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Orbital Cellulitis in Children at the Ophthalmology Department of Treichville University Hospital

Abaukan Kolou Justin Konan[1*], Liliane Fortunette Ouennebo[1], Cophican Arthur Urbain Dibi[1], Dohounrossi Maimouna Sirima[1], Bi Tah Epiphane Kouai[1], Kré Marius Adagra[2], Gilles Beda Appia[1], Kpatchingnain Kone[1], Kouame Luc Joel Kouassi[1]

[1]Department of Ophthalmology, Treichville University Hospital, Abidjan, Cote d'Ivoire
[2]Department of ENT, Treichville University Hospital, Abidjan, Cote d'Ivoire
Email: *kabaukanjustin@gmail.com

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Abstract

Introduction: Orbital cellulitis is a rare but serious condition in children that usually begins locally. Its treatment must be urgent to avoid blinding or even fatal complications. **Aim:** To assess the clinical and etiological aspects of orbital cellulitis in children in order to improve multidisciplinary management. **Method:** A cross-sectional study was conducted in the ophthalmology department of Treichville University Hospital over a period of 4 years from January 2018 to December 2022, covering patients under 15 years of age who were monitored and treated for orbital cellulitis. **Results:** We collected 12 orbits from 12 children. The mean age was 9.24 years, with a predominance of males (sex ratio = 1.4). The average consultation time was five days. Etiology was dominated by ethmoidomaxillary sinusitis in seven patients (58.3%). Inflammatory palpebral swelling and painful exophthalmos summarised the clinical picture. An orbital abscess was noted in 41.7% i.e. five cases. Surgical drainage was performed in half the cases (six patients), and antibiotic therapy was initiated in all patients. **Conclusion:** Orbital cellulitis is a potentially serious acute condition of the young, complicating neighbouring diseases. It is a medical and surgical emergency, and early multidisciplinary management improves prognosis.

Keywords

Orbital Cellulitis, Child, Sinusitis, Emergency

1. Introduction

Cellulitis, an inflammatory disease of infectious origin of the cellulo-fatty tissue

of the orbit, is a rare condition in children characterised by acute swelling of the orbit [1] [2]. It is a serious pathology due to its local, locoregional and general complications. It constitutes an emergency that can lead to blindness or even fatal complications in the event of endocranial extension. A distinction is made between preseptal cellulitis, located in front of the orbital septum, which usually has a favourable outcome, and retroseptal cellulitis, which can be life-threatening or functionally disabling. Treatment is based on antibiotic therapy, and surgery is only necessary in the event of abscessation. There are very few topical studies of this condition in sub-Saharan Africa, hence the interest of this study, the aim of which was to assess the clinical and aetiological aspects of orbital cellulitis in children in order to improve multidisciplinary management.

2. Method

The authors conducted a four-year cross-sectional study from January 2018 to December 2022 in the ophthalmology department of Treichville University Hospital in Abidjan. The inclusion criteria were all patients under 15 years of age seen in consultation for orbital cellulitis of any aetiology, except those who had not been followed up in the department during this period, those whose records were unusable and those lost to follow-up. Each patient was given an anonymous number after written informed consent had been obtained from the legal guardian. A history and ophthalmological examination were carried out to determine the history of the disease, previous history, and measurement of distance visual acuity, examination of the adnexa, anterior segment and fundus. A locoregional ENT and odontostomatological examination was also required for all patients. In cases of suspected retroseptal cellulitis, orbital imaging was required for diagnostic and extension purposes. Orbital CT scans were performed in axial, coronal, sagittal and 3D sections with and without contrast injection. The most widely used CHANDLER classification was applied to staging orbital cellulitis on the basis of clinical and/or imaging signs. The study variables were epidemiological, clinical, aetiology according to the portal of entry and and the treatment modalities, either medical (type of antibiotic therapy, dose, route of administration, duration) or surgical. This study took into account ethical and deontological considerations in accordance with the principles of the Declaration of Helsinki. Data were collected on a survey form from patient files. Data entry, tables and mean calculations were carried out using EPI INFO 7 version 1.3, Word and Excel 2016 software.

3. Results

We collected 12 eyes from 12 patients. The predominant sex ratio was 1.4, with seven males and five females. The mean age of the patients was 9.24 years, with extremes of 10 months and 15 years. The 5 - 10 age group was predominantly represented (58.3%). The average time to consultation was five days. Two patients were seen before 72 hours and seven patients (58.3%) were seen between three days and a week, the extreme being up to 16 days. The administration of oral non-

steroidal anti-inflammatory drugs was a contributing factor in three patients. The functional signs observed in all cases were painful palpebral swelling. Exophthalmos was associated with this in 66.7% (eight patients). Other signs such as reduced visual acuity and purulent discharge from the orbital region were reported in 41.7% (five patients) and 33.3% (four patients), respectively. According to CHANDLER, cellulitis was at the preseptal stage and at the orbital abscess stage in the same proportion of 41.7% (**Table 1**) and (**Figure 1**, **Figure 2**).

In terms of aetiology (**Table 2** and **Table 3**), sinus inflammation was the main cause in 58.3% of cases (seven children), followed by odontological and traumatic causes in 16.7% of cases (two children).

The treatment consisted of antibiotic therapy with 3rd generation cephalosporin at a dose of 10 mg per kg of body weight in two oral doses on an outpatient basis for 15 days for preseptal cellulitis. Hospitalisation was necessary for cases of purulent orbital collection, with surgical drainage carried out in 6 cases (50%), combined with parenteral antibiotic therapy with amoxicillin and clavulanic acid at a dose of 100 mg per kg of body weight divided into three slow daily direct intravenous injections. (**Figure 3(a)** and **Figure 3(b)**) During monitoring, all 12 children showed a favourable evolution, both anatomically (disappearance of swelling and inflammation), with normal ocular motility, and functionally, with visual acuity returning to normal.

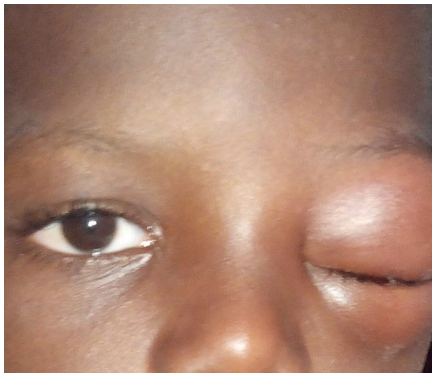


Figure 1. Preseptal orbital cellulitis (stage 1) in a six-year-old child.

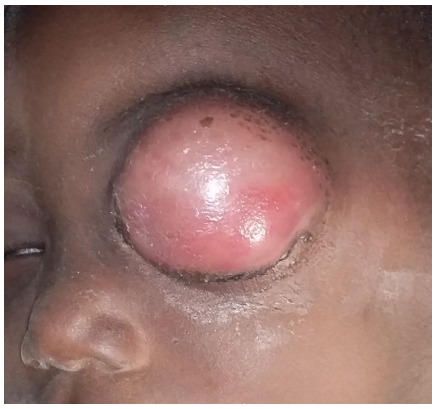
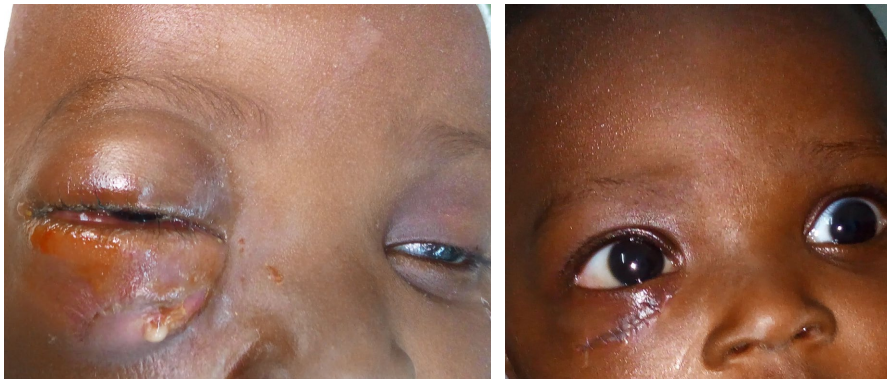


Figure 2. Orbital abscess (stage 3) in a three-year-old child.



(a) (b)

Figure 3. (a) and (b): Orbital abscess in a four-year-old child (pre- and post-operative appearance of surgical drainage).

Table 1. Distribution of patients according to the stage of orbital cellulitis.

Groups	Number	Percentage
1: preseptal cellulitis	5	41.7
2: orbital cellulitis	2	16.6
3: subperiosteal abscess	0	0
4: orbital abscess	5	41.7
5: cavernous sinus thrombosis	0	0
Total	12	100

Table 2. Distribution of patients according to etiology.

Causes	Number	Percentage
sinus	7	58.3
dental	2	16.7
local trauma with skin breakdown	2	16.7
dermatological	1	8.3
Total	12	100

Table 3. Distribution of causes according to age groups.

Age groups	Causes				Total
	sinus	dental	trauma	dermatological	
[0 - 5] years	1	0	0	1	2
[5 - 10] years	5	0	2	0	7
[10 - 15] years	1	2	0	0	3
Total	7	2	2	1	12

4. Discussion

Orbital cellulitis is relatively rare in ophthalmological practice. The incidence of adnexal infections in hospitals of all ages in sub-Saharan Africa is estimated to be

between 8% and 12% [3] [4]. Data on African children are not widely available, but need to be updated. The distribution of cellulitis according to sex varies in the literature. We have noted a predominance of males, with a sex ratio of 1.4. Kangni's extended study of 33 cases of maxillofacial cellulitis, including orbital involvement, found a clear male majority (sex ratio = 3.12) [4]. However, the small size of our sample could constitute a bias and could not demonstrate a causal link between sex and orbital cellulitis [5]. The average age was 9.24 years, and 83.3% of the children were over five years old. The fact that the growth process of the facial organs is in its final stages at this age, the relative body and oral hygiene of these children and the lack of interest in parental monitoring of these children compared with the youngest (under 5 years of age) are reasons that may explain the peak occurrence of this condition in these age categories. The average delay before consultation was five days. Delays in consultation have been noted in several studies [6]-[8]. Possible reasons for this delay include patients' ignorance, mystical and religious beliefs, and lack of financial resources, which lead them to turn to traditional treatments. Recourse to a specialist consultation is often only envisaged in the presence of major complications. The reflex of self-medication, encouraged by family and friends, is the rule. Education and awareness-raising are therefore an important part of prevention. Contributing factors, such as excessive use of non-steroidal anti-inflammatory drugs for pain relief in dental caries, were observed in two patients in our series. Harding's results confirmed the deleterious role of non-steroidal anti-inflammatory drugs in the worsening of orbital cellulitis, as they are thought to encourage the spread of infection and its worsening by blocking the mechanisms of inflammation [6]. The causes of orbital cellulitis in children were locoregional. Sinus conditions, dominated by ethmoiditis and ethmoidomaxillary sinusitis, were the most common, with seven cases (58.3%), followed by dental conditions in two cases (16.7%) and facial trauma with skin breakdown (16.7%). This may be due to the fact that ethmoiditis is the main portal of entry for orbital inflammation in children aged between 5 and 10 years, because of the immaturity of the sinus cavities at this age, which leads to mucus stagnation in this pneumatised cavity and bacterial proliferation, resulting in acute sinusitis which will progress by contiguity to the orbital structure at the origin of orbital cellulitis [9] [10]. In children, relatively poor oral hygiene could also potentiate the local infection, as described by Kangni, especially as the child's eating habits are based on sweet foods [4]. The clinical picture of orbital cellulitis in our context was noisy, marked by inflammatory oedema of the eyelids and painful exophthalmos, which may or may not be associated with a purulent collection. We identified three clinical groups, including five cases of preseptal cellulitis, two cases of diffuse orbital cellulitis and five cases of orbital abscess. No cases of thrombophlebitis of the cavernous cavity were identified. Kangni and Harding have described severe forms of retrospetal cellulitis with a risk of sepsis leading to death [4] [6]. According to Hodges, retrospetal orbital cellulitis is responsible for neuromeningeal complications because of its location and the fragile condition of

the child [11]. Orbital CT scan has contributed to improved management. In addition to confirming the diagnosis and assessing the impact on the neighbouring organs of the head and neck, the coronal section can be used to guide the surgical approach. Imaging is still of interest in the topographical diagnosis, assessment of the limits and choice of treatment for orbital abscesses [12] [13]. It can also be used to explore the ENT and maxillofacial regions. In terms of treatment, broad-spectrum antibiotic therapy has been used, targeting both aerobic and anaerobic germs [10] [14]. In the case of orbital abscesses indicating retrospetal involvement, multidisciplinary management has been used, involving the stomatologist and then an ENT opinion, depending on the aetiology of the orbital cellulitis. Cytobacteriological analysis of the purulent contents was not helpful in this study, as it did not reveal any bacterial germs that were probably decapitated. Nevertheless, the combination of amoxicillin and clavulanic acid covering drainage of the purulent collection carried out under general anaesthetic was the rule, in accordance with the data in the literature, due to the efficacy of the molecule in the face of microbial polymorphism in the head and neck area [1] [15]. The addition of systemic corticosteroids has been discussed in different schools and should take into account whether or not the patient is immunocompromised. In our series, surgery was performed in six patients (50%). In the work of Wane and Kangni, respectively, this treatment modality was applied in 60% and 72% [3] [4]. In these studies, as in our own, the late and advanced nature of the disease explains the need for surgical drainage accompanied by probabilistic antibiotic therapy. These high proportions highlight the need to raise awareness among the general public and healthcare professionals in peripheral centers of the need to refer patients to specialist services in order to improve both functional and vital prognosis. The outcome of the patients in our sample was favourable, with anatomical ad-integrum restructuring and visual acuity returning to normal. All authors stress the urgency of treating orbital cellulitis and its prevention through early and effective treatment of ENT and odontostomatological disorders [5] [16] [17]. This study has its limitations. Firstly, the small sample size corroborates the rarity of this condition in paediatrics. Secondly, orbital cellulitis is a disease that involves the involvement of several structures of the face as a portal of entry or site of extension of the infection. This explains why the patients concerned are referred not only to the ophthalmologist but also to the ENT or maxillofacial surgeon, hence the reduction in the number of cases depending on the reference context. Multicentre hospital studies would therefore be more beneficial in developing a multidisciplinary management strategy.

5. Conclusion

In our practice, orbital cellulitis in children is a rare condition, mostly of sinus origin, which is diagnosed late due to ignorance. The blinding and sometimes fatal complications of certain forms demonstrate the need for urgent management by a multidisciplinary team. Early treatment of sinus and dental disorders remains

essential for the prevention of orbital cellulitis. People need to be made aware of the need to seek urgent medical attention, and peripheral health centres need to be encouraged to recognise the signs of this condition.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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