Current Trends in Treatment Outcomes of Orbital Cellulitis in a Tertiary Hospital in Southern Nigeria

Odarosa M Uhumwangho, Dumebi H Kayoma

Department of Ophthalmology, University of Benin Teaching Hospital, P.M.B. 1111, Benin, Edo State, Nigeria

Abstract

Background: Orbital cellulitis refers to the inflammation or infection of the soft tissues of the orbit located behind the orbital septum. **Aim:** To determine the current trends in the outcomes following the management of orbital cellulitis in a tertiary hospital in Southern Nigeria. **Patients and Methods:** A retrospective review of medical records of patients with orbital cellulitis from January 2008 to December 2014 was conducted. The age, sex, duration of symptoms, predisposing factors, clinical findings, laboratory/radiological investigations, treatment provided, complications, and follow-up were recorded. Results were analyzed with SPSS Version 21 program. **Results:** Forty-two patients were seen made of 17 (40.5%) males and 25 (59.5%) females with a mean age of 18.2 ± 18.7 years of which children <16 years constituted 24 (57.1%) of cases. Orbital cellulitis was a unilateral occurrence in 38 (90.5%) patients. Trauma and sinusitis were the common predisposing causes in 20 (47.6%) and 6 (14.3%) patients, respectively. The most common complaint was eye swelling 36 (52.9%). Most patients had visual acuities of >6/18 at presentation, 38 (82.6%) and at discharge, 39 (84.8%). The mean duration of presenting complaints was 15.5 ± 31.6 days. Patients who presented early were less likely to develop complications, $P = 0.003$. The most common complication was exposure keratopathy in 8 (44.4%) eyes. The only surgical intervention performed was incision and drainage of abscess in 3 (7.1%) eyes. No patient came for follow-up. **Conclusion:** Prompt institution of effective antibiotics and management of complications that may arise improves prognosis of orbital cellulitis.

Keywords: Antibiotics, orbital cellulitis, Southern Nigeria

Address for correspondence:
Dr. Odarosa M Uhumwangho,
Department of Ophthalmology, University of Benin Teaching Hospital, P.M.B. 111, Benin, Edo State, Nigeria.
E-mail: odarosa.uhumwangho@uniben.edu

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Introduction

Orbital cellulitis refers to the inflammation or infection of the soft tissues of the orbit located behind the orbital septum.[1] It is an ophthalmic emergency with sight threatening complications of visual loss from complications such as exposure keratopathy with corneal opacity and optic atrophy from optic nerve compression.[1-5] Deaths can also occur as a result of life-threatening complications such as cavernous sinus thrombosis, meningitis, and brain abscess.[1-3] Bacteria and fungi are the predominant causative microorganisms responsible for the disease. Prompt treatment with appropriate antimicrobial cover prevents or reduces the complications that could arise. The use of effective antibiotics has resulted in a dramatic reduction of the complications of orbital cellulitis.[1]

The aim of this study is to determine the current trends in the outcomes following the management of orbital cellulitis at the University of Benin Teaching Hospital, Benin City, Nigeria.

Patients and Methods

A retrospective review of the medical records of all patients in whom a diagnosis of orbital cellulitis was made from January 2008 to December 2014 was retrieved. The case files were identified from the ward admissions register and theater register for patients who were admitted into the eye ward and/or had a surgical procedure performed in the course of treatment. The age, sex, duration of symptoms prior to presentation, predisposing factors obtained from history, clinical, laboratory,

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or radiological investigations when applicable, ocular findings, treatment provided, and antibiotics utilized, surgical intervention if any, complications and follow-up visit were recorded. Routine treatment in all patients consisted of immediate admission and empiric treatment with intravenous third generation cephalosporins such as ceftriaxone, intramuscular gentamycin, and intravenous metronidazole for anaerobic organisms pending reports of relevant investigations requested. Intravenous therapy was switched to oral formulations within 48–72 h of admission with improvement in clinical presentations or at discharge. In an earlier study in this center, routine treatment was with high doses of intravenous antibiotics such as ampiclox and intramuscular gentamicin. This was switched to the third generation cephalosporins such as cefuroxime in patients unresponsive to therapy and modified with laboratory results of cultured organisms.[2] A diagnosis of orbital cellulitis was made following the presence of sudden onset of eye lid swelling, conjunctival chemosis, proptosis, and limited ocular motility with symptoms of infection/inflammation such as fever and leukocytosis, especially in children. The results obtained were analyzed with the Statistical Package for Social Sciences Version 21 software program (SPSS Inc., Chicago, IL, USA) and $P < 0.05$ taken as statistically significant. Ethical clearance for the study was obtained from the Ethics and Research Committee of University of Benin Teaching Hospital, Benin City.

Results

A total of 42 patients were seen during the period of study made of 17 (40.5%) males and 25 (59.5%) females. The mean age of presentation was 18.2 ± 18.7 years (range 3 months to 70 years). Over one-third of the cases, 16 (38.1%) occurred in children <6 years while over half of the cases, 24 (57.1%) occurred in children <16 years. The age and sex distribution of the patients with orbital cellulitis are presented in Table 1. Orbital cellulitis was a unilateral occurrence in 38 (90.5%) patients occurring in 21 (50.0%) right eyes and 17 (40.5%) left eyes, whereas it was bilateral in 4 (9.5%) patients. Trauma and sinusitis were the most common predisposing causes of orbital cellulitis in 20 (47.6%) and 6 (14.3%) patients, respectively. The cause was unknown in 8 (19.0%) patients as shown in Table 2. The most common presenting complaints were eye swelling 36 (52.9%) and eye discharge 9 (13.2%) as presented in Table 3. The visual acuity in the affected eye of patients with orbital cellulitis is presented in Table 4 showing that majority of the patients had visual acuities of >6/18 at presentation and at discharge. The most commonly requested laboratory investigation was full blood count in 36 (85.7%) patients, whereas the most commonly requested radiological test was ocular ultrasound in 16 (38.1%) patients, as shown in Table 5. Results of investigations requested were not found in most of the case files. The mean duration of presenting complaints was 15.5 ± 31.6 days (range 1 day to 3 months). The duration of presenting complaints and occurrence of complications are presented in Table 6. It shows that patients who presented earlier were the ones who likely had the complications of orbital cellulitis, $P = 0.003$. The most common complication documented was exposure keratopathy in 8 (44.4%) eyes, as shown in Table 7. The only surgical intervention performed was incision and drainage of abscess in 3 (7.1%) eyes. Most patients, i.e., 31 (73.8%) spent <1 week on admission, 9 (21.4%) patients spent <2 weeks, whereas the remaining 2 (4.8%) spent more than 2 weeks on admission. The patients who had longer duration of hospital stay were those who were managed for complications. All patients managed had resolutions, improvement, or stabilization

Table 1: Age and sex distribution of patients with orbital cellulitis

Age group in years	Male (%)	Female (%)
0-5	9 (37.5)	7 (38.9)
6-10	3 (12.5)	2 (11.1)
11-15	2 (8.3)	1 (5.6)
16-20	1 (4.2)	0 (0.0)
>20	9 (37.5)	8 (44.4)
Total	24 (100.0)	18 (100.0)

Fisher's exact=1.194, *P*>0.999

Table 2: Predisposing factors for orbital cellulitis

Factors	Frequency (*n*=42)	Percentage
Trauma	20	47.6
Sinusitis	6	14.3
Preseptal cellulitis	3	7.1
URTI	2	4.8
Use of TEM	1	2.4
Postsurgical evisceration	1	2.4
Dental caries	1	2.4
Undetermined	8	19.0

TEM: Traditional eye medication, URTI: Upper respiratory tract infection

Table 3: Presenting complaints of patients with orbital cellulitis

Presenting complaints*	Frequency (%)
Eye swelling	36 (52.9)
Eye discharge	9 (13.2)
Eye pain	8 (11.8)
Redness of eye	8 (11.8)
Protrusion of eye	3 (4.4)
Fever	3 (4.4)
Nasal discharge	1 (1.5)
Total	68 (100)

*Multiple responses

Table 4: Visual acuity in affected eye of patients with orbital cellulitis

Visual acuity	Frequency (*n*=46)	Percentage
At presentation		
>6/18	38	82.6
6/18-6/60	4	8.7
<6/60	4	8.7
At discharge		
>6/18	39	84.8
6/18-6/60	2	4.3
<6/60	5	10.9

Table 5: Investigations requested in patients

Investigation*	Frequency	Percentage
FBC	36	85.7
Eye swab for MCS	22	52.4
ESR	19	45.2
Ocular USS	16	38.1
Skull X-ray	13	31.0
Blood culture	6	14.3
Paranasal sinus X-ray	6	14.3
CT scan	3	7.1
FBS	2	4.8
RVS	1	2.4

*Multiple responses, FBC: Full blood count, MCS: Microscopy, culture and sensitivity, ESR: Erythrocyte sedimentation rate, USS: Ultrasound scan, CT: Computed tomography, FBS: Full blood count, RVS: Retroviral screen

Table 6: Duration of presenting complaints and occurrence of complications

Duration of presenting complaints	Occurrence of complications	
	Yes (%)	No (%)
24 to ≤72 h	10 (40.0)	0 (0.0)
>72 h to ≤1 week	10 (40.0)	11 (52.4)
1 week to 1 month	4 (16.0)	8 (38.1)
>1 month	1 (4.0)	2 (9.5)

Fisher's exact=12.551, *P*=0.003

Table 7: Complications among patients with orbital cellulitis

Complication	Frequency (*n*=18)	Percentage
Exposure keratopathy	8	44.4
Endophthalmitis	3	16.7
Raised IOP*	3	16.7
Cavenous sinus thrombosis	2	11.2
Panophthalmitis	1	5.5
Subperiosteal abscess	1	5.5

*IOP: Intra ocular pressure

of clinical features with instituted therapy, which was considered as treatment success. No patient came for follow-up visit.

Discussion

This study had a higher number of patients, a total of 42 in comparison to a previous study performed in the same center with 26 patients.[2] This increased number of cases may be due to the slightly longer study duration of 7 years, whereas the earlier study was for a 6 year study period. However, a similar study in Ibadan, Southwestern Nigeria, also comparing with an earlier report found reduced number of cases which was attributed to possible outpatient treatment of orbital cellulitis.[3,4] There were more females with orbital cellulitis than males. This is at variance with some other studies including that earlier conducted in this center in which there was a male preponderance.[2-5] However, a study in Ilesa, also from Southwestern Nigeria, also had a higher number of females than males.[6] The reason for the disparity in the number of cases between both sexes may be related to the predisposing factors in various studies. Orbital cellulitis is a common occurrence in childhood as reflected in this study in which more than half the cases (59.6%) occurred in children <16-year-old; which agrees with previous reports.[2-6] The mean age of the patients in this study was 18.2 years, with 57.1% of the patients <15 years. This is in contrast to that reported from Ibadan with a lower mean age of 13 years and more than 80% <15-year-old.[3] This study had 40.5% of patients over 20 years in contrast with 15.4% in the study earlier conducted in this center.[2] The disparity may be due to the difference in the predisposing factors. Trauma related event, the most common predisposing factor of orbital cellulitis in this study, is more likely to occur in older individuals unlike the previous study in which facial cutaneous sepsis (boils) was the most common cause. Some other studies report sinusitis as the most common predisposing factor of orbital cellulitis.[3,6-8] Other predisposing factors are postocular or periocular surgery, dental infection, otitis media, dacryocystitis, and endophthalmitis. The most common presenting complaint was eye swelling (52.9%). Reduction in visual acuity may not be readily noticed by some individuals, including children, whereas the other eye has optimal vision. However, majority of the patients (82.6%) had visual acuity at presentation of >6/18 in the affected eye. Poor vision usually occurs due to the involvement of the optic nerve or exposure keratopathy. Fever was a major presenting complaint in 4.4% unlike the study in Ibadan in which fever was documented in 45% of the patients.[3] Perhaps, this may be because more patients (more than 80%) in Ibadan were <15-year-old unlike our study. Fever, as a presenting complaint, is more commonly reported in the pediatric population.[3] The most commonly requested laboratory and radiological investigations were full blood count and ocular ultrasound scan, respectively. Most of the investigations were either not performed or were not retrieved when performed. This reluctance may be due to the lack of funds because all treatments were from out of pocket payments. As empirical treatment is commenced before results of investigations, some patients may have delayed undergoing investigations following improvement in symptoms. Furthermore, as patients or their relatives collect results themselves; they may have decided to forget about the results following improvement of their conditions. Patients did not also come for follow-up appointments which was an opportunity to obtain results of investigations requested from them. Patients who presented earlier were the ones who likely had complications of orbital cellulitis, $P = 0.003$. Perhaps, the occurrence of complications may have prompted their earlier presentation. Being a tertiary referral center, some patients may present only when they notice no improvement or perhaps worsening of symptoms with their treatment intervention. The study in Ibadan speculated that orbital cellulitis was likely being treated on an outpatient basis.[3] Early institution of appropriate intervention and antibiotics limits the occurrence of complications and promotes early resolution of complications that may occur. It is also likely that more virulent organisms may lead to a higher incidence of complications. In the preantibiotic era, there was a high incidence ocular morbidity and mortality from orbital cellulitis. These serious complications include visual loss, cavernous sinus thrombosis, frontal abscess, meningitis,

osteomyelitis, and death.[1,7,9,10] The incidence of blindness and deaths from meningitis following orbital cellulitis was as high as 20% and 17%, respectively.[1,8] In this postantibiotic era with effective treatment of infections with antibiotics, there has been a decline in these complications.[1,11] This is also corroborated in our study when compared with the study performed almost two decades ago from this center.[2] The change to the use of more effective antibiotics as the first line treatment is likely responsible for the reduction in the severity of complications in this study. There were no complications such as meningitis, cerebral abscess, and death recorded in this study, which occurred in the earlier study.[2] This is despite the fact that patients in this study had a longer duration of symptoms prior to presentation, with a mean duration of 15.5 days in comparison with the earlier study of 4.7 days. Delayed presentation to health facilities in this region has been well documented.[12-14] However, lack of funds could still result in devastating complications due to the delay in procuring needed antibiotics or an inability to do so.[6] Surgical procedures are usually performed to treat the underlying pathology such as sinus surgery by otorhinolaryngologist or manage complications such as drainage of cerebral abscess by neurosurgeons.[1-3,7] Incision and drainage for abscess was the only surgical procedure performed in this study. The poor follow-up rate found in this study is a well-documented occurrence in studies from this region.[15]

Conclusion

Commencement of more effective antibiotics in the treatment of orbital cellulitis and early management of complications significantly improves the outcomes and prognosis of patients with orbital cellulitis.

The limitation of the study includes its retrospective nature with possible missing data.

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Conflicts of interest

There are no conflicts of interest.

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