surgical debridement (Figure 1,2), requiring up to 5 surgical interventions and which consisted in excision of all necrotic tissue. After initial radical debridement, 3 patients (30%), underwent fecal diversion, with loop colostomy. Orchiectomy was carried out unilaterally for gangrenous testes in one patient.

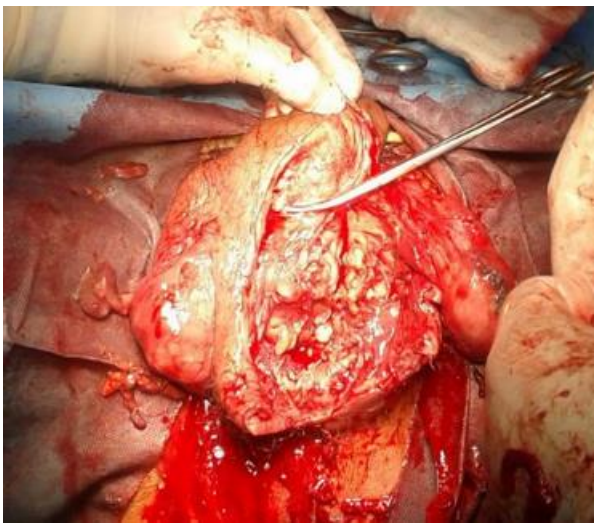

Figure 1 - Intraoperatory view – surgical debridement

Figure 2 - Intraoperatory view – 5 days after surgical debridement

We registered mortality in 2 patients (20%) with gangrene extended to the abdominal wall, sepsis after 5 repeated surgical debridement, cardiopulmonary failure and mechanical ventilation.

Mean hospital stay was 21 days (range from 11 days to 48 days).

Discussions

FG was described first time by Robert Robertson in 1777 [3], but the name of this perineal gangrene is given by Jean-Alfred Fournier in 1883 which describes it acute idiopathic gangrene of the scrotum, presenting a case with perineal gangrene in a healthy young patient [4]. It seems that however the first description of the disease belongs to the historian Flavius Josephus who recorded details of the death of King Herod of Judea, reporting of symptoms that included reporting symptoms including intense itching, intestinal pain, difficulty breathing, convulsions, and genital gangrene. Hirschmann analyzed the text and concluded that the diagnosis is Fournier's gangrene [5].

The incidence of FG is growing. If in the period 1950-1999 more than 1700 cases were reported after the years 2000 more than 1500 cases were described [6].

The ratio Male/Female is 10 to 1, probably due better drainage of the perineal region through vaginal secretions. Male homosexuals seem to have at higher risk. Other risk factors involved are: immunocompromised patients, alcoholism, diabetes mellitus (more 60% cases), cancer and HIV. There are also hygiene problems in patients with low social economic status which explains the high frequency in developing countries but there is also a relatively high supply in USA and western countries.

Identifiable causes are in approximately 95% of cases: dermatological, anorectal, urological, intra-abdominal. Trauma to the perineum and scrotum continues to be a frequently recognized mechanism for mechanism for bacteria entry and infection onset [7]. Recent surgery, presence of foreign bodies, perianal, perirectal abscesses, anal fissures; colonic perforations, urethral strictures, epididymoorchitis, urethral instrumentation, prosthetic penile implants, superficial soft-tissue injuries, intramuscular injections, genital piercings and penile self-injection with cocaine have been reported in the literature as causative factors Other factors that can cause FG can be: recent surgery, presence of foreign bodies, perianal abscesses, anal fissures, colic perforations, urethral strictures, urethral instrumentation, penile prosthetic implants, genital piercings, penile self-injection with cocaine, superficial soft-tissue damage [8-10]. FG is also found at immunocompromised children and cases with poor hygiene [11].

Common pathogens are Streptococcus, Staphylococcus, Enterococcus, Corynebacteria, E. coli, Klebsiella, Proteus and anaerobic germs like Bacterioides, Clostridium [12].

The infection causes a thrombosis of the small subcutaneous vessels which will favor the occurrence of gangrene. The polymicrobial origin of FG is required to create the synergy of enzyme production that favors the multiplication and rapid dissemination of the infection. One bacterium produces a nutrient for another, which in turn produces a leucocidal toxin. This toxin then protects both organisms from phagocytosis. In FG is a disequilibrium between host immunity and bacterial virulence [13,14].

FG has an insidious onset; it starts with itching and discomfort in the external genital organs. At the beginning of the infection, the pain may be out of proportion to the physical findings, then swelling and erythema of the region appear, and the patient complains of fever or chills, systemic symptoms. Genital and perianal examination is mandatory to detect the possible portal of entry. In our patients, the source of infection was identified in 6 patients (60%), and these were perineal abscesses [15,16].

As early treatment has the greatest benefits in reducing morbidity and mortality, early recognition scores have been created: admission heart rate greater than 110 beats/minute, serum sodium less than 135 mmol/L, blood urea nitrogen greater than 15

mg/dL, and white blood cell count greater than 15 × 103/μL [17].

Very important is the role of imaging. CT exam remains the best explorations and shows asymmetric fascial thickening, fluid collections, abscess formation and very important reveals the present of subcutaneous emphysema. Anteroposterior radiograph and ultrasonography identify subcutaneous emphysema and fluid collections [18]. We discovered the same aspects in our cases.

The treatment includes fluid resuscitation, empirical broad-spectrum antibiotics, early emergent surgical debridement, hyperbaric oxygen therapy, electrolyte and metabolic control and blood transfusion if indicated. Patients cannot be treated without surgery. Without surgery, there is no survival. Surgical treatment includes surgical debridement of necrotic tissue and must be repeated whenever necrosis is observed. Orchiectomy is required in cases with gangrene extension to the testicle, as was necessary for our cases in one patient.

Today a multistep approach therapy: surgery, hyperbaric oxygen therapy and negative pressure wound therapy is indicated in patients with disseminated FG [19]. We used vacuum therapy in only one case with the shortening of hospital stay. In cases requiring colostomy, the Flexi-Seal can be useful [20].

Morbidity is higher with a duration of hospital stay which varies from the literature between 2 to 278 days, and mortality rate is around 20-30% [12,19]. The mortality rate is influenced by numerous factors involving the immune system, co-morbid disease – DM, renal failure on admission, septic shock, postoperative mechanical ventilation, anorectal sourcem, delayed treatment and more than 5% body surface area involvement. There is described in the literature an FG severity index described in the literature. Depending on its values, early surgical intervention is required, which can improve survival in high-risk FG patients [21,22].

Conclusions

Fournier's gangrene is a fulminant disease that remains with a very high mortality rate. The advanced age, renal failure on admission, extension of infection to the abdominal wall, occurrence of septic shock and need for postoperative mechanical ventilation are the main prognostic factors of mortality. Early recognition of infection associated with invasive and aggressive treatment is essential for attempting to reduce these prognostic indices.

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