

Corneal ulcers at a Nigerian eye hospital

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Abstract

Objectives: To determine the incidence, pattern, predisposing factors and treatment outcome of corneal ulcers at the Guinness Eye Center Onitsha, Nigeria.

Methods: A retrospective study of corneal ulcer patients treated between July 1998 and June 2000.

Results: One hundred and twenty eyes of 117 patients (1.2% of new patients) were treated. Farmers, pensioners and housewives presented late to hospital compared to students, preschool children, traders, artisans and civil servants ($p < 0.001$). 66 eyes (55%) had peripheral ulcers; 45% were central ulcers. Central ulcer patients presented late to hospital ($p < 0.01$; OR – 3.0; CI: 1.29, 6.97) and also had worse visual acuity ($p < 0.001$; OR – 8.8; CI: 3.3, 22.9). 89 eyes were culture-negative. Organisms identified in other specimens were fungi (14 eyes); herpes simplex keratitis (9 eyes) staphylococcus aureus (3 eyes); streptococcus pneumonia in (2 eyes); coliforms (2 eyes); mixed infection with staphylococcus aureus and coliforms (1 eye). Major predisposing factors were trauma (54.8%); traditional eye medicines (23.1%) and self-medication with corticosteroids (10.5%). Post-treatment, 44 eyes (36.7%) gained 1-7 lines of visual acuity and blindness was reduced by 40.5% ($p < 0.01$; OR – 2.3; CI: 1.33, 3.99). Complications included leucoma (18 eyes); corneal vascularisation (5 eyes); anterior staphyloma (1 eye); panophthalmitis (1 eye) and large corneal perforation (1 eye).

Conclusions: Optimal results from treatment of corneal ulcers require patients to report early to hospital; upgrading diagnostic facilities and provision of relevant drugs.

Key words: Corneal ulcers, predisposing factors, Nigeria

Introduction

Corneal ulceration is an important cause of blindness and visual impairment worldwide. But the aetiology and factors predisposing to corneal ulcers vary in different parts of the world.¹⁻⁶ While contact lens wear is commonly associated

with keratitis in the industrialized countries,^{5,6} post-measles keratitis, malnutrition and ocular trauma have been reported to be the major predisposing factors in developing countries.^{2-4,7}

Reports on causes of blindness from different parts of Nigeria had documented the contribution of corneal diseases.⁹⁻¹²

Traditional eye medication,^{9, 16} traumatic corneal ulceration^{13,14} and measles keratitis^{12,15} were common especially in children.^{8,11-13} Some workers in Nigeria had also studied specific forms of ulcerative keratitis such as mycotic keratitis,¹⁷ Mooren ulcer^{18, 19} and measles associated corneal ulcers.²⁰

This paper is a 2-year review of the incidence, pattern, predisposing factors and treatment outcome of corneal ulcers at the hospital.

Materials and Methods

This is a retrospective study. The records of all patients treated for corneal ulcer at the Guinness Eye Center Onitsha, Nigeria between July 1998 and June 2000 were reviewed. Information obtained included demographic data; type of ulcer; location; predisposing factors; disease duration before presentation; microbial aetiology; and treatment outcome including presenting and post-treatment visual acuity (VA). Excluded from the analysis were patients with alkaline and or acid corneal burns, since these severe emergencies are not strictly regarded as ulcerative keratitis.

The Guinness Eye Center Onitsha is the only publicly owned eye hospital in Anambra State, Nigeria (with a population of about 3 million). It attends to patients from all over Nigeria and beyond but the bulk of the patients are from Anambra State and its environs. It has facilities for outpatient, in-patient and surgical eye care, supported with modest medical laboratory services. It operates a 24-hour emergency service. The hospital serves as referral center for other clinics in Anambra State and its environs. Nevertheless, patients are accepted into hospital with or without referral letters.

In this hospital, corneal ulcer patients are usually treated with topical and subconjunctival antibiotics; topical antivirals; cycloplegic drops; antifungal agents and analgesics as applicable.

Surgical treatment includes therapeutic corneal scraping and chemical cauterization especially for viral ulcers; conjunctival flaps and tarsorrhaphy when necessary. There are no facilities for keratoplasty.

When patients present with corneal ulcers, diagnostic scrapings from the ulcer are sent to the hospital laboratory for microbiologic studies. The laboratory is capable of Gram staining; aerobic bacterial culture and sensitivity studies. Potassium hydroxide smear (KOH mount) is used to identify fungal hyphae. There are no facilities for anaerobic culture, viral studies and detailed mycology.

The chi-square test was used in statistical analysis. The strength of association of some variables was further explored with the odds ratio (OR) and its 95% confidence intervals (CI).

Results

During the 2-year period, excluding 4 patients with chemical burns from acid or caustic soda, 117 patients (67 male and 50 female) were treated for ulcerative keratitis. A total of 9,836 new patients were seen in the hospital during the period. Corneal ulcers thus constituted 1.2% of the new patients. The age range was 7 months - 80 years (Table 1). The occupation of the patients is shown in Table 2. More than half of the patients were students, farmers, and traders. Some patients who registered as traders and teachers also engaged in subsistent farming. Artisans included technicians, plumbers, drivers and automobile mechanics. Patients were followed up for 4 months - 2 years.

Three patients had bilateral ulcers, thus making a total of 120 ulcerated eyes. Sixty-six eyes (55%) had peripheral corneal ulcers while central corneal ulcers occurred in 54 eyes (45%). In 14 eyes the corneal ulceration involved more than 80% of the cornea. Patients with central ulcers presented with significantly worse

visual acuity than those with peripheral ulcers ($p < 0.001$; OR = 8.8; CI: 3.3, 22.9). There was no case of keratomalacia (from xerophthalmia) or measles-associated corneal ulcer. Hypopyon (hypopyon keratitis) was present in 20 eyes and 5 of these also had corneal abscess. Of the 13 patients (14 eyes) with mycotic ulcers, 9 were farmers.

Laboratory studies of the corneal scrapings showed that 89 eyes were culture-negative; fungal hyphae were identified in 14 eyes; staphylococcus aureus was isolated in 3 eyes; streptococcus pneumonia in 2 eyes; coliforms in 2 eyes and a mixed growth of staphylococcus aureus and coliforms in an eye. Nine eyes had dendritic ulcers presumed to be due to herpes simplex virus.

Presentation in hospital ranged from one day to 4 months. Students, preschool children, civil servants, traders, and artisans were more likely to present to hospital within one week of the onset of illness, while farmers, pensioners, and housewives tended to present more than one week after the onset of symptoms ($p < 0.001$). Similarly patients with central ulcers significantly presented later (more than one week of disease onset) than those with peripheral ulcers ($p < 0.01$; OR = 3.0; CI: 1.29, 6.97).

Information on factors predisposing to the ulcers was recorded in 104 patients (Table 3). Ocular trauma of varying aetiologies; use of traditional eye medicines (TEM) and self-medication with topical steroids or steroid-antibiotic combination were the major predisposing factors. TEM as recorded in this study included herbs, palm kernel oil, sugar solution, cassava water and human urine. Injuries with metallic objects occurred in artisans and all those affected did not wear ocular protective devices. Systemic diseases predisposing to corneal ulcer were diabetes mellitus (3 patients),

tuberculosis, HIV infection and febrile convulsion (1 patient each). None of the patients in this study wore contact lens.

Table 3 shows the presenting and post-treatment visual acuities with the latter showing a marked decrease in the proportion of eyes with low vision (VA: 6/24 - LP). While 42(35%) eyes were blind at presentation, only 25(20.8%) remained blind after treatment. This means that following treatment blindness was reduced by 40.5%. In 37(30.8%) eyes, there was no change in visual acuity while 44(36.7%) eyes improved 1-7 lines of Snellen acuity post treatment. But acuity deteriorated 1-3 lines in 10(8.3%) eyes. The 15 eyes in which the presenting and post-treatment acuities were not recorded belonged to children. Nine of these children could not open their eyes when first seen in hospital and the cornea ulcer was diagnosed on speculum examination or examination under anesthesia. When these children spontaneously opened their eyes following treatment (and healing of the ulcer), there was no residual central corneal opacity. These 9 children's eyes were taken as having improved post-treatment visual acuity. The difference between the recorded presenting and post-treatment acuities was statistically significant ($p < 0.01$; OR = 2.3; CI: 1.33, 3.99).

Complications included healed perforation with adherent leucoma (11 eyes); central; leucoma (7 eyes); corneal visualization (5 eyes); anterior staphyloma (1 eye); panophthalmitis (1 eye); large corneal perforation requiring suturing (1 eye).

The following surgical procedures were carried out: foreign body removal (10 eyes); repeated scraping/debridement in eyes with corneal stromal abscess (5 eyes); conjunctival flap (2 eyes); repair of corneal perforation (1 eye); evisceration (1 eye).

Table 1: Age distribution of the patients

Age (Years)	No.	%
1 – 9	26	22.2
10 – 19	12	10.2
20 – 29	14	12.0
30 – 39	15	12.8
40 – 49	14	12.0
50 – 59	11	9.4
60 – 69	16	13.7
70 – 79	7	6.0
80 – 89	2	1.7
Total	117	100.0

Table 2: Occupation of the patients

Occupation	No.	%
Student	33	28.1
Farmer	24	20.5
Trader	19	16.2
Artisan	11	9.5
Civil servant	10	8.6
Preschool	9	7.7
Pensioner	6	5.1
Housewife	5	4.3
Total	117	100.0

Table 3: Factors predisposing to corneal ulcers

Factor	No.	%
Trauma	57	54.8
Vegetation/stick (29)		
Missile (stone, sand, palm fruit, etc.) (15)		
Foreign body (insect) (6)		
Foreign body (metal) (4)		
Human nail (2)		
Road traffic accident (1)		
Traditional eye medicine	24	23.1
Self medication (steroids)	11	10.5
Blepharoconjunctivitis	6	5.8
Systemic disease (Diabetes, tuberculosis, HIV, Febrile illness)	6	5.8
Total	104	100

HIV – Human immunodeficiency virus

Table 4: Disease duration before presentation

Duration (Days)	No.	%
1	20	17.1
2 – 4	24	20.5
5 – 7	16	13.7
8 – 14	25	21.4
> 14	32	27.3
Total	117	100

Table 5: Presenting and post-treatment visual acuity (affected eyes)

Visual acuity (Snellen)	Presenting acuity (Eyes) (%)	Post-treatment acuity (Eyes) (%)
6/6	-	17 (14.2)
6/9	19 (15.8)	14 (11.7)
6/12	6 (5.0)	13 (10.8)
6/18	13 (10.8)	15 (12.5)
6/24	9 (7.5)	8 (6.7)
6/36	10 (8.3)	7 (5.8)
6/60 – 3/60	6 (5.0)	6 (5.0)
<3/60 – LP	40 (33.3)	23 (19.1)
NLP	2 (1.7)	2 (1.7)
Not recorded	15 (12.5)	15 (12.5)
Total	120 (100)	120 (100)

LP: Perception of light, NPL: No Perception of light

Discussion

Studies on corneal ulceration tend to concentrate on microbial keratitis, perhaps

because it is the commonest form of this potentially blinding corneal disease.¹⁻⁶ In the present study, the inadequacy of laboratory facilities could not allow

detailed study of the microbial aetiology of the ulcers. Nevertheless, the study highlighted the importance, in our environment, of fungus, herpes simplex virus and bacteria as causative agents of ulcerative keratitis with staphylococcus aureus, streptococcus pneumonia and coliforms as common bacterial pathogens. In a recent retrospective study of bacterial keratitis in Florida, Alexandrakis et al²¹ reported that staphylococcus aureus and pseudomonas aeruginosa were the major pathogens. They also documented a gradual increase in the incidence of staphylococcus aureus versus a concurrent decrease in the incidence of pseudomonas aeruginosa over a 9-year period. Reports from Nigeria¹⁷ and India²² showed that fusarium and aspergillus species are frequent causes of keratomycosis.

Most of the specimens were culture-negative. This could be as a result of self-medication with topical antibiotics prior to presentation in our hospital. In Nigeria, antibiotics and other "prescription only medicines" are freely purchased without doctor's prescription. This has given rise to widespread misuse of antibiotics and the attendant bacterial resistance. However, it is possible that some of the culture-negative specimens were due anaerobic bacterial infections. Until about 2 decades ago, anaerobic corneal ulcers were considered so rare that single case reports were published.²³ But in 1982, Perry et al¹ detected anaerobic organisms in several apparently culture-negative corneal ulcer specimens.

Except for some with acute injuries, many patients in this study presented late for treatment in our hospital with central ulcer patients presenting significantly later than those with peripheral ulcers. There are private eye clinics and traditional healers within and outside Anambra State where patients do obtain ophthalmic treatment. Some of these patients later report to our hospital when treatment at the primary institution fails to give the desired result. Therefore it is likely that most of the cases seen in our

hospital have filtered from the peripheral clinics. Secondly, our hospital is fee-paying and located in the city. These factors could also explain the late reporting to hospital of patients with limited income (pensioners and housewives) and those living far from the city (farmers).

Peripheral corneal ulcers constituted more than 50% of the ulcers in this series. But surprisingly none was due to Mooren ulcer. Previous reports showed that Mooren ulcer is prevalent in Northern¹⁸ and Southwestern Nigeria.¹⁹ The present study was conducted in Eastern Nigeria. Further observation is required before reaching a conclusion on the rarity of Mooren ulcer in this part of Nigeria. Peripheral ulcers are usually associated with autoimmune disease or immunological reactions to mycobacterial and staphylococcus aureus toxins,²⁴ with the latter having staphylococcal blepharoconjunctivitis is a risk factor.^{4,24} No patient in this study was diagnosed with autoimmune disease but a child who had phlyctenular corneal ulcer was Mantoux positive. The present study recorded only 6 patients with blepharconjunctivitis in the patients' case histories. A prospective study is required to further determine the aetiology and factors associated with peripheral corneal ulcers in this environment.

Various factors predisposing to corneal ulcers have been described in different parts of the world.^{3-8,25} In Nigeria^{7, 12,15,20} and other developing countries,⁸ the importance of measles in the aetiology of corneal ulcers had been highlighted. The present study is remarkable for absence of measles-related corneal ulcer. A trend towards a reduction in the incidence of measles keratitis (coincident with a decrease in the incidence of measles outbreak in the community) has been observed in this part of Nigeria since 1984 when the Expanded Programmed on Immunization (now National Immunization Programme) was launched.^{16,26}

It is not surprising that no patient in this study had contact lens-related corneal ulcer. Contact lens is scarcely worn in Nigeria. Climatic droplet keratopathy has been reported to be commonly associated with corneal ulcers in outdoor workers in South Africa.^{3,4} None was recorded in this study. While band keratopathy is common in Nigeria, climatic droplet keratopathy is rarely reported.

Ocular trauma as a risk factor in ulcerative keratitis is similar to the experience elsewhere.^{3,4} Most of the injuries were caused by vegetable matter. This is expected since a good proportion of the patients were subsistent farmers. Apart from playing with wooden sticks, students in Nigeria are generally involved in manual labour. In the process some sustain injuries from soil, grass and stick. The preponderance of vegetation-related injuries also explains the relatively high incidence of mycotic corneal ulcers in this series.

Of particular concern are the use of traditional eye medicine (TEM) and the indiscriminate self medication with steroid preparations by at least 34.7% of the patients. Similar observations have been made by other workers in developing countries.^{13,14,27} Courtright et al²⁷ reported that a third of the patients presenting with corneal ulcers in 2 district hospitals in rural Malawi had used TEM and a similar proportion had also consulted a traditional healer. In rural Anambra State ophthalmic patients consult trained eye health workers, including ophthalmologists, only as a last resort.²⁸ Traditional healers are well patronized and significantly contribute to healthcare delivery in Nigeria. But nothing serious has been done to examine their practice with a view to refining them to ensure the safety of the consumers.

The Nigerian National Health Policy is based on primary health care and Primary Care Centers have been established nationwide. But it should be pointed out that although personnel trained in modern orthodox medical care

and hygiene man these centers, the real primary health care providers and advisors are yet to be reached and influenced. The de facto primary health care providers are traditional healers and drug sellers (patent medicine dealers or "chemists" in local parlance). The actual primary health care advisors are not the doctors, pharmacists or trained nurses. Rather they are influential members of the community, patient's peers, and non-medical non-skilled hospital workers such as orderlies and porters. Usually these lay people are the first to be consulted by the ill person in the community. They recommend medicines and also advise on where the ill person obtains further remedy. Although not allowed by the law, the patent medicine dealers still dispense antibiotics and steroids without medical supervision. Herbal concoction is major ingredient of traditional medicine.

Solution to these problems should be bi-pronged. It is necessary to enforce the law prohibiting the sale of antibiotics and steroids without the doctor's prescription. The role of traditional healers in the provision of primary health care in the rural areas and disadvantages urban communities must be acknowledged and steps taken to educate the healers on how to eliminate the harmful aspects of their practice. Chana et al,¹⁹ in Zimbabwe, have shown how this could be achieved with good results.

In an effort to limit the morbidity associated with microbial corneal ulcers, some workers have recommended management guidelines.^{4,30} Allan and Dart,³⁰ emphasized the importance of prompt and accurate microbial identification and drug sensitivity test; initial intensive antibiotic therapy based on local epidemiological experience and close monitoring of disease progression with a view to referring cases of failed initial therapy to specialists. Omerod,⁴ on the other hand, considering the practical limitations in developing countries, recommended the early use of

broad-spectrum topical antibiotics as well as sub-conjunctival antibiotics injections. The practice in our hospital is line with Omerod's recommendation.

However, the present study further highlights some of the difficulties associated with managing ulcerative keratitis in deprived communities. The patients usually present late to hospital; laboratory support is weak; drugs including the relatively cheap antibiotics are not consistently available and in some cases are adulterated; antibiotics and steroids abuse is common and traditional eye medicines of dubious benefits are in common use. In the absence of ophthalmic anti-fungal preparations, vaginal anti-fungal cream is used and most patients complain of increased pains, redness and general discomfort. These lead to poor compliance.

In conclusion despite the obvious limitations, the present study recorded statistically significant improved visual acuity following treatment. Nevertheless, these results need be improved upon. The facilities, especially the laboratory support, should be upgraded and relevant drugs, in particular ophthalmic anti-fungal preparations, provided. Health education of the public on harmful eye care practices and on the need to report to hospital early is required. Refining the practice of traditional healers and keeping the activities of the "chemists" in check are also essential.

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