Necrotizing fasciitis after influenza vaccine: case report

_Fasciite necrotisante após vacina influenza: relato de caso_

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**Abstract**

A 30-year-old male patient, after being vaccinated against the common influenza, presented severe pain, swelling and erythema at the site of injection on the left upper limb and had continuous fever that was not checked. He was admitted to the hospital, but his clinical condition got worse, with no response to treatment with anti-inflammatory drugs and antibiotics. He developed an abscess at the site of vaccine injection, and high fever with febrile seizures. Surgical treatment was chosen, and the patient underwent debridement and drainage of the abscess, upper arm fasciotomy and repair of the extensive surgical wounds of the left arm.

**Keywords:** Fasciitis, necrotizing; bacterial infections; skin diseases, infectious; limb salvage.

**Resumo**

Paciente de 30 anos, do sexo masculino, apresentou, após vacinação contra influenza comum, dor intensa, edema e eritema em membro superior esquerdo no local da aplicação e febre contínua não aferida. Foi hospitalizado, porém houve agravamento progressivo do quadro e resistência ao tratamento com anti-inflamatórios e antibióticos, culminando em queda do estado geral, formação de colecção no local e convulsão febril. Optou-se por tratamento cirúrgico, submetendo-se o paciente a procedimentos para fasciotomia, desbridamento, drenagem de colecção e sutura de extenso ferimento em membro superior esquerdo.

**Palavras-chave:** Fasciite necrosante; infecções bacterianas; dermatopatias infecciosas; salvamento de membro.

**Introduction**

Necrotizing fasciitis (NF) is a bacterial infection of the subcutaneous tissue and deep fascia that progresses rapidly and may be present high morbi-mortality rates, if not treated properly. It was first mentioned in the literature by Hippocrates in the 5\(^{th}\) century BC, even though the medical term was initially used by Wilson in 1952\(^1\). NF is a polymicrobial infection caused by aerobic and anaerobic microorganisms, mainly beta-hemolytic streptococci, hemolytic staphylococci, enteric gram-negative bacteria, enterococci, pseudomonas and bacteroides, that may act in association or isolated\(^1,2\).

The lesion develops 24 to 48 hours after surgical procedures or trauma with break of skin integrity, but it may develop spontaneously in children. Initially, the patient presents with sudden severe pain, followed by localized painful erythema that increases within hours or days and by significant tissue edema. The clinical picture progresses to local cyanosis and formation of blebs filled with yellowish or dark reddish purulent fluid. The affected region becomes delimited, with a central area surrounded by an erthyematous halo, and it may progress to tumefaction and abscess formation\(^3\). The skin covering the lesion becomes anesthetized due to subcutaneous tissue destruction and nutrient vessel thrombosis, causing necrosis of the cutaneous nerve fibers. The skin, that is initially spared, may be compromised by the necrosis, which is larger than it appears to be on clinical examination\(^4\). The lesion may be accompanied by limb ischemia, leading to gangrene.
Predisposing factors are: type II diabetes, old age, cancer, trauma, alcoholism, malnutrition, obesity, AIDS, corticoid therapy, chemotherapy, herpes zoster infection and peripheral vascular disease. The use of intravenous drugs has been considered a new and increasing risk factor.4

NF affects individuals of both genders and of any age group; however, an increased incidence in the elderly and patients with chronic diseases has been observed. The incidence in children is low, and, in this age group, about 50% of the cases occur in varicella-zoster patients. Differential diagnosis of NF in the early stages is done with other soft tissue infections, cellulitis or erysipela5.

The treatment recommended is early, extensive and repeated surgical debridement with removal of necrosed fascia, subcutaneous tissue and other tissues, administration of antibiotics and adjuvant measures6. Surgical technique depends on the presentation and evolution of the case, as well as on the number of compartments to be decompressed3,7. In most cases, it is possible to minimize the adverse consequences, however, if adequate therapy is not applied early on, severe complications may ensue, such as streptococcal toxic-shock syndrome, myositis or myonecrosis, acute renal failure, coagulopathy, hepatic damage and adult respiratory distress syndrome2.

Objective

This paper reports a case of infection after flu vaccine, involving the fascia, muscles and subcutaneous tissue of the left upper limb that progressed to necrotizing fasciitis, which was treated by fasciotomy, debridement, and antibiotic therapy.

Methods

BTC, 30-year-old male caucasian patient, married, born and living in Maceió (AL, Brazil). The patient reported intense pain, edema, and erythema on his left upper limb and fever 12 hours after being vaccinated against the flu (Figure 1). He was referred to the emergency service four days later and started on oral nimesulide and cephalexin. Since the clinical picture did not improve after three days, he was admitted to the hospital three days, kept on oral nimesulide and cephalexin and started on intravenous meropenen. He was evaluated by the Angiology Service two days later, and another antibiotic agent was added to the treatment.

The inflammatory lesion of the left upper arm regressed and became circumscribed to the injection site. Pain was relieved with tramadol hydrochloride. However, his general condition deteriorated and he developed continuous high fever and febrile seizures. He underwent three operations, for debridement, fasciotomy and drainage of the left upper limb (Figure 2).

Results

The general condition of the patient improved and he was afebrile a few days later. The surgical wounds were sutured, after the microbial cultures turned negative. At the time of this report, the patient was undergoing motor rehabilitation of the left upper limb (Figure 3).
NF is a clinical entity influenced by multiple predisposing factors, as mentioned above. In the present case, the predisposing factor was the influenza vaccine injection. One can suspect that some kind of contamination occurred during the process – in the handling of needles – or even some break in the aseptic technique, allowing skin microorganisms to penetrate the patient’s tissues.

The unfavorable clinical course may have been influenced by the long time between the vaccine injection and the beginning of proper treatment. Such time lag was the result of nonspecific initial symptoms and the complexity of the diagnosis.

The treatment consisted of antibiotic administration, that was not sufficient to control the infection, because tissue necrosis had already set in. Three surgical procedures were performed with the objective of necrotic tissue removal, abscess drainage, wound suture and final resolution of the infection. These measures prevented systemic sepsis and enabled limb salvage, even after the development of bacte remia, which resulted in fever and febrile seizures. Other coadjuvant therapies to be considered would be hyperbaric oxygen therapy (HOT) and the VAC system.

HOT is recommended by the Federal Medical Council for necrotizing infections of soft tissues, such as NF. It consists of pure oxygen administration (FIO₂ = 100%) above atmospheric pressure, between 2 and 3 atm, in a pressurized chamber that accommodates one or more patients.

The mechanism of action of this HOT is hyperoxygenation by the oxygen dissolved in the plasma, which leads to physiological and metabolic consequences. Hypoxia is known to impair bacteria phagocytosis by leukocytes, but this function is reestablished with increase in oxygen tension (antimicrobial effect). Besides that, collagen synthesis by fibroblasts increases with oxygen supplementation. Tissue oxygenation by hyperbaric oxygen therapy restores capillary angiogenesis, thus increasing tissue proliferation and granulation tissue formation (compensatory effect of cell hypoxia). HOT increases the partial pressure of oxygen in arterial blood with concomitant increase of the oxygen gradient between the capillary vessels and tissues, thus increasing cell oxygenation and breaking the vicious cycle of ischemia (physiological and biophysical effects). There is vasoconstriction and consequent reduction of edema and compartment pressure during HOT (pressure mechanical effects).

Although this therapy may be useful for some lesions, there is not enough evidence to indicate which patients will benefit from it and when is the adequate moment to start the treatment. Besides that, serious adverse events may occur, such as pulmonary and neurologic toxicity; auditory discomfort and barotraumas, sinus discomfort and transient visual alterations. Randomized controlled clinical trials should be carried out to assess short and long-term risks and benefits, allowing more adequate clinical decisions to be made. This kind of therapy is not used as an isolated measure, but rather as concomitant therapy to surgical debridement and antibiotic administration.

VAC therapy is used to heal wounds in which localized and controlled negative pressure is applied, with the objective of stimulating granulation and healing. It also promotes arterial vasodilatation and consequently, it increases tissue blood flow, which stimulates granulation tissue formation. It is similar to HOT regarding better and early wound healing. Besides that, the removal of fluids decreases edema, interstitial pressure and bacterial colonization, creating a humid environment for epithelial migration and healing. It removes the metalloproteins that impair the healing process and increase bacterial colonization. Constant or intermittent negative pressure stimulates healing from the edges to the center of the wound.

Both therapies are used as adjuvants to treat NF and act in the healing process with an antimicrobial effect. They also allow a faster recovery and shorter hospital stay. However, each one has its indications and peculiarities: oxygen therapy requires hospitalization and it has a high cost; also, the duration of therapy depends on the disease severity, progress and on the hyperbaric chamber pressure adjustment. VAC system is also a high-cost therapy and, depending on the infectious process and on the amount of exudate, it must be replaced every two or four days. VAC therapy has
the advantage of being used in the outpatient setting, when applied by a portable vacuum system that allows continuation of therapy after discharge from the hospital.

In the present case, the negative results of microbial culture and antibiogram of samples obtained at the operations were the consequence of the long-term administration of broad spectrum antibiotics, that inhibited bacterial growth in those samples.

**Conclusion**

Necrotizing fasciitis is an extremely dangerous condition that should be managed according to its severity. A case is reported of this disease, associated to common influenza vaccine, that progressed to control of the infection after the removal of the necrotic tissue and control of bacteremia by debridement of contaminated tissues and drainage of purulent collection.

This case is a source of knowledge and learning on NF, regardless of the etiologic factor, for it elucidates the difficulties related to the therapy, diagnosis and clinical course of a serious disease that may lead to death if not adequately managed.

**References**


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