

OBESITY AND DIABETES, RISK FACTORS FOR POTENTIALLY LETHAL SOFT TISSUE INFECTIONS - CASE REPORT

Roxana RISTEA¹, Nicoleta SANDA¹, Silviana HERETOIU¹, Marius RISTEA² and Daniel ION^{1,2}

¹ University Emergency Hospital, Bucharest, Romania

² "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

Corresponding authors: Roxana RISTEA, E-mail address: roxristea@yahoo.com

Accepted November 16, 2015

Fournier gangrene is an acute, fulminating infection that has severe general manifestations and it is a medical-surgical emergency. It has a very high mortality (10-65%) and high risk of disability if not treated promptly and effectively. We present a patient of 47 years old known with obesity and gout and without other diseases, who presented to the emergency room with fever and chills and vivid pain that grew rapidly in intensity at a suddenly appeared perineal tumor. Based on clinical and laboratory data we decided emergency surgery. Postoperatively, the patient's evolution was slowly favorable.

Key words: Fournier gangrene, emergency, diabetes, obesity

INTRODUCTION

Fournier gangrene is an acute, fulminating infection that produces necrosis of the subcutaneous tissue and muscle fascia but does not affect the muscles.

It is a rare disease, with an extremely fast progression (3 cm tissue destroyed per hour), severe general manifestations and it is a medical and surgical emergency. It has a very high mortality (10-65%)¹ and high risk of disability if not treated promptly and effectively.

Although in the past most cases were caused by beta-hemolytic streptococci group A (*Streptococcus pyogenes*), nowadays it is considered that, most often, the disease is caused by associations of aerobic (staphylococci, streptococci, enterobacteria) and anaerobic bacteria (peptococci, peptostreptococci) with predominant gram-negative autologous flora².

Depending on the type of germs encountered, we describe two types of necrotizing fasciitis:

Type I - aerobic-anaerobic intestinal flora (occurs after abdominal-perineal surgery and has serious evolution);

Type II - association of pathogen staphylococcus, with Peptostreptococcus (commonly encountered in infections of the extremities, better prognosis).

The pathophysiologic mechanism is similar to other diffuse necrotizing infections. It consists in ischemia due to local hypoxia (secondary to the oxygen consumption by aerobic bacteria) which leads to a lower redox potential of the tissue, favoring the development of anaerobes. This process leads to necrosis. The low oxygen content and necrosis potentiate the effects of the anaerobic bacteria and cause rapid dissemination of the infection³.

Diabetes and obesity are frequently mentioned in the literature as favorable factors (in addition to alcoholism, malnutrition, immunosuppression and malignancy)⁴, although their epidemiologic association with Fournier gangrene is rather suspected than proven, given the small number of cases reported.

The treatment involves both medical and surgical emergency measures and must be started quickly⁵.

The purpose of presenting this case is to contribute to a better understanding of the necessary health care and practical implementation of preventive measures.

CASE REPORT

We present the case of a 46 years old male patient known with obesity (evolving for more than 10 years) and gout, without any other known pathological history, who comes into the emergency room with mediocre general condition, fever and chills and a painful perineal tumor, symptoms evolving for the last 6 days.

On the local examination we have discovered left perineal large tumor with inflammatory characters and cellulitis of the left buttock, thigh, groin and left part of the scrotum. The inflammatory tumor presents a central fluctuant area, with skin necrosis in progress. Inguinal lymphadenopathy with diameters of about one centimeter, higher on the left side and bilateral groin pain were found.

On the general examination we found confused patient with fever (39.3° C), dehydrated, cold, clammy skin, tachypnea (38 breaths per minute) with present bilateral vesicular murmur and no added noise; tachycardia (102 beats per minute) with equidistant and equipotent heart sounds, without murmurs and blood pressure of 110/70mmHg. We

also found grade III obesity with a body mass index of 41.4 kg / m² and waist circumference of 140cm.

No other changes were detected in the examination of the body systems.

The patient's condition gradually degrades from the very first minute of hospitalization.

We decide carrying out urgent investigations. Blood tests, electrocardiogram and chest X-ray were done.

Blood tests shows a significant neutrophilic leukocytosis (22 570 leukocytes / mm³ with 81% neutrophils), normochromic normocytic anemia (Hb = 11,3 g/dl, MCHC = 33,3g/dl, MCV = 81.2 fl), hypocoagulability (INR = 1.47 and APTT = 40 sec) and hyperglycemia (blood glucose = 359mg / dl).

Electrocardiogram reveals tachycardia (heart rate = 108 beats / min) without rhythm changes or signs of ischemia.

There were no pathological findings on chest radiography.

Based on clinical and laboratory data is established presumptive diagnosis of Fournier gangrene and sepsis and we start administrating broad-spectrum antibiotic treatment (third generation cephalosporin and metronidazole) in the first 45 minutes of presentation. Preoperative we administrated insulin - 12 units intravenous and 6 units subcutaneous and also intravenous fluid and electrolyte support. In approximately 2 hours after the treatment is started, we repeated blood tests and found lower blood glucose (from 350mg /dl to 186 mg /dl) without change in any other values.

We performed the surgical procedures under general anesthesia with intubation in the first 6 hours of admission.

With the patient in gynecologic position, we cleaned the spot and we performed large incision in the fluctuant part of the left perineal tumor out where evacuate about 300 ml of brown, creamy, fetid liquid (Figure 1). We collected samples for bacteriological and drug susceptibility tests (DST). We explored the affected region and found multiple necrotic tissues (skin, subcutaneous tissue and muscle fascia) that support the diagnosis of Fournier gangrene. We proceeded to large incisions with debridement and excision of all the necrotic areas (cell tissue, fascia, skin) all over the skin takeoff, sparing the muscles and wash with hydrogen peroxide, betadine and abundant chloramines the restant cavity. We practice also large incision in the scrotum and evacuated 15 to 20 ml brown, creamy, fetid liquid, from which we collected samples for bacteriological and sensitivity exams. At this level we found the maintaining of the integrity of testicles. We washed the wound with abundant hydrogen peroxide, betadine and chloramines, practiced betadine internal dressing of perineal cavity and placed 2 scrotal drainage tubes.



Figure1. Operatory aspect after incision of the skin

The surgery lasted an hour and no intraoperative complications occurred. Postoperatively, the patient was seen in the department of surgery where broad spectrum aerobic and anaerobic antibiotics were administered (metronidazole and 3rd generation cephalosporin), anti-inflammatory, analgesic, gastric antisecretory, intravenous fluid with electrolyte support and insulin.

At 24 hours after surgery we have done blood tests and there have been noted a decrease in white blood cells (WBC 19 240 /mm³), decreased INR (INR = 1.32) and glucose 140mg/dl with glycosylated hemoglobin, HbA1c = 8.3%. Is diagnosed insulin requiring type II diabetes in context of sepsis? We gave treatment according to the schedule indicated by the diabetologist asked for advice.

In the following days we practiced the lavage of wounds with hydrogen peroxide and chloramine and Betadine dressing of internal cavities under intravenous sedation. Repeated daily laboratory analysis shows a stagnation in the number of leukocytes at 18 000-19 000 / mm³ and the maintaining blood glucose levels to values below 160mg/dl. On day 4 after surgery local wound examination finds areas of skin necrosis and purulent fluid at the upper pole of the wound. Blood tests have found increasing leukocytes (WBC 20 050 / mm³), fibrinogen = 621,8mg /dl, INR = 1.32, persistent anemia (same value as in admission) and hyperglycemia = 145mg/dl.

It was decided emergency surgical intervention. Under general anesthesia with intubation was practiced cranial extension of primary incision and excision of the necrotic tissue, left groin incisions and in the left part of scrotum with debridement until viable tissue was found (figure 2).



Figure 2. Second intervention – extension of the skin incisions and debridement. Intra-operative aspect.

Bacteriological assay and DST are performed again and then we practiced abundant lavage with hydrogen peroxide, chloramines and betadine dressing of internal cavities.

Postoperatively, the patient was monitored in surgery department where we practiced daily wash of the wound with small debridement of superficial tissues under intravenous sedation and local anesthesia. The aim was on maintaining glucose below 130 mg/dl with subcutaneously insulin and oral antidiabetic associated. The treatment was continued according to the result of the culture and sensitivity testing with imipenem/cilastatin 1g/6 hours.

There were taken regularly blood tests and found a gradual decrease in the number of leukocytes reaching, 5 days after the second intervention, at 10,090 WBC/mm³.

Also coagulation values have reached normal. Anemia was maintained until discharge.

In terms of favorable evolution with supple wounds (Figure 3, Figure 4) and good general condition we decided the third surgery – reconstruction.



Figure 3. Post-operative aspect of the wound, before reconstruction



Figure 4. Wound aspect before reconstruction

The surgery is performed in the 11th postoperative day. Under general anesthesia with intubation was practiced a secondary suture after cutting the wound edges and mobilization of the skin flaps of the perineal wound. The evolution is favorable and the patient is discharged in the healing process (Figure 5). He will be seen by a doctor every two days. Ten days after the last surgery wound healing is ascertained and sutures are removed; the patient is still watched monthly.



Figure 5. Post-operative aspect after the reconstructive surgical intervention

Two months after discharge are made further investigations to detect possible associated pathology, but colonoscopy, upper endoscopy and abdominal ultrasound exclude any oncological or systemic inflammatory disease, which can be considered a risk factor for this type of infection. It remains to be discussed as risk factors for Fournier gangrene, obesity and diabetes.

DISCUSSIONS

The particularity of the case lies in the occurrence of the disease in a young patient, without personal history of other illnesses, excepting obesity and newly discovered diabetes (therapeutic neglected).

Surgical procedures, often mutilating, associated with aggressive medical treatment is the only solution in the case of Fournier gangrene, and our approach to this case is justified by the patient's locally and generally (sepsis) advanced stage of infection on admission.

Drug treatment is also aggressively and should be instituted quickly, empirically and will be adjusted later depending on the cultures and antibiogram. In this case the patient had normal renal and hepatic function which allowed administration of treatment in appropriate doses.

In this case it was necessary to repeat surgery (general anesthesia) after 4 days.

Repeated interventions to several days depending on the expansion or cessation of the infection should not be delayed in anticipation of a spontaneous resolution and should be rigorously performed under anesthesia.

After extinguishing the infection and the appearance of quality granulation is often required reconstructive surgery, to cover skin defects (skin defects smaller diameter of 4-6 cm can be solved by grafting). In our case, reconstruction was performed in one intervention in which the saved tissue was enough so it did not require grafting.

The slow postoperative evolution of the disease is an unexpected event in a young patient but it's explained by the association of obesity and diabetes. Note the favorable evolution of blood glucose once the infection was restrained, which makes clear that the two disorders tangle each other.

CONCLUSIONS

Although diagnosed for the first time more than 2000 years ago, Fournier gangrene is still a challenge for modern medicine such as diagnosis, but especially as treatment. The disease progresses to death in up to 65% of cases despite the modern antibiotic therapy and it consumes medical resources, justifying the need for better understanding and prevention.

In our case, disease prevention would have been possible by combating obesity and detection and adequate treatment of diabetes.

Acknowledgement *This work was cofinanced from the European Social Fund through Sectoral Operational Programme - Human Resources Development 2007-2013", project number POSDRU/1871.5/S/155605, entitled "Scientific excellence, knowledge and innovation through doctoral programs in priority areas", Beneficiary – University of Petrosani.*

REFERENCES

1. Yanar H, Taviloglu K, Ertekin C, Guloglu R, Zorba U, Cabioglu N, Baspinar I, Fournier's gangrene: risk factors and strategies for management, *World J Surg* 2006, 30 (9): 1750-1754.
2. Thwaini A, Khan A, Malik A, Cherian J, Barua J, Shergill I, Mammen K, Fournier's gangrene and its emergency management, *Postgrad Med J*, 2006, 82 (970): 516-519.
3. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2791735/>
4. Jain A, Varma A, Mangalanandan Kumar PH, Bal A Surgical outcome of necrotizing fasciitis in diabetic lower limbs, *Journal of Diabetic Foot Complications*, 2009, 1 (4): 80-84.
5. Burch DM, Barreiro TJ, Vanek VW, Fournier's gangrene: be alert for this medical emergency, *JAAPA*, 2007, 20 (11): 44-47.