A Rare Clinical Case of Periorbital Necrotizing Fasciitis in a Healthy Child

Caso Clínico Raro de Fasceíte Necrotizante Periorbitária numa Criança Saudável

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ABSTRACT

Periorbital necrotizing fasciitis is a rapidly progressive, highly destructive microbial infection involving the periorbital tissue's skin, subcutaneous and deep soft tissues, and muscles. This report describes a case of periorbital necrotizing fasciitis in an otherwise healthy 2-year-old girl, underscoring the critical importance of early diagnosis and timely intervention. Remarkably, this case demonstrates that extensive surgical debridement is not invariably necessary, emphasizing the relevance of individualized treatment approaches and prompt medical management in achieving optimal patient outcomes.

KEYWORDS: Child; Debridement; Eyelid Diseases; Fasciitis, Necrotizing; Orbital Diseases.

RESUMO

A fasceíte necrotizante periorbitária é uma infecção microbiana rapidamente progressiva e altamente destrutiva que envolve a pele, tecidos moles subcutâneos e profundos e músculos periorbitários. O objetivo deste caso clínico é descrever um caso de fasceíte necrotizante periorbitária numa menina saudável de 2 anos, destacando a importância do diagnóstico e intervenção precoces na abordagem desta grave patologia. Este caso foi resolvido sem desbridamento cirúrgico, uma opção possível para situações cuidadosamente selecionadas.

PALAVRAS-CHAVE: Criança; Desbridamento; Doenças da Órbita; Doenças das Pálpebras; Fasceíte Necrotizante.

INTRODUCTION

Necrotizing fasciitis (NF) is a rapidly progressive bacterial infection that involves all subcutaneous tissues, including the fascia, fat, and muscles, leading to necrosis of the overlying skin. Although it is uncommon in the head and neck regions, it is particularly rare in the periorbital area.[1,2]

Periorbital NF (PNF) is extremely rare in children, but a few cases have already been reported in the literature.[3–8]

The risk factors associated with NF are alcoholism, diabetes mellitus, rheumatologic disease, systemic malignancy, corticosteroid use, intravenous drug abuse, nonsteroid anti-inflammatory drugs, and chickenpox. Nonetheless, it can also occur in healthy patients.[2,5]

It is crucial to differentiate PNF from periorbital cellulitis as their symptoms may be similar, but their treatments differ significantly. Clinical manifestations of NF include erythema (without sharp margins), edema that extends beyond the visible erythema, severe pain (out of proportion to exam findings in some cases), fever, crepitus, skin bullae, necrosis, or ecchymosis. Cellulitis presents with skin erythema, edema, and warmth. Fever may be present but generally is not associated with hemodynamic instability, exquisite tenderness, or necrosis.[9]

Therefore, PNF typically requires a more aggressive approach, which generally includes parenteral antibiotics and extensive surgical debridement, in contrast to the more conservative management of periorbital cellulitis.[1]

The authors report a case of a PNF in a healthy 2-year-old girl and highlight the importance of an early diagnosis and intervention, in which surgical debridement was not necessary.

Written informed consent for publication of this clinical case report was obtained from the patient's mother.

CASE REPORT

A 2-year-old previously healthy child had been hospitalized in a secondary care hospital for three days due to suspected left orbital cellulitis, being treated with amoxicillin-clavulanic acid (50 mg/kg/dose), methylprednisolone (1 mg/kg/day), and intravenous fluid therapy. It was thought that the cellulitis originated from a slight trauma to the left superior palpebra, with an aluminum platter (Fig. 1).

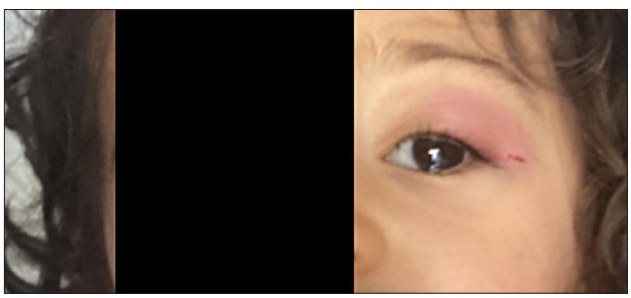

Figure 1. Photography taken by the mother of the patient revealing the mild trauma to the left superior palpebra.

Due to worsening of her clinical condition (increased bilateral eyelid swelling and prostration), therapy was updated to vancomycin 60 mg/kg/day q8h, meropenem 120 mg/kg/day q8h, and clindamycin 40 mg/kg/day q8h and she was sent to our tertiary hospital for orbital computed tomography (CT) scan under sedation.

In the first evaluation in our hospital, the eyelids were swollen and erythematous, with more pronounced symptoms on the left side. This side also exhibited necrosis on the superior and inferior palpebral skin and significant purulent eye discharge. Due to the severely swollen eyelids, a detailed ocular examination was not possible - pupillary reflexes were normal, but assessing eye movements or measuring intraocular pressure was not feasible. The CT scan ruled out a post-septal extension but revealed a hypodense collection with peripheral enhancement in the left lower eyelid, indicative of an abscess (Fig. 2). This collection measured approximately 2 mm in anteroposterior thickness and extended transversely across a significant portion of the eyelid.

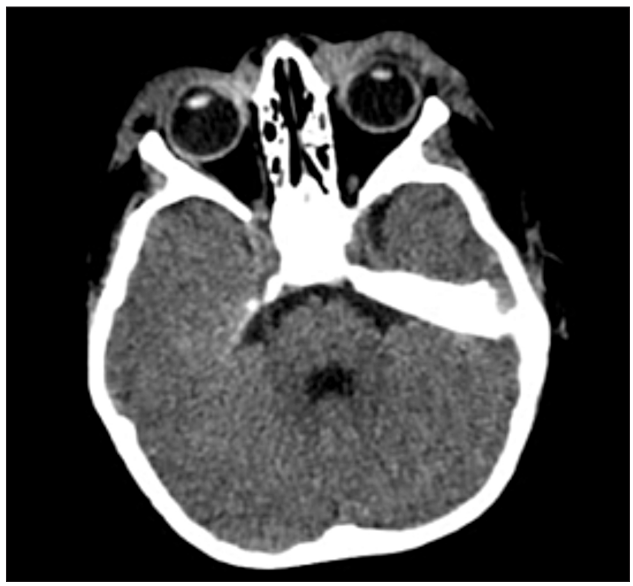

Figure 2. CT scan that revealed a hypodense collection with peripheral enhancement in the left lower eyelid.

As the necrotic tissue was superficial, it was decided to do a bedside debridement with the help of our nursing team specialized in wound treatment. In the first treatment (Fig. 3), the

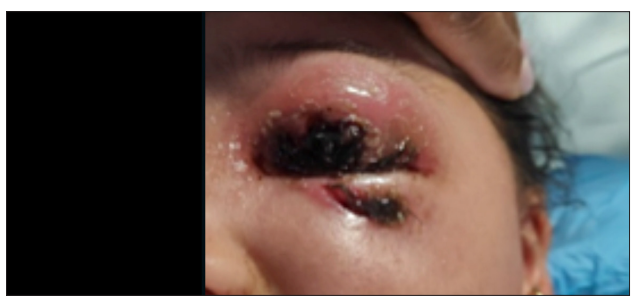

Figure 3. Photography taken right before the first treatment.

area was carefully washed with saline solution (NaCl 0.9%), an aqueous antiseptic was applied for three minutes (octenidine dihydrochloride + phenoxyethanol; Octiset®) and after that, a light mechanical debridement was performed. One day later (Fig. 4), no areas of necrosis could be identified, and a new treatment was initiated: washing with saline solution (NaCl 0.9%), Octiset® application for three minutes, use of a hydrogel (VariHesive® hydrogel) to promote the natural autolytic debridement process, and application of a soft silicone foam dressing (Mepilex® Border). This foam was used due to its capacity to absorb any oozing from the wound and to promote re-epithelialization. During the first week, the patient was seen almost daily, and the treatment was repeated in every observation. After one week, the dressing was discontinued, and treatment consisted solely of cleaning and applying VariHesive® hydrogel. Two weeks later, on the day before discharge, the area was only washed, and moisturizing cream was applied (Fig. 5).

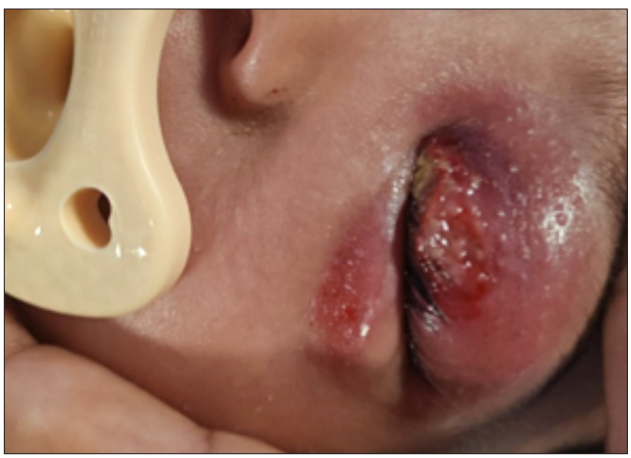

Figure 4. Photography taken 1 day after the first treatment.

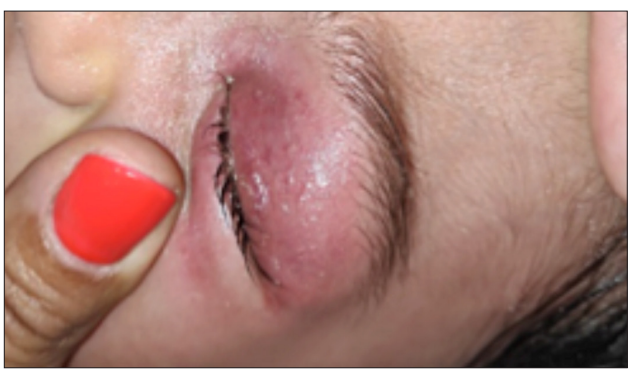

Figure 5. Photography taken 2 weeks after starting treatment.

During hospitalization, the patient was always hemodynamically stable. Her first blood test revealed leukocytosis with neutrophilia and increased C-reactive protein but, in our hospital, the patient presented a pattern of analytical improvement. Blood cultures and the microbiological analysis of the purulent exudate performed in the first hospital were negative. The exudate analysis was repeated in our hospital (seventh day of hospitalization), but the result was also negative.

One week after the CT scan, magnetic resonance imaging was performed and excluded post-septal, muscle, and intra-orbital fat involvement.

Clindamycin was prescribed for 7 days and meropenem and vancomycin were continued for 16 days. She showed a major improvement in general condition and in the eyes and eyelids' appearance.

Currently, she is being followed on an outpatient basis, by the Orbit sector of our department (Fig. 6).

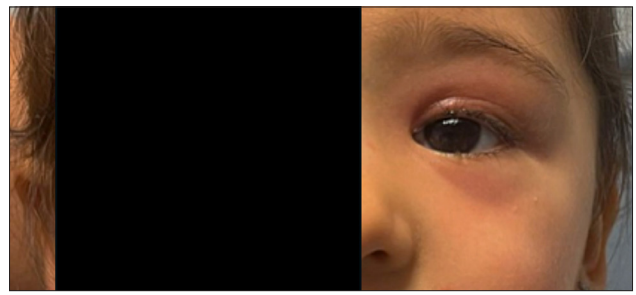

Figure 6. Photography taken 1 month after discharge from hospital.

DISCUSSION

NF is a potentially deadly infection that affects the subcutaneous tissue and the underlying fascia. The bacteria involved produce enzymes such as collagenase and hyaluronidase, which accelerate the destruction of tissues. Polymorphonuclear leukocytes infiltrate the deep tissues, leading to thrombosis of blood vessels traversing the fascia. Tissue invasion proceeds horizontally due to the avascularity of the fascial planes. Therefore, facial involvement is rare due to the excellent blood supply in the area.[2,10]

Regarding the causative microorganisms of NF, it can be divided into two types: type 1 is a polymicrobial infection caused by anaerobes, gram-negative bacilli, and enterococci affecting predominantly immunocompromised patients, and type 2 is an infection caused by Group A *β-hemolytic streptococcus* (*Streptococcus pyogenes*) with or without coexisting *Staphylococcal* infection.[1]

NF of the extremities and trunk are frequently polymicrobial. In contrast, PNF often involves Group A *β-hemolytic streptococcus* as the most frequent organism. *Pseudomonas* and *Staphylococcus aureus* can also be involved in PNF, alone or as a co-infection.[1,10]

In the present case, the cultures of the purulent exudate were negative. The absence of results may be because the patient was already taking antibiotics at the time of the exam. This lack of bacterial growth had also been recorded in other published pediatric clinical cases.[2,11]

PNF may be triggered by a precipitating event or can be theoretically spontaneous, without an apparent cause. Precipitating events can be blunt or penetrating trauma to the area (for example, an insect bite), varicella, or recent surgery on nearby areas (including blepharoplasty, dacryo-

cystorhinostomy or puncture of a hordeolum). Through the thorough photographic description of our clinical case, it is possible to appreciate the relative innocence of the trauma that gave rise to this case study.[1,10,12]

Another aspect that must be highlighted in this clinical case is that the patient was a healthy 2-year-old child, which means that this diagnosis could have faced oblivion.

Concerning treatment, intravenous antibiotics are always used, and a wide variety of combinations are prescribed. Nevertheless, they should always be effective against *Streptococcus pyogenes*. Acceptable empiric antibiotic regimens include a carbapenem (such as Imipenem, Meropenem, or Ertapenem), combined with an agent active against methicillin-resistant *S. aureus* (e.g., vancomycin), and Clindamycin for its antitoxin properties and effectiveness against toxin-producing strains of beta-hemolytic *Streptococci* and *S. aureus*. Subsequently, treatment should be tailored to Gram stain, culture, and sensitivity results when available.[9,10]

Aggressive surgical debridement is commonly described as essential for the proper management of PNF. However, some cases have been reported to be resolved with conservative treatment alone. This approach is justified by the rich palpebral vascular supply and the thinness of the eyelid skin. For instance, in a study conducted by Flavahan *et al* nine of the thirty patients did not undergo surgical debridement and had comparable vision and morbidity outcomes to those who did.[10,13]

An important consideration with aggressive surgical debridement is that it can easily breach the natural barrier of the orbital septum, increasing the risk of post-septal complications (in cases where this has not yet occurred).

The option for non-surgical treatment should not make the team devalue the case. This case proved the importance of having a team specialized in wound treatment, which is essential in a department with an Orbit sector. Clinical follow-up must be close and imaging reassessment must be carried out whenever necessary. PNF can result in multiorgan failure and potentially fatal outcomes, underscoring the critical importance of close collaboration with the Pediatrics and Infectious Diseases teams.

PNF is a rare diagnosis. Since it can occur in healthy patients without risk factors, it should never be excluded in cases of periorbital infection. Close follow-up and rapid treatment are essential. Surgical debridement may not always be necessary, and the decision should be made on a case-by-case basis depending on the presented clinical characteristics.

CONTRIBUTORSHIP STATEMENT / DECLARAÇÃO DE CONTRIBUIÇÃO

JSO and PMC: Literature review, data collection, writing, revision.

FP: Coordinator of the nurse team specialized in wound treatment; data collection.

VL and JM: Data collection, writing, revision.

All authors approved the final version to be published.

JSO e PMC: Revisão da literatura, recolha de dados, redação, revisão.

FP: Coordenadora da equipa de enfermagem especializada no tratamento de feridas; recolha de dados.

VL e JM: Coleta de dados, redação, revisão.

Todos os autores aprovaram a versão final a ser publicada.

RESPONSABILIDADES ÉTICAS

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Patient Consent: Consent for publication was obtained from the patient's mother.

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