







Periorbital Edema: A Clinical Spectrum

Edema Periorbitário: Um Espectro Clínico

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ABSTRACT

INTRODUCTION: When the ophthalmologist evaluates a patient in the emergency department with a periorbital edema, the first approach should be directed to the distinction between a periorbital/preseptal and an orbital/postseptal cellulitis. The objective examination presents valuable sign that can help in this differentiation. The main causes of cellulitis are bacterial infections, but noninfectious causes can also lead to it. The main purpose of this work is to present 4 clinical cases of patients with the same clinical complaint but whose diagnosis, treatment and follow-up were substantially different.

CASE REPORTS: Two of the clinical cases presented patients diagnosed with a preseptal cellulitis, the first caused by an odontogenic abscess and the other caused by a Kerion Celsi (a fungal infection). The last two cases presented patients diagnosed with a postseptal cellulitis caused by a frontoethmoidal mucopyocele and a squamous cell carcinoma of the maxillary sinus. The four patients had different clinical presentation and the medical and/or surgical approach varied among them.

DISCUSSION: Clinical presentation of a preseptal and a postseptal cellulitis varies and these series of cases demonstrate these semiological differences. With them, we demonstrate the variability of diseases that may be associated and present with a periorbital edema. We also enhance the importance of a correct etiologic diagnosis to a correct therapeutic approach and of a multidisciplinary approach of these patients. It is crucial for the ophthalmologist to be aware of all signs and symptoms that the patient presents with, through a complete clinical history and a detailed objective evaluation, allowing the identification of the potentially severe cases, in which an orbital invasion might exist, leading to a correct orientation and proper treatment.

KEYWORDS: Edema/diagnosis; Eyelid Diseases/diagnosis; Orbital Cellulitis/diagnosis; Orbital Diseases/diagnosis.

RESUMO

INTRODUÇÃO: Quando o oftalmologista avalia um doente no Serviço de Urgência com

edema periorbitário, a primeira abordagem deve ser direcionada para a distinção entre celulite periorbital/pré-septal e celulite orbitária/pós-septal. O exame objetivo apresenta achados valiosos que podem auxiliar nessa diferenciação. As principais causas da celulite são infecções bacterianas, mas causas não infecciosas também podem levar a ela. O principal objetivo deste trabalho é apresentar 4 casos clínicos de doentes com a mesma queixa clínica mas cujo diagnóstico, tratamento e seguimento foram substancialmente diferentes.

CASOS CLÍNICOS: Dois dos casos clínicos apresentavam doentes diagnosticados com celulite pré-septal, o primeiro causado por um abscesso odontogénico e o outro causado por um *kerion celsi* (uma infecção fúngica). Os dois últimos casos apresentavam pacientes com diagnóstico de celulite pós-septal causada por mucopiocele frontoetmoidal e carcinoma espinocelular de seio maxilar. Os quatro pacientes tiveram apresentação clínica diferente e a abordagem médica e/ou cirúrgica variou entre eles.

CONCLUSÃO: A apresentação clínica de uma celulite pré-septal e pós-septal varia e esta série de casos demonstram essas diferenças semiológicas. Demonstramos a variabilidade de doenças que podem estar associadas e apresentar edema periorbitário. Salientamos ainda a importância de um correto diagnóstico etiológico para uma correta abordagem terapêutica e de uma abordagem multidisciplinar destes doentes. É fundamental que o oftalmologista esteja atento a todos os sinais e sintomas que o doente apresenta, através de uma história clínica completa e de uma avaliação objetiva detalhada, permitindo identificar os casos potencialmente graves, nos quais pode haver invasão orbitária, levando a uma orientação correta e um tratamento adequado.

PALAVRAS-CHAVE: Celulite Orbitária/diagnóstico; Doenças da Orbita/diagnóstico; Doenças Palpebrais/diagnóstico; Edema/diagnóstico.

INTRODUCTION

When a patient presents to the Emergency Department (ED) with a periorbital edema, the list of differential diagnoses is extensive.¹ The first evaluation of the ophthalmologist must be directed to the semiological distinction between a periorbital or preseptal and an orbital or postseptal cellulitis. Periorbital cellulitis only affects the structures anterior to the orbital septum, a strong fibrous tissue that originates from the orbital roof behind the superior orbital rim and attaches to the levator aponeurosis above the superior tarsal border.² Orbital cellulitis includes structures posterior to this septum and leads to a more exuberant presentation with signs other than edema and erythema, such as proptosis, chemosis and ocular movement (OM) restriction, sometimes associated with pain. Some signs denote more severity that includes visual acuity (VA) decrease, changes in color vision, changes in the visual field and pupillary defects. These signs suggest optic nerve damage and require a prompt intervention.^{3,4}

The main causes of cellulitis are bacterial infections (originated in adjacent infection such as rhinosinusitis, dacryocystitis or odontogenic; in the direct inoculation caused by trauma or cutaneous infections; or in the hematologic extension from distant focus). However, the periorbital edema may have its origin in noninfectious causes such as autoimmune disease, malignancies, foreign bodies, postsurgical or medications.^{1,3,4}

The main purpose of this work is to present 4 clinical

cases of patients who came to the ED with the same clinical complaint – periorbital edema – but whose diagnosis, treatment and follow-up were substantially different from each other, demonstrating the variability and clinical complexity of these situations.

CASE REPORTS

CASE 1:

A 55-year-old woman, without any relevant personal background, came to the ED complaining of a right periorbital edema associated with erythema with a 5-day evolution (Fig. 1). She reported a history of odontogenic abscess diagnosed in a dentistry appointment on the previous day to the appearance of the edema. She was already on antibiotics for the previous 2 days (amoxicillin 875 mg and clavulanic acid 125 mg, twice a day). She denied fever, VA decrease, diplopia, orbital pain, or any other symptom. At the objective evaluation, her right eye (RE) and left eye (LE) VA was 20/25 without optical correction. Hirschberg reflex was centered, there was no relative afferent pupillary de-

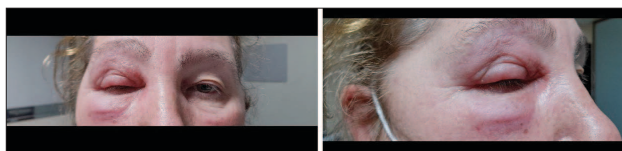


Figure 1. Periorbital edema - case 1

fect (RAPD) and OM had no restrictions. No change was observed at the slit lamp or at the fundoscopic examination. An ophthalmic ointment of prednisolone 2.5 mg/g and chloramphenicol 10 mg/g was started and the medication she was already on was continued.

However, the patient returned to the ED on the next day due to worsening of the edema but without new complaints. At the objective examination, a decrease in the VA of both eyes to 20/50 was noted. The periorbital edema remained soft and incomplete occlusion of the visual axis was observed. She remained with no RAPD or OM alterations. Still, due to the worsening of the edema perceived by the patient, orbits and maxillofacial computerized tomography (CT) was performed (Fig. 2) and 125 mg of intravenous (IV) metilprednisolone was administered.



Figure 2. Orbital computerized tomography – case 1

The CT showed a preseptal cellulitis, without any orbital extension and revealed a discrete right maxillary sinusitis, without any other relevant changes. The patient was forwarded for evaluation by the otolaryngologist that switched her antibiotics to ceftriaxone 500 mg, intramuscular, twice a day, associated with deflazacort in a tapering scheme. She was examined in our department 2 months after this episode showing a normal examination at the objective evaluation and both eyes VA of 20/20 with the appropriated spectacle correction.

CASE 2:

An 8-year-old healthy boy came to the ED with a left periorbital edema associated with ulcerated lesions. His dad mentioned that 2 weeks before a small vesicle appeared on his left superior eyelid and he was medicated with a dexapanthenol ointment 50 mg/g for a week with an escalation of the lesion, being for that reason medicated with a betamethasone cream 1 mg/g associated with fusidic acid 20 mg/g but still no improvement was observed. Two days before coming to the ophthalmology ED, due to the *de novo* appearance of a periorbital edema, he was medicated with oral amoxicillin associated with clavulanic acid 90 mg/kg/day, twice a day.

On our observation, the patient showed an exuberant edema and palpebral lesions compatible with herpes zoster infection (Fig. 3). His OM and pupillary reflexes were



Figure 3. Periorbital edema with vesicular lesions – case 2

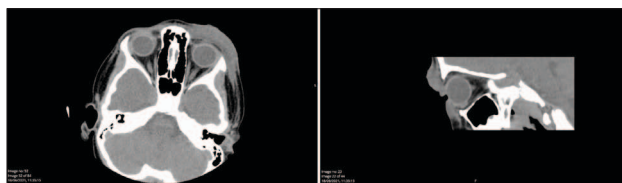


Figure 4. Orbital computerized tomography – case 2

normal and at the slit lamp exam a discrete conjunctival hyperemia was observed, but without any corneal lesions or other findings. His fundoscopic examination was unremarkable.

Due to his age and exuberance of the lesions, the child was hospitalised with the suspicion of a preseptal cellulitis associated with a herpes zoster infection with bacterial superinfection. The confirmation of a preseptal cellulitis was made through a CT (Fig. 4). He had a leukocytosis ($16.3 \times 10^9/L$), with a neutrophilia (65.4%), a thrombocytosis ($509 \times 10^9/L$) and an elevation in his erythrocyte sedimentation rate (ESR) (22 mm) and his reactive C protein (RCP) (19.7 mg/L). He was treated with acyclovir 30 mg/kg/day IV, every 8 hours, and with amoxicillin associated with clavulanic acid 150 mg/kg/day IV, with the same frequency.

However, since no improvement was observed on the third day of IV treatment, the antibiotic therapy was changed to ceftriaxone 100 mg/kg/day IV, once a day and clindamycin 30 mg/kg/day IV, every 8 hours. No change was noted at the ophthalmologic examination and it was possible to observe some extensive palpebral lesions in various stages (skin crusts and vesicles) associated with the edema similar to the first observation, but with a resolution of the conjunctival hyperemia.

After 6 days of the new antibiotic treatment, the patient remained with upper eyelid small scaly pustules, with partial improvement of the edema. The result of the wound exudate was positive for *Candida albicans* and, along with the clinical presentation and the absence of complete improvement with the treatment administered, a diagnosis of a Kerion Celsi was made, a fungal infection that typically appears on the scalp. The medication he was on was stopped and oral griseofulvin was started. He completed a 5-month course with total resolution of the edema and significant improvement of the lesions, with no complications.

CASE 3:

A 69-year-old woman, with arterial hypertension, dyslipidemia, obesity, hyperuricemia and chronic renal disease on hemodialysis, came to our ED with a left periorbital ede-

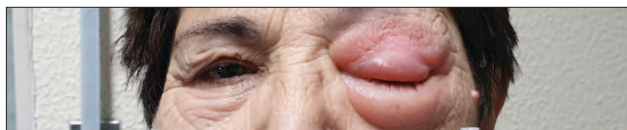


Figure 5. Periorbital edema – case 3



Figure 6. Ocular movements – case 3

ma with 2 days of evolution, associated with intense pain that awake the patient during the night. At the observation, the RE VA was 20/25 and of the LE was 20/30, with the spectacles she used. The edema was soft but very exuberant leading to a complete occlusion of the visual axis and proptosis of the ocular globe (Fig. 5). The pupillary reflexes had no change, but there was a limitation in every OM (Fig. 6), with pain mainly at the supraduction. Ocular pressure (OP) was 12 mmHg and no changes were observed at the slit lamp or the fundoscopic examination. She had no fever.

An orbital CT was performed with the diagnosis of a mucopyocele with extensive occupation of the left frontal

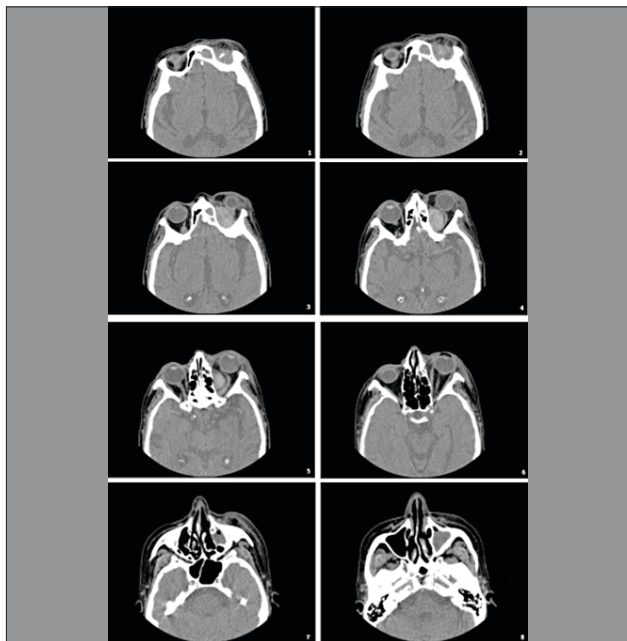


Figure 7. Orbital computerized tomography – case 3

sinus. It had a bony erosion of the posterior wall and floor of the frontal sinus, with mucopyocele content on the adjacent orbit, which led to an inferior deviation of the superior rectus and elevator palpebral superior muscles and ocular globe proptosis (Fig. 7). The ESR was 65 mm and the RCP was 6.3 mg/L (above normal limits).

The patient was forwarded to the otolaryngology ED being initially hospitalized and medicated with ceftriaxone and clindamycin IV. She was then submitted to two surgical interventions aiming the resolution of the frontoethmoidal mucopyocele and the orbital abscess. First she was submitted to their drainage in a combined route (endoscopic and external). Four months later, due to the lack of total resolution, she was reintervened, being submitted to a new drainage, this time only in an external approach. The patient had a total resolution of the disease being completely asymptomatic in her last evaluation.

CASE 4:

A 51-year-old man, 29 pack-year smoker, came to the ED with a left periorbital edema associated with pruritus with 1 month evolution. He also complained of epistaxis with 1 week evolution. He had no diplopia. At the objective evaluation, his RE VA was 20/20 and his LE VA was 20/30 with the spectacles he usually used. He had an exotropia with a hyperopia of his LE and a suppression of it. The edema was a medial swelling, hard on palpation and associated with purulent exudation, leading to a temporal deviation of the ocular globe and proptosis (Fig. 8). He showed no other relevant changes at the slit lamp of both eyes or at the fundoscopic evaluation (Fig. 9) and his OP was 15 mmHg. An orbital CT was obtained and it showed a large space-occupying lesion intersecting the left maxillary sinus, nostril, ethmoidal cells and the orbital left wall. It caused erosion of the bone structures and extended posteriorly to the pterygopalatine fossa and retroantral fat.



Figure 8. Periorbital edema – case 4

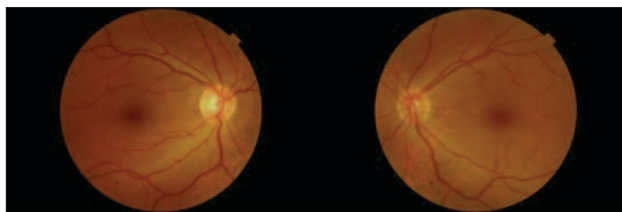


Figure 9. Retinography – case 4

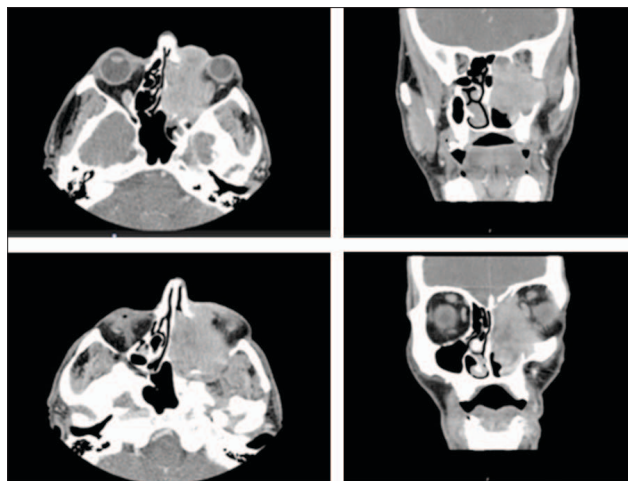


Figure 10. Orbital computerized tomography – case 4

It led to a nasal septum and orbital deviation, as well as of the optic nerve and medial rectus muscle, with left ocular proptosis (Fig. 10).

On the same day, he was observed by the otorhinolaryngologist who performed a biopsy of the neoformation. He was medicated with ciprofloxacin 750 mg, per os, once a day and drops of gentamicin associated with dexamethasone, 5 times per day. However, one week after the first evaluation, the patient showed worsening of the nasal cantus swelling (Fig. 11), without any other new changes at the ophthalmologic evaluation. The histological examination of the biopsy revealed a squamous cell carcinoma, nonkeratinizing, with stromal invasion, and the magnetic resonance allowed better characterization of the tumor (Fig. 12). The patient underwent a perinasal sinus and neck



Figure 11. Periorbital edema one week after the first evaluation – case 4

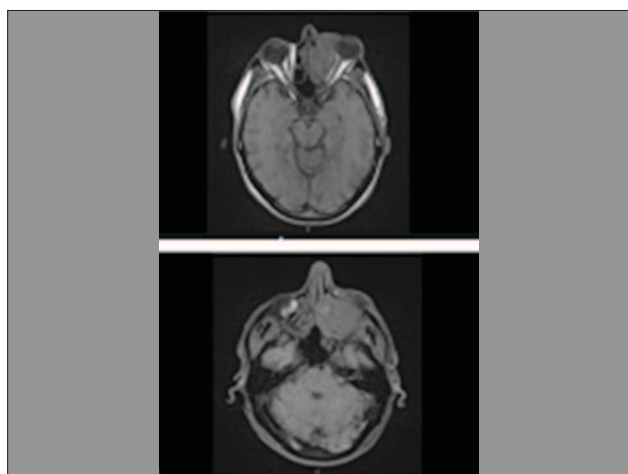


Figure 12. Head magnetic resonance – case 4

CT that showed large adenopathy, probably metastatic. Therefore, the neoplasm was staged (cT4aN2aMx) and, in a multidisciplinary appointment, it was decided that the initial therapeutic approach was going to be an induction chemotherapy followed by concomitant radical chemoradiotherapy. MRI after the treatment showed persistence of the tumor on the left orbit and left pterygopalatine fossa, so left orbital exenteration was decided.

DISCUSSION

The evaluation of a periorbital edema must always begin with a complete clinical history and clinical exam.¹ Maloney *et al* classification divides cellulitis into preseptal and postseptal, a simplified classification with prognostic and treatment implications.⁵ The orbital septum is a fibrous tissue that arises from the periosteum of the orbit into the eyelids and it prevents the spread of the periorbital tissue infections to the orbit.⁶ Orbital cellulitis is therefore less common than periorbital and due to its potential serious complications its diagnosis and treatment should be made as soon as possible.⁷ In contrast, preseptal cellulitis rarely lead to severe complications.^{4,5}

The clinical distinction between a postseptal and preseptal cellulitis is based on different signs such as the OM limitation, VA decrease, proptosis and pain.^{3,4,6} On the clinical cases reported here, it was possible to observe this semiological difference between the cases of preseptal (cases 1 and 2) and postseptal (cases 3 and 4) cellulitis. The incorrect diagnosis of an orbital cellulitis, initially misclassified as preseptal, can lead to an inadequate treatment, originating other problems such as subperiosteal or orbital abscesses and cause ophthalmologic complications with an irreversible decrease in the VA or an intracranial extension with cavernous sinus thrombosis.^{4,5}

Imaging techniques help in their distinction, allowing better characterization of the edema and it should be performed when there is no obvious cause for the edema.¹ Usually, the first line exam is an orbital and perinasal sinus CT with contrast. This exam should also be required when there is fever, leukocytosis, or an absence of improvement after 24 hours of antibiotic therapy. This therapy must be administered empirically and should cover the species usually responsible for this infection, namely, the *Staphylococcus aureus*, *Streptococcus pneumoniae* e *Streptococcus pyogenes*.^{4,7,8}

With this series of cases, we intend to demonstrate the variability of diseases that may be associated and present themselves through a periorbital edema - the ones with a more benign course such as cutaneous or odontogenic infections to the ones potentially more severe and that require surgical intervention like a mucopyocèle or, on the extreme of the most gravity, the presence of a malignancy.

We also want to enhance the importance of a correct etiologic diagnosis to a correct therapeutic approach. The infectious etiology should always be questioned when an absence of improvement is verified with the treatment, as we demonstrated with case 2. Before the clinical presenta-

tion, a diagnosis of a herpes zoster infection with a bacterial superinfection was made, however, after nonresponse to treatment and collection of exudates from wound material, the diagnosis was altered to a Kerion Celsi, a fungal infection of the follicles, more frequent on the scalp, which requires a specific treatment.⁹

In all these situations, multidisciplinary collaboration, namely with otorhinolaryngology, is of extreme importance since some nasal and perinasal diseases may manifest themselves primarily with ophthalmologic signs, as it was possible to demonstrate in clinical cases 3 and 4. On this last one, we observed that the first signs of an extremely severe disease such as a maxillary sinus squamous cell carcinoma can be ophthalmologic, when it is already in an advanced stage, with orbital invasion, since it is a very aggressive tumor with poor prognosis.¹⁰

In conclusion, it is crucial for the ophthalmologist to be aware of all signs and symptoms that the patient presents with, through a complete clinical history and a detailed objective evaluation, allowing the identification of the potentially severe cases, in which an orbital invasion might exist, leading to a correct orientation and proper treatment.

CONTRIBUTORSHIP STATEMENT / DECLARAÇÃO DE CONTRIBUIÇÃO:

All authors declare that they had a substantial and direct intellectual contribution in the design and elaboration of this article, that they participated in the analysis and interpretation of the data, in the writing of the manuscript, in the revision of versions and critical revision of its content and in the approval of the final version, agreeing who are responsible for the accuracy and completeness of all work.

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