

Life or Death after Necrotising fasciitis. The importance of Early Diagnosis and Treatment

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Abstract

Necrotizing fasciitis is defined as a rapidly progressive infection of the skin and soft tissue that usually involves severe systemic toxicity. The incidence of this infection has increased in the last few decades and is estimated to affect one out of every 100000 habitants in western European countries. This disease is the most serious form of skin and soft tissue infection, due to the rapid destruction and necrosis of the fascia and subcutaneous fat, and the development of shock and multiorgan failure of one third of the patients.

The diagnosis and early treatment with aggressive surgical debridement, broad-spectrum antibiotic therapy and hemodynamic support measures are essential³. This is a surgical emergency. We can show two necrotising fasciitis cases from different locations and different outcomes, which highlights the importance of the anatomical area affected by the infection for the control and eradication of the focal point. And the importance of early diagnostic suspicions and early and aggressive actions to eradicate the infection.

Keywords: Necrotising fasciitis; Surgical emergency; Streptococcus pyogenes; Septic shock;

of the right upper limb. She went to Accident & Emergencies unit with a fever which lasted 18 hours and general physical discomfort. It was associated with the erythematous zone, which was swollen and hot, with no defined edges, that went from her hand to her elbow. She felt severe pain upon touching that area and had passive mobilisation, with no previously known traumatic history. She had a punctate wound on her left thumb due to scratching caused by her dermatitis. She was initially diagnosed with soft tissue cellulitis. However, the rapid progression on the member suggested a necrotizing fasciitis. A Computed Tomography (CT) scan was performed on the extremity, showing an necrosis increment that had reached the bone. For this reason, an early debridement was carried out by the plastic surgeons. Surgery agreed with discharge fasciotomy, drainage in forearm and left hand (figure I). Several samples of the collections were sent for a microbiological study. Empirical treatment was initiated with broad-spectrum antibiotic therapy and administration of vasoactive drugs for hemodynamic maintenance. In less than 24 hours, she underwent surgery

Introduction

Necrotising fasciitis, due to streptococcus pyogenes, is a rare pathology, with a high morbidity and mortality rate and is difficult to diagnose. It is essential to diagnose it and establish aggressive early treatment in order to increase the chances of survival of patients.

We present two cases of necrotising fasciitis in different anatomic areas and with different outcomes. This publication was approved by the research ethics committee of our hospital (CEICm H.U.G.C. Doctor Negrín), code 2018-066-1, informed consent was also obtained.

Case report

A 42-year-old woman with a history of contact dermatitis due to rosin and brachial plexus injury at birth with residual paresis



Figure I: Discharge fasciotomy, forearm and left hand drainage

once more due to a clinical-radiological worsening. Amputation was performed through the humeral surgical neck, with poor progress, leading the following day to the disarticulation of her left shoulder. After this last procedure, the vasoactive amine were removed after 48 hours and was extubated on the third day. She was admitted to the hospitalization ward on the 6th day of her admission. In the microbiological study, pyogenes streptococcus (Group A) was isolated and the value obtained upon admission to the LRINEC scale (Laboratory Risk Indicator for Necrotising Fasciitis) was 2.

A 66-year-old woman with a history of arterial hypertension, a smoker and having undergone surgery for hemorrhoidectomy and anal fissure in another centre without antibiotic prophylaxis, 26 days before. We do not know the reasons why this prophylaxis was not carried out. It is not the habitual practice in our center, where the antibiotic prophylaxis is carried out to all patients involved in hemorrhoidectomy. She attended the Accident & Emergencies unit with a general physical discomfort and a large ischioanal abscess. She was diagnosed of perianal abscess that soon evolved affecting greater areas with necrosis and clinical worsening. Urgent intervention was performed, draining and washing under general anaesthesia. From the beginning, this required vasoactive amines for severe hemodynamic instability, as well as lactic acidosis, generalised cyanosis and conjunctival jaundice. She was taken to the Resuscitation Unit with an LRINEC score of 8. In the first 24 hours she presented progressive worsening and cardio respiratory arrest that was reversed with advanced resuscitation manoeuvres, undergoing surgery once more urgently. Cutaneous and subcutaneous perineal necrosis was observed, involving the right side from the coccyx to the beginning of the labia majora, labia minora, and laterally to the right thigh. Debridement of the affected area and a discharge colostomy were performed (Figure II).



Figure II: Debridement of cutaneous and subcutaneous perineal necrosis involving the right side from the coccyx to the beginning of the labia majora, labia minora and laterally to the right thigh, with discharge colostomy

The next day, an important clinical deterioration is observed with an increment of the necrotic area and an increment in lactic acid, C-Reactive Protein (CRP), procalcitonin, leukocytosis and vasoactive support. Given the critical situation of the patient, emergent surgery was carried out without performing a complementary imaging test. A perianal debridement was executed, greater lips, right buttocks and both inguinal regions by advanced Fournier gangrene. The patient presented a poor outcome with secondary septic shock from Fournier gangrene due to Escherichia Coli and Pyogenes Streptococcus group A despite broad-spectrum antibiotic coverage, multi-organ dysfunction, severe hepatic dysfunction, lactic acidosis and refractory hypoglycemia, disseminated intravascular coagulation and rhabdomyolysis. She died 72 hours after arriving to the Accident & Emergencies unit. The necropsy study showed multi-organ failure.

Discussion

Necrotising fasciitis is an infrequent soft tissue infection with rapid progression leading to necrosis and high mortality (15-50%) [1]. It occurs in the deep zone of subcutaneous tissue and is characterised by extensive destruction of muscles and fat [2-4]. The microorganism is introduced into the tissue through a solution of continuity of the skin. Initially there is evidence of cellulitis, then blisters form and gangrene and further symptoms appear. Increasing and localised pain, which is difficult to see are the main symptoms that should make this diagnosis apparent [2]. It typically appears before manifestations of shock and multi-organ failure [2].

It most commonly affects the extremities, especially the legs, followed by the perineal area and buttocks, trunk, head and neck and post-surgical wounds [4].

It is classified, according to the etiological agent, into 4 types

- I:** synergistic polymicrobial,
- II:** monomicrobial positive gram,
- III:** monomicrobial negative gram and
- IV:** fungal infections [2-3].

The LRINEC scale (Laboratory Risk Indicator for Necrotising Fasciitis)5 performed upon admission, helps to establish a mortality forecast at higher values (LRINEC > 6) as reflected by several authors, although at present there are few studies published and samples are relatively small6. The LRINEC is a scoring system driven from six routinely performed laboratory tests and initially used to early distinguishing necrotising fasciitis from the other severe soft tissue infections. LRINEC was calculated at presentation using laboratory results of six variables C-reactive protein (CRP) (< 150 mg/dl = 0 points, > 150 mg/dl = 4 points), white blood cell count (< 15 per mm³ = 0 points, 15-25 per mm³ = 1 points, > 25 per mm³ = 2 points), hemoglobin (> 13.5 g/dl = 0 points, 11-13.5 g/dl = 1 points, < 11 g/dl = 2 points), sodium level (≥ 135 mmol/L = 0 points, < 135 mmol/L = 2 points), creatinine (≥ 1.6 mg/dl = 0 points, > 1.6 mg/dl = 2 points) and glucose (≥ 180 mg/dl = 0 points, > 180 mg/dl = 1 points) [5].

Streptococcus pyogenes is a positive gram bacteria and one of the most common human pathogens. It is the most frequent cause of bacterial pharyngitis. It produces medium otitis, mastitis, impetigo, erysipelas, and in the most severe cases, necrotising fasciitis, hence the name used, "meat-eating bacterium".

Systemic toxicity, multi-organ failure and death are characteristic of this disease, which is why early diagnosis is key. This diagnosis, which is mainly clinical at the initially, requires complementary microbiological, imaging and histological studies, and early treatment to prevent an ominous prognosis [2-4,7]. This treatment consists of three fundamental pillars: extensive aggressive surgical debridement and necrotic tissue with local cleaning, broad-spectrum antibiotics and hemodynamic support measures. Also, nutritional support [3-5,6-7]. Frequently, surgical revision is necessary with new debridements of necrotic tissue in the following 24-48 hours [7-8].

Limb amputation is sometimes required to save a life. Therefore, necrotising fasciitis when it affects the extremities, means a lower mortality rate than when affecting the trunk and perineum [8].

Regarding antibiotic treatment, combination therapy with penicillin (4,000,000 Units / 4 hours) plus clindamycin (600-900 mg / 8 hours) for 10-14 days is always preferred [2,4,7]. Another possible additional treatments are adding gamma globulin 400 milligrams / day for 5 days to block the streptococcal exotoxin and/or the hyperbaric oxygen therapy (HBOT). The HBOT increases the partial pressure of oxygen in tissues that allows bacterial destruction by formation of free radicals, enhances the effectiveness of some antibiotics and increases the formation of capillaries with the consequent improvement in the oxygen, nutrients and antibiotics supply. However, randomized evidence is insufficient to support or refute the use of hyperbaric oxygen therapy in the treatment of patients with necrotizing fasciitis [9]. In our hospital, we do not have hyperbaric chambers, which is why our patients did not receive this therapy.

Mortality is related to its rapid identification and timely management. Early debridement is essential. Necrotising fasciitis is a surgical emergency [10]. Surgery should not be delayed,

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