



### **Orbital Necrotizing Fasciitis: A Case Report and Literature Review**

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**Abstract**

**Background:** *Necrotizing fasciitis is a severe, rapidly progressive infection of the skin, subcutaneous tissue, and superficial fascia. Is associated with high rate of morbidity and mortality, due to massive tissue necrosis and systemic toxicity.*

*Periorbital involvement is rare, however it can cause a devastating course with facial disfigurement, loss of vision, or can even be fatal.*

*It is classified as superficial and deep, the latter involving fascia and muscle.*

*They are generally polymicrobial, and the predominant germ is from the Stretococcus beta hemolytic group in 50% of cases and in association with Staphylococcus aureus in up to 20%.*

**Case presentation:** *We present the case of an 93-year-old woman with COPD (Chronic Obstructive Pulmonary Disease) who presented to the emergency department with a 10-day history of progressive left eye pain and periorbital edema. The patient was afebrile, and her vital signs were within normal limits. An ocular examination revealed severe periorbital edema with purulent conjunctival drainage and periorbital necrotizing tissue. (Figure 1) Her visual acuity was 20/200 in the right eye and perception of light in the left eye. Computed tomographic imaging revealed extensive periorbital cellulitis. Necrotizing fasciitis of the face is relatively uncommon.*

*Orbital Necrotizing Fasciitis is a diagnosis which is managed and follow-up by several specializations (emergency physicians, ophthalmologists and dermatologist).*

*The data regarding the disease course and management remain scarce, thus reporting new cases are very important.*

**Conclusions:** *Early identification of serious pathologies is very important for several reasons: prognosis improves with early diagnosis, improve tolerance of the treatment, better outcomes, enhance life quality.*

*Early diagnosis and treatment, with intravenous antibiotic therapy, are essential to reduce the complications associated with this infectious process. As well as they are fundamental to reduce the mortality to which it is associated.*

*For a favorable evolution, early initiation of treatment is required. This includes early identification of the process, intravenous antibiotics and one of the most critical factors, surgical debridement.*

*We have made an updated review of the subject showing some illustrative images of our experience.*

**Key words:** *Case report, Orbital Necrotizing Fasciitis, Periorbital Necrotizing Tissue, Surgical debridement, Periocular Infection.*

### **List of abbreviations**

COPD = Chronic Obstructive Pulmonary Disease

NF = Necrotizing Fasciitis

PS = Posterior Segment

LRINEC = Laboratory Risk Indicator for Necrotizing Fasciitis

MSCT = Multi-Slice Computed Tomography

GABHS = Group A beta Haemolytic Streptococcus

### **Introduction**

Necrotizing fasciitis (NF) is a severe, rapidly, progressive infection of the skin, subcutaneous tissue, and superficial fascia. Orbital necrotizing fasciitis is uncommon, and there are few cases currently reported. Mortality is approximately between 10 and 14 % and is attributed to serious systemic complications such as multi-organ failure, shock and sepsis.

NF is divided into two types on the basis of microbiological culture: type 1 is polymicrobial caused by both aerobic and anaerobic organisms and type 2 is by single organisms such as Streptococcus or Staphylococcus or a combination of the two. Gram-positive group A beta haemolytic Streptococcus (GABHS) was the most common single organism responsible for NF followed by pseudomonas.

The loss of skin and subcutaneous cellular tissue, with the consequent cosmetic and functional repercussions, represents the main morbidity associated with necrotizing fasciitis. (1)

Early identification of this entity is very important for several reasons: prognosis improves with early diagnosis, improve tolerance of the treatment, better outcomes, enhance life quality.

### **Case Report**

A 93 year old female was admitted to the Eye Trauma and Emergency Department, Dra Mulet Private Eye Clinic, due to severe left-sided periorbital pain 10 days of evolution, with blackish skin discoloration around the left eye also of swelling and redness.

She claimed that this has been getting worse in the last 10 days and her vision had also rapidly worsened during this time.

At admission, the patient was complaining of the left-sided supra-orbital pain that expanded into the infraorbital area. During history taking, the patient reported that she has multiple underlying medical conditions including diabetes mellitus, COPD (Chronic obstructive pulmonary disease), congestive cardiac failure, hypertension.

At the current admission, the patient denied having nausea, fever, trauma or recent surgery over the affected area. The patient denied possible allergy to medications.

On ocular examination performed at admission verified right eye visual acuity of 20/200 and left eye visual acuity of perception of light.

In the physical examination, left periorbital area was hyperemic and edematous with necrotic tissue covering the temporal half of the upper and lower lids. There was a widespread edema at the left side of the face. (Figure 1)

Slit-lamp examination of the left eye revealed severe periorbital edema with purulent conjunctival drainage and periorbital necrotizing tissue, mid-stromal infiltrate with overlying epithelial defect along with the adjacent superficial limbal vascularization. The fundus examination could not be visualised due to the media opacity.

B-scan reveals a cataractous lens and normal posterior segment (PS) contains clear anechoic vitreous and flat retina. Examination of the fellow eye was unremarkable apart from a brunescient cataract.

Her laboratory risk indicator for necrotizing fasciitis (LRINEC) score was 8 points.

Emergency cranial multi-slice computed tomography (MSCT) was reported showed features suggestive of orbital and periorbital cellulitis of the left eye. Blood, urine, and eyelid swab samples were obtained for bacterial culture.

Emergency debridement for necrotic skin and subcutaneous tissue was performed until healthy viable tissue was seen around the wound (Figure 2)

She was treated initially with intravenous cefepime 2.0 g twice a day, intravenous vancomycin 1.0 g three times a day, moxifloxacin eye drops hourly and sodium hyaluronate eye drops hourly in the left eye. Wound site care was made by the application of pomades with topical erythromycin. Following the debridement, it was observed that periorbital edema began to regress prominently on the first day of the treatment.

Dramatic improvement in pain was noted within 48 hours of starting debridement and antibioticotherapy. Treatment was carried on with daily wound care and parenteral antibiotherapy.

Wound site culture resulted as positive for *Streptococcus pyogenes* on the third day of the treatment. Patient's antibiotherapy was rearranged as stopping the vancomycin therapy and continuing 2.0 g parenteral cefepime therapy (2 times/day) based on the consultation of department of infectious disease.

Seven days after debridement, wound healing speeded up and debrided areas got epithelized (Figure 3)

Ten days after debridement, white blood cell count and C-reactive protein were within normal limits, which prompted discontinuation of intravenous cefepime and continued with: moxifloxacin eye drops every six hours, sodium hyaluronate eye drops every six hours, oral levofloxacin 750 mg/day and topical erythromycin three times daily for 14 days.

On the 3 month follow-up, the patient could voluntarily open her left eye and had normal visual function and mild lagophthalmos. (Figure 4 -5)

The patient was satisfied with her appearance.



**Figure 01: Facial erythema with edema and necrotizing tissue with a black eschar left periorbital region.**



**Figure 02 Emergency debridement for necrotic skin and subcutaneous tissue was performed until healthy viable tissue was seen around the wound.**



**Figure 03 Seven days after debridement, wound healing speeded up and debrided areas got epithelized**



**Figure 04 Three month after debridement, the patient could voluntarily open her left eye and had normal visual function and mild lagophthalmos.**



**Figure 05 Three month after debridement, the patient could voluntarily open her left eye and had normal visual function and mild lagophthalmos.**

### **Discussion**

Necrotizing Fasciitis (NF) was first described in 1952 by Wilson. NF is a fatal disease and is rarely seen in the head and neck region. Incidence of periorbital NF is low due to the rich blood supply of this area. (2)

Although, NF frequently generally develops secondary to penetrating trauma or surgery, it may also appear in case of immunosuppression, diabetes mellitus, rheumatologic disease alcoholism, malignancy, and trauma. Such predisposing factors should be well examined by clinicians.

In about 27% of the cases, no predisposing factors are found. In our case, the patient was considered immunocompromised because of her old age and multiple comorbidities. (3)

NF is clinically initiated by periorbital edema and redness. This appearance frequently resembles preceptal cellulitis and erysipelas. However, blackish skin color change and crust form should be a warning for necrotizing fasciitis. Thin skin can provide an early diagnosis of the disease. Progressive

vascular thrombosis rapidly causes necrosis of subcutaneous tissue. The subcutaneous necrosis is usually more extensive than that suggested by the changes in the overlying skin; however muscular layer is generally retained. (4)

Laboratory and imaging studies are essential diagnostic modalities for periorbital NF. The LRINEC score is also a useful tool for early detection of patients with NF. Our patient had a LRINEC score of 8, which was strongly predictive of this disease. (5)

GABHS (Group A beta haemolytic Streptococcus.) is the most commonly isolated organism in periorbital NF. All reported cases of death were found to be infected by GABHS alone or associated with other bacteria. The significant predictors of mortality from NF are age (>50 years), immunosuppression and streptococcal toxic shock syndrome from GABHS

The presentation of the periorbital NF is usually early due to the thin eyelid skin and lack of subcutaneous tissues. Therefore, early recognition and prompt treatment should be employed to prevent mortality and morbidity.

The mortality rate from periorbital NF is about 8.5%. This is far less compared to NF in the other regions of the body, which can vary from 20% to 35%. Mortality generally develops due to systemic complications such as septicemia and multiple organ failures.

A significant delay in diagnosis is often responsible for the mortality. Early recognition and hospital admission for initiation of high-dose antibiotics combined with tissue debridement help to decrease the mortality. (6)

High dose antibiotic combinations initiated with early diagnosis and tissue debridement will help to decrease the mortality. Since thrombosis developed in the blood vessel, antibiotics may not be effective in the infected region. Therefore, antibiotic therapy must be combined with an appropriate surgical debridement.

All necrotic tissues must be debrided until reaching the live hemorrhagic tissue in the surgical debridement. During the debridement, underlying muscles and eyelids must be protected in order to prevent ectropion and keratitis. In case of a slow response to the therapy, repeated debridement surgeries can be considered. After taking the acute phase under control, a reconstructive surgery can be planned for a further date. (7)

In our case, the diagnosis of periorbital NF was straightforward. However, there was a delay in initiation of parenteral antibiotic and surgical debridement as the patient reported nearly ten days after the development of symptoms.

## Conclusion

Early diagnosis and treatment with high dose antibiotic combinations and tissue debridement are essential to reduce the complications associated with this infectious process. As well as they are fundamental to reduce the mortality to which it is associated.

The data regarding the disease course and management remain scarce, thus reporting new cases are very important.

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