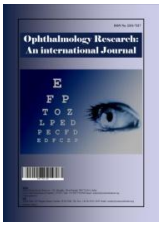

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Preseptal Cellulitis: 13 Years Review in a Tertiary Hospital South-Eastern Nigeria

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Authors' contributions

This work was carried out in collaboration among all the authors. Author AIA designed the study and protocol, performed the data analysis and general supervision and proof-reading of the work. Author CCU wrote the first draft manuscript and the literature searches. Author CCN collected the data.

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ABSTRACT

Objectives: To determine the epidemiology and management outcome of preseptal cellulitis seen at a tertiary eye hospital within a period of 13 years.
Materials and Methods: The case files of all patients seen with preseptal cellulitis from 2005 to 2017 were reviewed. The information obtained included the patients' demography, presenting symptoms and signs, research, treatment, outcome, complications and follow-up.
Results: Of the 123 patients with preseptal cellulitis reported on the study, 66 were males and 57 females. In a range of 0 to 80 years old, the mean age was 19 years. The commonest predisposing factor was trauma (20.3%) followed by upper respiratory tract infection (11.4%). Progression to orbital cellulitis was seen in 11.4% of the patients.
Conclusion: Preseptal cellulitis is not uncommon in adults as seen in previous studies. Trauma is now more common than sinusitis as a predisposing factor. Despite oral antibiotic therapy some cases may progress to orbital cellulitis.

Keywords: Preseptal cellulitis; trauma; sinusitis; predisposing factor.

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1. INTRODUCTION

Preseptal cellulitis, also known as periorbital cellulitis, is a skin and soft tissue infection around the eye anterior to the orbital septum.[1] Although infections of the orbital and periorbital areas are relatively frequent and cause significant local and systemic morbidities, the orbital septum separates the preseptal cellulitis, which is less severe, from the potentially more dangerous orbital cellulitis. [2].

Preseptal cellulitis may progress to orbital cellulitis, when diagnosis and treatment are delayed. Cavernous sinus thrombosis and meningitis could be the result of a more posterior spread of the orbital infection.[1,3] The orbital complications classification developed by Chandler in 1970 remains valid: preseptal cellulitis (stage 1), orbital cellulitis (stage 2), subperiosteal abscess (stage 3), orbital abscess (stage 4), and cavernous sinus thrombosis (stage 5).[4]

Preseptal cellulitis more commonly seen in children manifests with fever, edema, hyperemia, and pain in the palpebral and periorbital tissue. The eyeball is not involved; conjunctival hyperemia is absent; no pain with eye movements nor loss of vision are seen; and intraocular pressure is not affected.[5] Predisposing factors include local skin trauma, sinus infections or penetrating trauma especially those involving the ethmoid sinus. The bacterial infection may result from spread of dacryocystitis, an external ocular infection or following trauma to the eyelids.[3,6] The most common organisms are *Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus species*, and anaerobes – known causative organisms of upper respiratory tract infections and external eyelid infections.[6] Early treatment with appropriate antibiotics often results in regression of most preseptal cellulitis.

This study aims at determining the current epidemiology and management outcomes of preseptal cellulitis at the Guinness Eye Centre, Onitsha, South Eastern Nigeria.

2. PATIENTS AND METHODS

The medical records of all patients in whom a diagnosis of preseptal cellulitis was made from January 2005 to December 2017 were retrieved. The patients' case files were selected from the out-patients register, and the following information were recorded in a proforma: age, sex, presenting complaints, eye affected, duration of symptoms prior to presentation, predisposing factors, use and duration of antibiotics prior to presentation, presenting visual acuity, clinical signs, laboratory investigations done, treatment provided, surgical intervention if any, last visual acuity, complications, admission, follow-up visits. Patients whose case files could not be traced were excluded. The data were entered, validated, and analyzed using the Statistical Package for the Social Sciences version 22.0 software (IBM SPSS Inc., Chicago, IL, United States). Simple descriptive terms were used to present the quantitative and categorical variables.

3. RESULTS

A total of 123 patients with preseptal cellulitis during the period were reviewed. There were 66 {53.7%) males and 57 (46.3%) females. The mean age of presentation was 19.6 ± 19.8 years (range 0 to 80 years). Almost 50% of cases occurred within the first decade of life and of them, a quarter (26%) are in children less than 5 years old. (Table 1).

Furthermore, the table shows that 63.4% fell within 0 to 20 years. Table 2 shows that the single most common presenting complaint was eyelid swelling 97 patients (78.9%), followed by eyelid pain 74 cases (63.4%). Blurry vision was documented as a complaint in 15.4%.

Table 1. Age of the patients in the study

	Frequency	Percent (%)
<5yrs	32	26.0
5 -10yrs	29	23.6
11 -20yrs	17	13.8
21 – 40yrs	25	20.3
>40yrs	20	16.3
Total	123	100.0

Table 2. Frequency of presenting complaints

Complaint	Frequency	Per cent
Lid swelling	97	78.9
Lid pain	78	63.4
Fever	23	18.7
Blurry vision	19	15.4
Eye protrusion	2	1.6

Table 3. Frequency and duration of symptoms

Days	Frequency	Percent	Valid Percent	Cumulative Percent
1	16	13.0	14.3	14.3
2	14	11.4	12.5	26.8
3	26	21.1	23.2	50.0
4	11	8.9	9.8	59.8
5	9	7.3	8.0	67.9
6	3	2.4	2.7	70.5
7	15	12.2	13.4	83.9
8	1	.8	.9	84.8
9	2	1.6	1.8	86.6
10	2	1.6	1.8	88.4
14	8	6.5	7.1	95.5
15	1	.8	.9	96.4
21	2	1.6	1.8	98.2
28	1	.8	.9	99.1
35	1	.8	.9	100.0
Total	112	91.1	100.0	
Missing system	11	8.9		
Total	123	100.0		

Table 4. Predisposing factors to Preseptal cellulitis

Factors	Frequency	Per cent
URTI	14	11.4
Trauma	25	20.3
Recent ocular surgery	2	1.6
Chronic dacryocystitis	1	0.8
Skin lesion	8	6.5
Stye	3	2.4
None identifiable	70	56.9
Total	123	100.0

The right eye was affected in 58 patients (47.2%), left eye in 57 cases (46.3%) while both eyes were involved in 8 (6.5%) patients. Ninety-four (83.9%) patients presented within 7 days of onset of symptoms (range 1 day to 35 days) as shown in Table 3.

The most common predisposing causes documented in the case files were trauma and upper respiratory tract infection (URTI) in 25 (20.3%) and 14 (11.4%) patients, respectively (Table 4).

About one-quarter 33 (26.8%) of the patients used antibiotics before presentation which were mostly topical 22 (17.9%), and oral 16 (13.0%) antibiotics. Both topical and oral antibiotics were used simultaneously by 5 patients. The presenting visual acuities in the affected eyes of 88 patients were recorded: 59 (67.0%) had vision 6/18 or better as shown in Figs. 1 and 2.

The clinical signs seen in the patients occurred in the following frequencies: fever 13 (10.6%), discharge 55 (44.7%), lid oedema 119 (96.7%),

tenderness 35 (28.5%), lid erythema 85 (69.1%), reduced ocular movement 20 (16.3%) proptosis 14 (11.4%), chemosis 36 (29.3%), abnormal pupillary reaction 9 (7.3%). Laboratory investigations were done by 13 (10.6%) of the patients as shown in Table 5.

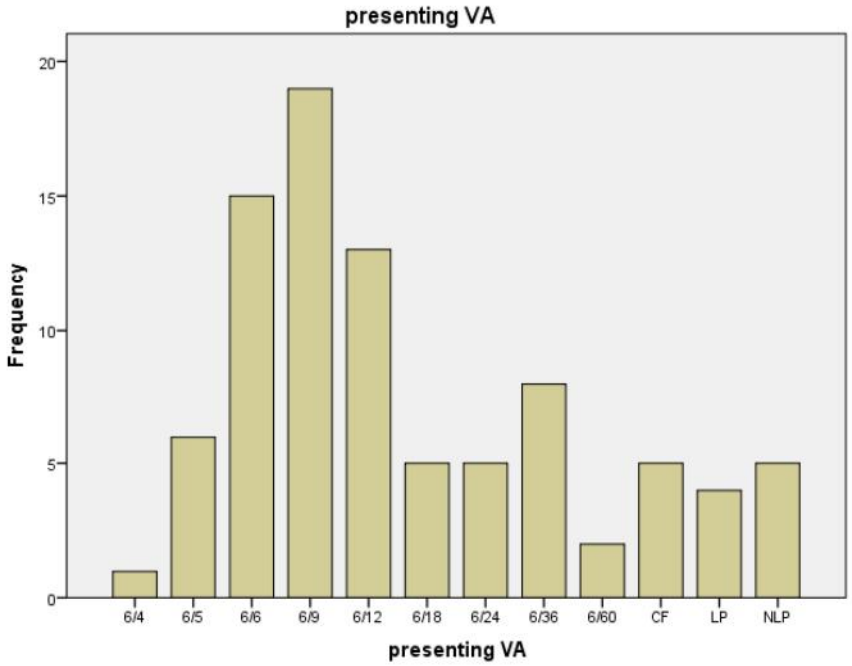

Fig. 1. Graphical representation showing variation in presenting visual acuity (VA) with frequency

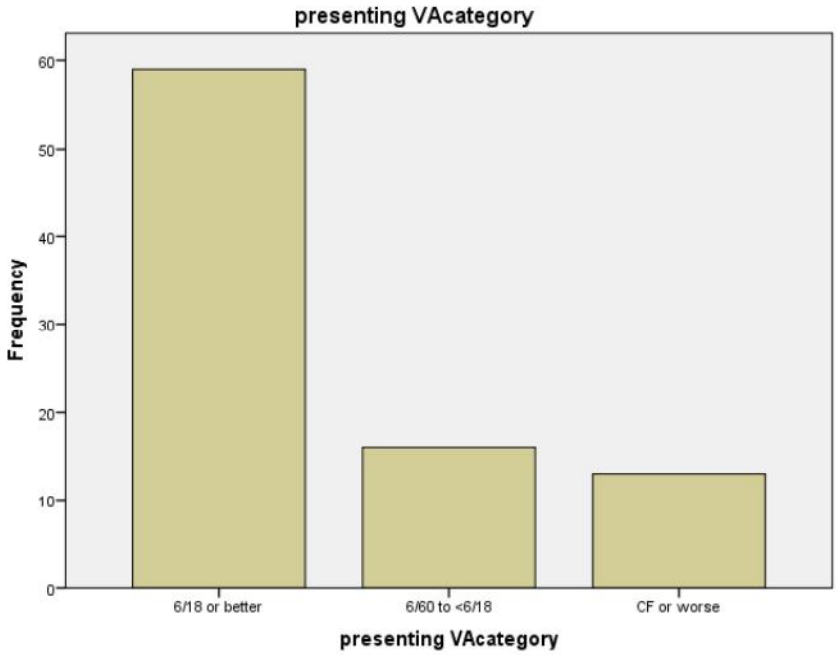

Fig. 2. Graphical representation showing variation in presenting VA category with frequency

Table 5. Laboratory Investigations

	Frequency	Percent
FBC	4	3.3
MCS	7	5.7
FBC and MCS	2	1.6
None	110	89.4
Total	123	100.0

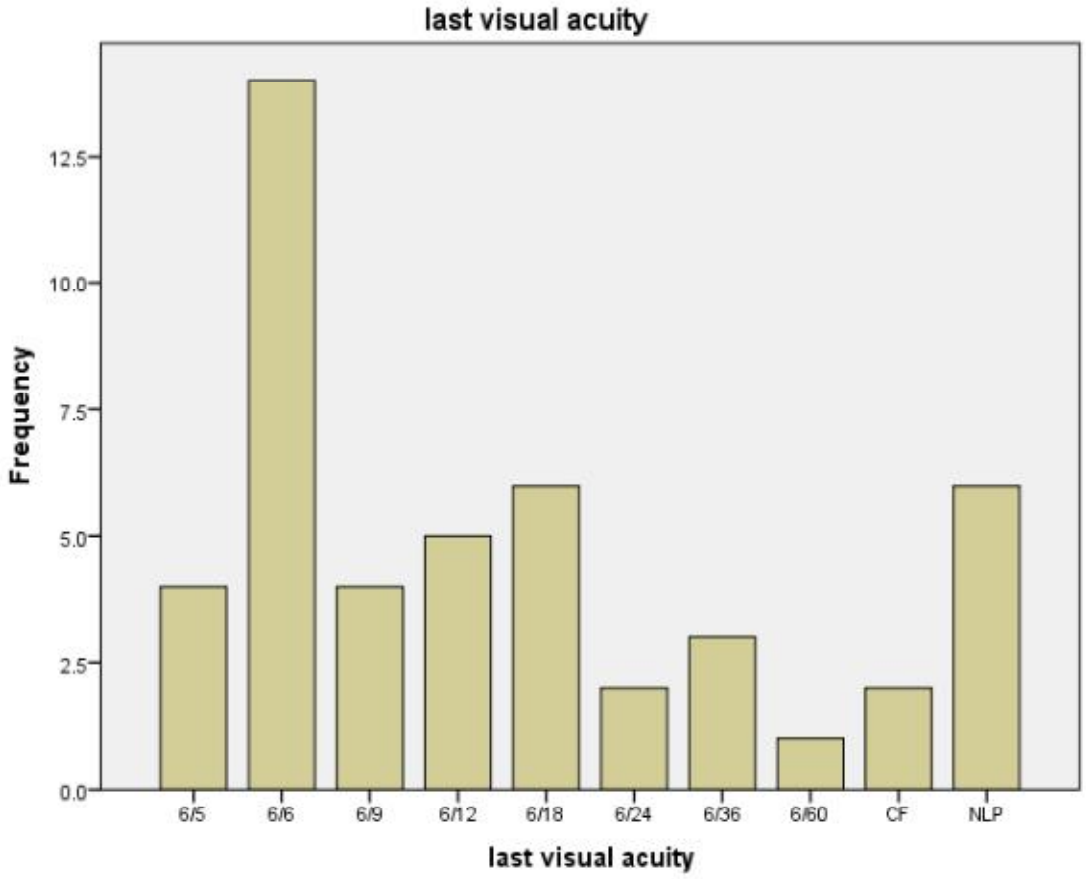

Fig. 3. Graphical representation showing variation in last visual acuity with frequency

Microscopy, culture and sensitivity tests of conjunctival swab was the commonest investigation done by 7 (5.7%) patients. All the patients (123) received pharmacologic therapy: 106 (86.2%) patients received oral and topical antibiotics while 18 (14.6%) were administered systemic (intravenous and intra-muscular) antibiotics. Surgical intervention (drainage of orbital abscess) was recorded in 3 (2.4%) patients. After treatment and follow-up, a last visual acuity of 6/18 or better in the affected eye was recorded in 33 (70.2%) out of 47 patients considered; most common vision was 6/6 in 14 (29.8%) patients. The last VA was not recorded in 76 (61.8%) patients lost to follow-up (Fig. 3).

Sixteen (13%) patients had one or more complications: orbital cellulitis 14 (11.4%), visual loss 12 (9.8%), orbital abscess in 3 (2.4%) patients, strabismus 2 (1.6%) patients, ptosis, and, exposure keratopathy one case of each (0.8%).

Twenty-three (18.7%) patients were managed as in-patients during the period. Table 6 shows the hospital stay of the 23 patients (mean 9.87days, median 8.00days, and standard deviation 5.57).

Table 6. Average hospital stay

Days	Frequency	Percent	Valid Percent
2.00	1	0.8	4.3
3.00	1	0.8	4.3
4.00	2	1.6	8.7
5.00	1	0.8	4.3
6.00	1	0.8	4.3
7.00	4	3.3	17.4
8.00	3	2.4	13.0
10.00	2	1.6	8.7
12.00	1	0.8	4.3
13.00	1	0.8	4.3
14.00	1	0.8	4.3
15.00	1	0.8	4.3
16.00	1	0.8	4.3
19.00	1	0.8	4.3
21.00	2	1.6	8.7
Total	23	18.7	100.0
Missing system	100	81.3	
Total	123	100.0	

Table 7. Follow up duration

Days	Frequency	Percent	Valid Percent
.00	43	35.0	35.0
1.00	1	0.8	0.8
3.00	2	1.6	1.6
5.00	2	1.6	1.6
7.00	31	25.2	25.2
14.00	10	8.1	8.1
19.00	1	0.8	0.8
21.00	6	4.9	4.9
30.00	12	9.8	9.8
42.00	1	0.8	0.8
60.00	5	4.1	4.1
90.00	3	2.4	2.4
120.00	1	0.8	0.8
150.00	1	0.8	0.8
210.00	2	1.6	1.6
366.00	2	1.6	1.6
Total	123	100.0	100.0

Table 7 shows the patients' follow-up durations (mean 23.69 days, median 7.00days, and standard deviation 56.21days). Twenty-seven (22%) patients were followed-up for at least 30 days, while more than 60% achieved minimum of 7 days follow-up.

4. DISCUSSION

This 13-year review identified 123 patients who presented with preseptal cellulitis; 14 (11.4%) of whom progressed to orbital cellulitis. A similar retrospective review done by Liu et al in Taipei, Taiwan over a period of 10 years identified 94 patients (in which 27 had orbital cellulitis).[7] Preseptal cellulitis can occur at any age, but especially common in the paediatric population.1 The mean age of our patients was 19.6 years (range 0-80), however, patients in the first decade of life constituted about 50%. This corroborates the paediatric predilection of preseptal cellulitis. Liu et al, and Shoaei et al in Tehran, Iran recorded mean ages of 32.5 years (range 0.1-89) and 38.9 years respectively [3,7] while in Istanbul, Turkey, Berksu et al documented a lower average age of five years (61.8 months).[4] It is debatable if there is any gender predilection. In our study a marginally

higher male proportion was observed (54% males, 46% females) but a much larger male predominance was reported in the Turkey study (66% males, 34% females).[4] A slight female preponderance was noted in Taiwan (male: female = 32 : 35)7 and Iran (male : female = 19 : 21).3 The most frequent presenting complaint was eyelid swelling (79%) as seen in other studies.3,4,5,6,7 The eyelid skin is loose and thin allowing for easy expansion and accumulation of fluid. However, contrary to what others recorded the authors reported the second most common complaint was not eyelid erythema rather pain. This may largely be due to skin colour difference whereby our dark pigment obscures the redness of eyelid skin. The low frequency of fever as a presenting complaint in our study may stem from the common practice in our environment of prior antibiotic and antipyretic treatment before presentation to hospital.[8] The benefit of early presentation was demonstrated wherein 84% of our patients presented within 7 days of onset of symptoms, while about 50% presented in the first 3 days. Overtime, many authors reported paranasal sinus infection as the commonest predisposing factor of preseptal cellulitis[1,4] however our review identified periocular trauma as the leading factor constituting 20%, and higher than URTI (14%). Shoaei et al made similar observation that trauma (57.5%) was the leading cause.[3] Furthermore, Liu et al in their series reported that periocular conditions such as skin pustule (19.4%), dacryocystitis (19.4%) and hordeolum (16.4%) were the leading predisposing factors.[7] In our study, due to the high number of patients with unidentifiable predisposing factors (56.9%), and the fact that most patients could not afford radiological investigations requested sinus infections may have been under-reported. The practice of self medication or pre-hospital consultation which is rife in our environment is noted in one-quarter of our patients who had antibiotic treatment prior to presentation.[8] The reviewed presenting visual acuities were documented in 72% of our patients. In our study, children <5 years accounted for 26%: this young age, in addition to the presence of eyelid swelling and pain, could explain most of the remainder 28% without documented presenting VA. It is known that upon making clinical diagnosis of preseptal cellulitis preference was given to prompt institution of treatment. Preseptal cellulitis typically does not affect vision because infection and inflammation are superficial and anterior to periocular tissue with no involvement of extraocular muscles.[1] In our study, about 70% presented with vision 6/18 or better while 11.5% had vision CF or worse in the affected eye. The latter group could have pre-existing causes of poor vision. In differentiating between preseptal and orbital cellulitis, Bae and Bourget [1] submitted that the absence of fever suggests orbital cellulitis. They, however, acknowledged that some cases of orbital cellulitis may not exhibit fever while some cases of preseptal cellulitis may be associated with fever, conjunctival hyperemia, chemosis, and some reduction in vision. These assertions align with our finding of fever in 11% of patients. There was paucity of investigations as only 10.6% did laboratory tests: conjunctival swab MCS 5.7%, FBC 3.3%, both MCS and FBC 1.6%. There was no recording of any yielded organism probably due to prior antibiotic usage. Likewise, radiological investigation was not done in any of the patients. These two problems may have resulted from serious financial constraints, and absence of health insurance coverage. The treatment of preseptal cellulitis differs based on the severity of disease and age of patient. Patients who are over one year of age with mild symptoms can be treated as out-patients with oral antibiotics. Those with more severe disease or are less than one year of age should be admitted to hospital.[1] In our study 81.3% were treated on out-patient basis. Intravenous antibiotic regimen was administered to 14.6% of patients including those who progressed to orbital cellulitis (11.4%) and needing hospital admission. Although there was significant proportion of patients lost to follow-up (61.8%), there was equally an improvement in visual outcome among the VA CF or worse group from 11.2% at presentation to 6.5% at last VA done at one month follow-up.

5. CONCLUSION

Preseptal cellulitis is prevalent among children but not uncommon in adults. Trauma as a predisposing factor may equally be as important as sinus infections. Prompt antibiotic treatment is imperative to prevent progression to severe disease. This study is limited by its retrospective design: a robust prospective study is needed to clarify the unanswered questions.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not

intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval for the study was obtained from the Ethics and Research Committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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