

## Case Report

# Necrotizing Fasciitis after Influenza Vaccination: Case Report

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## Abstract

**Background:** Necrotizing fasciitis is a soft tissue infection, mainly related to penetrating trauma, which creates a gateway for pathogens.

**Case presentation:** A female patient, 8 months old, is admitted to the Pediatrics Emergency Unit of the with erythema, edema and hemorrhagic blister at the site of application of the Influenza vaccine 4 days post-vaccination.

**Discussion:** Necrotizing fasciitis is a dermatological condition with a polymicrobial etiology, due to the synergism of the necrotoxins of such pathogens. Tests show leukocytosis and significant elevation of C-reactive protein. Treatment should be performed with broad-spectrum antimicrobials initially and with subsequent adjustment for those of proven sensitivity, in addition to early surgical debridement.

**Conclusion:** Necrotizing fasciitis is a severe infection, with fast evolution which can lead to death. Its presentation after vaccination must be considered and avoided with proper hygiene and prophylactic methods during the administration of the vaccine.

## ABBREVIATIONS

SCT: Toxic Shock Syndrome; CRP: C-Reactive Protein; HIV: Human Immunodeficiency Virus

## INTRODUCTION

Necrotizing fasciitis is a soft tissue infection, mainly related to penetrating trauma, which creates a gateway for pathogens. Its first description in children was in 1930, 6 years after the description of it in adults [1]. Hippocrates described this disease as a different type of putrefaction that caused many deaths, this being one of the first reports of the disease in adults [2]. Its prevalence is higher in male children from underdeveloped countries and has a close relationship with parenteral medication administration, trauma, surgery, immunosuppression and varicella infection [3].

It is usually caused by *Streptococcus pyogenes*, although *Staphylococcus aureus* may also be involved. It is characterized by quick destruction and consequent necrosis of the muscular fascia and subcutaneous tissue, sometimes reaching the epidermis. It can be complicated by toxic shock syndrome (SCT), which is characterized by sudden onset of shock, multiorgan failure and high mortality (30-60%) [4].

## CASE PRESENTATION

Infant, female, 8 months, comes to the pediatrics emergency room, coming from the interior of the state, due to a blister on her right leg with suspected local necrosis, which evolved 4 days after intramuscular administration of vaccine Influenza. On physical examination, she presented regular general condition, edema of the face, abdomen and lower limbs. Dermatological examination revealed a necrotic plaque with a tense blister containing yellowish discharge, with an erythematous peripheral halo, with sharp limits and irregular contours, of approximately 10cm in its largest diameter in the right thigh (Figure 1).

Mother reported that the day after the vaccine, fever, induration and erythema appeared on the spot, so she went to a health center where she received a prescription for painkillers and warm compresses, maintaining a progressive worsening of the condition. She sought new medical care and was referred to a referral hospital.

On admission, laboratory tests were performed to test for anemia (hemoglobin 7.5mg/dl), normal leukocytes with increased lymphocytes and thrombocytopenia (platelets 92,000), C-reactive protein (CRP 117.6), and ultrasound of the site attesting cellulitis of the right thigh. Cellulitis of the right thigh



**Figure 1** Delimitation of the area of necrosis with formation of a tight bubble and serous content.

was established as a diagnostic hypothesis and the patient was admitted with a prescription for Cefazidime and Clindamycin. She underwent an evaluation of vascular surgery and pediatric surgery that guided conservative treatment.

On the 5th day of hospitalization, she developed severe sepsis and the need to schedule antibiotic therapy for Cefepime and Vancomycin. There was an increase in leukocytosis (17,000), maintenance of increased levels of CRP (121.8), and worsening of anemia with hemoglobin below transfusion levels (5.5mg/dL) and of thrombocytopenia (66,000 platelets). Then she underwent red blood cell transfusion and 48 hours later she partially responded to the antibiotic regimen change, maintaining significant edema and thigh hardening. The following day, the bubble ruptured and the area of necrosis was better delimited.

She received an evaluation of restorative surgery on the 10<sup>th</sup> day of hospitalization, which opted for a surgical block approach with site debridement. At the same time, a dermatology team was called and suggested the same surgical treatment. Approximately 200ml of yellowish with thick consistency were drained (Figure 2). At the time, biopsies and culture of the lesion border and necrosis area were performed, in addition to aspirate culture.

In the bacterioscopy and culture of the aspirate, no germs were found, but in the culture at the edge of the lesion, *Escherichia coli* sensitive to Piperacillin/Tazobactam and resistant to Cefepime were found. An antimicrobial adjustment was made, progressing with progressive clinical improvement and daily dressings to close the ulcer formed at the site.

Five days after the surgical procedure, the CRP decreased to 15.1 and the patient's general condition improved with anasarca regression, leukocytosis and thrombocytopenia normalization.

In the histopathological study, the following findings were found: necrotic epidermis, with anucleated cells, bacterial colonies in the dermis, amorphous collagen, coreless fibroblasts, necrosis of the adipose tissue vessels and neutrophil infiltrate, with the conclusion of acute suppurative necrotizing dermoepidermitis (Figure 3).

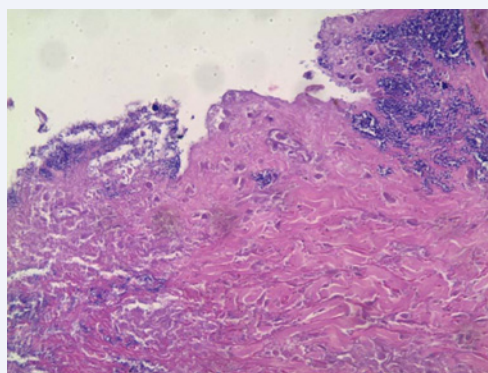
The patient remained in hospital for a further 30 days until granulation tissue formation and partial closure of the ulcer formed on the right thigh (Figure 4). The last antibiotic regimen

was suspended after 14 days, with no further complications after that period.

Patient maintains outpatient follow-up in research on the possibility of immunodeficiencies.



**Figure 2** Thick secretion drainage: liquefied subcutaneous tissue.



**Figure 3** Skin biopsy showing necrotic epidermis with anucleated cells, bacterial colonies, amorphous collagen and fibroblasts without nucleus.



**Figure 4** 18th postoperative period - formation of granulation tissue, without infectious signs.

## DISCUSSION

Necrotizing fasciitis is defined as the primary infection of the superficial fascia, with subsequent extension of the infectious process to the hypodermis, due to the polymicrobial synergism associated with necrotoxins, especially hyaluronidase. The process leads to liquefactive necrosis of the superficial fascia, accompanied by thrombosis of the adjacent vessels, causing hypodermis ischemia [5]. In the present clinical case, the evolution of the affection accurately portrays the order of events that involve necrotizing fasciitis, with the initial appearance of induration and erythema at the site, evolving to tense bubble formation at the site and delimitation of the necrosis area, as the illness extended to the deepest planes.

Predisposing factors include the following conditions: chronic diseases (heart disease, peripheral vascular disease, lung disease, kidney failure and diabetes mellitus), alcohol abuse, immunosuppressive conditions (use of systemic corticosteroids, collagen diseases, HIV infection, transplants of solid organs and malignant diseases being treated), use of intravenous drugs, surgery, chickenpox in children, ischemic and decubitus ulcers, psoriasis, contact with people infected with *Streptococcus* and penetrating and closed or even minimal skin traumas [6]. Here, the unquestionable factor for the involvement was the penetrating cutaneous trauma caused by the administration of the Influenza vaccine. The Ministry of Health itself lists as immunization errors those that cause muscle, vascular, neurological injuries due to errors or poor administration technique [7].

Necrotizing fasciitis can affect any part of the body. In adults, the most common site is the extremities. In children, most injuries occur on the trunk [8]. Through the predisposing factor it is possible to glimpse which site will be affected. In the case of intramuscular injections, the most affected sites in children are the gluteal and thigh region, especially the vastus lateralis, which is recommended for the application of intramuscular vaccines. In the present case, the vaccine was applied to the medial portion of the right thigh. The development of the necrosis area was approximately 10 cm away from the vaccine application site.

Systemic manifestations of sepsis are usually present, including changes in mental status, tachycardia, tachypnea, leukocytosis ( $> 12000\text{mm}^3$ ), fever ( $38.9\text{-}40.5^\circ\text{C}$ ), metabolic acidosis and hypocalcemia [6]. Regarding laboratory findings, leukocytosis (17,000 total leukocytes), tachycardia, fever and elevated acute phase proteins were found. The patient also presented anemia (hemoglobin  $5.5\text{mg/dL}$ ) with thrombocytopenia (66,000 platelets), having undergone transfusion of packed red blood cells.

Diagnostic imaging methods can provide additional information, useful for diagnosis. However, most of the time, the findings are not specific and are not essential for the surgical approach [9]. The patient underwent ultrasound of the site on the 3<sup>rd</sup> day of clinical evolution, which attested to cellulitis of the right thigh, an examination that is in fact not essential for the final diagnosis and management.

Surgical treatment should be as short as possible, with debridement of the necrotic portion and drainage of liquefied subcutaneous tissue, in order to facilitate the penetration of antimicrobials, in addition to antibiotic therapy itself. The culture and antibiogram of the material must always be performed due to the possibility of a polymicrobial microbiota, since these patients end up using several previous antimicrobial schemes [10]. The delay in performing surgical debridement, in addition to not corroborating the expected clinical outcome, still allows for the contribution of a resistant microbiota in the place, since antibiotic schemes are introduced in an attempt to achieve clinical improvement that does not happen. In the present clinical case, ceftazidime and clindamycin were initially used, with a subsequent septic condition and the need for scheduling for cefepime and vancomycin. After the correct performance of the surgical procedure, Piperacillin / Tazobactam-sensitive *Escherichia coli* and Cefepime-resistant *Escherichia coli* lesion culture was found, with a new need to adjust the medical prescription, which could have been avoided from the beginning with early debridement and isolation of the correct bacterial agent associated with the condition.

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