

Necrotizing fasciitis

Case report



Ann. Ital. Chir., 2008; 79: 299-302

Mario Costanzo, Laura Antonella Maria Caruso, Francesca Condorelli, Vincenzo Cassaro*, Francesco Longo*, Giuseppe Forzisi*, Matteo Angelo Cannizzaro

Università degli Studi di Catania, Dipartimento Scienze chirurgiche, trapianti d'Organo e Tecnologie avanzate, Unità Operativa Clinicizzata di Endocrinochirurgia P.O.U. "S. Luigi-S. Currò" (Direttore: Prof. M.A. Cannizzaro), Italy

*AORNAS "Garibaldi- S. Luigi-S. Currò – Ascoli-Tomaselli", Catania P.O.U. "S. Luigi-S. Currò" U.O.C. di Chirurgia generale (Direttore: Prof. V. Schillaci), Italy

Necrotizing fasciitis. Case report

Necrotizing fasciitis (NF) is an infection localized at the fascial structures (both the superficial and deep ones) layering the muscles though never affecting them. NF death rate is very high (20-40%). NF can be a post-surgery, traumatic or infective complication and its prognosis *quoad vitam* is fatal without a timely and correct therapy. A 57 years-old woman was got into observation due to her temperature, left thigh pain, erythema and tumefaction in the left groin-crural seat. She suffered from obesity, insulin-dependent mellitus diabetes and modest but chronic renal failure and ischaemic cardiopathy from previous Acute Myocardial Infarctions.

It was then started a wide-spectrum antibiotics therapy. But after just six hours there took place a rapid development of the clinical picture with the appearance of haemorrhagic-content blisters and areas of cutaneous necrosis. The patient therefore underwent-under general anaesthesia-multiple incisions in the groin-crural seat and on the ipsilateral thigh. The multiple biopsies carried out during the operation too underwent cultural and histomorphopathological analysis. The anatomic pathological study highlighted the presence of necrosis of the fascia, vascular thrombosis and myonecrosis. The cultural analysis of the tissue biopsies showed a polymicrobial infection. Both the pharmacological therapy and the surgical cleaning were carried out daily but without any improvement of the clinical picture. On the eighth day a worsening of the patient's general conditions took place, with a multiple organ failure determining the patient's exitus.

KEY WORDS: Infection, Muscular fasciis, Necrosis.

Introduction

Necrotizing fasciitis (NF), is an infection localized at the fascial structures (both the superficial and deep ones) layering the muscles though never affecting them.

Every area of the body can be infected but it's more frequently found in the torso and the limbs¹¹ and it rapidly evolves in necrosis. NF death rate is very high (20-40%)^{9,10}.

This clinical picture was outlined for the first time in 1952 by Wilson, who stressed the seriousness, the rapid spreading and the final development leading up to the necrosis of the fascial planes and subcutaneous tissue¹. NF can be a post-surgery, traumatic or infective complication and its prognosis *quoad vitam* is fatal without a timely and correct therapy.

Case report

A 57-years-old woman was got into observation due to her temperature, left thigh pain, erythema and tumefaction in the left groin-crural seat.

The patient lamented the presence of a furuncle at the

Pervenuto in Redazione Agosto 2007. Accettato per la pubblicazione Gennaio 2008

For corrispondence: Prof. Mario Costanzo, Via Nuovaluce, 50 - 95030 Tremestieri Etneo (Catania), (e-mail: mario.costanzo@unict.it).

level of the left groin-crural seat seven days before the admission, which had been treated with macrolide antibiotics (posology: 750 mg every 12 hours for 7 days).

Anamnestically the patient had been suffering from insulin-dependent mellitus diabetes for over 25 years, was obese, showed a modest but chronic renal failure and ischaemic cardiopathy from previous Acute Myocardial Infarctions the last of which treated with two aorto-coronary by-passes. Furthermore three years earlier she had been hospitalized for an instance of NF on the right thigh, with a positive outcome after a wide-spectrum antibiotics therapy and drainage applications.

Initially it hadn't been noticed any trouble regarding vital capacities, heart rate being 96 bpm, respiratory F of 20 acts/minute and AP of 110/50 mmHg.

The left limb presented erythema, it was hot and with a conspicuous groin-crural subcutaneous tumefaction.

The limb had spontaneously severe aches which were heightened by both active and passive movements. No pathology was observed through clinical examination on the contralateral limb.

Laboratory parameters showed only a glycaemia alteration (299 mg/100 ml) and a leucocytosis (14000 WBC, with a noticeable neutrophilia equal to 80%). Thorax X-ray and ECG were normal.

It was then started a wide-spectrum antibiotics therapy. But after just six hours there took place a rapid development of the clinical picture with the appearance of haemorrhagic-content blisters and areas of cutaneous necrosis extending from the thigh to the abdomen and to the distal parts of the left limb.

The patient therefore underwent -under general anaesthesia- multiple incisions in the groin-crural seat and on the ipsilateral thigh. The necrotic tissue was removed as far as healthy and vital tissue was reached. Upon opening the fascia the muscle structures revealed initial trophic disorders. After thorough washing with peroxide and antibiotics the affected area was treated with tile drainage and tamponing with iodoform gauze in the remaining cavities.

The multiple biopsies carried out during the operation too underwent cultural and histomorphopathological analysis. 24 hours after the operation it was proposed hyperbaric treatment which was categorically refused by the patient. The anatomic pathological study highlighted the presence of necrosis of the fascia, vascular thrombosis and myonecrosis.

The cultural analysis of the tissue biopsies showed a polymicrobial infection (methicillin-sensitive Staphylococci, E. Coli, gram-negative Coccus) and clostridia absence. These findings suggest a NF diagnosis.

Both the pharmacological therapy and the surgical cleaning were carried out daily but without any improvement of the clinical picture. On the eighth day a worsening of the patient's general conditions took place, with a multiple organ failure (renal and serious cardio-respiratory insufficiency) determining the patient's exitus.

Discussion

FN can be classified in two types:

– **type 1 or polymicrobial:** caused by aerobic and anaerobic bacteria, it targets patients showing one or more risk factors (subjects aged 50 or over, diabetes mellitus, immunodeficiency, past surgical operation, penetrating trauma, omphalitis in newborns, colon carcinoma and pierced colich diverticola, appendicular abscesses, etc.) it is the most frequent type (about 80% of the cases).

– **type 2 or monomicrobial:** it's caused by group A Streptococci only (or in association with the Staphylococcus Aureus), it targets subjects of any age who do not present any risk factor; it makes up for the 20% of the cases ³.

All bacteria can potentially trigger FN, Streptococci, Staphylococci, Enterococci and even Salmonella ⁴.

Initially the skin looks erythematic, hot, shiny, aching with papules having blurred rims. Then blisters containing a purplish liquid develop. After their breaking open a scab will ensue. The violent red colour of the skin turns into that bluish hue with the setting in of the necrosis; pain and tenderness will be replaced by cutaneous anaesthesia due to arteriole thrombosis and superficial nerve-ending lesion compromised by subcutaneous tissue necrosis ^{2, 8}.

From the pathophysiological perspective the *primum movens* is characterized by the loss of structural and functional integrity of the skin. That takes place due to a penetrating trauma (external cause) or due to bacterial proliferation from any tissue focus (internal cause). The noxa determining the bacterial proliferation can be found even a long way from the FN seat.

The clinical picture is at the beginning non-specific and subtle, but just in a matter of a few hours the general and local symptomatology gets more telling and the cutaneous manifestations more evident. The gravity of the clinical picture might depend on two factors:

– bacterial toxicity with direct tissue damage and anaerobic over-infection favoured by oxygen consumption on the part of aerobic bacteria;

– Bacteriotoxin production and releasing responsible of an altered response by the host and of a necro-ischaemic effect on the tissues.

The diagnosis makes use of laboratory examinations, cultural examinations of the tissue sample and of imaging diagnostics.

The therapy is integrated medico-surgical. Initially it will consist of a wide-spectrum antibiotics therapy, administering penicillin, aminoglycoside and metronidazole ^{5, 6, 7}.

The maximum waiting time taken prior to turning to the surgical therapy can be of 6-12 hours but in any case never more than 24 hours ⁹. However if there coexist alarming symptoms signalling a rapid progression of FN towards a state of shock (Figg. 1, 2), surgery will have absolute priority.

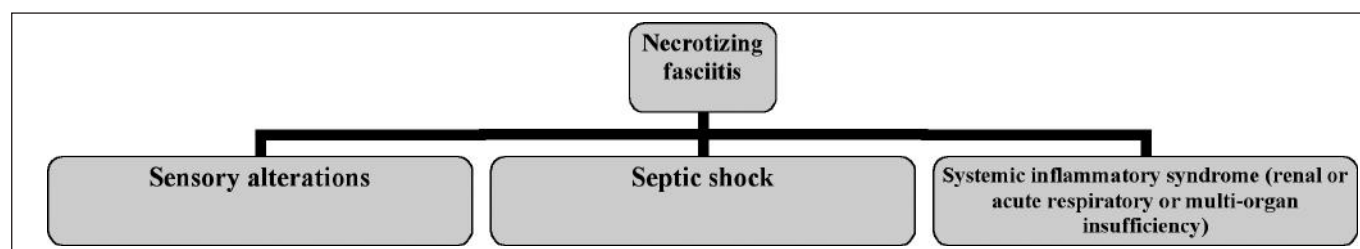


Fig. 1: Systemic signs of alarm meaning fatal prognostic of NF.

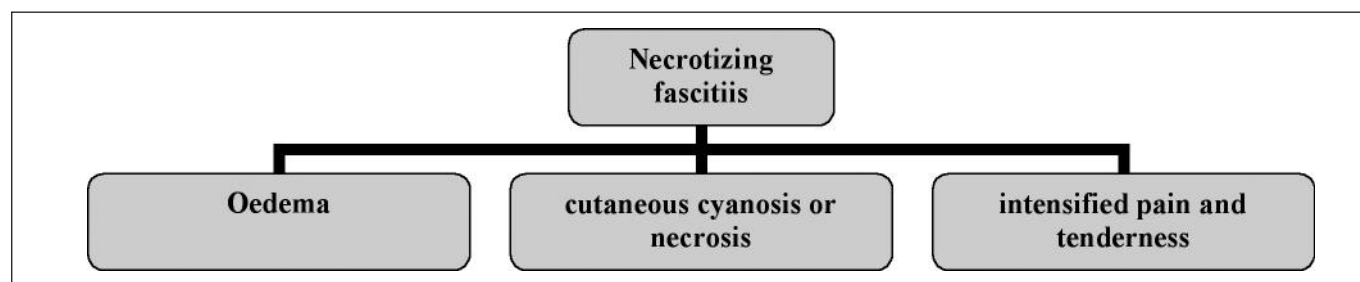


Fig. 2: Local signs of alarm meaning fatal prognostics of NF.

When one or more systemic signs get associated with one or more local signs, it means that NF is continuing to extend and therefore drug therapy has to be associated to surgery.

Surgical treatment involves a large removal of all the necrotizing tissue through skin and subcutaneous incisions as far as the fascia, in parallel to the vessels and the nerves that have to be isolated and not touched. The adipose tissue and the fascia have to be excised. The surgical openings are left open for subsequent medications carried out every 24 hours or less in the operating room, and possibly for a surgical 'second-look'²².

During the operation exudate samples and tissue biopsies will be collected and relative cultural and cytological tests will be carried out.

Several Authors underscore the importance of the hyperbaric therapy in treating NF together with the pharmacological and the surgical one. It seems that the hyperbaric oxygen reduces -in statistically significant terms- both mortality and morbidity.

The above mentioned therapy is constituted of 2-3 30-minute long sessions within the first taking place within the first 24 hours and afterwards the therapy will consist of two sessions every 24 hours depending on the patient's clinic^{9, 10, 18, 19}.

The importance of the hyperbaric therapy for the cellular metabolism, in the defence and tissue repairing mechanism is often highlighted¹¹. These mechanisms are clinically translated into oedema reduction, enhanced lymphocyte action, increased antibiotic effectiveness at tissue level and in the increased formation of collagen fibers¹²⁻¹⁷.

In order to obtain optimal results it's necessary that the hyperbaric therapy be implemented no later than 7 hours after the surgical therapy²⁰, moreover with such therapy

surgical re-examinations are highly reduced in number²². On the other hand, some Authors point out no benefits deriving from the hyperbaric therapy in relation to decreased mortality rates and surgical re-intervention, nor any benefits in terms of hospitalization²³.

Conclusions

Necrotizing fasciitis is a primitive infection of the muscular fascias involving a rapid and progressive in-site and systemic proliferation with serious jeopardizing of the patient's general conditions potentially leading up to septic shock in absence of adequate treatment.

Early diagnosis makes it possible to start a wide-spectrum antibiotic therapy followed up by surgery and, when it is possible, by hyperbaric therapy as well, thus aiming at a substantial reduction of both morbidity and mortality rates, unfortunately still very high.

The lesser the free-time from therapy the better the prognosis will be for the carefully monitored patient.

The observation of a case of FN and relative treatment -unfortunately resulting with the exitus of the patient- has led the Authors to review the most recent national and international literature with the purpose of assessing their own experience and evaluate posteriorly their approach to this rare but potentially lethal infection of the skin and soft tissue.

Riassunto

La fascite necrotizzante è un'infezione localizzata alle strutture fasciali che rivestono i muscoli, localizzata più frequentemente al tronco e agli arti ad evoluzione necro-

tica. La FN necessita di una corretta e tempestiva terapia al fine evitare un esito infausto.

La paziente da noi trattata presentava l'arto sinistro caldo, eritematoso e con una grossolana tumefazione sottocutanea dolente a livello inguino-crurale. Nonostante antibiotico-terapia si assistette al peggioramento del quadro clinico per la comparsa di bolle a contenuto emorragico e di zone di necrosi cutanea che dalla coscia si estendevano all'addome. Fu sottoposta a toilette chirurgica con biopsie multiple e posizionamento di drenaggi. L'esame istologico dimostrò la presenza di necrosi fasciale, trombosi vascolare e mionecrosi e l'esame colturale mostrò un'infezione polimicrobica, suggestiva per FN.

Il trattamento deve essere intrapreso il più precocemente possibile. La terapia è farmacologica e chirurgica integrata e si avvale di antibiotici e toilette chirurgica della ferita. Molti Autori sottolineano l'importanza della terapia iperbarica associata a quella medica e chirurgica. Controverso è il ruolo dell'ossigeno iperbarico, anche se in sinergia con la terapia farmacologica e chirurgica sulla riduzione della mortalità e della morbidità.

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