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HAAG-STREIT
INTERNATIONAL
The article by Murthy and Sudhakar on the aetiology and clinical and neurologic findings in patients with Cortical visual impairment (CVI) in India (a third world country) brings to the fore the inadequacies in the Nigerian health system with respect to proper diagnosis of cortical visual impairment (CVI).

What is cortical visual impairment? According to Good et al.,[1] “Cortical Visual Impairment is defined as “bilateral loss of vision, with normal pupillary response and an eye examination which shows no other abnormalities.” This definition takes into account recent advances in neuroimaging and the fact that there some visual recovery following CVI. In recent years, there has been a rise in cases of CVI due mainly to a rise in the survival of infants with previously fatal conditions.[2] To make an accurate or definitive diagnosis of CVI, the patient has to have a brain MRI or CT. In the literature, standard assessments for CVI involved neuro-imaging studies. Unfortunately, in Nigeria, CT/MRI are available in very few centers and because of its exorbitant cost (N55,000 ~ USD 150), the poor can hardly afford the test thereby making it extremely difficult to properly assess a child or adult with visual impairment and confidently label it as CVI. MRI or CT will help evaluate the extent of injury and aid in prognosis for improvement in vision following visual stimulation therapy. Visual stimulation programs have been proven to be effective.[3] Do we have provisions or facilities for visual rehabilitation programs in Nigeria and other middle- and low-income countries? Granted that visual recovery may be incomplete,[1] any amount of recovered vision is worth it, considering the implications of diminished vision on one’s quality of life.

The article on eye cancers at Guinness eye centre Onitsha Nigeria, reviewed cases of ocular and adnexal cancers in the practice of the authors and alluded to the geographical variability in the pattern of these tumours. Majority of the tumours were primary malignancies and the commonest tumours were retinoblastoma and conjunctival squamous cell carcinoma. Late presentation with advanced tumour was noted in children with retinoblastoma by the authors. They re-emphasized educating the public on the early presenting feature of leukocoria to promote early detection. A strong association between conjunctival squamous cell carcinoma and HIV/AIDS was also noted hence, continuous training of health care workers on the early features of ocular and adnexal tumours to enhance early detection could reduce the morbidity and mortality associated with late presentation of the patients.

The authors from the University College Hospital Ibadan, Nigeria presented their 4 year review article on Pterygium surgeries at a tertiary Hospital, South West Nigeria. It was a surgical audit of 324 pterygium cases managed over a period of four years. They reported that pterygium excision combined with 5FU and conjunctival autograft with a recurrence rate of 9.6% was the treatment least associated with recurrence when compared with other surgical methods for pterygium treatment. A useful article which further adds value to the management of pterygium, a very common conjunctival growth with cosmetic and disturbing ocular surface effects.

The case report of intraocular lens opacification (IOL) following intracameral air injection from authors in New Delhi India, documented that IOL opacification may result from a direct contact between the IOL surface and exogenous air. The authors urge clinicians to bear in mind this rare but significant complication. They advised that It is important not to jump into additional surgery of IOL exchange, rather patients who develop this condition should be followed up and any increase in the size of the opacification and/or drop in visual acuity documented. If such a situation arises, an IOL exchange becomes necessary with the consent of the patient. It is therefore imperative that surgeons take precautions to prevent IOL opacification and do the needful to ensure the best interest of the patient is uppermost in decision making.

Megbelayin from the southern part of Nigeria describes a novel method of needle –assisted pterygium excision. The series consists of ten patients. The period and time lapse between when the first and last patient were done was not clearly stated. The advantages and disadvantages of this methodology when compared to other established methods would require further research. The golden rule before using any new procedure is to consider the overall benefit to the patient and the skill and competence of the Surgeon. There is need for comparative studies to be able to determine the advantage that will accrue to the care giver and receiver in adopting this novel approach of using a 21 gauge needle to excise pterygium.

The bacteriology profile and sensitivity pattern in a select group of patients with nasolacrimal duct obstruction was reported by the authors from Benghazi Libya. The challenge associated with patients having nasolacrimal
obstruction and who require intraocular procedures makes it imperative to have a clear understanding on possible choice of antibiotics to use in them. The authors established that nasolacrimal drainage system harbour microorganisms when obstructed and re-emphasized that chronic dacryocystitis is a contraindication to intraocular procedures. Gram-positive bacteria were the most common isolates with Staphylococcus being the most cultured organism reported. These were found to be highly susceptible to Ciprofloxacin while the Gram-negative organisms were sensitive to Gentamycin, hence, prophylactic treatment of patients with nasolacrimal duct obstruction with this combination of antibiotics is recommended.

From south western Nigeria was the case report of retinochoroidal coloboma in a female Nigerian. The authors noted that Retinochoroidal coloboma is a rare ocular malformation of development. Failure of complete fusion of optic fissure results in coloboma. it may extend from the iris all the way to the optic disc. Complications include amblyopia and retinal detachment which may or not be related to the coloboma.

Early detection and laser photocoagulation before retinal detachment sets in may prevent irreversible visual loss.

Retinal detachment from coloboma is difficult to treat and may require multiple vitrectomy surgeries.

These and other interesting articles await your perusal in the current edition of the Nigerian Journal of Ophthalmology.

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Conflicts of interest
There are no conflicts of interest.

References


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The Use of Bandage Contact Lens for Epithelial Healing in Corneal Epithelial Defect

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Faculty of Medicine Universitas Indonesia, Ophthalmology Department, Dr. Cipto Mangunkusumo Kirana Hospital, Jakarta, Indonesia

Abstract

Context: Corneal epithelial defect cause pain that leads to significant subjective complain, severe morbidity, and medical leave. Management of uncomplicated corneal epithelial defect using bandage contact lens (BCL) has many advantages compare to the pressure patching (traditional treatment). The use of BCL as an alternative therapy in uncomplicated epithelial defect is not yet declare as a standard protocol of treatment. Aims: To evaluate the efficacy of bandage contact lens use in patients with corneal epithelial defect compared to pressure patching in term of level of comfort, visual acuity, and wound healing period. Methods and Material: The literature search was conducted from online database. All relevant studies were reviewed based on Level of Evidence developed by Oxford Centre for Evidence-based Medicine Levels of Evidence 2011. The articles were divided into baseline characteristics and outcomes table. Details regarding the author, year of publication, level of evidence, number of samples, age, gender, follow up duration were recorded. Results: Six out of seven studies concluded that BCL is the better treatment for corneal abrasion due to trauma or related to ocular surface surgery. Four systematic reviews did not recommend pressure patching as corneal epithelial defect treatment. Conclusions: BCL was found to be superior in treating corneal abrasion compared to pressure patching. The BCL group showed significantly faster healing time, pain level reduction, and epithelial defect size reduction compare to the pressure patching group.

Keywords: Bandage contact lens, corneal epithelial defect, pressure patching

Key Messages

Bandage contact lens was proven to be superior in treating corneal abrasion compared to the traditional pressure patching. The BCL outcome shows faster healing time, and lower pain level in the reduction of epithelial defects compare to the pressure patching group.

INTRODUCTION

The bandage contact lens (BCL) can be used for an uncomplicated corneal epithelial defect, as it prevents direct contact between cornea and eyelid thereby protecting the corneal epithelium underneath, speeding up the healing process, and reducing pain.1

The use of BCL as an alternative to conventional therapy is not established, as there is no protocol of treatment up until now. This study aimed to compare the efficacy of BCL with pressure patching, the patient’s level of comfort and pain, and the visual acuity in two groups.

SUBJECTS AND METHODS

Data source

The literature search was conducted from online database which include Clinical Key, Pubmed and Ophthalmology Advance (Ophsource) using various combination of term. The search was limited to articles with human sample and that published in English. If the full text articles were not available online, manual search in the Central Library and Department of Ophthalmology Library Faculty of Medicine University of Indonesia were conducted. Reference list from the included studies was also checked for potentially relevant articles.

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Study selection and criteria

In the beginning of articles selection process, abstracts were evaluated to choose affiliated articles that represent the study purposes, based on keywords stated above. Full-text articles related to the adopted abstracts were then screened based on the inclusion and exclusion criteria. Inclusion criteria were all studies analysing soft bandage contact lens on corneal epithelial defect. Exclusion criteria were all studies with no data of corneal epithelial defect and untraceable full-text articles, articles not in English, animal subject, single case reports, disease treated concomitantly with multiple medications, disease with unsuccessful prior treatment, disease with the presence of infection sign, inaccessible journal, non-ophthalmology journal, and review articles were excluded.

We included patients with corneal epithelial defect that never been treated before, to our study. All relevant studies were reviewed based on Level of Evidence developed by Oxford Centre for Evidence-based Medicine Levels of Evidence 2011.[2] The trials included in this review is the level of evidence of IV or higher.

Data processing and presentation

The extracted information was processed through a data sheet. The articles were divided into baseline characteristics and outcomes table. Details regarding the author, year of publication, level of evidence, number of samples (eyes), age, gender, follow up duration were recorded. The outcome of this review include the corneal epithelial defect, the number of usage of analgesic abrasion reduction size, the pain scale, medical leave days, residual of corneal opacities, the number of usage of analgesic due to pain.

RESULTS

We identified 424 articles from the keywords, and 417 were excluded: 307 were duplicates, 85 used animals as subjects, and 25 were non-English articles. There were seven studies reviewed in this paper, published between year 1987 and 2014. Number of the samples vary from the smallest by Buglisi et al.[3] with total patients of 15, to the largest group with a total of 63 patients by Daglioglu et al.[4] [Table 1]. Majority of the studies were randomized control trials (six studies), and one case series. Five studies focused on the use of BCL on traumatic corneal abrasion, while the other two studies focused on the use of BCL after corneal surface-related surgery.

In the traumatic corneal abrasion group with randomized control trial method and the corneal surface related surgery group, the pressure patching was the control variable. The baseline characteristics of each group are summarized in Table 2.

The baseline characteristics between the PP and BCL from all of these studies were similar, in the study that conducted among subject with corneal abrasion due to trauma, Buglisi et al.[3] had the youngest participant age range 25.75 ± 4.2 years, this is a case report study with USA soldiers in Afghanistan as the subject, meanwhile the oldest participant was found on the Acheson et al.[8] study with subject’s age range 38.28 ± 5.77 years old. In the group that focused on the corneal surface-related surgery there was certain gap on the age between these two studies, the study by Daglioglu et al.[4] had the younger participants (42.66 ± 5.58 years old) compare to the study by Chen et al.[9] (69 ± 13 years old). There are four studies that provide the gender data, these studies showed that male was the dominating gender with ratio ±2:1 compare to female.

There were four studies that recorded the initial size of the epithelial defect, the biggest defect was found on the study by Triharpini et al.[6] with epithelial defect size 27.25 ± 17.5 mm², the smallest defect was found on Menghini et al.[5] study with epithelial defect size of 3.6 ± 3.4 mm². The initial pain level was also recorded by three studies with different pain scale tools.

The outcome of these studies is the reduction of the epithelial defect size and the decrease level of the pain that the patients experienced due to the corneal epithelial defect because of trauma or after corneal surface-related surgery. There are three studies that recorded the epithelial defect size reduction by comparing the size of the initial visit and 24 hours after

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PP, pressure patching; AB, antibiotic; BCL, bandage contact lens; NSAID, Non Steroid Anti Inflammatory Drugs; NA, not available

Zulkarnaen and Mardianto: The use of bandage contact lens for corneal epithelial healing


4
therapy, two out of three studies were conducted in randomized control trial method. Study by Menghini et al.\cite{1} showed there is no significant difference in the reduction of corneal abrasion size and pain level in pressure patching group compare to the BCL group, yet this study also stated that the preference of using either pressure patching or BCL is depends on the patient and their threshold of pain. Triharpini et al.\cite{6} reported a significant difference on the reduction of the size of the corneal defect and the pain level between two groups, this result contradicted the result of the Menghini et al.\cite{5} Triharpini et al.\cite{6} also subtracted the reepithelization time, in the pressure patching group it shows that the percentage of total healing in 24 hours is 62.5%, meanwhile in BCL group it is slightly smaller, 56.25%, yet in the next 72 hours, all of the subject on the BCL group had regained complete healing meanwhile in pressure patching group there are 25% of patient who had not totally healed. This showed the ability of reepithelization time of 72 hours was bigger in the BCL group. The reduction level of the pain is also significantly different between these two groups as the BCL provided immediate comfort after application.

Buglisi et al.\cite{3} who conducted their research on battle field environment reported the average reduction size of the epithelial defect was $\pm 6.7 \text{ mm}^2$, he reported this result as a satisfactory achievement as it helped the soldiers as they went back to the battle field immediately. Buglisi et al.\cite{3} also reported that more than half of the subject regained their complete corneal healing on the first 24 hours, meanwhile the rest was resolved in 48 hours. The VAS was also decreasing from average 6.26 at the initial trauma time to 1.8 after application of bandage lens.

Donnenfield et al.\cite{7} and Acheson et al.\cite{8} also supported the positive result of the application of BCL compare to pressure patching. Both of these studies stated that the average days required for the cornea to heal were faster on the BCL group. The pain that the subject experienced was also better on the BCL group.

**DISCUSSION**

Corneal abrasions are superficial defects of the epithelium of the cornea. This condition happens mostly due to mechanical injuries to the cornea, it could also occur due to corneal surface-related surgery, such as pterygium removal surgery, keratoplasty, photorefractive surgery, photorefractive keratectomy, laser assisted in situ keratomileusis and so on.\cite{10,11} According to data in one eye hospital in Hong Kong, corneal abrasion was ranked as the eight most common eye condition that brings people to the emergency room. Corneal foreign bodies are also often associated with corneal abrasions as, once removed, an epithelial defect remains. Corneal abrasion can leads to significant morbidity and lost productivity. A major United States automotive corporation found an annual incidence of 15 eye injuries per 1000 employees, with one third of workers unable to resume normal duties for at least one day.\cite{12} In this systematic review we looked at seven articles and five of them discussed treatment outcomes between pressure patching and BCL in corneal abrasion due to trauma, the other two reviewed studies had similar outcome with different condition, they focused on corneal abrasion after corneal related surgery.

Up until now there is no standard protocol for corneal abrasion treatment.\cite{5,13,14} It is a global condition that depends on the clinical judgement and the facility of the eyecare center. The traditional way of treatment was pressure patching with antibiotic eye ointment or eyedrop.\cite{14} There were some systematic reviews that did not recommend pressure patching as corneal abrasion treatment. The most recent systematic reviewed by Lim et al.\cite{15} conducted in 2016 concluded that patching the eye is not useful for the treatment of simple traumatic abrasions. They reviewed 12...
studies from the year 1960 to 2013, where antibiotic eyedrops were used as the control group. The outcome that they measured was similar to this literature review, which is epithelial healing time and level of pain.

Lim et al.\textsuperscript{[15]} study was only stressing the effect of pressure patching that restated the conclusion from the three previous review studies that were done by Flynn et al.\textsuperscript{[16]} in 1998, Yamada et al.\textsuperscript{[17]} in 2001 and Turner and Rabiu\textsuperscript{[18]} in 2009. Our reviews are one of the effort to seek other better technique to treat corneal abrasion by using popular bandage lens.

The pressure patching is believed to promote corneal healing, by limiting eyelid blinking so that the wound healing cascade, especially the migration of the healthy epithelia to cover the defect will not be interrupted by the blinking eye.\textsuperscript{[20]} It is also believed to relieve pain, as the pressure patch would put the affected eye to rest.\textsuperscript{[1]}

In all of seven studies reviewed, every treatment arm used the application of antibiotic eyedrop or eye ointment from different classes such as ofloxacin, levofloxacin, ciprofloxacin, polymixine B sulfate/trimethoprim sulfate, combination of polymyxin B + neomycin + garamicidin.\textsuperscript{[5-9]} Topical antibiotic application is a must as a prophylaxis to infiltration and infection of the cornea with microbes.\textsuperscript{[5,20]}

Six out of seven studies concluded that BCL is a better treatment for corneal abrasion due to trauma or related to ocular surface surgery. One of the most debated issue is the oxygenation that will be needed during corneal healing. Triharpini et al.\textsuperscript{[5]} stated that one of the disadvantages of pressure patching was the reduction of corneal oxygenation that is important during the healing process. The adequate oxygenation is vital.\textsuperscript{[1,15,10,21]} Triharpini et al.\textsuperscript{[6]} used the Senofilcon A, a type of silicon hydrogel BCL with 38% water content and oxygen permeability of 107 Dk and oxygen transmissibility of 147 Dk/t. The clinical manual of contact lenses book recommend Senofilcon A for 2 weeks.\textsuperscript{[6,22]} The most used lens in this study was the Balafilcon A, a silicon hydrogel with water content 36% and oxygen permeability of 91 Dk and oxygen transmissibility of 130 Dk/t.\textsuperscript{[15]} this lens were used in study by Menghini et al.,\textsuperscript{[5]} Daglioglu et al.,\textsuperscript{[4]} and Chen et al.\textsuperscript{[9]} and recommended for monthly use. The other lens was Etafilcon A that was used by Donnenfield et al.\textsuperscript{[6]} with 58% water content and 28 Dk oxygen permeability and oxygen transmissibility of 20 Dk/t. The use of Etafilcon A is maximum for 1-2 weeks duration. Another one was Ocuofilcon D that used by Buglisi et al\textsuperscript{3} which has 55% of water content and 19.7 Dk oxygen permeability and oxygen transmissibility 20 Dk/t. The Ocuofilcon D can be used for 1-2 weeks duration.\textsuperscript{[22]} We couldn’t retrieve any information about the BCL that was used in the Acheson et al.\textsuperscript{[8]} study. The high oxygen permeability will make sure that the anoxia of corneal do not happen, hence helping the corneal healing cascade.\textsuperscript{[1,22]}

The U.S Food and Drug Administration (FDA) classifies soft contact lenses into four groups for the U.S. Market according to the water content percentage and the ionic status. Senofilcon A is classified as group A which is low water percentage with nonionic polymer, Balafilcon A is classified as group 3 with low water with ionic polymer, Etafilcon A and Ocuofilcon D is in group 4, high water with ionic polymer. Each group has its own advantages and disadvantages. Contact lens with higher water contents, higher Dk and higher Dk/t can be used for a longer duration. In this study we can see that senofilcon A and balafilcon A can be used longer (extended use) compare to etafilcon A and ocuofilcon D (short time use). Unfortunately, senofilcon A and balafilcon A were cost higher, one senofilcon A or balafilcon A equal to three etafilcon A or two ocuofilcon D.\textsuperscript{[1,22]}

In these seven studies, the fastest follow up was done by Menghini et al\textsuperscript{2} that measure the pain after 3 hours of treatment from both arms, this study was the only study that contradicted the other six. This study had the fourth highest number of sample, this study focused on corneal abrasion due to trauma with the size of relatively small size of abrasion (4.2 ± 4.0 mm\textsuperscript{2}) compare to the study by Triharpini et al.\textsuperscript{[6]} (27.2 ± 17.5 mm\textsuperscript{2}) and Buglisi et al.\textsuperscript{[3]} (8.5 ± 8.39 mm\textsuperscript{2}), this discrepancy between studies could actually be the reason why the study by Menghini et al.\textsuperscript{[5]} did not find a significant different between both arms of treatment. In the study by Triharpini et al.\textsuperscript{[6]} the abrasion size on both arms were significantly different after 24 hours. The BCL arm had an average of 17.75 mm\textsuperscript{2} abrasion healing compared to the pressure patching group that had 10.50 mm\textsuperscript{2} abrasion healing size in 24 hours. Buglisi et al\textsuperscript{3} also showed significant healing based on the reduction of epithelial abrasion size to ±6.7 mm\textsuperscript{2} in 24 hours after BCL application.

When it comes to the pain level, most of the studies use visual analogue scale for measurement. Menghini et al.\textsuperscript{[5]} also stated no significant different between pain level on both arms, they stated in their study this could also related to the small size of abrasion. Menghini et al.\textsuperscript{[5]} also stated that their limitation on their study was the small sample number and the size of the corneal wound. On their pressure patching group, most of the subject complained about their disturbed binocular vision and uncomfortable pressure of the patch, yet it did not affect the pain level. In the study by Buglisi et al.\textsuperscript{[3]} the soldiers favour the usage of BCL because it helped them with the pain, it is documented on the VAS scale at the initial visit which is 6.26 on average that decreased to 1.8 on average after the application of BCL.\textsuperscript{3}

Donnenfield et al\textsuperscript{7} and Acheson et al.\textsuperscript{[8]} measure the efficacy of BCL by documenting the average number of days that required to heal completely. Both studies favoured the BCL arm treatment. Donnenfield et al\textsuperscript{6} also stated that the pain reduction was higher on the BCL group.

Both of these studies stated that the limitation of both of these studies were the number of the subject, they also did not provide the data of the initial epithelial defect size. One of the
reason why they did not provide the initial epithelial defect size data was due to the cost of the bandage lens and the complication.\cite{6,23}

In the study by Donnenfeld et al.,\cite{7} they found one patient from the BCL arm that experienced corneal ulcer, in the study by Buglisi et al.\cite{3} they also experienced the same, two patients with corneal ulcer, they explained this condition happened due to the unhygienic environment on the battle field that increase the chance of infection. There are several disadvantage of bandage contact lens use for example deposit formation that could lead to giant papillary conjunctivitis, greater chance of bacterial contamination that increased with noncompliance, problem with oxygen transmission with hydrogels lenses and limited durability, that is why when a physician decided to use BCL the benefit need to be always bigger than the risk, the usage of BCL needs a strict follow up. Secondary infection is the most unwanted complication that could lead to permanent disability, the usage of bandage lens will increase the chance of infection if it is not well monitored and properly used. Infection and other complication could also occur if the patients do not follow the factory or doctor’s instruction.\cite{6}

Both of this study stated, even though they favoured the BCL arm, the use of this particular treatment is very dependent on the patients. According to the clinical manual and contact lenses book,\cite{22} the usage of BCL was very dependent on the subject individually. The ability to keep the schedule on time of putting antibiotic eyedrop, hygiene issue, the ability to come on strict follow up, and the necessity to have clean environment are few education pearls that needed to be informed to the patient.\cite{1}

The studies by Chen et al.\cite{9} and Daglioglu et al.\cite{4} that specifically focused on the treatment of corneal abrasion after pterygium removal showed a significant result on the average time to heal and the reduction of pain. The Daglioglu et al.\cite{4} stated that the average time to heal after the pterygium removal on BCL arm was 48 hours, this was faster compared to Chen et al.\cite{9} that was approximately 93 hours. This was most likely related with the size of the original abrasion, both studies did not mention the size and the location of the pterygium (if it was double head or single head pterygium). The bigger the size of the pterygium, the more abraded the cornea was, hence the longer the healing time will be. In the study by Triharpini et al.\cite{6}, they stated that the position of the corneal erosion and the depth of the erosion is an important factor that will determine the healing process. None of these studies mention the position or the depth of the erosion. If the erosion placed centrally, it will heal longer than the one placed peripherally due to the closer distance to the limbus and its stem cell. This factor needed to be documented and calculated for further study.

At this moment there are several theory of other adjunct therapy that will speed up the corneal epithelial healing, such as the consumption of high vitamin C to help promoting the healing process by providing sufficient amount of antioxidant and the use of artificial tears accompanied by antibiotic eyedrops. None of this adjunct therapy is used in the seven studies that were discussed above.

**CONCLUSION**

Bandage contact lens was proven to be superior in treating corneal abrasion compared to the traditional pressure patching technique. The outcome shows the healing time, epithelial defect size reduction was significantly faster and bigger compared to the pressure patching group. The other outcome was the pain level that significantly decreased on the initial installment of BCL on the injured eyes. The downside of the BCL is the complication, it requires strict follow up and cooperative patient with good hygiene insight to prevent further infection, another downside is the price. Further study should be conducted more specifically mentioning the position, the depth, and the size of each corneal abrasion before treatment. Another study also need to be conducted in order to make a clinical guideline regarding the treatment of corneal abrasion with BCL. We recommend the use of BCL on patient with corneal abrasions, for the relatively bigger wound, as documented on Triharpini et al.\cite{6} study, the application of BCL is preferably use for a longer duration (extended use), for the smaller abrasions we can use short duration (1-2 weeks duration) BCL that comes with lower price compared to the extended use.

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**Conflicts of interest**

There are no conflicts of interest.

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Cortical Visual Impairment in Children — Aetiology, Clinical Findings and Neurological Findings

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Abstract

Objectives: To evaluate the demographic profile, aetiology, systemic and ocular associations and findings on neuroimaging, of children with cortical visual impairment (CVI) at a tertiary eye hospital in South India. Materials and Methods: Records of 85 children with CVI, undertaking visual stimulation therapy (VST), were retrospectively analysed between March 2016 and March 2018. The data obtained was analysed for the age and gender profile, aetiology, cycloplegic refraction, fundus evaluation, MRI findings, pre and post visual stimulation therapy vision. Other associated ocular and neurological abnormalities were also noted. Results: The records of 63 boys and 22 girls were analysed. The mean age was 1.93 years with 58.8\% aged <2 years were analysed. Hypoxia ischemic encephalopathy (HIE) was found to be the most common aetiology (31.7\%), followed by epilepsy (27\%) and structural abnormalities of brain (24.7\%). Amongst the ocular associations, refractive error was the most common, seen in 42 (49.4\%) children, while strabismus (exotropia > esotropia) in 40 (47\%), nystagmus in 34 (40\%) while pale disc in 31 (36.5\%) patients. Fifty-five (64.7\%) children had associated developmental delay, while 40 (47\%) had seizures. Other neurological associations noted were, cerebral palsy (14.1\%), microcephaly (14.1\%), hearing loss in 5 and hemiparesis in 1 patient. MRI abnormalities were present in 65 (76.4\%), with ischemic encephalopathy (32.9\%) being the most common change noted. Conclusion: In our study cohort, HIE was found to be the most common cause of CVI with refractive error and strabismus being the common ocular associations, while seizures and developmental delay were the common neurological associations. Neuroimaging showed that the structural insult was at both the cortical and white matter levels.

Keywords: Cortical visual impairment, developmental delay, exotropia, ischemic encephalopathy, HIE, nystagmus, refractive error

Introduction

According to the recent global estimates, there are 19 million visually impaired children in the world.\textsuperscript{[1,2]} Of these, 1.26 million are blind with a vast majority living in developing countries.\textsuperscript{[1,2]} Statistics have shown that in up to 60\% of childhood cases, visual impairment is treatable or preventable.\textsuperscript{[2]} These numbers and figures stand to rationalize the control of childhood blindness as one of the priorities of Vision 2020: The Right to Sight. Unlike in adults, the risk of amblyopia in this segment of population only adds to the gravity of the problem at hand. Hence, dealing with various causes of visual impairment in children is of paramount connotation.

The revamping of perinatal care and intensive neonatal care services have not only increased the survival of babies, but also of those born prematurely and with hypoxic\textsuperscript{?}ischemic insults and perinatal stress. This is of significance as perinatal injury to the developing visual system is a common cause of visual impairment and neurologic morbidity in children.\textsuperscript{[3,4]} Cerebral or cortical visual impairment (CVI) is one such entity.

The definition of CVI has evolved to encompass a significant deficit in visual and perceptual visual impairments resulting from dysfunction, anomaly or injury to retro-geniculate visual pathways (optic radiations, occipital cortex, and visual association areas) and oculomotor control in the absence of major ocular disease, oculomotor disorder, or...
uncorrected refractive error.\(^5\) Hence, the diagnosis of CVI should not be made in the presence of concurrent pathology of the anterior visual pathway.

While there have been reports of large series of patients with CVI in developed countries, there is paucity of studies from developing countries like India. This disparity could perhaps be accounted for by the possibility of underestimation, missed diagnosis and under reporting of these cases, due to various reasons such as lack of complete awareness, lack of screening facilities, or even failure of documentation of the same. Hence, recognizing CVI, which is the first step toward rehabilitation and prevention, entails modifications in the examination techniques towards detailed assessment of vision and the components of visual function. It has been stated that as many as 65% of patients with CVI may have associated ophthalmological abnormalities.\(^6\) Refractive errors and strabismus are common associations.\(^7,8\) As part of the syndrome, structural anomalies such as cataract, coloboma, optic atrophy, and retinal dystrophy have also been found to be associated.\(^9,10\) ROP may be found to be in association with periventricular white matter injury.\(^11\) Optic nerve hypoplasia and optic atrophy known to occur with a wide range of brain disorders including CVI, impair visual function.\(^12\) Disorders of eye movement control, including strabismus, nystagmus, unstable fixation, inaccurate fast eye movements (dysmetric saccades), deficient smooth pursuit movements, and paroxysmal deviations, in which the eyes intermittently deviate upward (most commonly) are common in children with CVI.\(^11\)

The extremely nascent age and the associated ocular comorbidities make their examination difficult. However, more importantly, the lack of adequate facilities for paediatric eye screening and the lack of compliance thereof, adds to the challenge. The purpose of this study was to look at the common causes, and the ophthalmic associations and neuroimaging findings of CVI in a south Indian cohort. This could help us address the potential areas which when identified could possibly bridge the existing lacunae in effectively tackling this emerging dilemma.

**Methods**

We retrospectively reviewed the clinical records of eligible children registered for the vision rehabilitation clinic at our hospital, between March 2016 and March 2018. Our study included children aged \(<16\) years with a confirmed diagnosis of CVI and excluded incomplete records. The diagnosis of CVI was based on an ocular examination that revealed poor visual function bilaterally that could not be accounted for by age, structural ocular examination findings, optic atrophy, or high refractive error. Preliminary comprehensive eye examination of these children was done in the pediatric ophthalmology department.

The digital medical records (DMR) of the hospital helped us procure pertinent data. Following the demographic data, which included age and gender, we made a note of relevant birth history. This included stormy perinatal course, use of supplemental oxygen and its duration, ventilator support, anemia requiring transfusion, repeated episodes of hypoglycemia, which could be an indicator of sepsis, neonatal enterocolitis, phototherapy for hyperbilirubinemia, seizures, meningitis, or encephalitis.

Visual responses in infants and young children who could not identify letters or pictures had been qualitatively assessed by their quality of fixation and following. The former was noted as being brief, sustained, uncertain, or inaccurate while the latter by the child’s ability to follow toys, with eyes alone or eyes and head together or only with the head, the last two suggesting possibility of poor vision. We broadly classified and documented these responses as:

1. Inability to fixate or follow light
2. Ability to either fixate or follow light
3. Ability to fixate and follow the light

In older children, the quantitative records (Lea paddles, Snellen optotypes) were considered.

We then noted the findings of dynamic retinoscopy performed at 33 cm using a streak retinoscope with the object of interest presented to the child and noting the accommodative response, and then switching the child’s fixation to a distant target (at least 3 m) like a lighted mount on the wall and back again to the near.

Pupillary examination performed with a moderately bright torch light with dimmed room light, was looked for and any note of paradoxical pupils or relative afferent pupillary response was included in the data. Anterior segment examination findings of associated anomalies, if any, such as a developmental cataract or other media opacities, done using either a portable slit lamp or distant direct ophthalmoscopy, were recorded. Data on the documented findings on dilated fundoscopy especially optic atrophy were also collected. Other findings such as scars in the macula, altered background pigmentation, and arteriolar attenuation, suggestive of coexisting retinal dystrophy, were also noted.

The findings of cycloplegic refraction done preferably using homatropine 2%, were also noted.

General examination findings noted in case records of dysmorphic features, change in gait, or other systemic features suggestive of syndromic association were noted.

Further, findings of MRI brain reports in the records were studied and the positive findings recorded.

**Results**

Records of 85 children, diagnosed with CVI, were reviewed. Of these, there were 63 boys and 22 girls. Majority of them (58.8%) were \(<2\) years of age, with mean age of 1.93 years [Table 1].
Though many of the patients (37.6%) had multiple aetiologies, hypoxic ischemic encephalopathy (HIE) was the most common (31.7%) followed by epilepsy (27%). The remainder had various aetiologies as listed in Table 2.

The ocular and neurological associations in our patients are summarized in Tables 3 and 4. Ocular findings were present in almost all the patients, with significant refractive error (>−2/+2 Ds) being the most common (49.4%) followed by strabismus (47%). Of the 40 patients with strabismus, majority (23) had exotropia. Nystagmus was seen in 40 patients. Fundus examination revealed that 47 of the 85 children (55.2%) had normal fundi, 28 had disc pallor (33%) and 1 had optic nerve head hypoplasia. 44 of the 85 patients had multiple neurological deficits. The common neurological findings were developmental delay (64.7%) followed by seizures (47%). Cerebral palsy and micro/brachy/scaphocephaly were seen in 14% each. Amongst the less common associations were hearing loss (6%) and hemiparesis (2%).

All the patients had neuroimaging (MRI) done, and the findings are listed in Table 5. Abnormality in MRI was seen in 77.6% and non-specific changes in 22.4% of cases. The most common findings were ischemic encephalopathy (32.9%), periventricular leukomalacia (15.3%), and structural abnormalities (12.9%).

The visual function of these children during their preliminary evaluation was recorded as:
(1) Ability to either fixate or follow light
(2) Ability to either fixate and follow light
(3) Inability to fixate or follow the light

We found that majority of them (39 of 85 children) only followed light, while 22 could fixate and follow the light, while the remainder 24 children could neither fixate or follow the light.

### DISCUSSION

With the new wave of revamped perinatal services sweeping across developing countries like India, CVI is looming ahead as one of the important causes of acquired bilateral visual impairment in children. The availability of limited literature on children with CVI, and more so from the developing world, it becomes even more imperative to study the nuances in identifying the disorder. CVI is a verifiable visual dysfunction which cannot be attributed to disorders of the anterior visual pathways or any potentially co-occurring ocular impairment.
The most common associated aetiologies in our series of children (most of whom were <2 years old) were hypoxic ischemic encephalopathy (31.7%), followed by epilepsy (27%) and structural abnormalities of the brain (24.7%). This was comparable to the results of a few similar studies. Huo et al. reported that the four most common causes of CVI were perinatal hypoxia (22%), cerebral vascular accident (14%), meningitis (12%), and acquired hypoxia (10%).[13] While Khetpal et al.[14] reported perinatal hypoxia (35%), prematurity (29%), hydrocephalus (19%), structural central nervous system abnormalities (11%), and seizures (10%) as the common aetiologies. Many children (69%) had multiple aetiologies. Pehere et al.[11] found perinatal hypoxia to be the most common aetiological association.

Majority (77 of 86 children, i.e. 89.5%) of the children in our cohort had associated neurological issues, of whom 55 had delayed developmental milestones. This perhaps corroborates the fact that most of these children had a neurological insult as an antecedent event. The associated neurological deficits were reported to be in all patients to some extent and ranging between 65.3–75% in various studies.[6,14-16] In our study, we found that developmental delay (64.7%) was the most common neurological association followed by seizures (47%), cerebral palsy (14.1%), and microcephaly (14.1%). This was comparable to the finding from a similar study in the Indian subcontinent, by Pawar et al.[17], who found developmental delay and seizures to be the most common neurological associations. However, the statistical results of Huo, Good, Hoyt, Khetpal et al. though grossly analogous, varied in the order of frequency. Seizures followed by cerebral palsy were found to be the major neurological association.

This could possibly be due to one of the following causes viz.,

Our study being retrospective in nature, possible lower reporting of seizures in our cohort or possibly a higher chance of being missed due to absence seizures manifesting in other subclinical forms and its documentation in records.

(1) Sample size being smaller and the difference in population compared (eastern versus western population).

(2) The higher incidence of meningitis/encephalitis in other studies could also account for higher incidence of seizures in their study.

(3) Difference in terminologies used may also be an explanation. Some studies have overlapped inclusions of features of developmental delay and traits of cerebral palsy to be included into one single entity of cerebral palsy unlike ours.

Apart from neurological issues, children with CVI can have a myriad of ocular manifestations.[13] All the children had associated ocular comorbidities, with 62.8% having multiple associations. The results from our study highlighted that the major causes of visual impairment were those amenable to treatment like refractive error (96.5%) and strabismus (exotropia > esotropia) (46.5%). While this was true for the majority, the ones more refractory to treatment, like optic atrophy (36%) and nystagmus (39.5%), also contributed to the spectrum. This was in conjunction with findings from similar studies by Khetpal and Pehere et al.[11,14] in which, refractive errors, strabismus, and optic atrophy, in the descending order of frequency, were found to be the most common ocular associations. Most of the records of patients had MRI of brain reports, of which 12 were normal, while the vast majority (86%) had abnormalities in the report, of which 21.6% had multiple changes. Ischemic encephalopathy (32.5%) was the most common change, followed by some non-specific changes (22%), PVL (15%), and structural abnormalities (12.8%). Ischemic encephalopathy, followed by PVL, cortical and subcortical atrophy and structural malformations were the most common MRI changes in other studies.[14,17]

The visual function of these children revealed that majority of them (45.9%) only followed light, while 25.9% could fixate and follow the light, while the remaining 28.2% children could neither fixate nor follow the light.

Our study included 85 patients less than 16 years and majority (58.8%) were <2 years of age, with mean age of 1.93 years. There were 63 boys and 22 girls. Khetpal et al.[14] included 98 patients ranging from 0.2 to 19 years, with an average age of 3.1 years. There were 56 males and 42 females. Pehere et al.[11] included 428 severely visually impaired children aged ≤3 years with average age at presentation being 14.02 months. There were 264 (62%) boys and 164 (38%) girls. Males were commonly affected in both studies comparable to our cohort.

**Conclusion**

Cortical visual impairment has ocular and neurological associations. In our study cohort, majority were boys and aged less than 2 years. HIE was found to be the most common cause of CVI, with refractive error and strabismus being the common ocular associations, while seizures and developmental delay were the common neurological associations. Neuroimaging showed that the structural insult was at both the cortical and white matter levels.

This may suggest the need for early ocular examination in children with history of hypoxic ischemic encephalopathy or developmental delay to detect the possible cortical visual impairment in these children.

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**Conflicts of interest**

There are no conflicts of interest.
REFERENCES

Eye Cancers at the Guinness Eye Center Onitsha, Nigeria

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Abstract

Objectives: To describe the hospital incidence and pattern of ocular and adnexal cancers at the Guinness Eye Center, Onitsha. Materials and Methods: The case files of all new patients seen with ocular and adnexal tumors at the Guinness Eye Center, Onitsha, between 2005 and 2017 were reviewed. Those with histological diagnosis of malignancy were selected and analyzed. Information obtained included age, sex, disease duration, diagnosis and co-morbidity. Results: There were 85 patients (0.1% of all the new patients), made up of 42 males and 43 females. The median age was 5 years; range: 5 months–70 years. The commonest cancers were retinoblastoma, 45 patients (52.9%) and conjunctival squamous cell carcinoma, 30 (35.3%). Twenty eight (93.3%) squamous cell carcinoma patients were HIV-positive. No child had squamous cell carcinoma. All retinoblastoma patients were aged ≤6 years. Conclusions: The incidence of ocular and adnexal cancers at the Guinness Eye Center, Onitsha, was low with retinoblastoma and conjunctival squamous cell carcinoma accounting for most of the cancers. While retinoblastoma would most likely be suspected in a child with ocular tumor, young adults with squamous cell carcinoma should be evaluated for HIV infection. Since these lesions threaten sight and life, the public should be educated on the early signs of the diseases and the need to report to hospital early.

Keywords: Adnexa, cancer, eye, incidence, Nigeria

INTRODUCTION

Cancers of the eye and adnexa contribute to morbidity and mortality among Nigerians as evidenced from studies from different parts of Nigeria.1-15 These studies highlighted the cancers prevalent in particular geographic zones of Nigeria. While some focused on children,1,6,13 others studied both adults and children.2,4,15 On the other hand, some studies dealt with both benign and malignant lesions2,3 while others dwelt only on orbito-ocular cancers8,10 and yet others dealt with specific cancers such as retinoblastoma.1,5,9

In one of the earliest studies, Olurin and Williams2 reported retinoblastoma and Burkitt’s lymphoma as the commonest orbito-ocular tumors in Ibadan, western Nigeria. Later, Abiose et al.13 while analyzing childhood malignancies in Kaduna, northern Nigeria, also observed the preponderance of retinoblastoma and noted the rarity of Burkitt’s lymphoma.

Surprisingly, a recent report from Nnewi (South East Nigeria) Cancer Registry16 did not record any ocular and adnexal tumor; thus, giving the impression of the absence of these diseases in Anambra State or South East Nigeria. The present study reports the pattern of ocular and adnexal cancers over a 12-year period at the Guinness Eye Center Onitsha, Anambra State, Nigeria.

MATERIALS AND METHODS

Approval for this retrospective study was obtained from the management of the Guinness Eye Center, Onitsha. The case files of all new patients seen with ocular and adnexal tumors between 2005 and 2017 at the Guinness Eye Center Onitsha were reviewed. The out-patient, in-patient and theatre records of these patients were examined. Those with histological diagnosis of malignancy were selected and analyzed. Information obtained included age, sex, disease duration, diagnosis and co-morbidity. Care was taken to preserve the confidentiality of patients’ personal information.

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information. Being a descriptive study, the data obtained was analyzed and presented using descriptive statistics.

RESULTS

Eighty-five patients (95 eyes) with histologically-confirmed ocular and adnexal malignancies were studied. During the study period, 99,437 new patients were attended to at the Guinness Eye Center Onitsha; thus, giving a hospital incidence of 0.1% for ocular and adnexal cancers. There were 42 males and 43 females with an age range of 5 months to 70 years and median age of 5 years. Table 1 shows the age and sex distribution of the patients. The disease duration at presentation ranged from 3 weeks to 4 years with a median of 10 months.

Primary cancers occurred in 91 eyes (95.8%) while metastatic cancers were recorded in four eyes (4.2%). The commonest cancers in the 85 patients were retinoblastoma and conjunctival squamous cell carcinoma [Table 2]. Retinoblastoma occurred in 45 patients (52.9%), and 10 (22.2%) of these patients had bilateral disease. In terms of eyes, retinoblastoma occurred in 55 eyes of 95 eyes (57.9%). Conjunctival squamous cell carcinoma was found in 30 patients (35.3%); all were unilateral.

The age range for retinoblastoma was 5 months to 6 years; median of 2.4 years. For conjunctival squamous cell carcinoma, the age range was 25–70 years; median of 33 years. Twenty eight out of 30 (93.3%) patients with squamous cell carcinoma of the conjunctiva were HIV-positive. The two non-HIV infected patients with squamous cell carcinoma were aged 69 and 70 years.

Retinoblastoma patients presented with the following clinical features: leukocoria in 18 patients (40.0%); proptosis/fungating mass in 18 patients (40%); regression/phthisis in five patients (11.1%) and distant metastasis in four patients (8.9%). Conjunctival squamous cell carcinoma had metastasized to the orbit and beyond in two patients. A 68 year old woman had primary orbital lymphoma. Blood cancer (leukemia) was associated with orbital infiltration, proptosis and retinal hemorrhage in two patients. Metastatic (secondary) cancers observed were nasopharyngeal and prostatic cancers, in one patient each. Table 3 shows the anatomic sites of the lesions. The intraocular compartment and the conjunctiva accommodated 86 (90.5%) lesions.

DISCUSSION

The results of the present study suggest that majority of the ocular and adnexal cancer patients in our hospital were children. Olurin and Williams[2] reported that two-thirds of their patients were children. The results of the present study agree but also differ in some respects with findings of previous studies on the subject from different parts of Nigeria and elsewhere. Retinoblastoma remains the commonest malignancy accounting for more than half of the cases in all the studies, including ours.[2-14]

About four decades ago, Olurin and Williams[2] reported that retinoblastoma was the commonest orbito-ocular tumor in Ibadan; Abiose[3] while analyzing childhood orbito-ocular malignancy in Kaduna also recorded retinoblastoma as being commonest. More recent reports on the subject from

<table>
<thead>
<tr>
<th>Table 1: Age and sex distribution</th>
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<tr>
<td>Age (years)</td>
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<tr>
<td>1–10</td>
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<tr>
<td>11–20</td>
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<tr>
<td>21–30</td>
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<td>31–40</td>
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<td>41–50</td>
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<tr>
<td>51–60</td>
</tr>
<tr>
<td>61–70</td>
</tr>
<tr>
<td>Total</td>
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<table>
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<tr>
<th>Table 2: Type of cancer</th>
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<tbody>
<tr>
<td>Cancer type</td>
</tr>
<tr>
<td>Retinoblastoma</td>
</tr>
<tr>
<td>Conjunctival squamous cell carcinoma</td>
</tr>
<tr>
<td>Eyelid Kaposi sarcoma</td>
</tr>
<tr>
<td>Rhabdomyosarcoma</td>
</tr>
<tr>
<td>Leukemia</td>
</tr>
<tr>
<td>Uvea melanoma</td>
</tr>
<tr>
<td>Primary orbital lymphoma</td>
</tr>
<tr>
<td>Orbital metastasis from nasopharyngeal carcinoma</td>
</tr>
<tr>
<td>Orbital metastasis from prostate cancer</td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

<table>
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<th>Table 3: Anatomical site of the lesion</th>
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<tbody>
<tr>
<td>Site (Eyes)</td>
</tr>
<tr>
<td>Intraocular</td>
</tr>
<tr>
<td>Conjunctiva</td>
</tr>
<tr>
<td>Orbit</td>
</tr>
<tr>
<td>Eyelid</td>
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<tr>
<td>Total</td>
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</table>
Since the earlier experiences of Olurin and Williams in Western Nigeria as well as Abiose in Northern Nigeria, this may be related to geographic distribution of this disease in different parts of Nigeria. It could also be possible that cases of Burkitt's lymphoma are now diagnosed and treated earlier by paediatricians in comparison with the experience in the 1970s and 1980s when the above referenced studies were conducted. The Guinness Eye Center Onitsha is a stand-alone eye hospital with minimal interaction with paediatricians. The Nnewi (South-East) Cancer Registry was established to gather and store information on cancers in that part of Nigeria. This job, it has performed for more than 20 years. However, in a recent review of cases in its data-base, no mention was made of ocular and adnexal tumors. This is worrisome since the Registry is accommodated within the Nnamdi Azikiwe University Teaching Hospital of which the Guinness Eye Center Onitsha is the ophthalmic wing. Perhaps the physical separation of the eye hospital from the main teaching hospital campus where the Registry is based may have accounted for this lapse. But more importantly, the omission points to the inefficiency of documentation in our system which needs to be strengthened. This lack of information on eye and adnexal cancers in the Nnewi Cancer Registry was a major justification for the present study. With the results of this study, it is expected that the cancer registry, and indeed other cancer registries around Nigeria, will update their records to ensure inclusiveness. It is also recommended that stand-alone eye hospitals should also maintain good records of cancer patients as a prelude to establishing a national ocular tumor registry in Nigeria.

Almost all the patients presented late thus making palliative care the only practical management approach. This experience has been reported in previous studies. Many factors affect health-seeking behavior and patronage of health services. In a survey of ocular cancers awareness, Ayanniyi et al. reported that only half of the respondents were aware that cancers could affect the eyes and fewer knew of the possible symptoms and signs. They also found cost and long distance as factors militating against early presentation to hospital. These factors need to be addressed for improved patronage.

In conclusion, although the incidence of ocular and adnexal cancers in our hospital is low compared to ametropia, cataract, glaucoma and AMD, ocular and adnexal cancers need to be tackled early since they threaten sight and life. Most of the patients were children and young adults. Health education of patients and public on the symptoms and signs of eye cancer are required. Secondly, training and retraining of primary health workers and other health care providers on the clinical manifestations of eye cancers may aid early detection and presentation of patients.

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Conflicts of interest
There are no conflicts of interest.

References
Pterygium Surgeries at a Tertiary Hospital, Southwest Nigeria: A Four-Year Review

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Abstract

Background: Over the years several pterygium surgical techniques have been developed with the aim of having the least possible recurrence rate. This has been from bare sclera excision which had an unacceptable recurrence rate to the current use of conjunctiva autograft with or without various adjuncts. This study was to review the current practice in a typical multi-specialist ophthalmic department. Method: The ophthalmic theatre operating register was retrospectively reviewed to obtain information on all patients who had pterygium excision at the University College Hospital, Ibadan, over a 4-year period from January 1, 2014, to December 31, 2017. Results: A total of 324 pterygium surgeries were performed and final analysis was on 249 (76.9%) surgeries which met the inclusion criteria, male to female ratio of 0.96:1. The commonest surgical technique was excision + 5-Flourouracil (5FU) + conjunctival autograft accounting for 187(75.1%) eyes. In total, postoperative recurrence was recorded in 40 (16.1%) eyes. The subgroup of excision + 5FU + autograft had the least recurrence rate of 18 (9.6%) eyes. Conclusion: A significant majority of the excision was with conjunctiva autograft with an acceptable low recurrence rate compared with most studies.

Keywords: Autograft, excision, pterygium, recurrence

INTRODUCTION

A pterygium is a wing-shaped growth of conjunctiva and fibrovascular tissue on the superficial cornea.[11] It is common in the tropics with a prevalence of 0.3% to 29% and despite propounded theories the etiology is not fully known.[2,3] One such propounded theory is exposure to ultraviolet radiation which is more in the tropics.[2,4] Pterygium may cause ocular surface irritation, cosmetic concerns or visual impairment. The mainstay of treatment is surgery. Post-operative recurrence is the most common complication of pterygium surgeries and its absence is a major marker for successful treatment.[5-7]

There are several surgical techniques for pterygia excision and the most appropriate should be the one with least recurrent rate, least complications, short surgical time and good cosmesis. In a meta-analysis of 24 RCTs that studied 1815 eyes of 1668 patients, 14 different interventions were included. The rank from the best to worst treatment to prevent recurrence is: conjunctival autograft + ciclosporin 0.05% eye drops, bare sclera + intraoperative Mitomycin C (MMC) >0.02%, bare sclera + intraoperative MMC >0.02%, bare sclera + ciclosporin 0.05% eye drops, bare sclera + intraoperative 5-fluorouracil 5%, amniotic membrane transplantation, bare sclera + intraoperative MMC 0.02%, conjunctival autograft + bevacizumab 0.05% eye drops, bare sclera + bevacizumab 0.05% eye drops and bare sclera alone.[8]

Different clinical trials have studied techniques such as bare sclera technique modified by partial thickness sclerectomy, 5FU adjuvant, conjunctival autograft, Beta irradiation, Bevacizumab adjuvant, Mitomycin-C adjuvant.[5,9-13] In our hospital, pterygium surgeries have evolved over the decades from the initial bare sclera technique.

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As knowledge evolves and more sophisticated equipment like Optical Coherence Tomography (OCT) becomes available for post-operative management, the searchlight remains on for the ‘ideal’ pterygium surgery with no recurrence, good cosmetic outcome and negligible complication rates.

**Materials and Methods**

The ophthalmic theatre operating register was retrospectively reviewed to obtain information on all patients who had pterygium excision at the University College Hospital, Ibadan, over a 4-year period from January 1, 2014, to December 31, 2017. Clinical records of patients were also retrieved. The information obtained included patients’ demographics, preoperative visual acuity, clinical presentation, surgical management and post-operative complications. The data obtained were entered into SPSS (SPSS for Windows, version 20.0; SPSS, Chicago, IL, USA) statistical package and analyzed. Descriptive statistics were used to yield frequencies, percentages, and proportions. The demographics of patients, follow-up duration, surgery performed (bare sclera excision, conjunctival autograft, amniotic membrane graft, or concomitant use of surgical adjuvants), recurrences with respect to the type of surgery performed and other postoperative complications were analyzed. The retrieval and analysis of patient’s data followed the ethical standards of the Helsinki Declaration of 1975, as revised in 2000.

Mean follow up duration was 9 months with a median of 5 months and a range of 0–53 months. In the final analysis we excluded patients with missing post-operative notes, cataract surgery combined with pterygium excision, follow up of less than 4 months and patients whose case notes could not be retrieved.

**Definitions**

Pterygium can simply be divided into four stages.[14] Stage I: Incipient stage, when it is just crossing the limbus; Stage II: The pterygium is midway between the limbus and pupillary margin; Stage III: The pterygium is at the pupillary margin; Stage IV: The pterygium has crossed the visual axis and could cause blindness/low vision. Pterygium recurrence was defined as any fibrovascular re-growth across the limbus.

**Results**

A total of 324 pterygium surgeries were performed on 290 patients in the study period. Only 1 patient had the same eye re-operated during that period. The male to female ratio was 0.95:1. The overall mean age was 51.3 ± 13.5 years, while the age range was 20–90 years. More resident doctors performed surgeries compared to consultants with a ratio of 4.28:1.

In the final analysis, 249 (76.9%) surgeries were included with a male to female ratio of 0.96:1. The mean age was 50.8 years with a range of 20–90 years. The age group with highest operation was 41–50 years, with a total of 77 patients (30.9%).

The left eye had slightly fewer surgeries compared to the right with a ratio of 0.86:1. Two hundred and twenty-two cases of pterygium (89%) occurred on the nasal aspect of the eyeball, 9 (4%) on the temporal aspect and 17(7%) were double (temporal and nasal) pterygia. The pre-operative visual acuity was ≥6/18 in 209 (84%).

Though the pterygium was not graded or measured in 76 (30.5%) of the eyes, for those that were measured; surgery was performed for pterygium between 2 and 4mm from limbus in 94(37.8%) and 44(17.7%) had pterygium of >4mm.

Excision + 5Fluorouracil + Autograft was the commonest surgery performed in 187(75.1%) eyes and 45(18.1%) had no type of graft. Bare sclera technique was performed in only 4(0.2%) of the eyes. Table 1 shows the different surgical techniques performed.

Post-operatively, recurrence following pterygium excision was documented in 40 (16.1%). The recurrence rate when sub-analyzed with surgical techniques and was found to be higher in patients with no autograft. Recurrence was noted in 18 (47.4%) eyes of patients who had only Excision + 5FU compared to 18 (9.6%) eyes of the patients who had Excision + 5FU + Autograft. Other notable postoperative complications include granuloma, symblepharon, ankyloblepharon, orbital cellulitis and panophthalmitis [Table 2]. The patients each with orbital cellulitis and panophthalmitis were diabetic, defaulted on medication use and follow up.

**Discussion**

There has been an evolution in the surgical techniques for pterygium excision performed in our Hospital. Bare sclera technique though easy and quick has been replaced with newer techniques such as excision + 5-FU with conjunctiva autograft (CAG) or amniotic membrane (AM) transplantation. Ashaye[10] in 1991 reported a mainly bare sclera excision which now forms only 0.02% of surgeries performed during this period of analysis, more than 2 decades after. Grafts and or adjuvants made up 99.98% of our surgical procedures.

<table>
<thead>
<tr>
<th>Surgical procedure</th>
<th>Total no. of eyes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple excision (bare sclera)</td>
<td>4 (1.6)</td>
</tr>
<tr>
<td>Excision + 5FU</td>
<td>38 (15.3)</td>
</tr>
<tr>
<td>Excision + 5FU + CAG</td>
<td>187 (75.1)</td>
</tr>
<tr>
<td>Excision + CAG</td>
<td>12 (4.8)</td>
</tr>
<tr>
<td>Excision + AMG</td>
<td>1 (0.4)</td>
</tr>
<tr>
<td>Excision + Avastin</td>
<td>1 (0.4)</td>
</tr>
<tr>
<td>Excision + MMC</td>
<td>1 (0.4)</td>
</tr>
<tr>
<td>Excision + MMC + CAG</td>
<td>1 (0.4)</td>
</tr>
<tr>
<td>STEP± lamellar corneal graft</td>
<td>4 (1.6)</td>
</tr>
</tbody>
</table>

No. = number, 5FU = 5-Fluorouracil, CAG = Conjunctival Autograft, AMG = Amniotic Membrane Graft, MMC = Mitomycin C
et al. Lower recurrence rates were recorded in an autograft was 12.1%. This study also had comparable total recurrence of 2.14% and rate of 6.9% versus 0.57% for American series in a retrospective study of 234 cases with excision was with conjunctiva autograft with an acceptable tissue (both conjunctival and episcleral tissues) towards the limbus. It is worthy of note that there was no indication in the surgical documentation that the CAG surgery ensured limbal autograft, though this is the standard operating practice in our centre.

CAG transplantation
This technique reduces the risk of recurrence as transplantation of normal conjunctiva forms a barrier to the proliferation and advancement of residual abnormal tissue (both conjunctival and episcleral tissues) towards the limbus. It is worthy of note that there was no indication in the surgical documentation that the CAG surgery ensured limbal autograft, though this is the standard operating practice in our centre.

In this series, the recurrence rates for excision + 5FU + CAG (9.6%) was comparable with excision alone (8.3%). Compares favorably with Bekibele et al. where recurrence using conjunctival autograft was 12.1%. This study also had comparable recurrent rate with studies such as Fahez et al., Gular et al. Lower recurrence rates were recorded in an American series in a retrospective study of 234 cases with total recurrence of 2.14% and rate of 6.9% versus 0.57% for recurrent versus primary pterygium surgery with CAG.

CONCLUSION
This retrospective study reported significant majority of the excision was with conjunctiva autograft with an acceptable low recurrence rate. This may not be unrelated to the outcome of previous randomized study outcomes of pterygium excision with CAG in the same centre, thus influence the choice. We recommend that pterygium excision with conjunctival autograft should be the first consideration in pterygium surgeries.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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20. Masters JS, Harris DJ. Low recurrence rate of pterygium after excision with conjunctival limbal autograft: a retrospective study with long-term follow-up. Cornea 2015;34:1569-72
21G Needle-Assisted Pterygium Excision (21-GNAP): A Novel Safe Approach

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Abstract

Aim: To determine surgical efficacy of 21G needle-assisted pterygium excision. Method: A pictorial review of pterygia excised at different levels of maturity and diverse clinical history using a 21G hypodermic needle and a colibri. Ten pterygia were excised of which grade 3 were six and grade 2 were four. Nine cases were primary pterygia and a case was recurrent. The author was the only surgeon. Result: Cases reviewed showed minimal or no residual pterygial tissues post-operatively. Pterygial beds had smooth corneal optical surfaces, there were no perforations or undue corneal “guttering” from irregular cuts, no exuberant tissue formation like pyogenic granuloma or recurrence at 6 weeks of follow-up. Overall, slit lamp images were comparable with conventional “grab and cut” with surgical blade or scissors. Conclusion: 21G Needle-Assisted Pterygium (21-GNAP) excision is cheap, safe, and easy-to-learn new modality of exciting all forms of pterygial and ocular surface masses.

Keywords: Excision, pterygium, 21-gauge hypodermic needle

Introduction

A pterygium (plural pterygia) is a triangular fibrovascular subepithelial ingrowth of degenerative bulbar conjunctival tissue over the limbus onto the cornea. It typically develops in patients who have been living in hot climates and, as with pinguecula, may represent a response to ultraviolet exposure and to other factors such as chronic surface dryness. A pterygium is histologically similar to a pinguecula and shows elastotic degenerative changes in vascularized subepithelial stromal collagen in contrast to pingueculae, pterygia encroach onto the cornea, invading the Bowman layer. Pseudo-pterygium appears similarly clinically but is caused by a band of conjunctiva adhering to an area of compromised cornea at its apex.[1] If not promptly removed, pterygium unleashes significant cosmetic blemish and defective vision.

Numerous surgical techniques have been described since the early 1960s, including the bare sclera technique, simple closure with absorbable sutures, sliding flap, rotational conjunctival flap, conjunctival autoplasty, mucous membrane graft, and conjunctival autograft.[2,3] These techniques involve grasping the pterygial head and avulsing from its base or grasping and gradually dissecting it off its base using a surgical knife or conjunctival scissors.

21G hypodermic needle has been noted by the author to possess the right size, finesse, and ergonomics to neatly separate pterygium from its bed with little or no worry about corneal perforation. 21G needle is being reported by this article as a viable alternative to surgical knife, razor blade, scissors, or similar tools hitherto employed in pterygium excision.

Surgical Procedure and Adjuvants

Items required are ophthalmic operating microscope, lid speculum, colibri, cotton buds, conjunctival scissors (optional). A sterile tray is set in the usual way. For a right-handed surgeon, best sitting position is above the
patient to operate right nasal pterygium and left temporal pterygium. This position also allows operating left nasal pterygium and right temporal pterygium for a left-handed surgeon. Sitting at patient’s right temporal side allows for good grasp of pterygial heads at left nasal areas and right temporal areas for the right-hand. This reverse is the case for the left-handed.

A good initial grasp should be ensured at the tip of the head of pterygium close to Stocker’s line. The grasped head is gently lifted with sufficient but minimal force to avoid avulsion (shearing) [see Figures 1 and 2]. The right hand holding 21G with the bevel face up and one of the sharp edges advanced into bed of the pterygium, ensuring that every of its anatomic part has been lifted off the cornea. The same plane is followed until pterygium is dissected fully from the cornea to the conjunctiva. After sufficiently dissected, the same needle or conjunctival scissor is used to severe the separated pterygial tissues and attached conjunctiva. Further procedures could be carried out such as amniotic graft, conjunctival auto-graft, Mitomycin 5FU application as necessary.

The implication of avulsion that escapes needle control, if it occurs, is that the entire pterygium may be severed from its head leaving behind superior and inferior fangs. If this occurs, grasp each fang and repeat the initial process making sure the fangs are lifted with 21G needle leaving no pterygial tissues behind. Then all three parts: the initial bite and the two fangs, are then dissected off the cornea and amputated with conjunctival scissors or same 21G needle.

<table>
<thead>
<tr>
<th>SN</th>
<th>PreOp</th>
<th>Post Op</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.png" alt="PreOp Image 1" /></td>
<td><img src="image2.png" alt="PostOp Image 1" /></td>
</tr>
<tr>
<td>2</td>
<td><img src="image3.png" alt="PreOp Image 2" /></td>
<td><img src="image4.png" alt="PostOp Image 2" /></td>
</tr>
</tbody>
</table>

Figure 1: Grasping pattern and needle positioning

Figure 2: Pictorial representation of sampled cases
DISCUSSION

The field of Ophthalmology has witnessed massive innovations from surgical techniques, ideas and ophthalmic equipment. 21G Needle-Assisted Pterygium excision (21-GNAP) is a novel and safe method of pterygium removal with flat-surfaced learning curve that adds to the burgeoning body of ophthalmic innovations. Excision as a modality of removing pterygium is not new. What continues to evolve is the modalities of preventing its recurrence with each method having variable outcomes. Various methods exist to disinsert pterygial head before dissecting the belly from corneal epithelium to which it is attached by variable degree. At times adhesions are so tough that cicatrizations make separation during surgery tedious. 21G green hypodermic needle is a cheap “scalpel” for a clean disinsertion and subsequent dissection of pterygium. Apart from limiting the chance of inadvertent corneal perforation associated with surgical knife or razor blade fragment, there is little or no residual pterygium on corneal surface with a relatively smoother optical surface. The author believes that in the event of inadvertent intraocular penetration by the 21G needle, the resultant opening is likely to be a self-sealing perforation unlike a full-thickness several millimeters lacerations reported as a complication of conventional blade/surgical knife excision. Till date, the authors have not experienced needle penetration during pterygium excision. Therefore, corneal perforation is thought to be a rare and unlikely complication of 21-GNAP.

CONCLUSION

Surgical firmament remains accommodative to innovations that ease life and enhance its quality while increasing access and decreasing cost. With just a colibri and a 21G hypodermic needle, pterygium could be safely removed with minimal or no effect on ocular surface architecture.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

Bacteriology of Lacrimal Drainage System Following Obstruction of the Nasolacrimal Duct in a Reference Population

El-Said G. Metmoah, Samar A. Bukhatwa, Sabah S. Eldressi
Ophthalmology Department, Faculty of medicine, University of Benghazi, Libya

Abstract

Context: Lacrimal drainage system obstruction gives discomfort to patients and threatens intraocular surgeries by infection, thus, knowledge of its bacteriology leads to the choice of effective therapy. Aim: To determine the bacteriology of nasolacrimal duct obstruction in an adult Libyan patient population and to analyze the appropriate antimicrobial therapy based on susceptibility testing. Settings and Design: A prospective study was conducted at the Great River Eye hospital, Benghazi/Libya in the period between September 2005 and February 2007.

Methods: Lacrimal swab materials collected from patients aged 18–62 years who were diagnosed as having lacrimal passage obstruction and referred for lacrimal drainage surgery. The specimens were cultured and results analyzed.

Results: Of 86 cases, 87.2% yielded a positive culture result. The majority of microorganisms were gram positive bacteria (73.3%) with Staphylococcus Aureus being the most frequently cultured species (36%) of the sample. Gram negative bacteria represented 26.7% of the isolates. The most common gram negative bacteria were Pseudomonas, Klebsiella, and E. coli which were isolated in 8% of the cases each. Staphylococcus aureus was isolated from 28.6% of cases having epiphora with no clinical signs of lacrimal drainage system infection. Ciprofloxacin (96%) and Gentamycin (94.7%) were found to be the most sensitive antibiotics against isolated organisms.

Conclusions: Adult patients with lacrimal drainage system obstruction harbor microorganisms in their lacrimal sacs indicating the importance of investigating patients before planning for intraocular surgeries and considering prophylactic use of antibiotics before lacrimal drainage procedures.

Keywords: Lacrimal drainage obstruction, microbiology, susceptibility tests

Key Messages

Prophylactic use of antibiotics should be considered before lacrimal drainage procedures.

Gram-positive bacteria (Staphylococcus species predominance) are the most common isolates in the lacrimal drainage system.

Ciprofloxacin and Gentamycin are the most sensitive antibiotics against isolated organisms. Penicillin showed the highest resistance which should be taken in consideration when treating cases of dacryocystitis putting in mind that appropriate use of antibiotic can control the antibiotic resistance.

INTRODUCTION

Chronic dacryocystitis is a chronic infection of the lacrimal sac that usually results from lacrimal duct obstruction.

Lacrimal sac and nasolacrimal duct obstruction cause considerable discomfort and sometimes, threatening ophthalmic problem especially when another intraocular procedure such as cataract surgery has to be done.

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Nasolacrimal duct obstruction can affect any age group, it may be caused by idiopathic inflammatory stenosis secondary to trauma, infection, inflammation neoplasm or mechanical obstruction.\[^1,2\]

The obstruction of the lacrimal drainage system occurs most often at either the junction of the sac and nasolacrimal duct or within the bony nasolacrimal duct, distal obstruction with the stagnation of secretions within the Lacrimal sac creating an infection that leads to chronic dacryocystitis with epiphora and purulent discharge.\[^3\]

Some patients tolerate nasolacrimal obstruction with epiphora for many years without clinical infection as simple stenosis of the nasolacrimal duct,\[^4\]\ and during the past years, there have been a few studies on the bacteriology of adult nasolacrimal duct obstruction, which showed staphylococcus epidermidis and staphylococcus aureus as the commonest isolated organisms.\[^5\]

The treatment of adult nasolacrimal duct obstruction is surgery either external or endo nasal dacryocystorhinostomy (DCR) or occasionally silicon intubations. According to Walland and Rose\[^6\], there is a five-fold risk of soft tissue infection after open lacrimal surgery without systemic antibiotic prophylaxis; therefore, post-operative soft tissue infection represents a major risk for lacrimal surgery failure.

Knowledge of the bacteriology of nasolacrimal duct obstruction contributes significantly to the choice of prophylactic antimicrobial agents.\[^7\]

The purpose of this study was to identify the bacteriology of nasolacrimal duct obstruction in an adult Libyan patient population and to determine the appropriate antimicrobial therapy based on susceptibility testing.

**Subjects and Methods**

A prospective study was conducted according to the principles of the World Medical Association Declaration of Helsinki with the approval of Great River Eye hospital/ Benghazi authorities in the period between September 2005 and February 2007.

Informed consent to participate was obtained from all of the patients enrolled in this study.

All patients had been referred for lacrimal drainage surgery.

All patients presented with obstruction of the nasolacrimal duct, which was confirmed by a positive regurgitation test, and by reflux of the irrigated fluid from the upper punctum after injecting saline into the lower punctum while the sac becoming distended with no saline passing to the nose or nasopharynx, also by probing up to the nasal wall of the Lacrimal sac fossa.

Patients who have done previous lacrimal drainage surgery were excluded from the study.

Patients were classified into three sub groups according to the severity of infection:

**Group 1 (G1):** Included cases of chronic dacryocystitis with copious purulent discharge or thick mucus discharge (and referred to as severe).

**Group 2 (G2):** Were cases of epiphora and minor mucopurulent discharge (referred to as moderate).

**Group 3 (G3):** Included cases complaining of epiphora only and no clinical signs of infection to the Lacrimal drainage system (referred to as mild).

**Bacterial isolation**

In all cases the collection of the samples was performed at the time of surgery by applying pressure over the Lacrimal sac and allowing the purulent material to reflux through the Lacrimal punctum or by using of sterile saline to irrigate the Lacrimal drainage system and the samples from the refluxing material were collected. Prior to the collection of the samples, povidone-iodine 5% was instilled into the conjunctiva along with cleaning of the surrounding area with it, and the samples were collected with sterile cotton swabs ensuring that the lid margin or the conjunctiva were not touched, local and systemic antibiotics were stopped at least two weeks before collecting the specimen.

Organisms grown were identified using standard biochemical reactions and antibiotic sensitivity test was done by the Kirby-Bauer disc diffusion method as per the Clinical and Laboratory Standards Institute guidelines.\[^8,9\]

Statistical analysis was performed using Statistical Package for the Social Science (Windows version 17.0; SPSS Inc., Chicago [IL], US). Data were presented as frequencies and mean ± standard deviation (SD). Chi-square $\chi^2$ was used with $P$-values of 0.05 or less were considered as statistically significant.

**Results**

Cultures from 86 adult Libyan patients with the diagnosis of obstruction of the nasolacrimal duct were submitted for microbiological studies.

There was a predominance of female subjects 80 (93%) compared to male subjects 6 (7%).

The mean age of patients was 34.3 ±10.25yrs (range,18-62 years) with the majority of cases (73.3%) in the age between 20 and 39 years old.

According to severity of infection the patients were distributed into the followings:

**Severe** (G1) with 38 (44.2%) cases; **Moderate** (G2) with 27 cases (31.4%) and **Mild** (G3) 21 cases (24.4%)

Our clinical diagnosis for these 21 cases was simple stenosis of naso-lacrimal duct [Table1].
Bacteriology findings

Of the 86 samples; 75 (87.2%) yielded a positive culture. All the cases of no growth 100% (11 cases) were in the mild group, while 50.7% (38 cases) of the cases with growth were in the severe group and that was statistically significant \( P < .0001 \)

Of the 75 samples with positive culture results no mixed cultures were isolated. The majority of microorganisms 55 cases (73.3%) were gram-positive bacteria with \textit{Staphylococcus Aureus} being the most frequent cultured species which was isolated in 27(36%) of the sample.

Gram-negative bacteria were recovered from 20 samples (26.7%) of the isolates. The most common Gram-negative bacteria were Pseudomonas, Klebsiella, and E. coli which were isolated in 6 (8%) of the cases each. Neither anaerobic microorganisms nor fungi were cultured from the samples [Table 2].

\textit{Staphylococcus aureus} was the major isolate 15 cases (39.5%) in group 1 (severe) form followed by \textit{Streptococcus pyogenes}, 8 cases (21.1%). Gram-negative organisms were 11 in number which account for 29% of the isolates in this group, and although \textit{proteus} were isolated in only two cases; they constitute all the cases of \textit{proteus} in all the three groups (100%) and that was statistically significant \( P= 0.004 \) [Table 3].

In group 2 (moderate), \textit{Staphylococcus aureus} was the main bacteriological finding 6 cases (22.2%) followed by \textit{Staphylococcus epidermidis} five cases (18.5%).

Gram-negative organisms were 33% of all isolates in this group (group 2).

And although \textit{Streptococcus pneumoniae} were 3 cases (11.1%) this account for all the cases (100%) within the bacteriological study, \( P= 0.006 \) [Table 4].

Although in group 3 (mild) \textit{Staphylococcus aureus}, six cases (28.6%), was also the main bacteriological finding; all the cases of no growth laid in this group, 11 cases (100%) [Table 5].

Microbiological sensitivity tests

Based on the sensitivity tests, Ciprofloxacin was found to be most effective antibiotic (96%) against all gram-positive isolates followed by Chloramphenicol (85%).

Regarding gram-negative isolates the most effective agent was Gentamycin (94.7%) followed by Tobramycin (90.7%).

The highest resistance was to penicillin (32%) which is a broad-spectrum antibiotic [Table 6].

These results of microbiological sensitivity tests were all statistically highly significant, \( P < 0.0001 \).

### Table 1: Distribution of patients according to severity of infection

<table>
<thead>
<tr>
<th>Severity of infection</th>
<th>Number of patients</th>
<th>% within culture results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild (G3)</td>
<td>21</td>
<td>24.4</td>
</tr>
<tr>
<td>Moderate (G2)</td>
<td>27</td>
<td>31.4</td>
</tr>
<tr>
<td>Severe (G1)</td>
<td>38</td>
<td>44.2</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2: Bacteriological findings of the contents of lacrimal sac in 75 adult patients with lacrimal duct obstruction

<table>
<thead>
<tr>
<th>Bacteria isolates</th>
<th>No of strains ((N = 75))</th>
<th>% of all strains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram +ve bacteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textit{Staphylococcus aureus}</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>\textit{Staphylococcus epidermidis}</td>
<td>13</td>
<td>17.3</td>
</tr>
<tr>
<td>\textit{Streptococcus pyogenes}</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>\textit{Pseudomonas aeruginosa}</td>
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<td>\textit{Klebsiella pneumoniae}</td>
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<td>\textit{Proteus species}</td>
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<tr>
<td>\textit{Escherichia coli}</td>
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<td>8</td>
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<tr>
<td>Gram –ve bacteria</td>
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<tr>
<td>\textit{Pseudomonas aeruginosa}</td>
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<td>8</td>
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<tr>
<td>\textit{Klebsiella pneumoniae}</td>
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<td>8</td>
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<tr>
<td>\textit{Proteus species}</td>
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<td>2.7</td>
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<tr>
<td>\textit{Escherichia coli}</td>
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<td>8</td>
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</tbody>
</table>

### Table 3: Bacteriological findings in Group 1

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>No of strains ((N = 38))</th>
<th>% within severe group</th>
<th>% within bacteriology findings</th>
</tr>
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<tbody>
<tr>
<td>\textit{Staphylococcus aureus}</td>
<td>15</td>
<td>39.5</td>
<td>55.6</td>
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<td>\textit{Staphylococcus epidermidis}</td>
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<td>30.8</td>
</tr>
<tr>
<td>\textit{Streptococcus pyogenes}</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>\textit{Streptococcus pneumoniae}</td>
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<td>21.1</td>
<td>66.7</td>
</tr>
<tr>
<td>\textit{Pseudomonas aeruginosa}</td>
<td>5</td>
<td>13.2</td>
<td>83.3</td>
</tr>
<tr>
<td>\textit{Proteus species}</td>
<td>2</td>
<td>5.3</td>
<td>100</td>
</tr>
<tr>
<td>\textit{Klebsiella pneumoniae}</td>
<td>2</td>
<td>5.3</td>
<td>33.3</td>
</tr>
<tr>
<td>\textit{Escherichia coli}</td>
<td>2</td>
<td>5.3</td>
<td>33.3</td>
</tr>
</tbody>
</table>
DISCUSSION

The lacrimal excretory system draws tears into the lacrimal sac which then pass through the nasolacrimal duct into the inferior meatus of the nose by gravity and tissue elasticity. As a result of stenosis or obstruction of the nasolacrimal duct, tears will be retained in the cavity of the lacrimal sac, which facilitates the growth and propagation of microorganisms causing dacryocystitis.

In the 1930s, Streptococcus pneumoniae was the most common species in chronic dacryocystitis in adults.\(^5\) In 1980s Huber Spitz\ et al.\(^{10}\) reported Staphylococcus aureus (45%) and Streptococcus epidermidis (20%) followed by gram-negative E. Coli as predominant isolates.

In the present study, gram-positive bacteria were found in 73.3% of the isolates. This is in close agreement with the observation of 65% of gram-positive organisms by Coden et al.\(^5\) The most common organisms cultured in our study were Staphylococcus species counting for 53.3% of isolates. This percentage compares fairly well with the previous reports that ranged between (49%-73%\(^5,10-12\)) but is higher than what was reported by Negm et al.\(^{13}\) (38.8%), the cause of disparity between Negm et al. results and the present study could be due to the difference in the number as well as the techniques of samples collection used in both studies. In Negm et al. study there were 25 samples obtained directly from the contents of lacrimal sac during the DCR surgery, whilst in the present study; the number was 86 sample collected before the surgery from the reflux of the purulent material through the lacrimal punctum after applying pressure over the lacrimal sac.

Streptococcus pneumonia represented 4% of the isolates in the present study, which was slightly higher than Huber Spitz\ et al.\(^{5}\) (2%) and Coden et al.\(^{10}\) (2.3%) reports, but lower than Chaudhry et al (10.2 %)\(^{12}\) and Negm, S et al (22%).\(^{13}\) These dissimilarities could be due to the difference in the number and the type of dacryocystitis cases studied (Spitz et al.\(^{10}\) included cases of acute dacryocystitis in their study).

Gram-negative organisms represented (26.7%) of the isolates of the total material in this study, the most frequently isolated species being pseudomonas, klebsiella and E. Coli (8% each). Previously Huber Spitz\ et al.\(^{10}\) reported that gram-negative organisms accounted for 26% of the isolates in their study, the most frequent species being E. Coli (12%), while Coden et al. observed gram-negative organisms in 27% of all isolates including Pseudomonas aeruginosa in 9% and Haemophilus species in 6% of isolates.\(^5,10\) In the present study, the cases with chronic dacryocystitis with copious mucopurulent discharge (G1); the gram-negative organisms were isolated in 29% of the sample. But found in 33% in cases with mild mucopurulent discharge (G2). This goes with the practice that chronic dacryocystitis with mucous or purulent

---

Table 4: Bacteriological findings in Group 2

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>No of strains (n = 27)</th>
<th>% within moderate group</th>
<th>% within bacteriology findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>6</td>
<td>22.2</td>
<td>22.2</td>
</tr>
<tr>
<td>Staphylococcus epidermidis</td>
<td>5</td>
<td>18.5</td>
<td>38.5</td>
</tr>
<tr>
<td>Streptococcus pneumoniae</td>
<td>3</td>
<td>11.1</td>
<td>100</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>4</td>
<td>14.8</td>
<td>33.3</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1</td>
<td>3.7</td>
<td>Gram –ve33%</td>
</tr>
<tr>
<td>Proteus species</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>4</td>
<td>14.8</td>
<td>66.7</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>4</td>
<td>14.8</td>
<td>66.7</td>
</tr>
</tbody>
</table>

Table 5: Bacteriological findings in Group 3

<table>
<thead>
<tr>
<th>Bacteria isolated</th>
<th>No of strains (N = 21)</th>
<th>% within mild group</th>
<th>% within bacteriology findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>6</td>
<td>28.6</td>
<td>22.2</td>
</tr>
<tr>
<td>Staphylococcus epidermidis</td>
<td>4</td>
<td>19</td>
<td>30.8</td>
</tr>
<tr>
<td>No growth</td>
<td>11</td>
<td>52.4</td>
<td>100</td>
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</table>

Table 6: Microbiological sensitivity tests

<table>
<thead>
<tr>
<th>Type of antibiotic</th>
<th>Resistance</th>
<th>Sensitive</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>3 (4%)</td>
<td>72 (96%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>4 (5.3%)</td>
<td>71 (94.7%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>7 (9.3%)</td>
<td>68 (90.7%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Augmentin</td>
<td>8 (10.7%)</td>
<td>67 (89.3%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>10 (13.8%)</td>
<td>65 (86.7%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Neomycin</td>
<td>11 (14.7%)</td>
<td>64 (85.3%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>11 (14.7%)</td>
<td>64 (85.3%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Fucidin</td>
<td>12 (16%)</td>
<td>63 (84%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Septrine</td>
<td>12 (16%)</td>
<td>63 (84%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>13 (17.3%)</td>
<td>62 (82.7%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>16 (21.3%)</td>
<td>59 (78.7%)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Penicillin</td>
<td>24 (32%)</td>
<td>51 (68%)</td>
<td>P &lt; 0.0001</td>
</tr>
</tbody>
</table>
discharge is a contraindication for elective intraocular surgery; and on doing lacrimal drainage surgery for cases of nasolacrimal duct obstruction, the antimicrobial prophylaxis should cover both gram-positive and gram-negative organisms.

Treatment of infection of the lacrimal drainage system has no regimen in Libya; thus, knowledge of its bacteriology leads to the choice of effective therapy.

In the present study, according to susceptibility testing, Ciprofloxacin is the most effective therapeutic agent (96%) against gram-positive isolates followed by chloramphenicol (85%), while Gentamycin is the most effective isolate (94%) against Gram-negative isolates followed by Tobramycin (90%). These results are in accordance with Eslami et al. and Pornpanich et al.[14] who showed that Ciprofloxacin (75%) was the most effective antibiotic to isolated bacteria,[14,15] but in contradictory to Chaudhary et al.[7] and Usha et al.[16] who showed that chloramphenicol is the most effective agent in lacrimal duct obstruction. This discrepancy may be due to the unwise use of broad-spectrum antibiotics, in the treatment of non-infectious conditions or as a prophylactic for long periods, with the emergence of more virulent organisms that are drug-resistant.[17,18] Most of the isolates in the present study showed the highest resistance to penicillin (32%), which are similar to previously reported results.[16,19] Bacterial resistance has increased over the last years due to the usage of antibiotics without microbiological testing; the appropriate use of antibiotics should be encouraged to avoid the emergence of resistant strains and to decrease the failure rate of lacrimal duct surgery due to soft tissue infection.[6,16]

**Conclusion**

Adult patients with lacrimal drainage system obstruction harbor microorganisms in their lacrimal sacs indicating the importance of investigating patients before planning for intraocular surgeries and considering prophylaxis use of antibiotics before lacrimal drainage procedures.

Gram positive bacteria are the most common isolates in the lacrimal drainage system obstruction with a predominance of Staphylococcus species (53.3%), and gram-negative bacteria constitute a considerable amount (26.7%) of isolates. Ciprofloxacin and Gentamycin are the most sensitive antibiotics against isolated organisms while penicillin showed the highest resistance which should be taken in consideration when treating cases of dacryocystitis putting in mind that appropriate use of antibiotic can reduce antibiotic resistance.

**Limitation of the study**

There were no previous studies that determine the bacteriology of nasolacrimal duct obstruction in the Libyan population to compare with the present study. Another limitation is that, although an attempt to ensure minimal contamination with normal ocular surface flora was carried out by the prior installation of povidone-iodine 5% into the conjunctiva, this does not absolutely prevent this; so, we recommend to change the way of sample collection to be direct from the lacrimal sac contents while making sac flap during DCR surgery in the future studies.

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**Conflicts of interest**

The authors declare no conflict of interest.

**References**


Vision-Related Quality of Life Assessment of Patients Attending a Geriatric Centre in South-West Nigeria

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BACKGROUND

According to World Health Organization, health not only refers to the absence of physical diseases, but also includes psychological and social well-being of individuals.[1] Quality of life (QoL) on the other hand, lacks a single, universally accepted definition.[2] However, QoL may be defined subjectively as “an individual’s perception of his/her life in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards and concerns.”[3] QoL also has an objective component which can be measured objectively using validated instruments (e.g. questionnaires) in which a score is assigned to specific indices or characteristics in different domains along a scale in a continuum.[4-6]

Visual function is important for optimal orientation in functional and social life and has effects on physical, psychological, mental and emotional well-being of the individual.[7] Visual function therefore is a domain under which QoL may be assessed. This is referred to as vision-specific or vision-related QoL. The National Eye Institute Visual Function Questionnaire (NEI-VFQ) is an example of an instrument designed and validated for the objective assessment of vision-specific QoL.[8]

Broman et al.[9] revealed that a visual acuity of at least 6/12 was found to negatively impact on an individual’s quality of life. This was also reiterated by Bekibele et al.[10] The Proyecto VER study[9] observed that visual impairment was associated with a decrease in the quality of life among elderly patients, and that the severity of ocular diseases was related to the level of visual impairment. In relation to persons with no visual impairment, persons with bilateral mild and unilateral or bilateral moderate or severe visual impairment report greater difficulties in performing most vision-dependent daily activities, experience vision-related dependency and poorer vision-related mental health.[11]

Ee Munn Chia et al.[12] further disclosed that the impact of visual impairment on mental domains was much greater compared to co-existing medical conditions like stroke. Therefore, data is needed on the effect of ocular diseases on vision-related quality of life among the elderly for the purpose of making recommendations for improved eye care with resultant improvement in their quality of life.

METHODS

This was a descriptive cross-sectional study conducted at the Geriatric Outpatient Clinic of the University College Hospital, Ibadan, which is an established unit that attends to various health needs of the elderly i.e. individuals 60 years and above between February 2016 to May 2016.

A sample size of 427 was determined using Leslie-Keish statistical formula,[13] in addition to an anticipated non-response rate of 10%. Ethical approval was obtained from the University of Ibadan/University College Hospital Ibadan ethical committee before commencement of the study. Permission was also obtained from the Head of the Geriatric Centre.

In addition, written informed consent was gotten from consecutive and eligible patients who met the following...
criteria i.e. best corrected visual acuity of worse than 6/12 and agreed to participate in the study. However, patients with acute or severe medical illness requiring urgent medical attention e.g. cerebrovascular accident, acute urinary retention, diabetic emergencies, and communication barrier like cognitive impairment, dementia were excluded from the study.

The study was carried out in line with the declaration of Helsinki for studies on human subjects.

Questionnaires in English (with translation to Yoruba) were administered to all participants (depending on their language preference) by only one trained assistant who recorded their socio-demographic data and the National Eye Institute Visual Functioning Questionnaire-25 (NEI-VFQ 25) section. The examination section of the questionnaire was filled by the primary investigator. Presenting distance visual acuity of each eye was tested using an illuminated Snellen chart placed at a distance of six meters from the participant, while the near vision was assessed using a Jaeger near chart placed at 33cm in a well-lit room (with distant correction where applicable). Their vision-specific quality of life was assessed using the NEI VFQ-25.\(^8\)

**Statistical analysis**

The effect of ocular diseases on quality of life was assessed using the NEI VFQ-25. Original numeric values obtained from the survey were re-coded following the scoring rules according to the NEI VFQ-25 scoring algorithm.\(^8\) Each item was then converted to a 0 to 100 scale, so that the lowest and highest possible scores are set at 0 and 100 points respectively. Items within each subscale were averaged, and the final score represented the average of all items in the subscale that each respondent answered.

Data collected were entered and analyzed using the IBM Statistical Package for Social Sciences (IBM-SPSS) software version 20 (IBM SPSS Inc., Chicago IL, USA).

Summary statistics are presented as proportions for categorical variables, while quantitative variables were presented as means and standard deviation. Bivariate analysis including independent sample t-test and ANOVA was performed to test for association between quantitative continuous variables, while Chi square test was used to test the association between categorical variables.

All 11 sub-scales of the QoL including general health, general vision, ocular pain, near activities, distance activities, social functioning, mental health, role difficulty, dependency, colour vision, and peripheral vision were independently compared with gender using independent sample t-test, while ANOVA was used to compare the individual visual functioning sub-scales with the visual impairment sub-groups. t-test was also used to compare the mean difference between presence and absence of the individual ocular diseases. To perform the multivariate analysis, a linear regression analysis was performed to ascertain the predictors of the various quality of life domains. The linear regression model included the variables that were statistically significant with the various outcome variable (quality of life domains) at the bivariate analysis level.

All test analysis was set at 5% level of significance \((P < 0.05)\).

**Operational Definitions**

**Visual impairment**

Mild Visual impairment was defined as visual acuity \(< 6/12\) to \(6/18\), Moderate Visual Impairment as \(< 6/18\) to \(6/60\), Severe Visual Impairment as \(6/60\) to \(3/60\) and blindness as \(<=3/60\).\(^14\)

Refractive error included myopia, hypermetropia, and astigmatism.

Myopia was defined as spherical error of \(-1.50\)D or worse.\(^14,15\)

Hypermetropia was defined as spherical error of \(+1.50\)D or worse.\(^14,15\)

Astigmatism (minus cylinder format) was defined as a cylindrical error greater than \(+0.50\)D.\(^15\)

Presbyopia was defined as inability to read N8 with both eyes at a distance 40cm away from the subject.\(^16\)

Cataract was defined as opacification of the crystalline lens and graded using the WHO cataract grading system.\(^17\)

Cataract surgery was defined as surgical removal of lens in at least one eye, with or without intraocular lens implantation.\(^18\)

Glaucoma diagnosis was defined using International Society of Geographical and Epidemiological Ophthalmology (ISGEO) criteria as vertical cup-disc ratio \(\geq 0.7\) and or cup-disc asymmetry of \(\geq 0.2\).\(^19\)

Age Related Maculopathy (ARMD) was classified using the International Classification and Grading System for Age-Related Maculopathy and Age Related Macula Degeneration.\(^20\)

**Results**

A total of 427 consenting respondents participated in the study. The mean age of respondents was 71.6 ± 7.11 years, while most of the respondents 127 (29.8%) in this study were between the ages of 65 years to 69 years. The sex distribution among the age groups is shown in Table 1.

Distance visual acuity assessment showed that about one third of the patients had moderate visual impairment at the bivariate analysis level.

The mean quality of life was highest in the colour vision sub domain (53.86 ± 28.91), followed by the distance activities...
### Table 1: Sex distribution among the age groups

<table>
<thead>
<tr>
<th>Age</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
<th>$X^2$</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 65 years</td>
<td>53 (81.5)</td>
<td>12 (18.5)</td>
<td>65 (15.2)</td>
<td>36.736</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>65–69 years</td>
<td>53 (41.7)</td>
<td>74 (58.3)</td>
<td>127 (29.8)</td>
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<td></td>
</tr>
<tr>
<td>70–74 years</td>
<td>57 (60.6)</td>
<td>37 (39.4)</td>
<td>94 (22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75–79 years</td>
<td>39 (66.1)</td>
<td>20 (33.9)</td>
<td>59 (13.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 years</td>
<td>35 (42.7)</td>
<td>47 (57.3)</td>
<td>82 (19.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>237 (55.5)</td>
<td>190 (44.5)</td>
<td>427 (100)</td>
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</table>

### Table 2: Visual impairment

<table>
<thead>
<tr>
<th>Right Eye</th>
<th>Total</th>
<th>$X^2$; $P$ value</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>Total</td>
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#### Distant VA

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<tr>
<th>&gt;6/18</th>
<th>12</th>
<th>8 (4.2)</th>
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<tr>
<td>6/18–6/60</td>
<td>81</td>
<td>81</td>
<td>162</td>
<td>92</td>
<td>85</td>
<td>177</td>
<td>55</td>
<td>33</td>
</tr>
<tr>
<td>6/60–3/60</td>
<td>35</td>
<td>49</td>
<td>84</td>
<td>48</td>
<td>26</td>
<td>74</td>
<td>55</td>
<td>33</td>
</tr>
<tr>
<td>&lt;3/60</td>
<td>109</td>
<td>52</td>
<td>161</td>
<td>90</td>
<td>79</td>
<td>169</td>
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#### Near VA

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<th>8 (4.2)</th>
<th>8 (1.9)</th>
<th>41.654; 0.001</th>
<th>0</th>
<th>8 (4.2)</th>
<th>8 (1.9)</th>
<th>21.306; 0.001</th>
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<tbody>
<tr>
<td>N12</td>
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<td>28</td>
<td>72</td>
<td>38</td>
<td>28</td>
<td>66</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>N14</td>
<td>75</td>
<td>68</td>
<td>143</td>
<td>67</td>
<td>45</td>
<td>112</td>
<td>67</td>
<td>45</td>
</tr>
<tr>
<td>N24</td>
<td>34</td>
<td>47</td>
<td>81</td>
<td>31</td>
<td>41</td>
<td>72</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>N36</td>
<td>11</td>
<td>19</td>
<td>30</td>
<td>31</td>
<td>6 (3.2)</td>
<td>37</td>
<td>31</td>
<td>6 (3.2)</td>
</tr>
<tr>
<td>&lt;N44</td>
<td>73</td>
<td>20</td>
<td>93</td>
<td>70</td>
<td>62</td>
<td>132</td>
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</table>

#### VA Glasses

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<th>8 (4.2)</th>
<th>8 (1.9)</th>
<th>21.306; 0.001</th>
</tr>
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<tbody>
<tr>
<td>N12</td>
<td>44</td>
<td>28</td>
<td>72</td>
<td>38</td>
<td>28</td>
<td>66</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>N14</td>
<td>75</td>
<td>68</td>
<td>143</td>
<td>67</td>
<td>45</td>
<td>112</td>
<td>67</td>
<td>45</td>
</tr>
<tr>
<td>N24</td>
<td>34</td>
<td>47</td>
<td>81</td>
<td>31</td>
<td>41</td>
<td>72</td>
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</tr>
<tr>
<td>N36</td>
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<td>19</td>
<td>30</td>
<td>31</td>
<td>6 (3.2)</td>
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<td>31</td>
<td>6 (3.2)</td>
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<tr>
<td>&lt;N44</td>
<td>73</td>
<td>20</td>
<td>93</td>
<td>70</td>
<td>62</td>
<td>132</td>
<td>70</td>
<td>62</td>
</tr>
</tbody>
</table>
sub domain (49.77 ± 2.35), while the quality of life was lowest in the general health subdomains (33.60 ± 18.78) as shown in Table 3.

The comparison between the quality of life domains and visual impairment is presented in Table 4.

The mean QOL scores were significantly lower among respondents with glaucoma across all QOL sub domains ($P < 0.05$) as shown in Table 5.

The linear regression between quality of life domains and presence of ocular diseases among respondents is shown in Table 6.

**DISCUSSION**

In this study, there were more male participants (55.5%) than female participants (44.5%) which was at variance with the findings of Adepegba et al.\(^{[21]}\) (male 29.7%, female 70.3%), Adio\(^{[22]}\) (male 40%, female 60%) and Dreer et al.\(^{[23]}\) (male 16%, female 84%). However, a study by Ibrahim et al.\(^{[24]}\) in Saudi Arabia showed a higher male preponderance (male 62.7%, female 37.3%).

The age distribution of the patients was 60 to 91 years with a mean age of 71.6 ± 7.11 years, with more than half of the respondents in their 6\(^{th}\) decade of life and about one tenth of them above 80 years of age. This mean age differs from Adio\(^{[22]}\) (85 ± 12.14 years) and Dreer\(^{[23]}\) (82 ± 7.7 years). Correspondingly, this upward trend of socio-demographic transformation suggests that there will be an increase demand for the limited healthcare services available due to the prospect of developing other health problems in addition to ocular morbidities.

Treatable and preventable causes of visual impairment accounted for majority of ocular morbidities among the elderly studied, which is akin to other studies done by Adepegba et al.\(^{[21]}\) and Kyari et al.\(^{[25]}\) Therefore, affordable and accessible healthcare services should be provided for them while not suffering any financial hardship according to the universal health coverage.

Despite a previous report by the Nigeria National Blindness and Visual Impairment Survey\(^{[25]}\) done between 2005 and 2007 where 84% of blindness was found to be avoidable, no other major national survey has been carried out to evaluate the recommendations as well as various efforts to eradicate needless blindness and visual impairment in the country. Also, it is still disheartening that the elderly in addition to other systemic diseases still suffer from treatable visual impairment/blindness. This finding restates that if nothing is done to the health needs of this escalating aging population, the burden of ocular diseases and co-existing systemic diseases among them will continue to rise, while also stretching the limited healthcare services available.

In this study, visual impairment was found to negatively affect their quality of life across all its domains ($P < 0.05$). This finding was similar to studies done by Bekibele in Nigeria,\(^{[10,26]}\) Nirmalan et al.\(^{[27]}\) in India and Broman et al.\(^{[9]}\) in the United States where diminishing quality of life across all domains were found to be associated with worsening visual impairment. Also, visual impairment negatively impacts the overall well-being and functional status of affected the elderly thus incapacitating them from performing independent daily tasks. This finding is similar to findings by Gureje et al.\(^{[28]}\) and Laforge et al.\(^{[29]}\) The presence of ocular diseases in conjunction with other systemic diseases and possible limited financial resources further worsens the physical and psychosocial well-being of affected individuals and care-givers at large.

The mean quality of life (QoL) scores was significantly lower among respondents with ocular diseases across all QoL sub domains ($P < 0.05$), especially glaucoma and ARMD. In the Barbados eye\(^{[18]}\) and Proyecto VER\(^{[19]}\) studies, glaucoma was reported to affect QoL scores across all domains. This may be associated to the irreversible nature of blindness of the disease, as well as the loss of peripheral vision loss and subsequent central vision loss at an advanced stage.

### Table 3: Vision-related quality of life of respondents

<table>
<thead>
<tr>
<th>Visual functioning sub-scales</th>
<th>Male (Mean ± SD)</th>
<th>Female (Mean ± SD)</th>
<th>Total (Mean ± SD)</th>
<th>t-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General health</td>
<td>38.27 ± 17.73</td>
<td>30.26 ± 19.55</td>
<td>33.60 ± 18.78</td>
<td>3.333</td>
<td>0.001</td>
</tr>
<tr>
<td>General vision</td>
<td>30.46 ± 18.46</td>
<td>37.68 ± 20.54</td>
<td>33.67 ± 19.72</td>
<td>3.774</td>
<td>0.001</td>
</tr>
<tr>
<td>Ocular pain</td>
<td>31.01 ± 26.10</td>
<td>37.63 ± 26.94</td>
<td>33.96 ± 26.65</td>
<td>2.567</td>
<td>0.001</td>
</tr>
<tr>
<td>Near activities</td>
<td>40.99 ± 23.14</td>
<td>44.60 ± 26.32</td>
<td>42.60 ± 24.64</td>
<td>1.505</td>
<td>0.133</td>
</tr>
<tr>
<td>Distance activities</td>
<td>47.46 ± 28.81</td>
<td>52.63 ± 27.57</td>
<td>49.77 ± 2.35</td>
<td>−1.876</td>
<td>0.061</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vision specific</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social functioning</td>
<td>43.35 ± 25.40</td>
<td>51.51 ± 26.88</td>
<td>46.98 ± 26.35</td>
<td>−3.213</td>
<td>0.001</td>
</tr>
<tr>
<td>Mental health</td>
<td>38.04 ± 26.15</td>
<td>43.33 ± 27.64</td>
<td>40.39 ± 26.92</td>
<td>−2.024</td>
<td>0.044</td>
</tr>
<tr>
<td>Role difficulty</td>
<td>38.86 ± 28.41</td>
<td>48.42 ± 30.47</td>
<td>43.19 ± 28.49</td>
<td>−3.462</td>
<td>0.001</td>
</tr>
<tr>
<td>Dependency</td>
<td>41.61 ± 31.09</td>
<td>48.55 ± 30.47</td>
<td>44.70 ± 30.98</td>
<td>−2.312</td>
<td>0.021</td>
</tr>
<tr>
<td>Colour vision</td>
<td>50.21 ± 28.46</td>
<td>58.42 ± 28.89</td>
<td>53.86 ± 28.91</td>
<td>−2.942</td>
<td>0.003</td>
</tr>
<tr>
<td>Peripheral vision</td>
<td>30.97 ± 24.27</td>
<td>41.71 ± 27.22</td>
<td>35.83 ± 26.17</td>
<td>−4.222</td>
<td>0.001</td>
</tr>
</tbody>
</table>
### Table 4: Comparison of quality of life domains against visual impairment

<table>
<thead>
<tr>
<th>Quality of life domains</th>
<th>Mean (SD)</th>
<th>95% Confidence interval for mean</th>
<th>F test</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Lower bound</td>
<td>Upper bound</td>
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</tr>
<tr>
<td>General health domain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;6/18</td>
<td>41.30 (12.17)</td>
<td>36.0396</td>
<td>46.5690</td>
<td>9.863 &lt; 0.001</td>
</tr>
<tr>
<td>6/18–6/60</td>
<td>36.14 (15.56)</td>
<td>33.9793</td>
<td>38.2979</td>
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</tr>
<tr>
<td>6/60–3/60</td>
<td>38.18 (19.16)</td>
<td>33.0029</td>
<td>43.3608</td>
<td></td>
</tr>
<tr>
<td>&lt;3/60</td>
<td>27.21 (21.69)</td>
<td>23.6761</td>
<td>30.7457</td>
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</tr>
<tr>
<td>General vision domain</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&gt;6/18</td>
<td>38.61 (20.00)</td>
<td>35.8389</td>
<td>41.3888</td>
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</tr>
<tr>
<td>6/18–6/60</td>
<td>36.14 (15.56)</td>
<td>33.9793</td>
<td>38.2979</td>
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</tr>
<tr>
<td>6/60–3/60</td>
<td>38.18 (19.16)</td>
<td>33.0029</td>
<td>43.3608</td>
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<tr>
<td>&lt;3/60</td>
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<td>23.6761</td>
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<td>Ocular pain domain</td>
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<tr>
<td>&gt;6/18</td>
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<td>55.7790</td>
<td>42.647 &lt; 0.001</td>
</tr>
<tr>
<td>6/18–6/60</td>
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<td>43.0090</td>
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<td>14.7035</td>
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<td>Near activity domain</td>
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<tr>
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<td>&lt;3/60</td>
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<td>Distance activity domain</td>
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<tr>
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<td>75.0000</td>
<td>75.0000</td>
<td>86.100 &lt; 0.001</td>
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<td>Mental health domain</td>
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<td>&gt;6/18</td>
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<td>51.8683</td>
<td>63.3491</td>
<td>69.933 &lt; 0.001</td>
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<tr>
<td>6/18–6/60</td>
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<td>56.8922</td>
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<tr>
<td>6/60–3/60</td>
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<td>29.4366</td>
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<tr>
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<td>20.69 (24.04)</td>
<td>16.7734</td>
<td>24.6098</td>
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<tr>
<td>Role difficulty domain</td>
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<td></td>
</tr>
<tr>
<td>&gt;6/18</td>
<td>66.30 (12.17)</td>
<td>61.0396</td>
<td>71.5690</td>
<td>61.649 &lt; 0.001</td>
</tr>
<tr>
<td>6/18–6/60</td>
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<tr>
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<td>35.0458</td>
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<tr>
<td>&lt;3/60</td>
<td>22.96 (26.74)</td>
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<tr>
<td>Dependency domain</td>
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<tr>
<td>&gt;6/18</td>
<td>71.19 (5.88)</td>
<td>68.6526</td>
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<tr>
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<td>55.8787</td>
<td>62.3144</td>
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<tr>
<td>6/60–3/60</td>
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<td>35.3583</td>
<td>53.2781</td>
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<tr>
<td>&lt;3/60</td>
<td>20.92 (26.09)</td>
<td>16.6646</td>
<td>25.1722</td>
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<tr>
<td>Colour vision domain</td>
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<tr>
<td>&gt;6/18</td>
<td>75.00 (0.00)</td>
<td>75.0000</td>
<td>75.0000</td>
<td>64.242 &lt; 0.001</td>
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<td>6/18–6/60</td>
<td>66.83 (16.77)</td>
<td>64.5052</td>
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<tr>
<td>6/60–3/60</td>
<td>54.55 (29.69)</td>
<td>46.5180</td>
<td>62.5729</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
The effect of cataract was significant in the general health, social functioning and peripheral vision domains. This was also supported by studies from Nirmalan et al.[27], as well as from the Barbados eye[18] and Proyector VER.[9].

On the other hand, respondents who had undergone cataract surgery had relatively better QoL scores in the general health, ocular pain, near activities, distance activities and peripheral vision sub domains compared to those who had not undergone the procedure. This observation was also described by Ishii et al.[30] and To et al.[31] in their different studies.

Following the linear regression analysis between quality of life domains and ocular diseases, the general health and general vision sub-domain were significantly affected by glaucoma, while ocular pain, near activities, distance activities, social functioning, mental health, role difficulty and peripheral vision sub domains were significant positive predictors of glaucoma and ARMD. These findings show that the elderly will find it challenging performing their vision-dependent daily activities, with further deterioration of their overall functional status. Furthermore, this inability to independently perform daily tasks in a society where social welfare scheme is grossly non-existent will create more socio-economic burdens for family members and/or caregivers.

All these put together recommends that fully subsidised or free accessible cataract surgeries should be provided, in addition to establishing reachable and affordable all-inclusive health system for the elderly population, where qualitative healthcare services can be gotten regardless of their social status with the aim of improving their overall quality of life.

**Study Limitations**

(1) This is a hospital-based study which is not likely to give a true prevalence of the ocular diseases and quality of life as compared to a population-based study.

(2) Time constraints – a longer study period would have helped for the assessment of their quality of life after intervention.

(3) Factors such as economic status of participants and cost of eye care services were not assessed in this study. This could have influenced previous utilization of eye care services.

(4) Presence of other associated systemic diseases associated with old age could have had an effect on their quality of life.

**Conclusion**

This study has revealed the undesirable effect of ocular diseases on vision-related quality of life

---

### Table 4 (Continued)

<table>
<thead>
<tr>
<th>Quality of life domains</th>
<th>Mean (SD)</th>
<th>95% Confidence interval for mean</th>
<th>F test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower bound</td>
<td>Upper bound</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5: Comparison of quality of life domains against ocular diseases

<table>
<thead>
<tr>
<th></th>
<th>Glaucoma (Mean ± SD)</th>
<th>Refractive errors (Mean ± SD)</th>
<th>Cataract (Mean ± SD)</th>
<th>Cataract surgery (Mean ± SD)</th>
<th>ARMD (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General health</td>
<td>29.66±19.03‡</td>
<td>35.06±17.97</td>
<td>32.61±19.06‡</td>
<td>46.87±8.40‡</td>
<td>31.06±10.88</td>
</tr>
<tr>
<td>General vision</td>
<td>29.58±18.39‡</td>
<td>34.65±19.61‡</td>
<td>33.71±19.80‡</td>
<td>35.00±19.67‡</td>
<td>29.69±17.41</td>
</tr>
<tr>
<td>Ocular pain</td>
<td>28.99±24.87‡</td>
<td>36.17±26.57</td>
<td>33.25±26.57</td>
<td>46.87±23.54‡</td>
<td>18.18±20.98‡</td>
</tr>
<tr>
<td>Near activities</td>
<td>36.15±24.92‡</td>
<td>45.28±23.44‡</td>
<td>41.75±23.89</td>
<td>58.33±25.75‡</td>
<td>23.48±14.05‡</td>
</tr>
<tr>
<td>Distance activities</td>
<td>42.87±30.56‡</td>
<td>52.92±26.51‡</td>
<td>49.23±28.52</td>
<td>62.50±17.96‡</td>
<td>37.87±28.04‡</td>
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<tr>
<td>Vision specific activities</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Social functioning</td>
<td>40.92±28.25‡</td>
<td>49.87±24.86‡</td>
<td>46.19±26.27‡</td>
<td>62.50±17.96‡</td>
<td>± 32.37</td>
</tr>
<tr>
<td>Mental health</td>
<td>34.09±26.27‡</td>
<td>42.61±26.12‡</td>
<td>39.68±27.11</td>
<td>54.17±17.45‡</td>
<td>22.73±27.26‡</td>
</tr>
<tr>
<td>Role difficulty</td>
<td>36.57±27.59‡</td>
<td>45.69±27.40‡</td>
<td>42.56±28.37</td>
<td>56.25±24.59‡</td>
<td>18.93±20.76‡</td>
</tr>
<tr>
<td>Dependency</td>
<td>37.02±31.25‡</td>
<td>47.30±30.13‡</td>
<td>44.47±31.32</td>
<td>53.12±22.67‡</td>
<td>25.00±30.62‡</td>
</tr>
<tr>
<td>Colour vision</td>
<td>47.62±31.68‡</td>
<td>56.75±27.36‡</td>
<td>53.71±29.61</td>
<td>59.37±17.68‡</td>
<td>43.94±36.99</td>
</tr>
<tr>
<td>Peripheral vision</td>
<td>30.66±26.24‡</td>
<td>38.03±25.89‡</td>
<td>34.24±25.47‡</td>
<td>59.38±21.78‡</td>
<td>31.06±27.26</td>
</tr>
</tbody>
</table>

‡Significant at 0.05 level #Mean value was higher in absent cases
Table 6: Linear regression showing the relationship between quality of life domains and ocular diseases

<table>
<thead>
<tr>
<th>Standardized coefficients</th>
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<td>General health</td>
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</tr>
<tr>
<td>Glaucoma</td>
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<td>5.678</td>
<td>6.635</td>
<td>13.662</td>
</tr>
<tr>
<td>Cataract</td>
<td>−0.208</td>
<td>−1.557</td>
<td>−31.723</td>
<td>3.684</td>
</tr>
<tr>
<td>Cataract surgery</td>
<td>−0.378</td>
<td>−2.845</td>
<td>−45.567</td>
<td>−8.331</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>0.313</td>
<td>6.432</td>
<td>8.627</td>
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<tr>
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<tr>
<td>Glaucoma</td>
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<td>5.253</td>
<td>8.417</td>
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<td>ARMD</td>
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<td>7.879</td>
<td>25.460</td>
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<tr>
<td>Near activities</td>
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</tr>
<tr>
<td>Glaucoma</td>
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<td>7.505</td>
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<td>20.454</td>
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<td>−41.819</td>
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Majekodunmi, et al.: vision-related quality of life assessment of patients
across all its domains. Furthermore, worsening quality of life with probable additional systemic diseases reiterates the need to take care of the elderly population for optimal visual function and desirable quality of life.

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There are no conflicts of interest.

**REFERENCES**

Intraocular Lens Opacification Post Intracameral Air Injection

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Abstract

Several cases of intraocular lens (IOL) opacification have been reported in the past few years following intraocular injection of gas or air in corneal and vitreoretinal surgery. The opacity can be associated with severe reduction in patients’ quality of vision which might necessitate IOL exchange. We report a short case series, an observational study, of IOL opacification following three cases of intracameral air injection in endothelial keratoplasty (EK), a triple procedure (cataract surgery with EK) and Descemet’s membrane detachment (DMD) repair post cataract surgery.

Keywords: Cataract surgery, endothelial keratoplasty, intracameral air injection, intraocular lens opacification

INTRODUCTION

Endothelial keratoplasty is the current technique of choice for treating corneal endothelial diseases.[1,2] The attachment of a graft to the host cornea requires a well-formed anterior chamber morphology with appropriate pressure, which can be achieved by filling about 80% of anterior chamber volume with air.[3] There have been several cases in the last few years of intraocular lens (IOL) opacification of hydrophilic acrylic lenses after corneal or vitreoretinal surgery with intraocular injection of either gas or air.[4-7] The currently available hydrogel or hydrophilic acrylic IOls are manufactured from different acrylic copolymers with varying water contents. Hydration renders these IOLs flexible and they have an advantage of better tolerability within the eye with high uveal biocompatibility which incites less inflammatory cytologic responses.[8] However, they are the most frequently explanted IOls today and in 85% of the cases explanation is because of opacification of the lens optic.[9] In this case series, we describe three patients with IOL opacification following air injection limited to pupillary area.

Case 1

A 70-year-old man underwent an uneventful left cataract surgery with hydrophilic acrylic IOL implantation elsewhere two years prior to presentation. On examination, he had a best corrected visual acuity (BCVA) of 20/30 in the right eye and 20/200 in the left eye. Slit lamp biomicroscopy revealed stromal oedema with bullae in his left eye suggesting a pseudophakic bullous keratopathy (PBK). An uneventful Descemet’s stripping automated endothelial keratoplasty (DSAEK) was performed in his left eye during which about 8 mm donor disc was inserted into the anterior chamber with aid of sheet’s glide. The apposition between donor tissue and host stroma was achieved by filling the whole anterior chamber with sterile air bubble. Air bubble was released after 10 min leaving 90% of anterior chamber filled with air. Patient was advised to lie in supine position for 4 hours. The postoperative course was uneventful. During the follow up visit at 4 weeks, slit lamp examination showed a well-apposed lenticule and a semi?circular pattern of white opacification around 4–5 mm in size on the anterior surface of the IOL [Figure 1a and 1b]. The opacification was characterized by fine and white granular deposits. The BCVA was 20/60 which the patient maintained till the last follow-up visit. The patient was also counselled on the

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possibility and prognosis of an IOL exchange in case the hazy vision became bothersome.

Case 2
A 62-year-old female presented with decreased vision in her left eye 9 days after her cataract surgery with hydrophilic acrylic IOL implantation which was done elsewhere. On examination, her visual acuity was 20/200 in both eyes. Slit lamp evaluation showed endothelial guttae and an immature cataract in the right eye and Descemet’s membrane detachment (DMD) in her left eye. Anterior segment optical coherence tomography (ASOCT) of the left eye showed large DMD involving inferior half of cornea with stromal oedema. Air descemetopexy was done with 90% chamber air fill. At third-week postoperatively, visual acuity was 20/50 in the left eye with attached Descemet’s membrane and her IOL revealed a 3?mm circumscribed opacification on the anterior surface [Figure 2] resembling tiny bubbles. She maintained a BCVA of 20/50 in her left eye and was quite comfortable with her vision. The patient was informed about the haze on the IOL in the left eye which had remained the same after 2 years of follow up.

Case 3
55-year-old man who had a bilateral Fuch’s dystrophy and immature senile cataract with visual acuity of 20/400 in both eyes underwent a triple procedure of phacoemulsification with foldable hydrophilic acrylic IOL implantation and DSAEK in his right eye. He had an uneventful postoperative course. Intraocular lens opacification was documented at 4 weeks on slit lamp evaluation. Patient was on follow up for over two years and maintained a visual acuity of 20/60. He was informed that the cause of the suboptimal visual acuity was the IOL haze and was offered IOL exchange but he declined. The posterior segments were examined at all follow up visits in these cases and were all within normal limits.

DISCUSSION
Faulty manufacturing as well as packaging processes have been suggested to play a role in primary IOL opacification.[10-12] Causes of secondary opacification are multifactorial. They include all factors which bring about disruption of the blood-aqueous barrier like systemic inflammatory diseases such as diabetes mellitus and hypertension,[13] multiple surgeries, injection of exogenous air, gas or recombinant tissue plasminogen activator.[6] These causes are of great importance as the location of opacification has always been on the central portion of the IOL optic that was not secluded from the aqueous and vitreous fluid by the capsule. An intact anterior capsule that covers the rest of the IOL surface seems to be protective against opacification of the IOL.[14]

Schrittenlocher et al.[4] retrospectively analyzed 564 patients who underwent Descemet membrane endothelial keratoplasty (DMEK), IOL opacification was seen in 2.5% of these cases.
and they found a strong association between IOL opacification and the number of re-bubbling. Similarly Dhital et al.\cite{15} described three cases of IOL opacification of hydrophilic IOLs in complicated, traumatized eyes with a history of intraocular gas use. Morgan? Warren et al.\cite{16} in their study concluded that repeated exposure to intracameral air and elevated IOP are major etiological factors for the opacification after DSAEK. Ahad et al.\cite{17} observed a reduced rate of opacification after reducing the time of full chamber air tamponade from 1 hr to 10 min. The duration between surgery and the onset of IOL opacification in most reported cases ranged from 1 month to 6 years.\cite{13,15,18} Similarly in our cases IOL opacification was documented at or beyond third week. We believe that the causative factor for IOL opacification in our cases would be direct contact between the IOL and exogenous air for considerable amount of time. Postoperative inflammation with break down in blood aqueous barrier promotes release of proteins, cells and calcium which leads to metabolic changes in the microenvironment of the anterior chamber. The contact of the IOL surface with intracameral air in the presence of high calcium content in anterior chamber can enhance crystallization and hence cause IOL opacification.\cite{15,19} Also Khurana and Werner\cite{6} have suggested in their study that increased hydrolyzation of the polyacrylate on exposure of IOL surface to air forms free carboxylic acid groups that in turn triggers biominaleralization, thus covering the IOL optic with calcium phosphate crystals. Another study\cite{12} has proposed that the inflammatory reaction after vitrectomy or factors that breakdown the blood-aqueous barrier like diabetes or postoperative medication could be responsible for facilitating biominaleralization of IOL material. A study by Yildirim et al.\cite{14} on investigations of the IOL opacification concluded that Alizarin red and Von Kossa staining was positive for calcium further corroborating that the deposits are indeed calcium.

The effect of these lens deposits on vision range from mild (insignificant) to severe visual impairment due to scattering of light on the calcified lens surface. Neumann et al.\cite{20} reported explanation of 106 hydrophilic acrylic IOLs from patients who had visual disturbances caused by postoperative opacification of the lens optic. In all of our patients the IOL opacification was not observed to be progressing either anatomically (in size) or functionally (visual acuity) enough to warrant any drastic surgical steps. We did give the option of IOL exchange to our patients which they declined as they were comfortable with their vision. In these cases if significant decrease in visual acuity occurs, they warrant an IOL exchange as procedures like neodymium-doped yttrium-aluminium-garnet laser treatment or mechanical scraping are ineffective in removing the deposits from the IOL.\cite{14} In summary IOL opacification may result from a direct contact between the IOL surface and exogenous air. Clinicians should bear in mind this rare but significant complication. It is important not to jump into additional surgery of IOL exchange, rather patients who develop this condition should be followed up and any increase in the size of the opacification and/or drop in visual acuity documented. If such a situation arises, an IOL exchange becomes necessary.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms and the patients gave consent that their images and other clinical information be reported in the journal.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

Retinochoroidal Coloboma in a Female Nigerian

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Abstract

We report a case of retinochoroidal coloboma in a 32 year old Nigerian female who first presented to the eye outreach clinic with a history of poor vision in the left eye of two years duration. The best corrected visual acuity was 6/5 and light perception with accurate light projection in the right and left eyes respectively. She was subsequently referred to the retina clinic for Neodymium:yttrium-aluminium-garnet (Nd:YAG) laser capsulotomy on account of a left posterior capsular opacity after cataract surgery at the eye outreach clinic with a best corrected visual acuity of 6/5 and 6/36 respectively in the right and left eye. Dilated binocular indirect ophthalmoscopy of the left eye revealed a large, wedge-shaped, excavated retinochoroidal defect with hyperpigmented edges involving the nasal retina extending across approximately five clock hours from 7 to 10 o’clock. The apex of the coloboma was approximately three disc diameters away from the optic nerve head and extended peripherally up to the ora serrata. The right fundus was normal. Retinochoroidal colobomas may occur in the absence of the known blinding sequelae like retinal detachment, choroidal neovascular membrane amongst others. Our patient had a cataract in the same eye with the retinochoroidal coloboma with subsequent visual gain post-surgery and increasing myopia.

Keywords: Female Nigerian, increasing myopia, pseudophakia, retinochoroidal coloboma

INTRODUCTION

Retinochoroidal colobomas are ocular colobomata which occur due to a failure of closure of the fetal or choroidal fissure during embryogenesis.[1] They usually occur during the 5th to 7th week of life.[2] Incidence of ocular colobomas vary from 0.5 to 2.2 cases per 10000 live births. Retinochoroidal colobomas, though not as common as other ocular colobomata are said to have an incidence of about 0.14%.[3]

Retinochoroidal colobomas may coexist with colobomas of the iris, zonules, ciliary body, optic nerve and other ocular structures.[4] Ocular pathology like cataract and microphthalmia may be seen in association with retinochoroidal colobomas.[4,5] Visual impairment in retinochoroidal coloboma is usually dependent on the extent, location, depth of excavation of the lesion and involvement of the optic nerve and macula.[6,7]

To the best of our knowledge, this is the first case of retinochoroidal coloboma reported in Nigeria though cases of optic disc coloboma occurring in two Nigerian siblings have been earlier documented.[8] Three cases of uveal coloboma with two being retinochoroidal coloboma have been reported in Yaounde, Cameroon.[9] Retinochoroidal colobomas may be missed in the presence of cataracts hence, post-operative binocular indirect ophthalmoscopy is essential in diagnosis.

CASE REPORT

A 32 year old business woman, an old patient of our eye outreach clinic presented to the retina clinic with a complaint of poor vision in the left eye of two years duration. She had been seen previously at the eye outreach clinic seven years ago with a similar complaint. There was no antecedent history of trauma, recurrent redness, pain nor photophobia. From her old patient notes, visual acuity at presentation was light perception with accurate light projection; the right eye was essentially normal with a visual acuity of 6/5. An
assessment of a left presenile cataract had been made then for which she subsequently had an uneventful left cataract surgery with insertion of a posterior chamber intraocular lens. The best corrected visual acuity in the operated left eye was 6/9 with a myopic correction of −0.50DS six months post-operative. She was then lost to follow-up and represented to the eye outreach clinic five years post-operatively requesting for a new pair of spectacles. The refraction in the left eye was −3.50DS −1.75DC x 50 with a visual acuity of 6/6 and plano in the right eye; an increase in the myopic component of the subjective refraction was noted. She was referred from the eye outreach clinic to the retina clinic to have a dilated binocular indirect ophthalmoscopy for retina evaluation on account of the increasing myopia to rule out degenerative myopic changes but defaulted and was lost to follow-up.

At this current presentation two years after her last follow-up visit, she gave a history of deterioration of vision in the left eye. Ocular examination at this presentation revealed a visual acuity of 6/5 and 6/36 in the right and left eyes respectively. The left eye was pseudophakic with a dense posterior capsular opacity extending over the pupillary axis and inferior capsule. The right anterior segment was within normal limits. The intraocular pressures were 14 and 15 mmHg respectively in the right and left eye. Her best corrected visual acuity with refraction was 6/5 in the right eye with a correction of pl − 0.50DC x 75 and 6/24 in the left with −5.00DS.

Right dilated binocular indirect ophthalmoscopy revealed cup disc ratio of 0.3, pink disc with distinct margins, normal vessels and macula with flat retina and no retinal lesions as seen in Figure 1A; indirect ophthalmoscopy on the left revealed a pink disc with cup disc ratio of 0.3 with distinct margins, peripapillary degeneration, normal vessels and early pigmentary changes at the macula and a vitreous opacity. Nasally, there was a large wedge-shape hypopigmented defect with a surrounding brownish hyperpigmented border with scleral exposure at the base about three disc diameters from the optic disc extending from about 7 o’clock to 10.30 o’clock [Figure 1B and Figure 2]. White without pressure was also seen at the periphery of the left eye otherwise the retina was flat with no holes nor tears seen.

There was no history of systemic nor concurrent medical illnesses. General and systemic examination of the central nervous, cardiovascular, respiratory systems and the abdomen was essentially normal.

A diagnosis of a left nasal retinochoroidal coloboma in a pseudophakic eye with posterior capsular opacity and uniocular myopia with anisometropia was made. She subsequently had a left uneventful Neodymium:yttrium-aluminium-garnet (Nd:YAG) capsulotomy. A good gap was made centrally and she was commenced on guttae dexamethasone four times daily for a week.

On her follow-up visit post-capsulotomy, unaided visual acuity was 6/5 and 6/18 respectively in the right and left eyes. The left eye improved to 6/6-2 with correction of −5.00DS-0.50DC x 170. Binocular indirect ophthalmoscopy findings were essentially the same as at the last visit with no indication for barrage laser. She was scheduled for bi-yearly follow-up visits if there was no significant acute ocular complaint. Our patient was counselled on the need for regular, dilated ophthalmic examinations and the need for prompt presentation if symptoms like flashes of light, floaters, field defects or deterioration in vision occurs.

**DISCUSSION**

Retinochoroidal coloboma appear as a hypopigmented defect revealing an area of bare sclera with the overlying RPE, retina, or choroid absent. In some cases, the retina though present may be hypoplastic and gliotic. Colobomas typically occur more commonly in the inferonasal quadrant as seen in our index patient.
Retinal detachment and cataracts are the most common complication and aetiology of visual impairment in patients with choroidal colobomas.\[11\] Rhegmatogenous retinal detachments occur in about 4–40% of cases and is due to breaks within or adjacent to the coloboma.\[10,12\] Non-rhegmatogenous retinal detachments may also be associated with retinochoroidal colobomas especially those coexisting with colobomas of the optic disc particularly the autosomal dominant variant.\[13\] Retinal detachment or retinal breaks was not present in our patient.

Cataracts of various morphology may occur with ocular colobomas with nuclear sclerosis being the most common. Distinct linear opacity in the region of the coloboma have been described as coloboma cataract. Lens subluxation may also be present. Our patient had total opacification of the lens in the eye with the retinochoroidal coloboma.\[14\]

Choroidal neovascular membranes though rare, occur in patients with retinochoroidal colobomas. The choroidal neovascularisation occurs due to pre-existing anomalies at the margin where the retinal pigment epithelium is folded and thickened, retina is atrophic and the barrier function of Bruch’s membrane is disrupted hence it is postulated that this anomalous retinal tissue serves as an entry site for growth of abnormal blood vessels.\[12,15\] This neovascular membrane usually develops at the superotemporal edge and is similar to the variety seen in high myopia, angiod streaks, choroidal rupture and choroiditis.\[16\] Colobomatous eyes are frequently myopic and have vitreous syneresis, which increases vitreous traction.\[10,17\] Our index patient had myopia which was progressively increasing but with no breaks in bruch’s membrane and no significant vitreous syneresis.\[10\]

Our patient is closely followed up for prophylactic laser barrage if indicated. In a study carried out in a paediatric population in India, it was discovered that eyes in which prophylactic laser was not applied at the edge of the retinochoroidal colobomas were 8.755 times more likely to develop rhegmatogenous retinal detachment in comparison to eyes that received prophylactic laser at the edge of the retinochoroidal coloboma.\[18\]

Meckel syndrome is a syndromic association of retinochoroidal coloboma in which ocular disorders like secondary glaucoma with related angle abnormalities, amblyopia and anisometropia and sensory strabismus may be present.\[17\] Anisometropia was present in our patient. Systemic disorders which may be sporadic or inherited like the CHARGE syndrome may also present with ocular colobomas.\[5,14\] It has been documented in literature that bilateral large retinal colobomas are a feature of the CHARGE syndrome occurring in up to 70% of these patients.\[19\] The Ida-Mann classification groups retinochoroidal colobomas into seven types depending on location and closeness to the disc. In the type 1, the coloboma extends above the anatomic disc while type 2 colobomas extending up to the superior border of the disc. Colobomas extending below the lower border of disc are classified as type 3 and those involving only the disc are type 4 colobomas. Coloboma present below the disc with normal retina above and below the coloboma are classified as type 5. Pigmentation present in the periphery is classified as type 6 while colobomas involving only the periphery are the type 7.\[20\] The retinochoroidal coloboma in our index patient falls into the type 7 category located in the peripheral nasal retina in the left eye.

Possible differential diagnoses for the retinochoroidal coloboma include chorioretinal scar, staphyloma and congenital hypertrophy of the retinal pigment epithelium though retinochoroidal colobomas are usually lesions with characteristic features which can be clearly differentiated from these other retinal conditions.

**Conclusion**

Isolated retinochoroidal colobomas may be obscured by co-existing presenile unocular cataract as seen in this patient. Detailed retinal examination is a mainstay in diagnosing these cases. Prophylactic laser may be applied where indicated while prompt treatment with pars plana vitrectomy may be beneficial in treating retinal detachments occurring from these colobomas.

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**Conflicts of interest**

There are no conflicts of interest.
REFERENCES

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VISIONCARE LIMITED
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