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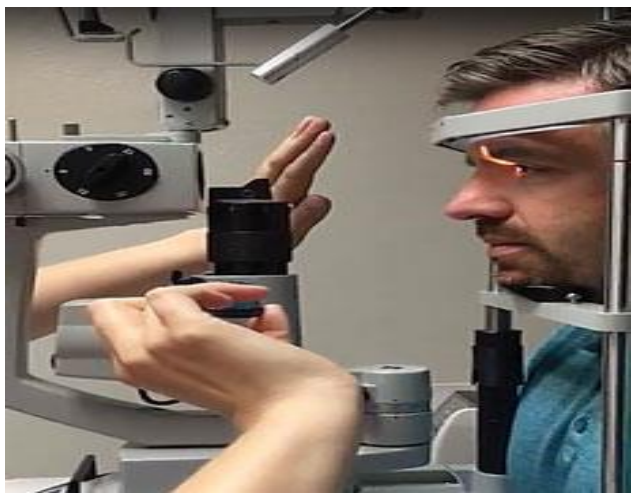
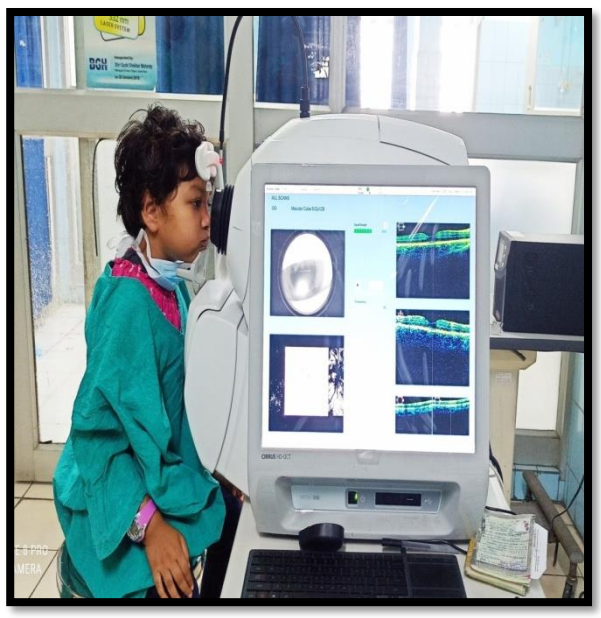


GONIOSCOPY IN CLINICAL PRACTICE

Unveiling amblyopia through OCT



FROM EDITOR'S DESK……

Dear seniors and colleagues,

Warm greeting from the Editorial office, JJO. We are happy to publish the 2023 issue of E. journal.

This year we come up with eleven articles. There are remarkable seven original articles and one case series, two case report and one review article which are highly informative.

Before we conclude thanks to the author for their hard work.

Thanking you

With regard

Dr M. Deepak Lakra

(Associate Professor, Rio, Rims)

Editor journal

CONTENT

ORIGNAL ARTICLE

CASE REPORT

CASE SERIES

REVIEW ARTICLE

Original Research Article *REVIEW*

A hospitalbased survey of Ocular Mucor mycosis at a tertiary care centre in Jharkhand

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Abstract

Aim: To study the risk factors and approach to management of ocular Mucor mycosis at a tertiary care hospital.

Methods: All patients who were clinically suspected and microbiologically positive for Mucor mycosis were included in the study. Through history taking, detailed ophthalmological examination, fundus examination, general examination. haematological and radiological test were performed. The Study was conducted under the aegis of declaration of Helsinki. The patients were treated with oral Posaconazole, intravenous liposomal amphotericin B and debridement of local necrotic tissue. Exenteration was done if indicated.A p value less than 0.05 was considered statistically significant.

Results:A total of 39 patients with ocular Mucor mycosis were identified. The mean age was 54.7 years. The major risk factors were COVID 19 positive patients (69.2%), uncontrolled diabetes (48.7%) and steroid overuse in 38.5% of patients. The most common presentations were diminution of vision (79.5%) and orbital cellulitis (53.8%). Intravenous liposomal amphotericin B was given to all patients for 3 weeks. Orbital Exenteration was required in (n=3) 7.69% of cases.

Conclusion: Early diagnosis and treatment by a multidisciplinary team of doctors is the key to management of orbital Mucor mycosis.

Keywords: COVID 19, Ocular Mucor mycosis, Orbital cellulitis, Exenteration

Introduction

Rhino-orbital-cerebral Mucor mycosis (ROCM) is a rare invasive fungal infection ofthe nasal and maxillary sinuses and the orbit. The causing agent belongs to the family of mucoromycetes fungi, includes more than 300 species and may be responsible for opportunistic infections, especiallyin immunosuppressed patients.[1] Particular attention to the ROCM was brought about following the first and second epidemic waves of COVID-19.[2,3] The rhino-orbito-cerebral is the most common form of Mucor mycosis.[4] The most common predisposing factors are uncontrolleddiabetes mellitus, immunosuppression, hemochromatosis, ketoacidosis, and damage to the physical barriers of the immune system.[5]

The increased incidence of orbital Mucor mycosis is associated with COVID-19 infection. The diagnosis of ROCM is based on clinical signs and microbiological confirmation.[6] In the case of para-orbital spread of Mucor mycosis, several specific signs such as orbital cellulitis not responding to conventional treatment, orbital apex syndrome, ptosis, ophthalmoplegia, blurring vision or vision loss development, bring the patient or physician to consult an ophthalmologist. The appearance of such symptoms often leads to an advanced stage of fungal invasion, with unfavourable functional visual loss, or even lethal outcomes such as brain infection via the orbit fissures.[7] The management of such patients is usually challenging, urging the need for systemic antifungal treatment combined with surgery.[8,9]Orbital Mucor mycosis is a rapidly progressive disease, even a slight delay in the diagnosis or appropriate management can have serious implications on patient prognosis and survival.

Aims and Objectives

To study the risk factors and approach to management of ocular Mucor mycosis at a tertiary care hospital.

Materials and Methods

A)Study Design and Patient Selection

This study is a retrospective institutional based study. It was carried out in Regional Institute of Ophthalmology (RIO), Rajendra Institute of Medical Sciences, Ranchi from September 2020 to August 2021. All patients who were clinically suspected and microbiologically positive for Mucor mycosis were included in the study. Through history taking, detailed ophthalmological examination, fundus examination, general examination. haematological and radiological test were performed. COVID 19 RT PCR and True Nat tests were done whenever required.A written consent was taken from the patient or guardian for this study. Study was conducted under the aegis of declaration of Helsinki.

The patients were treated topical and systemic antibiotics, analgesics, lubricants, oral Posaconazole, intravenous liposomal amphotericin B and debridement of local necrotic tissue. Exenteration was done if indicated. All patients were called for follow up till 4 weeks.

B) Data Collection

In patients with identified ocular Mucor mycosis, the following data were collected: demographics, the signs and symptoms of COVID-19 infection, laboratory findings at admission and during the course of therapy, the treatment administered, the duration of hospitalisation, the duration of steroid therapy, the presenting complaints with particular reference to COVID-19 associated infections and sequelae.

C) Statistical Analysis

Data was expressed in descriptive statistics.Results were expressed as frequency and percentage for categorical data.The chi-squared test was used, wherever appropriate. A p value less than 0.05 was considered statistically significant.

Observations and Results

A total of 39 patients with ocular Mucor mycosis were identified and reviewed. The mean age was 54.7 years. The major risk factors were COVID 19 positive patients (69.2%), uncontrolled diabetes (48.7%) and steroid overuse in 38.5% of patients. The most common presentations were diminution of vision (finger counting to hand movement) in 79.5% of patients, orbital cellulitis (53.8%), ophthalmoplegia (46.1%) followed by proptosisin 28.2% of patients. Intravenous liposomal amphotericin B was given to all patients for 3 weeks. Orbital Exenteration was required in (n=3) 7.69% of cases. Orbital swelling subsided in majority of the patients after treatment but visual acuity did not improve. The presence of cerebral extension indicated bad prognosis. Mortality was observed in three patients.

Epidemiology		No. of cases	Percentage
Age (Years)	20-30	02	5.13
	31-40	05	12.82
	41-50	07	17.95
	51-60	12	30.77
	61-70	10	25.64
	71-80	03	7.69
Gender	Male	28	71.79
	Female	11	28.21
Laterality	Rt Eye	23	58.97
	Lf Eye	14	35.90
	Bilateral	02	5.13

Table 1: Epidemiology of Ocular Mucor mycosis.

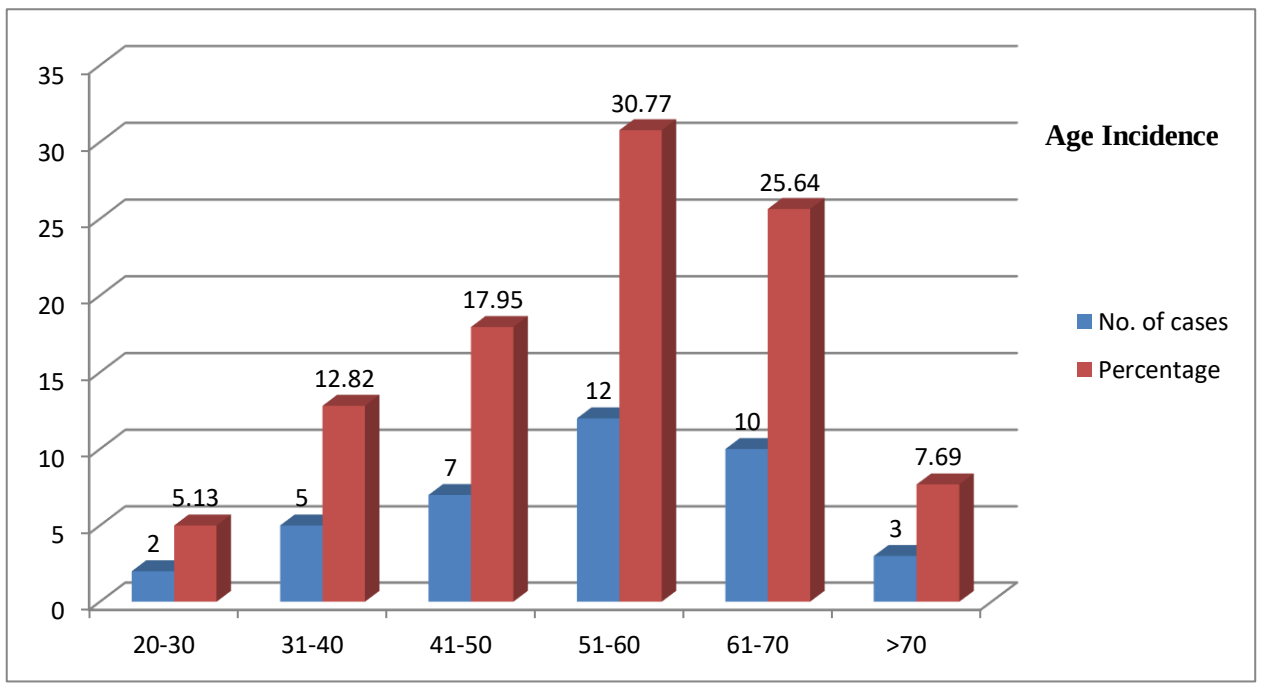

Chart 1: Age Incidence

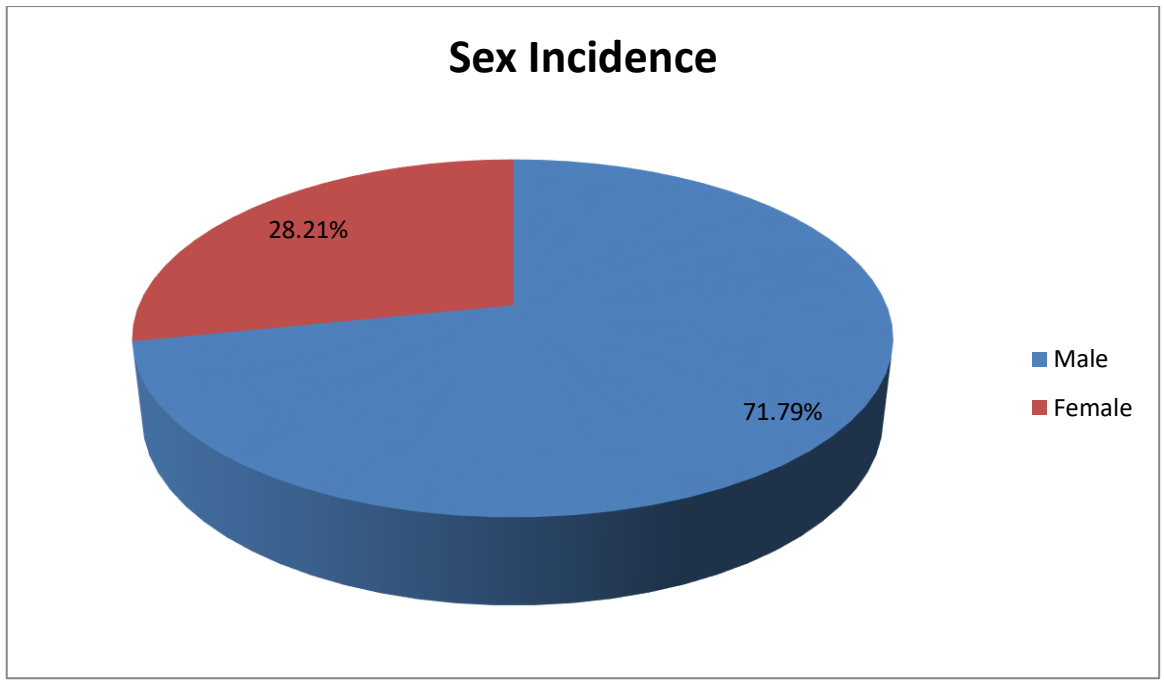

Chart 2: Sex Incidence

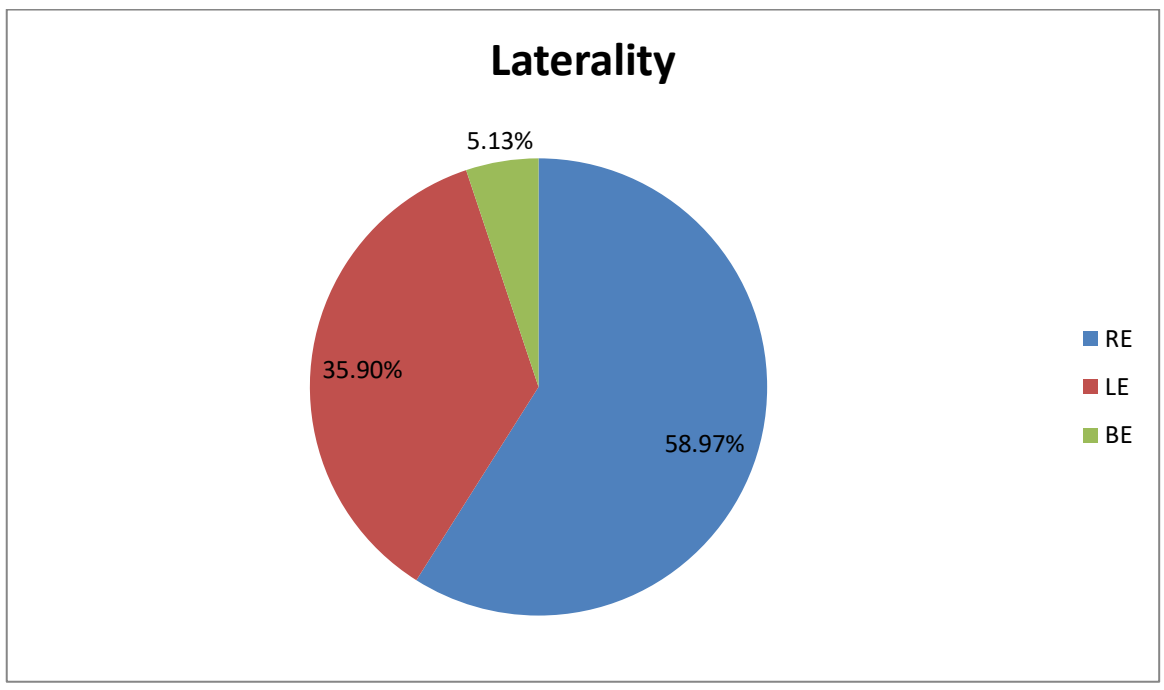

Chart 3: Laterality

Risk Factors	No. of cases	Percentage
Covid 19	27	69.23
Diabetes	19	48.72
IV Steroids	15	38.46
Hypertension	14	35.90
Kidney disease	03	7.69

Table 2: Risk factors associated with Ocular Mucor mycosis

Clinical presentation	No. of cases	Percentage
Diminution of vision	31	79.49
Orbital cellulitis	21	53.85
Ophthalmoplegia	18	46.15
Proptosis	11	28.21
Keratitis	02	5.13
Chemosis	09	23.08

Table 3: Clinical presentation of Ocular Mucor mycosis

Treatment modalities	No. of cases	Percentage

IV Li Amphotericin B	39	100
Sinus debridement	39	100
Orbital Exenteration	03	7.69

Table 4: Treatment modalities of Ocular Mucor mycosis

Discussion

Orbital Mucor mycosis is an aggressive fungal opportunistic infection of the immune-compromised, debilitated patients. Classically, the clinical presentation has been described as an orbital cellulitis with proptosis, visual loss and apical neuropathies.[10] Microbiological diagnosis, control of the underlying systemic conditions and antimicrobialtherapy with debridement of necrotic tissue have remainedthe mainstay of management of orbital Mucor mycosisover the years. Exenteration may not be necessaryif well managed.[10]In our study, the demographic profile of the patients was similar to those reported in the world literature.The mean age of presentation was 54.7 years with a skew deviation toward the male gender (71.8%) then females (28.2%). The most common systemic risk factor were COVID-19 positivity (69.2%) uncontrolled diabetes (48.7%) and concurrent steroid use (38.5%).

Song et al. [11] reported fungal coinfections associated with the global COVID-19 pandemic based on a retrospective analysis. They also suggested the possibility of neglected fungal coinfections in COVID-19 patients by suggestive ideas from SARS (severe acute respiratory syndrome) and influenza worldwide data.Sen et al. [12] reported six cases of rhino-orbital Mucor mycosis with a mean age of 60.5 years. The major risk factors were uncontrolled type 2 diabetes with systemic corticosteroids for COVID-19 in all patients. The patients presented with pain, redness and periocular swelling. This was followed by acute progressive ptosis, ophthalmoplegia and visual loss. These findings were similar to our study.Mehta and Pandey,[13]Mekonnenet al. [14]and Werthman-Ehrenreich[15] each presented with a case of concurrent COVID-19 infection associated with invasive rhino-orbital Mucor mycosis.

Patel et al. [16] reported a prospective multicentre study, conductedat 12 tertiary-care centres across India. In the study, they reported rhino-orbital Mucor mycosis as the most common presentation (315/465, 67.7%) of Mucor mycosis. Diabetes mellitus was the most common predisposing factor (73.5%). Amphotericin B was the primary therapy (81.9%) and Posaconazole was used as a combination therapy in 11.4% individuals.

Brunet and Rammaert[17] have recommended liposomal amphotericin B as the first-line therapy for the treatment of Mucor mycosis along with surgery whenever possible.

Nithyanandam et al.[18] in their study on the clinical features and treatment outcomes of rhino-orbital cerebral Mucor mycosishave reported that debridement of sinuses is necessary in all cases of rhino-orbital cerebralmucormycosis. Diagnosis in the early stage needs a high index of suspicion.

Other studies of pre-COVID-19 era have reported an increasing prevalence of Mucor mycosis in India due to increase in the cases of diabetes mellitus.[19]

Conclusion

- Early diagnosis and treatment by a multidisciplinary team of doctors is the key to management of orbital Mucor mycosis.
- Early intervention saves both the sight and life of the patient.

Financial support and sponsorship

Nil.

Conflicts of interest

None.

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Original Article **REVIEW**

Unveiling amblyopia through OCT

Dr Aiswariya Mohanty, Dr Sofia Ahmad, Dr Neda Ahmadi, Dr Priti Sinha

Purpose: To study the change in central macular thickness in unilateral amblyopia

Materials and Methods: An observational case control study was carried out by the Department of Ophthalmology in Bokaro General Hospital, Jharkhand which included all patients in the age group 3-20 years attending the Eye OPD. The sampling period was one and a half year(September 2020 – February 2022).Patients that had history of previous ocular surgery, bilateral amblyopia and deprivational amblyopia were excluded from the study.A comprehensive examination including cycloplegic refraction and fundoscopy was done. Central macular thickness (CMT) was measured by SD-OCT.

Results: Out of 64,there were 35 males and 29 females with mean age 11.84 ± 4.35years. In anisometropic amblyopia, the CMT was thicker in amblyopic eyes. There was no change in macular thickness in strabismic group. In mixed group amblyopic eyes had thinner macular thickness as compared to fellow eyes.There was a positive significant linear relationship between the age and the macular thickness in the amblyopic eyes.

Conclusion: Amblyopia is a serious medical condition affecting tens of millions of individuals around the world. The OCT has evolved rapidly in the past few years which allows more rapid scanning and higher resolution and permits a more detailed analysis of the optic nerve and retina. Therefore, OCT is recommended in moderate to severe amblyopia where subtle macular abnormalities are suspected.

Key Words Amblyopia, Central macular thickness,OCT

Amblyopia, with a prevalence of 1 to 5% of the global population [1], has become the leading cause of unilateral vision loss in children and young adults [2]. 35-40% of Indian population is currently constituted by children. Because a third of the Indian population may potentially lose their sight before the age of 20 years, the importance of early detection and treatment of visual impairment is apparent. Recently, subtle pathological variations in the macular area which goes unnoticed in routine examination have been suggested as the cause of reduced vision in amblyopic cases who are not responsive to treatment. The recent development of OCT has given researchers new insight into how these alterations occur.

Materials and Methods

An observational case control study was carried out by the Department of Ophthalmology in Bokaro General Hospital, Jharkhand. The study enrolled all patients in the age group 3-20 years attending the Eye OPD from September 2020 – February 2022. Patients who had history of previous ocular surgery, bilateral amblyopia and deprivational amblyopia were excluded from the study.

A total of 64 unilateral amblyopic patients were taken up after satisfying the inclusion criteria. The amblyopic eyes and their fellow eyes were considered as our cases and internal controls, respectively. Written informed consent was taken from every patient's parent/guardian. They were counseled regarding the nature of the study. A standardized questionnaire was used and details pertaining to medical and family history were collected. It was followed by comprehensive ocular evaluation which included external examination, uncorrected visual acuity (UCVA), cycloplegic refraction, slit lamp examination and detailed fundus evaluation by indirect ophthalmoscope and retina camera was done after instilling 2% Homatropine eye drop. Central macular thickness (CMT) was measured by Spectral Domain Optical Coherence Tomography (SD-OCT).

All the data was selected randomly and was entered in to the Microsoft excel and tabulated, then the data was analyzed with appropriate statistical tools “SPSS version 24”. Data was presented as mean with standard deviation or proportions as appropriate.Qualitativeor categorical variables were presented as frequency or percentageand analyzed by Chi – square Test and |Z| - Proportion Test. *P* value < 0.05 was taken as significant.

Results

This study was conducted on children between the age group of 3-20 years and the mean age was 11.84 ± 4.35years. It included 64children with 35 males and 29 females i.e. 54.69% and 45.31% respectively.

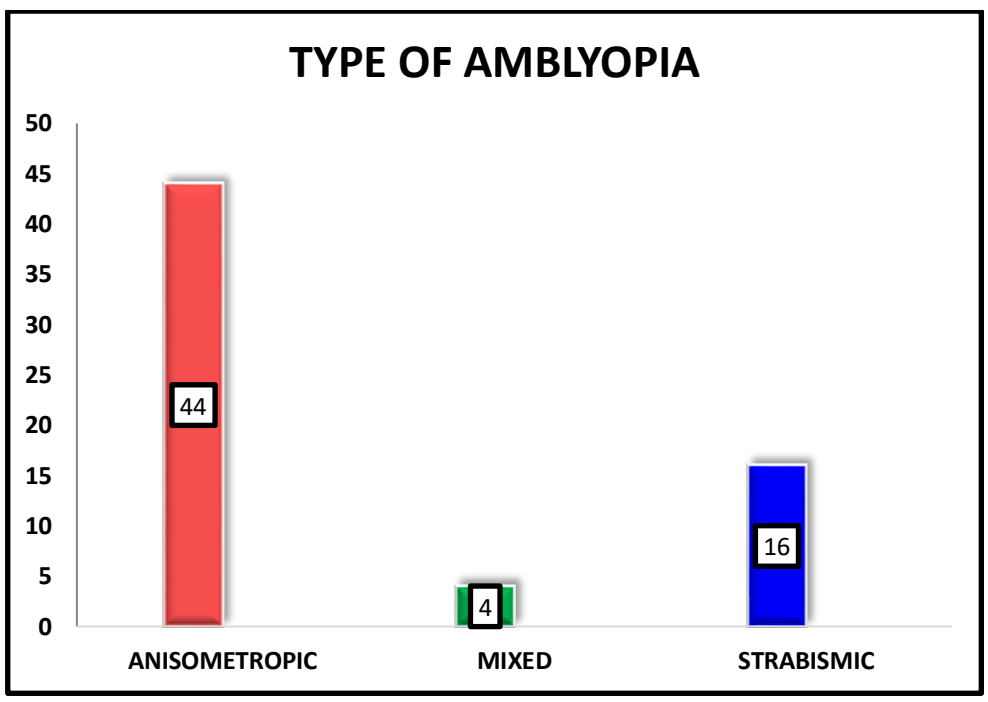

Fig no: 01 Shows type of Amblyopia distribution among the population

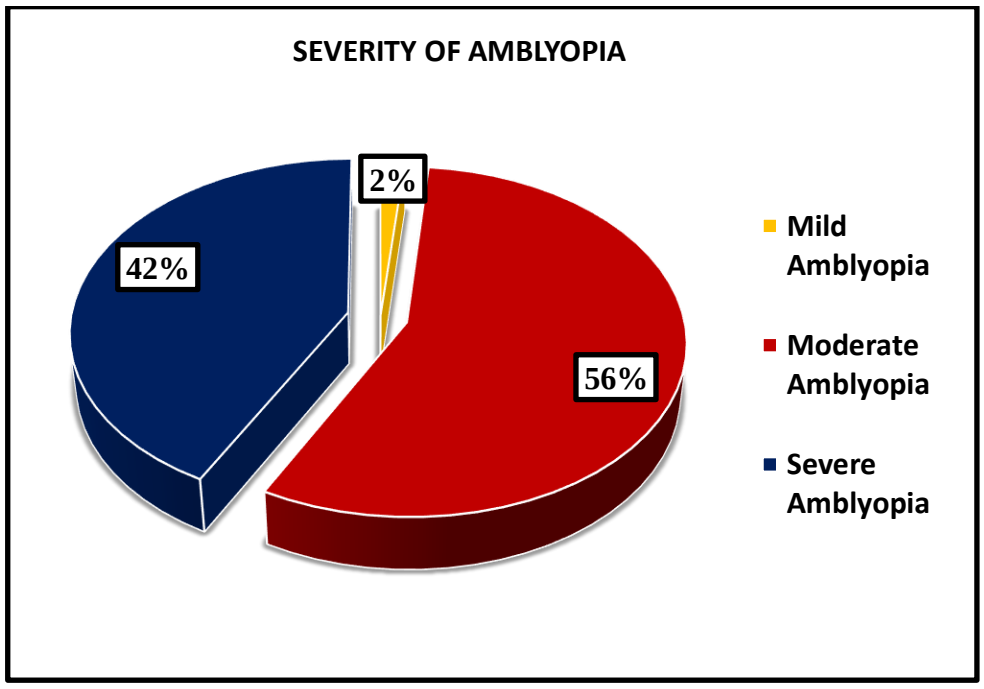

Fig no: 02 Shows Severity of Amblyopia paired of eyes among the population

Type of Amblyopia	CMT (micron) in Amblyopic eye	CMT (micron) in Non amblyopic eye	P value
Anisometropic Amblyopia	243.86 ±16.87	212.20 ± 21.22	<0.0001Significant
Strabismic Amblyopia	240.31 ± 16.48	239.94± 16.44	0.9497Not significant
Mixed Amblyopia	212.00 ± 20.12	245 ± 15.25	0.0399Significant

Table no. 01: Comparison of CMT with Type of amblyopia

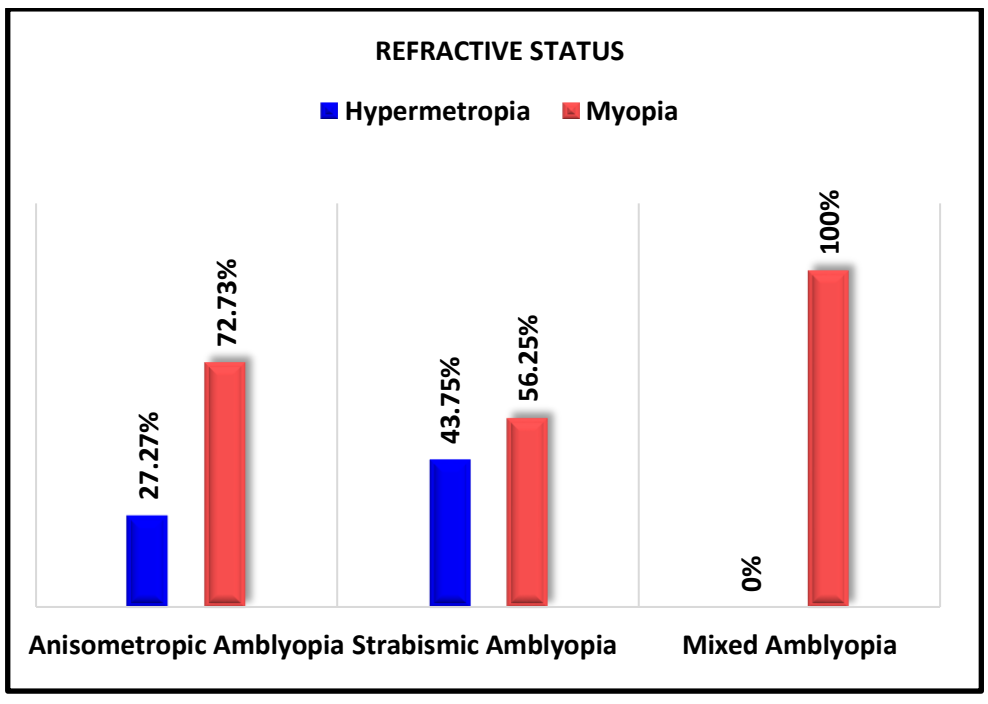

Fig no: 03 Shows comparison of refractive status with type of amblyopia

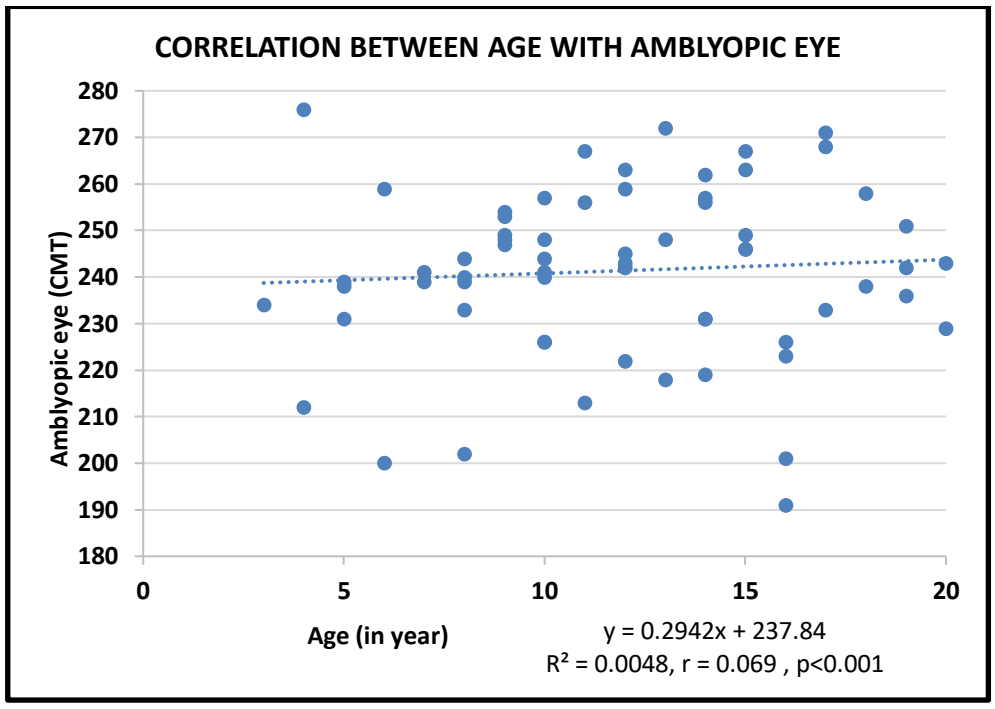

Fig no: 04 Scattered diagram shows the correlation between mean CMT of Amblyopic eyes with mean age of the patients.

The line of regression, Y= 0.2942X + 237.84, r^2 = 0.0048, r = 0.069

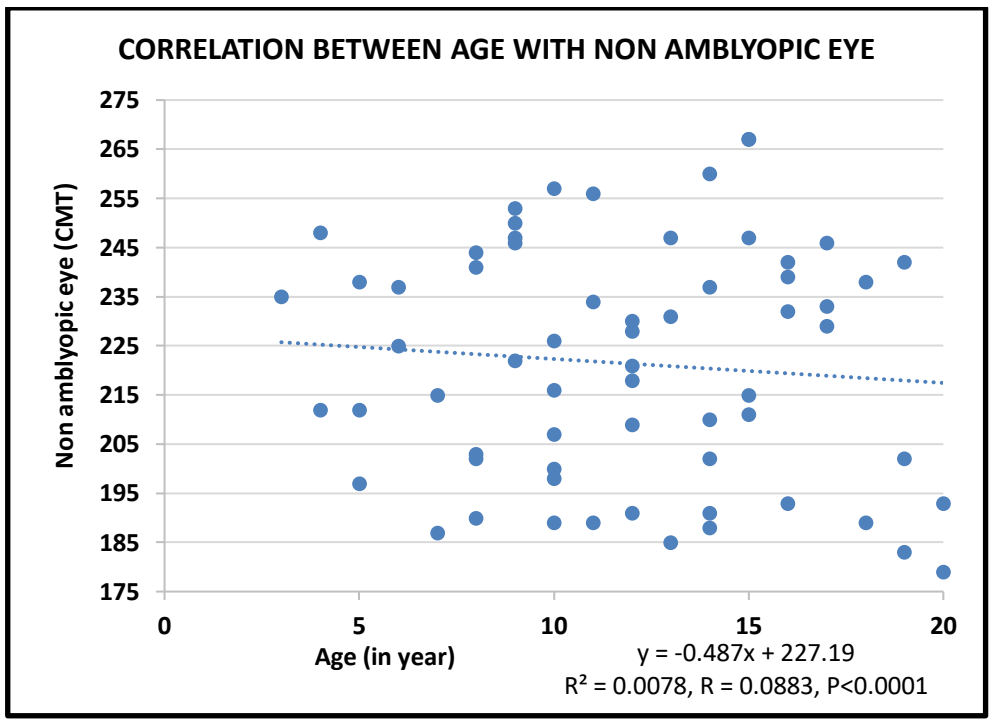

Fig no: 05 Scattered diagram shows the correlation between mean CMT of Non Amblyopic eyes with mean age of the patients.

The line of regression, Y= -0.487x + 2227.19, r^2 = 0.0078, r = 0.0883

Fig no: 06Evaluation of a patient via OCT

Discussion

Amblyopia is the most prevalent cause of preventable monocular blindness. Although classically amblyopia is defined as loss of vision associated with no organic defect, in fact there is always an abnormality, be it anisometropia, or strabismus, or isometropia, media opacity, which predisposes the eye or eyes to amblyopia. According to Hess et al [3], one third cases are caused by anisometropia, one third by strabismus and one third from a combination of the two. Amblyopia poses an important socioeconomic problem as the risk of the amblyopic patient becoming blind is significantly higher than the general population [4]. Amblyopia till date remains a diagnosis of exclusion.

Amblyopia is known as a disease occurring during the period when the neuronal network between the retina and the cerebral cortex is developing and maturing. Amblyopia develops during the first 2–3 years of the postnatal period frequently; however, it may develop up to the age of 8–9 years. It is a potentially curable disease if treated early. Its impact extends to different neural levels of the visual pathway; however, the certainty of its influence is still under inquiry.It is well established that alterations in the LGB neurons and the visual cortex might be the primary sites of the amblyopic impact.
The treatment modalities of amblyopia include restoration of a clear visual axis, appropriate spectacle correction, occlusion, atropine penalization, pleoptics, CAM vision stimulator and medical treatment with levodopa, carbidopa, citicholine drugs. The most commonly-practiced treatment modality is correction of the refractive error; patching or atropine penalization may be initiated later.

About 50% of amblyopic children can't achieve complete vision of 20/20 despite appropriate treatment [5]. Recently, subtle pathological variations in the macular area which goes unnoticed in routine examination have been suggested as the cause of reduced vision in amblyopic cases who are not responsive to treatment [6]. Whether these alterations in retinal structure are the cause or result of amblyopia is yet to be determined [7, 8].

In the modern era, Optical coherence tomography (OCT) can be termed as agreatboonforophthalmology,ininvestigatingretinallayerswithanin-vivoresolutionofabout3microns. OCT makes it possible to obtain non-invasive, rapid, objective, high-resolution, cross-sectional imaging of the retina and also permits direct, real-time imaging of ocular

pathology that previously could not be visualized by using traditional methods. Its application has been demonstrated in young children.With the recent advancement of OCT, it has opened a new horizon in understanding the etiopathology and morphologic anomalies in the retina of the amblyopic eye.In this study, an attempt was made to compare central macular thickness in amblyopic eyes and normal fellow eyes in unilateral amblyopic children and evaluate the utility of OCT as early diagnostic tool in amblyopia. This information may be useful in managing and pronouncing treatment outcomes.

The mean age among the study population was 11.84 ± 4.35 year. The present study found age incidence to be comparable with study done by S Agrawal et al [9]. He conducted a cross sectional analysis on 51 amblyopic patients and found that mean age of the patients was 11.63 ± 2.84 years. It was found that mean age was less in study by Rajavi Z et al [7] as compared to present study. However, our study did not show any statistically significant difference in sex distribution among the study population.

All the patients in our study were categorized on basis of severity as mild, moderate, and severe amblyopic according to PEDIG 2003. Out of 64 patients, 1 (1.56%) had Mild Amblyopia, 36 (56.25%) had Moderate Amblyopia and 27 (42.19%) had Severe Amblyopia. These patients were again classified into three main groups: anisometropic amblyopia (44 patients), strabismic amblyopia (16 patients) and mixed amblyopia (4 patients). They accounted for 68.25%, 25% and 6.25% respectively. The anisometropic group was subdivided into myopic anisometropia (32 patients) and hypermetropia anisometropic (12 patients). There were 9 myopic patients and 7 hypermetropic patients in strabismic amblyopia. All of them were myopic in mixed amblyopic group (4 patients).

The Pediatric Eye Disease Investigator Group studies concluded there was equal distribution of anisometropia and strabismus among patients <7 years [10]. Strabismus was the most common cause of amblyopia (37%) in a hospital-based study in India [11].In another study conducted on adult amblyopes in Germany, the author found that anisometropia was the predominant cause (49%), followed by strabismus (23%) and deprivation (17%)[12]. In a school-based study among Saudi Arabian children, anisometropia was also the major cause of amblyopia (77%)[13]. This most likely reflects the failure of referral of anisometropic amblyopes and unreliable preschool screening [14]. Anisometropia has become the more prominent amblyogenic factor with growing age; half of the adult amblyopes were anisometropic in one report. We similarly found Anisometropia accounted for a large proportion of amblyopes in our study. The differences in study population (hospital- vs. community-based and ethnicity) could be the prime cause of discrepancies in etiology across studies [15-16].

Firstly, there were 44 anisometropic amblyopic patients (243.86 ±16.87 micron) who had thicker macular as compared to normal fellow eyes (212.20 ± 21.22 micron). Secondly, 16 strabismic amblyopes had no change in macular thickness. The amblyopic eye and non-amblyopic eye had thickness 240.31 ± 16.48 micron and 239.94 ± 16.44 micron respectively. Thirdly 4 of our study patients were mixed type and had thinner CMT as compared to fellow eyes. The macular thickness was 212 ± 20.12 micron and 245 ± 15.25 micron respectively in the two groups.

Wu SQ et al (2013)[17]conducted a study on children with hyperopic anisometropic amblyopia using OCT and concluded that the mean macular thickness was significantly thicker in the amblyopic eyes than the contralateral sound eyes (181.4 ± 14.2µm vs 175.2 ± 13.3µm, P < 0.01). Likewise, Rajavi Z et al (2018) [7]compared the macular retinal thickness on 28 unilateral amblyopic children (28 amblyopic eyes as cases and 28 normal fellow eyes as internal controls) and 28 children who had normal visual acuity in both eyes and were considered as external controls (n = 56 eyes). The results of the study showed that the macular retinal thickness was significantly higher i.e. 10 microns thicker in moderate to severe amblyopic eyes compared to their fellow eyes and external controls.In line to the present study, Andalib et al [18] studied 25 monocular strabismic and 25 anisometropic amblyopic eyes and found a thicker macula in anisometropic amblyopic eyes, but the increase of macular thickness in strabismic amblyopic eyes was not significant (p=0.07).

By contrast, Alotaibi AG et al (2011)[19]conducted an optical tomography analysis on unilateral amblyopic patients. The mean macular retinal thickness was 259.3 µm and 255.6 µm. The author concluded there was no statistically significant difference in macular retinal thickness (P = 0.195). Kyung-Ah Park et al (2010) [20] wanted to compare the thickness of each retinal layer of amblyopic and fellow eyes in patients with unilateral amblyopia. They concluded that there was significant thinning of the ganglion cell layer plus inner plexiform layer at all four nasal and temporal macular locations and at the outer superior and inferior locations in amblyopic eyes.

Currently, the main interesting finding is the relationship of age to the CMT changes. There was a positive significant linear relationship between the age and the macular thickness in the amblyopic eyes. It suggested that the greater the age, the higher the thickness of the macula and thus the increase in the amblyopia impacts. This means that the age could be considered as an independent factor of the disease worsening and a predictor of treatment prognosis that can help in the clinical implementation of amblyopia treatment modalities. Likewise in his study, Kasem MA et al [21] concluded age was significantly correlated to CMT in amblyopic eyes. However, in the normal eyes, there was no such positive correlation between the age and the CMT as in amblyopic eyes. We demonstrated a statistically significant inverse correlation.There were contradictory results concerning age's relation to CMT changes in normal eyes; some reports were in agreement with the current findings showing a decrease in the CMT with the age [22], while others observed either a significant positive correlation indicating an increase in CMT with the age [23] or showing no significant correlation with age [24].

Several limitations were identified in the study. The study was conducted with a limited group of people; therefore, any conclusions drawn from this study cannot be generalized to the entire population. The study did not include a control group of normal children to compare OCT parameters with unilateral amblyopic children. The retinal thickness of the sound eyes may not accurately reflect normal retinal thickness. The amblyopia treatment history in our subjects varied from no previous treatment to noncompliance with past treatment. Thus, the effect of amblyopia treatment on macular thickness could not be evaluated in our study.

Conclusion

Our study aimed to find the CMT in amblyopic eyes in comparison to that of normal fellow eyes and concluded that the eyes with unilateral amblyopia were prone to have a higher CMT. Anisometropia was more prevalent among the study population. It also tried to determine the correlation between age and macular thickness. The linear relationship between the age and the macular thickness in the amblyopic eyes was positively skewed. The age appeared to bean independent factor of CMT variations in amblyopic eyes and has to be taken into consideration during the treatment course of the amblyopia.

Amblyopia is a serious medical condition affecting tens of millions of individuals around the world. For the most part it is correctable, assuming that it is promptly recognized and vigorously treated. There should be strict implementation of vision screening guidelines and shedding light on the importance of regular eye exams.More efficient efforts are urgently needed from health professionals, educational centres, the media and social organizations to promote awareness of amblyopia by organizing school screening programs and educational workshops for parents.Pediatricians should screen newborns for congenital cataract and other amblyogenic factors so that they are treated promptly in order to minimize the development of amblyopia. It is pivotal for ophthalmologists to screen for amblyopia and filter out patients at a young age and ensure prompt treatment to regain and retain binocular single vision. The OCT has evolved rapidly in the past few years, from time domain OCT to Swept source-OCT which allows more rapid scanning and higher resolution and permits a more detailed analysis of the optic nerve and retina. It can be successfully applied to young children, even those who are neurologically disable or less co-operative. Therefore, OCT is recommended in moderate to severe amblyopia where subtle macular abnormalities are suspected. More detailed and larger studies are required with bigger sample size for better understanding of amblyopia and its relation with ocular anatomy.

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Conflict of interest

There are no conflicts of interest.

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ORIGINAL ARTICLE **REVIEW**

Outcome of therapeutic penetrating keratoplasty in a tertiary care hospital of Jharkhand

DR ARCHANA KUMARI, DR SUNIL KUMAR

Purpose: To evaluate the outcome of TPK in patients of infective corneal ulcer.

Methods: All patients who underwent TPK from July 2017 to June 2022 were reviewed from records. Demographic data, microbiology of ulcers, surgical indications of TPK, donor graft details, pre and post-operative visual acuity, graft clarity and complications were analyzed.

Results: 42 eyes of 42 patients (23M/19F) were included. The mean age was 47.3±11.8 years. The mean follow-up was 2.1±1.3 years. 76% of infective corneal ulcer was perforated. 31(73.8%) were positive of organism of which 18(58.1%) showed fungal and 13(41.9%) had bacterial infection. The most common fungus and bacteria isolated were Aspergillus and Streptococcus. Anatomical success rate was obtained 35 patients(83.3%) and graft clarity was 33.4%. Overall 41.7% cases had developed glaucoma. Post-op visual acuity was improved in 21.4% of cases.

Conclusion: In infective corneal ulcer, TPK can be an important procedure to salvage eye and preserve vision but the incidence of post-op complications are more. BacterialCorneal ulcer has better outcome.

INTRODUCTION

Corneal Blindness accounts for 10% of all cases of blindness in the world. Infective keratitis is a sight threatening condition and the leading cause of corneal blindness in both childhood and adulthood.[1] As the disease is more in rural setup where people are ignorant often present with impending perforation or perforated corneal ulcers. Such cases often require an emergency surgical intervention such as therapeutic penetrating keratoplasty.

Corneal ulcer is defined as breach in normal epithelial surface of cornea associated with stromal necrosis and cellular infiltration. It occurs due to the host cellular and immunologic responses to the offending agent which may be bacterial, viral, fungal or protozoal organism.

History of ocular trauma, ocular surgery, long term use of contact lens and previous ocular infections promote microbial invasion of the cornea. A thorough slit lamp examination is useful to evaluate the clinical signs that may be helpful to confirm the probable diagnosis.[2] Corneal scraping of the ulcer is done from base and margin of corneal ulcer and inoculated on multiple culture media.[3] Stains used to routinely identify organisms include Gram stain, Giemsa stain and 10%KOHpreparation.

Corneal ulcers involving the superficial lamellae generally heal by varying degrees of scarring depending on the severity of inflammation. However, if the infection is severe, there may be corneal thinning, formation of a descemetocele, ectatic cicatrix, perforation, fistula, and secondary glaucoma.

The goals for treating microbial keratitis are to treat the corneal infection and associated inflammation, and to restore corneal integrity and visual function. The corneal ulcer is treated according to its etiology. Anti-microbial therapies are the mainstay of treatment. Other adjuvant therapy includes cycloplegics agents such as atropine 1% or homatropine 2% and anti-glaucoma medications.

The cases of microbial keratitis which do not respond to medical therapy or develop complications like corneal thinning and perforation require surgical interventions like cyanoacrylate glue, bandage contact lens, conjunctival flap, tarsorrhaphy and therapeutic keratoplasty. [4]

Keratoplasty is the procedure in which diseased host cornea is excised and replaced with healthy donor cornea. Various types of keratoplasty are optical, tectonic, therapeutic and cosmetic depending on its purpose. The indications of therapeutic keratoplasty are non- healing microbial keratitis, severe corneal thinning,

formation of descemetocele or frank corneal perforation.[5,6] The complications seen after therapeutic keratoplasty include severe uveal inflammation, post-operative hyphema, recurrence of infection, acute graft rejection, primary graft failure and secondary glaucoma.[7-9]

Careful selection of donor cornea, pre-operative and post-operative management are important for graft acceptance. Therapeutic keratoplasty can help in saving many eyes structurally and functionally, which otherwise may be lost. [10,11]

In this study we retrospectively analyzed the indications and outcome of TPK in terms of anatomical integrity of the globe, therapeutic success, visual acuity, complications in a tertiary care hospital of Jharkhand.

MATERIALS AND METHODS

This was a Retrospective study done in Regional Institute of Ophthalmology, Rajendra Institute of Medical Sciences, Ranchi in which we retrospectively reviewed data of TPK done from July 2017 to June 2022. This study was conducted in accordance with the tenets of the declaration of Helsinki.

All patients with perforated corneal ulcer, non-healing infectious corneal ulcer were included in the study. All patients who underwent TPK and were operated by a single surgeon were included in study. Patients who had corneal ulcer with associated endophthalmitis, panophthalmitis and have no light perception vision were excluded from the study.

- Patients with corneal ulcer who were refractory to the medical treatment or patient with perforated ulcers had taken as the candidate for therapeutic penetrating keratoplasty. Written informed consent was taken from all the patients after explaining the procedure.
- Patient demographic details, history of symptoms, any other systemic illness, personal history such as contact lens use, drug history, past history and family history had been taken.
- Detailed history of present illness including duration of ulcer, any ocular trauma, time duration between onset and presentation to hospital, prior treatment had been taken from all the patients.
- Preoperative evaluation:

  Visual acuity was recorded by using Snellen visual acuity chart.

  External eye and adnexal examination were done to rule out trichiasis, blepharitis, and dacryocystitis.

Detailed slit lamp examination of corneal ulcer was done including site, size, shape and depth of the ulcer, size and site of perforation, degree and extent of vascularization of the cornea, any ring shaped infiltrate, dendrites , hypopyon or scleral involvement.Scraping of corneal ulcer was done except in those who had corneal perforation and send for microbiological examination.

Fundus examination was done with indirect ophthalmoscopy only in possible patients.

IOP was recorded.

- Preoperative management:

Patient had started antimicrobial therapy according to the etiology of ulcer. Antibiotic treatment including topical Moxifloxacin (0.05%), and systemic antibiotic combination of amoxicillin and clavulinic acid were given bacterial corneal ulcer. Topical Natamycin (5%) was given to the patients of fungal corneal ulcers. I/V Mannitol (350ml) was administered 1hour before the surgery.

- Steps of surgery:

Therapeutic penetrating keratoplasty was done under peribulbar anaesthesia.

Donor button was oversized by 0.5mm and trephined from endothelial side-up by a hand held trephine.

Trephination of recipient cornea was performed with a manual trephine. The corneal button had excised with corneal scissors and sent to microbiology.

Thorough washing of anterior chamber with removal of infective exudates had been achieved by irrigation and dissection with forceps.

The iridocorneal angle had reformed with viscoelastic agent to release the peripheral anterior synechiae.

The donor graft was sutured to the host with interrupted 10-0 nylon microfilament sutures, 16 to 24 sutures had applied depending on the size of graft.

- Postoperative management:

Systemic antibiotics- IV Ceftriaxone 1gm BD. Topical antibiotics- 0.5% Moxifloxacin for 6 hourly.

In fungal keratitis- 5% Natamycin 4 hourly.

Herpetic keratitis- Oral Acyclovir 400mg 5 times/day.

Antiglaucoma medication- timolol maleate 0.5% BD for 1 month. Cycloplegics- 1%Atropine/2%Homatropine BD were given.

Lubricants- 1dp ×4times daily.

- Follow up: Postoperative follow up examination was done daily for 1 week, every week for 1 month, every 2 weeks for next 6 months thereafter monthly upto 1 year.
- Postoperative examination:

Assessment of visual acuity was done. Slit lamp examination- status of corneal epithelium

Graft clarity, sutures-tight/loose/broken, infiltrates, AC depth, IOP

STATISTICAL ANALYSIS:

All the finding was noted on MS excel sheet and data were analyzed using SPSS 21.0 package (SPSS Inc., Chicago, USA). Quantitative data was analyzed using Student's t-test (paired and unpaired) and categorical data had analyzed by the test of proportion, Chi-square, Fisher's exact test. Results of the analysis were evaluated under 95% confidence interval and mean values as mean ± standard deviation. The p value <0.05 was considered as statistically significant.

RESULTS

42eyes of 42 patients (23M/19F) who underwent TPK were included. The mean age of patients was 47.3±11.8 years(range, 15- 80 yrs). Among the patients, 23(57.6%) were male. The mean follow-up was 2.1±1.3 years.

76% of infective corneal ulcer was perforated.Occupation of subjects at the time of presentation was analysed retrospectively,in which 16(38.1%) out of 42 were agriculturists and 8 patients (19.1%) were housewives. Manuallabourersandcarpenterswere12 (28.5 %) & 6(14.2%)each.In this study,outdoorworkers were morepronetodevelop infections than indoorworkers.

13(31.5%) out of 42 cases gave no significant history of injury. 12 cases(28.6%) had given h/o injury by vegetable matters and 10 cases (23.8%) gaveh/o entry offoreignbodyin that 4casesgotitremovedbyatraditionalhealerandother6 caseshadtakentreatmentfromdoctor.4cases (9.52%)wereusingcontinuoussteroidsmore than2 monthsand 3 patients (7.14%)had h/o traumaby fingernail.

The microbiological diagnosis showed, out of42 patients, 31(73.8%) were positive of organism of which 18(58.1%) had fungal and 13(41.9%) had bacterial infection. The most common fungus and bacteria isolated were Aspergillus and Streptococcus.

32 (76%) out of 42 cases underwent TPK for perforated corneal ulcer inwhich 10 cases were preoperatively treated with tissue adhesives bandagecontact lens. 7 cases (16.6%) had non healing corneal ulcer and 3 cases (7.14%) had impendingcorneal perforation. 1 case was treated with TABCL, 3 cases of non-healingkeratitis were preoperatively treated with Amphotericin-B.2 cases had worsening ofkeratitis.

Recipient Trephine size used wasvaried from 7.5mm to 11 mm. Among them 7.5 mm trephines were used in 17 cases (37.1%) and 8mm trephines were used in 13 cases(33.3%).

In the postoperative period, complications include reinfection occurred in 13 grafts.

Resuturing was done in 4 grafts, corneal edema was seen in 10 grafts.(Table 1) The

associated factors for reinfection were recurrent hypopyon, corneal perforation and pre-

operative time and large graft size.These factors showed a significant association with

cataract and secondary glaucoma as late complications(Table2). Out of 42 patients,

17(41.7%) had developed glaucoma.

TABLE 1: EARLYPOSTOPERATIVECOMPLICATIONS

EARLY COMPLICATIONS	**NO.OFCASES**	**PERCENTAGE**
WOUNDLEAK WITHIRISPROLAPSE	6 2	14.2% 4.76%
RESUTURING	4	9.52%
REINFECTION	13	30.9%
CORNEAL EDEMA	10	23.8%

TABLE 2: LATEPOSTOPERATIVECOMPLICATIONS

LATE COMPLICATIONS	**NO OF CASES**	**PERCENTAGE**
GRAFTREJECTION	7	16.6%
SECONDARY GLAUCOMA	17	40.5%
REGRAFT	3	7.14%
CATARACTOUSLENS	8	19.1%
CORNEAL OPACIFICATION	20	47.6%

Functional outcome of TPK:

13 (30.9%) out of 42caseshad perception of light present at the end of the 12 months. Hand movement was seen in 8 cases (19.1%), counting fingerclose to face in 6 cases(14.2%), CF 1/2min3 cases (7.14%). In 33 patients VA was less than 3/60. Post-operative VA was improved in 9 (21.4%) of cases.
According to WHO criteria, visual outcomes of TPK were classified in Table 3.

TABLE 3: COMPARISION OF PRE-OPERATIVEANDPOST-OPERATIVE VISION

VISION	**PRE- OPERATIVE VISION**	**POST- OPERATIVE VISION**
More than 6/18 (Adequate)	-	-
6/18 -3/60 (Impairment)	-	9[21.4%]

Less than 3/60 Blindness)	42	33[78.6%]
TOTAL	42[100%]	42[100%]

Anatomical outcome of TPK:

14(33.4%) out of 42 patients had clear graft at the end of 6 months. Primary and secondary Graft failure wasnotedin23patients (54.6%).3patients(7.14%)underwent evisceration within one month of the surgery due topanophthalmitis. Phthisis bulbi was seen in 2 patients (4.76%). 3 patients underwentre-grafting due to non-healinggraftinfiltrate. Globeintegrity had maintained in 35 (88.3%) cases. (Table4)

TABLE 4: OUTCOME OF THERAPEUTIC PENETRATING KERATOPLASTY

CLEARGRAFT	14	33.4%
GRAFTFAILURE	23	54.6%
EVISCERATION	3	7.14%
PHTHISISBULBI	2	4.76%
GLOBE INTACT	35	83.3%

DISCUSSION

Cornea transplant surgery is the most successful solid organ transplant Surgery.The shorttermsuccess rate of this surgery is high. According to ACGR report,the short-term success rate is 90% at 1 yearwhile the long term success ratedecreases to 73% at 5 years, 60% at 10 years and 46% at 15 years.[12]A study donein India ,to analyze survival rate of corneal transplants in a large series showssurvival rates at 1, 2, and 5years for first-time grafts is 79.6%, 68.7% and46.5%, respectively They are different from the western studies essentially due todifferences inPatient‘s profile, different indications for surgery, differences inmethods of storageof corneas, and socioeconomic factors affecting healthcare provision.

Gram‘sstainandKOHmountweredone.Corneal scrapings were done and sentfor culture sensitivity. In our study, 31(73.8%) cases were positive of organism of which 18(58.1%) had fungal and 13(41.9%) had bacterial infection. The most common fungus and bacteria isolated were Aspergillus and Streptococcus.Inastudy doneinFlorida,Filamentousfungiformthemajoretiologicagentsoffungalkeratitis.Fusariumspecies (37–62%) and Aspergillus species (24– 30%) have been implicated as mainpathogens.Dematiaceousfungiarethecauseof8to16.7%ofcasesoffungalkeratitis.[13]

32(76%) out of 42 cases underwent TPK for perforated corneal ulcerin which 10 cases were preoperatively treated with TABCL. 7cases hadnon-healing corneal ulcer and 3 cases had impending corneal perforation.Inourstudypre-operative vision inalleyeswaslessthan3/60.Thisiscomparedtothestudydone bySukhijaetalPGIMER,Chandigarh,included134therapeutictransplants,recordswerebased ondemographicdetailsonage,gender, indication of surgery,graftclarity, complications, residual morbidity. Graftsneeded forbacteria are54and fungus is 54in numbers.In 118 cases perforationwasseenattimeofpresentation(88%).[14]

In a study doneby Xieet al,108 cases of severe fungal keratitis in which PKP wasperformed were retrospectively analyzed. Fungal keratitis was diagnosed by KOHstainingofcornealscraping.Theresultofthisstudywas86eyes(79.6%) remained clearduringfollowup.Complicationsinsomepatientsincludedrecurrentfungalinfection in 8 eyes(7.4%), corneal graftrejection in 32 eyes(29.6%) , Secondaryglaucomanotedin3(9%)eyesand5eyes (4.6%)developedcataract.[15]

In ourstudy attheendof1yearoffollowupglobeintegritywasmaintainedin 35(88.3%)casesand 3cases(7.14%)hadtoundergoevisceration duetoreinfection.Reduction of infective load was achieved in 90% of the cases and reinfection wasseenin10%ofthecases.

According to a study done by Anuradha Raj et al of 34 patients, 29 (85.29%)patients had achieved therapeutic success maintainingstructuralintegrityandstabilizationofthe eyewhichiscomparabletotheresultsofTietal. [16]

ThesuccessofTPKdependsoneradicationoftheprimaryinfectionandsalvagability of the globe. In lack of surgery, patients may lose their sight andpossibly their eye dueto severe infection and inflammation. Poor prognosis isexpected in patients receivingemergency therapeutic transplantation for severeinfectious keratitis. Following stabilization of the eye, repeat keratoplasty can beperformedonanelectivebasisforopticalpurposes.

CONCLUSION

In infective corneal ulcer, TPK can be an important procedure to salvage eye and preserve vision but the incidence of post-op complications are more. Bacterial Corneal ulcer has better outcome.Early intervention is mandatory topreventdisastrous coursesofthedisease.

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COLOR BLINDNESS : A DISABILITY OR NOT?

Dr. Priti Sinha[1], Dr. Sofia Ahmad[2], Dr. Naveen Ak[2]

ABSTRACT: color blind persons are declared unfit for many jobs but are not considered disabled. Why? **Aim:** Quality of vision in color blind while driving in different conditions. **Main outcome measures:**Driving quality in different visibility conditions.**Methods:**Observational study. 24 color blinds as cases & 15 age- & sex- matched controls with normal CV were taken. Inclusion criteria: Color blinds with BCVA >6/12. Exclusion criteria: Acquired color blindness cases.All cases & controls were tested in driving school simulator under normal condition, in fog, night & during rain (Courtesy:Maruti). **Results:** In normal condition & in night, both cases & controls had comparable results. But under poor visibility, color blinds had better visibility upto 100m in high fog &upto 50 m in rain. Controls had difficulty in vision during rain and fog. **Conclusion:** Color blindness didn't hamper maneuverability & may prove useful in certain circumstances. Revision of driving guidelines is recommended to include 8% of men.

Keywords: Color blind, Camouflage, Driving.

INTRODUCTION

Light is electromagnetic radiation, of which a small part lies within the range of the visible spectrum.
Appearance of colors is dependent on properties that include hue, saturation, brightness, lightness and chroma.
Hue is the aspect of the percept that differentiates it from white. It can be interpreted asdifferent parts of visible spectrum. The unique hues red, green, yellow and blue represent a minimal set of hues. None of them can be described through others, which makes them unique.
Saturation is the"colorfulness of an area judged in proportion to its brightness". The moresaturated a hue, the more intense and vivid it appears; the less saturated a hue the more grey and dull it isperceived.
Brightness defines the "perceived level of light emitted by the source". It can range from "dim to dazzling".
Chroma is a relative value depending "on a reference color that varies according to the lightness of the stimulus under consideration. The reference color is often a gray".
Lightness is the "brightness of an area judged relative to the brightness of a similarly illuminated area that appears to be white or highly transmitting".

In total, "about 10 % of the male population and about 1 % of the female population have some form of color vision deficiency". The most common form is congenital red-green deficiency (protan&deutan) with approximately 8 % of men and 0.5 % of women.
In India about 10 million people are deutranopes, the commonest being red-green. color blind persons who are declared unfit for many jobs but they are not considered disabled. Also, in many countries including India, color blinds are denied of driving license.
So, if color blindness is a disadvantage then why selection has not removed it completely?Also, since it is quite common, is there any evolutionary advantage of being color blind?

Aim of our study was to assess the quality of vision in color blinds while driving in different visibility conditions.

MATERIALS AND METHODS

It was an observational study conducted after taking full informed consent and permission of the ethical committee.
24 males with congenital colour blindness in the age group 20-40 years and 15 age and sex- matched controls with normal colour vision were selected.

Inclusion criteria:
a) Colour blindness
b) Age - 20-40 years
c) BCVA > 6/12

Exclusion criteria:
a) Cases of acquired color blindness
b) Chronic alcoholism with defective BCVA

TOOLS USED

a) Ishihara plates
b) Camouflage detecting pictures

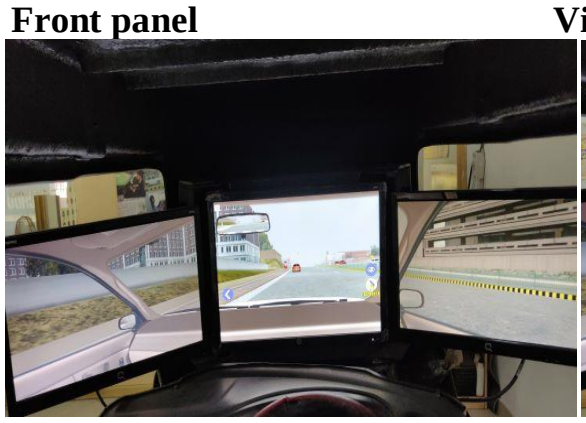
Figure 1- Locate the lizard.

Figure 2- Locate the Mushroom

c) Driving School Simulator:courtesy Maruti

Front panel

Visibility in fog



Visibility in normal weather upto 200m

Visibility in rainy condition

METHODOLOGY

- Ishihara plates were used for color vision testing.
- The color blind subjects were then presented a set of questionnaire.
- **Questionnaire included questions:**

a) How and when did you know about your color-blindness?
b) Specific situations where you find difficulty in comparison to normal color vision.
c) Do you feel difficulty while driving? Is there over-shooting of traffic signals in day and night?
d) Do you feel any advantage of being color blind?
e) Would you like to use color vision glasses?

- Both cases and controls were then presented with figures for camouflage testing and the time was noted for detecting the image.
- With the courtesy of Maruti, all cases and controls were tested in driving school simulator under different visibility conditions like fog, rain and night. Their performance was recorded as number of traffic signals overshooted.
- Also, we looked upon the historical perspective of color vision and celebrities with color vision defect.
- We also searched for researches based on color blindness in other animals and their evolutionary advantage.

RESULTS

Mean age of cases was 28.5 years and of controls was 29 years.
Ishihara color vision testing showed congenital red green color blindness in all 24 cases.
Answers to questionnaire showed that out of 24 color blinds, 4 knew about their color blindness since childhood through a school screening program for vision testing. Remaining 20 came to know about their color defect through medical tests for their job purposes.
All cases admitted that they do not go shopping alone and they face difficulty in choosing combination clothes.
On questioning about driving, all 24 cases answered that they face no difficulty in driving and over shooting of traffic signals has occurred only rarely, though all of them faced difficulty in getting driving license.
10 out of 15 controls accepted that over shooting of traffic signals also occur to them occasionally.
20 out of 24 cases said that they feel their night vision is better than their normal color vision friends.
About using color vision spectacles, 23 out of 24 said that they are ready to use any such glass but one subject said that he does not want to see what he is lacking.

Test with camouflage pictures showed that color blinds were better at detecting camouflage taking less time than the controls.

Color blind subjects performed better than controls on driving simulator under rainy conditions. Visibility of color blind cases was upto 100 m in foggy conditions while that of normal controls was upto 75 m.
In normal and in night conditions, visibility of both cases and controls were comparable.

DISCUSSION

Color blindness is inability to perceive difference in colors that others can distinguish. Presence of color blindness in 8% men make it quite common. So, the question arises whether it is of any advantage since evolution has not eliminated it.

Emerson Moser- Master Crayon Maker (molded more than 1.4 billion crayons). He was green-blue color blind, but despite his handicap, he had gone to the top of his trade.

John Dalton, a colorblind, pioneered research in the field.

Ravindranath Tagore- In spite of many problems he may have faced, he created a haunting visual world of forms & colors in his pictures, his unique signature world.

Color blinds are better at detecting camouflaged objects, giving them advantage in spotting predators. One possible explanation for this advantage is that a reduction in color signals makes the differences in texture and brightness more apparent, so it's easier to see past color camouflage.

Morgan et al[1] showed that dichromats were better in identification of a target area with a diff. texture or orientation pattern, when surfaces were painted with irrelevant colours.
An experiment published in Current Biology [2] showed that people with normal CV took around 90 min to assign scores rating how diff each of 105 pairs of colours looked to them, while deuteranopes typically got through the test in less than half the time.
During second world war, it was suggested that color deficient individuals could better penetrate through camouflage that deceived normal color vision persons. Lack of experimental results made this thought remaining theoretical only.

But it is considered as a disability and in past and presently many such color blind individuals have been declined of their jobs. But the irony is that they don't get any disability benefits. Our study showed that color blindness does not hamper the driving skills of a color blind individual and in conditions of low visibility they perform better than normal color vision persons.

CONCLUSION

Basic thought of seeing color blindness as a disadvantage needs to be changed.

Few changes in our surroundings like changing the shape of the traffic signals or railway signals can help color blind individuals to explore more job opportunities.
So, by exploring the benefits of color blindness new ways of seeing the world can be found & immense diversity of nature can be embraced.

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Necessity of Neuroimaging in Neuro-Ophthalmologists: Consensus and Disagreement

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Abstract

Aim: To get expert opinion of how urgently to request neuroimaging for neuro-ophthalmological clinical scenarios

Method: Neuro-ophthalmologist were approached with list of 35 different neuroophthalmological clinical scenarios generally presented in eye OPD and asked to state how urgently they would obtain neuroimaging.There were 4 response options:Emergency(within 2 days),Urgent (within 1 week),Observation (after 1 month),No Need.Consensus was set at a prior level of 70% agreement

Result:18out of 35 case scenarios met the criteria for consensus. 9 of these cases taken for emergency,7for urgent imaging,5 for observation imaging. Rest17 scenarios not reached consensus for imaging.

Conclusion:Neuro-ophthalmologists differ on urgency of neuroimaging, with consensus for some neuro-ophthalmological cases and Disagreement for many.To determine timing of neuroimaging,prospective or retrospective studies need to be done.

Introduction

Neuro-ophthalmology shares high risk of life-threatening pathologythan in other ophthalmic sub-specialties. Neuro-ophthalmic signs are commonly the presenting features of intracranial space-occupying lesions[1] and hence neuroimaging is frequently required to rule out serious intracranial disease and sometimes to rule in. For some patients, neuroimaging may act as reassurance tool thus reducing health care utilisation.[2] However, there are significant medicolegal consequences to missed or delayed diagnoses when patients with serious neurological conditions present first to ophthalmology. Malpractice claims arising from neuro-ophthalmic cases have higher average payouts than most other ophthalmic subspecialties and also are harder to defend.[3] So there is need for guidance on when to request neuroimaging in a range of clinical scenarios in neuro-ophthalmology. However, there are few published studies that address this question. Consequently, personal experience or expert opinion guide the decision regarding neuroimaging necessity.

Health economic factors highly influence the urgency of neuroimaging, being done for every case in condition with unlimited resources, while prescribed cautiously if resources are limited such as situation where health services are being run at National interest or State interest. As a result, imaging for neuro-ophthalmic conditions may occur less urgently than the requesting clinician would like.[4] The urgency of neuroimaging in day-to-day practice in the health services under Government cover is therefore determined by a pragmatic balance between clinical judgement and pressures on imaging services.

Materials and Methods

A list of 35 clinical scenarios was devised reflecting a wide range of neuro-ophthalmic presentations that usually present in OPD and areas with known difficulty in judging neuroimaging urgency were focused, and introduced subtle variations between scenarios to probe factors that might influence practitioners' judgement.

Neuro-ophthalmologist were approached with this list of 35 different neuropthalmological clinical scenarios generally presented in eye OPD and asked to state how urgently they would obtain neuroimaging(irrespective of whether it was computed tomography [CT] or magnetic resonance imaging [MRI]). There were 4 response options:

- Emergency (within 2 days),
- Urgent (within 1 week),
- Observation (after 1 month),
- No Need (x).

Consensus was set at an prior level of 70% agreement

The first 12 scenarios dealtwith the anterior visual pathway (Table 1). The next 11 scenarios dealtwith III, IV, and VI nerve palsies (Table 2). The final 12 scenarios covered Horner syndrome, nystagmus, and some miscellaneous conditions (Table 3).The scenario descriptions were kept intentionally brief to reduce the time needed to complete the survey. A standardized scenario format was used, to include age and any relevant additional risk factors. We instructed respondents to assume that there were no further hidden clinical details so that the clinical presentation could be considered isolated.

TABLE 1.

Survey responses for the 14 scenarios dealing with III, IV, VI nerve palsies.

	Scenario	E	U	O	X
1	Bilateral optic disc swelling with recent-onset headache in a 25-year-old	4	15	0	0
2	Asymptomatic bilateral optic disc swelling with drusen and normal visual function in a 40-year-old	0	1	17	1
3	Asymptomatic bilateral optic disc swelling with drusen and reduced visual function in a 40-year-old	0	14	3	2
4	Asymptomatic unilateral optic atrophy	0	1	14	4

	with mildly reduced visual function in a 50-year-old picked up incidentally by optician				
5	Asymptomatic bilateral optic atrophy with mildly reduced visual function in a 50-year-old picked up incidentally by optician	0	8	6	5
6	Suspected unilateral typical (MS type) optic neuritis in a 35-year-old	5	9	2	2
7	Unexplained bilateral visual loss in a 30-year-old (i.e., claims NPL; normal pupils, disc, fundus; but no positive functional features)	3	8	5	3
8	Suspected unilateral functional visual loss in a 23-year-old (i.e., claims 6/60 but no RAPD, normal exam, and positive functional features)	0	1	15	3
9	Suspected bilateral tobacco-alcohol/nutritional amblyopia in a 40-year-old alcoholic	0	0	2	17
10	Unexplained bilateral central scotomas in a 25-year-old (normal exam, normal retinal imaging, no functional features)	0	5	14	0
11	Asymptomatic bitemporal hemianopias picked up incidentally by optician in a healthy 40-year-old	3	14	2	0
12	Acute unilateral typical non-arteritic AION in a 65-year-old with hypertension	0	2	2	15

The numbers refer to the number of respondents for a given category. See Materials and Methods section for definitions of E (Emergency), U (Urgent), O (Observation), and X (No Need).

TABLE 2.

Survey responses for the 13 scenarios dealing with the anterior visual pathway.

	Scenario	E	U	O	X
13	Bilateral VI in 65-year-old diabetic	1	3	14	1
14	Unilateral VI in a healthy 35-year-old	2	11	5	1
15	Sudden-onset unilateral IV in a healthy 40-year-old with no longstandingfeatures and no head trauma	0	2	17	0
16	Complete III with pupil involvement in a 65-year-old diabetic	8	7	4	0
17	Complete III with no pupil involvement in 65-year-old diabetic	8	7	3	1
18	Partial III with pupil involvement in a 55-year-old diabetic	9	8	2	0
19	Partial III with no pupil involvement in a 55-year-old diabetic	6	6	5	2
20	Complete III with pupil involvement in a healthy 40-year-old	15	4	0	0
21	Complete III with no pupil involvement in a healthy 40-year-old	11	7	0	0
22	Partial III with pupil involvement in a healthy 35-year-old	16	3	0	0
23	Partial III with no pupil involvement in a healthy 35-year-old	8	6	3	2

The numbers refer to the number of respondents for a given category. See Materials and Methods section for definitions of E (Emergency), U (Urgent), O (Observation), and X (No Need).

TABLE 3.

Survey responses for the 12scenarios dealing with Horner syndrome, nystagmus, and miscellaneous conditions.

	Scenario	E	U	O	X
24	Acute painful isolated Horner in a 40-year-old	4	14	1	0
25	Horizontal jerk nystagmus with 6-month history of oscillopsia in a 60-year-old	4	15	0	0
26	Horizontal jerk nystagmus in a 30-year-old picked up by optician, no oscillopsia	3	10	4	2
27	Downbeat nystagmus in a 60-year-old with 6-month history of oscillopsia	14	3	2	0
28	Superior oblique myokymia in a 40-year-old	0	5	8	6
29	Hemifacial spasm in a 40-year-old	0	9	6	4
30	Blepharospasm in a 40-year-old	2	1	1	15
31	Spasm of the near reflex (convergence spasm) in a 40-year-old	0	1	2	16
32	Convergence insufficiency in a 15-year-old	0	4	3	12
33	Unexplained deep orbital pain with no signs in a 30-year-old	0	3	11	5
34	Complex visual hallucinations in a 60-year-old with normal visual function	0	10	6	3
35	Repeated infrequent bilateral transient loss of vision in a 60-year-old	1	9	3	6

The numbers refer to the number of respondents for a given urgency category. See Materials and Methods section for definitions of E (Emergency), U (Urgent), O (Observation), and N (No Need).

We sought to either elicit responses from recognized neuro-ophthalmologist or Ophthalmologist who were hinted by other ophthalmologist as specialized in dealing neuro-ophthalmological cases. Responses were made anonymously.

A priori level of >/=70% agreement was the criterion for defining consensus, as has been used in studies in other areas of medicine.[5–7] Raw responses of each respondent were pooled for each scenario."

Results

There were 9 respondents who all confirmed that they were Consultants with neuro-ophthalmology as their main area of specialization and 10 were Consultant Ophthalmologists. Responses were complete for each respondent. The scenarios and corresponding response frequencies are given in Tables 1, 2, and 3. Areas of consensus have been highlighted.

18 out of 35 scenarios met the criterion for consensus. 3 of these were for emergency (within 2 days) imaging. Of these 3, two were for presentations of III nerve palsy: namely both scenarios stating pupil involvement but in a younger patient. The other onescenario for which there was consensus on emergency imaging was downbeat nystagmus in 60 years old with 6 months history of oscillation.

Consensus was reached for urgent imaging (within 1 week) for five scenarios. These were Bilateral optic disc swelling with recent-onset headache in a 25-year-old, Asymptomatic bilateral optic disc swelling with drusen and reduced visual function in a 40-year-old, Asymptomatic bitemporal hemianopias picked up incidentally by optician in a healthy 40-year-old, Acute painful isolated Horner in a 40-year-old, Horizontal jerk nystagmus with 6-month history of oscillopsia in a 60-year-old

Consensusfor the response category of observation (1 month) was reached for sixscenarios. This included: Asymptomatic bilateral optic disc swelling with drusen and normal visual function in a 40-year-old, Asymptomatic unilateral optic atrophy with mildly reduced visual function in a 50-year-old picked up incidentally by optician, Suspected unilateral functional visual loss in a 23-year-old (i.e., claims 6/60 but no RAPD, normal exam, and positive functional features),

Unexplained bilateral central scotomas in a 25-year-old (normal exam, normal retinal imaging, no functional features), Bilateral VI in 65-year-old diabetic, Sudden-onset unilateral IV in a healthy 40-year-old with no longstanding features and no head trauma.

However, for the response "No Need," there were four scenarios that reached consensus. These were presentations ofBlepharospasm in a 40-year-old,Spasm of the near reflex (convergence spasm) in a 40-year-old,Suspected bilateral tobacco-alcohol/nutritional amblyopia in a 40-year-old alcoholic, Acute unilateral typical non-arteritic AION in a 65-year-old with hypertension

.

For the remaining 17 out of the 35 scenarios, consensus was not reached. Unanimity (100% agreement) was not reached for any scenario.

Discussion

This attempt at assessing areas of consensus and disagreement regarding the urgency of imaging in neuro-ophthalmology is crucial for future decision making regarding neuro-ophthalmological cases. The respondents were all ophthalmologist with specialization in neuro-ophthalmology, and can therefore be considered to be a representative body of experts in this area. The total number of respondents was small (n = 19). The principal weakness of this study is that it reports neuro-ophthalmologists' *stated* practice, which may be influenced by recall bias. Audit of *actual* practice shall be more accurate but could be logistically difficult across so many hospitals. In addition, there have been many neuro-ophthalmic scenarios that were not addressed in this survey and also the simplification of the scenarios is not genuinely reflective of real patients, where multiple additional clinical and psychosocial factors play a part. Nevertheless, it could serves as a valid qualitative reflection of expert opinion in a controversial area where an adequate evidence base is lacking.

Consensus was reached regarding the need for emergency/urgency imaging in III nerve palsy scenarios, except for the case of an older diabetic patient without pupil involvement (whether complete or partial). Established neuro-ophthalmic teaching states that non-involvement of the pupil in a III nerve palsy is reassuring with the following exceptions: in younger patients; when the palsy is not complete; or when the palsy is not isolated.[8]

Regarding young patients many of our respondents agreed with the need for urgent scanning, regardless of the pupil status. However, they did not all agree that an isolated, complete III nerve palsy with no pupil involvement in an older diabetic is automatically reassuring. There was also complete disagreement about the urgency of scanning an older diabetic patient without pupil involvement when the palsy was partial.

There was no consensus for scenarios relating to VI and IV nerve palsies. This lack of agreement mirrors the conflicting conclusions of several series of ocular motor mononeuropathies in the recent literature.[9–13] Variant conclusions are expected in these series due to their differing designs, study populations and imaging protocols. This is the established teaching, with some authors arguing further that even vasculopathy IV nerve palsies do not need neuroimaging if they are isolated.[14]

Papilledema is universally recognized as a red-flag sign in headache,[15] but the presence of drusen is not necessarily reassuring as drusen can coexist with papilloedema.[16] Some, but not all of the respondents felt that the presence of drusen did not obviate the need for urgent neuroimaging, especially with reduced visual function. Consensus was not clear for imaging in unilateral or bilateral optic atrophy in an older patient diagnosed incidentally by an optician, associated with mildly reduced visual function. There was no agreement for imaging of multiple sclerosis-type optic neuritis, but consensus was reached for urgent imaging in the scenario of atypical optic neuritis, in line with recent recommendations.[17,18]

There was disagreement regarding the urgency of imaging of incidentally diagnosed Horner syndrome, whereas for acute painful Horner syndrome, there was consensus on urgency imaging. Internal carotid artery (ICA) dissection can present as Horner syndrome, with accompanying pain highly suggestive of this etiology. It has been found that the period of risk for embolic events following ICA dissection is approximately 1 month.[19]

The aim of this study was not to provide didactic guidance regarding the urgency of neuroimaging in neuro-ophthalmology, but rather to assess the range of accepted practice amongst a representative body of specialists. This topic would be advanced considerably by a national, prospective audit with case ascertainment from radiology departments for unbiased capture, which included follow-up to find out whether variations in the timing of scanning actually affect outcomes.

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Incidence of non – traumatic sub conjunctival hemorrhage in the tertiary care centre of Jharkhand

- *Dr. Shilpa Hembrom, Dr. M Deepak Lakra, Dr. Shazia Tabassum*

Introduction

Subconjunctival hemorrhage (SCH) is a common benign condition of the eye that has characteristic features , such as the painless acute appearance of a sharply circumscribed redness of bleeding underneath the conjunctiva in the absence of discharge and inflammation in the contagious areas[1].It is usually not accompanied with decrease in the visual acuity.

The incidence of SCH was reported as 2.9% in a study with 8726 patients and it increased with age particularly over 50 years of age[2].It is thought that this significant increase depends on the increase of prevalence of systemic hypertension after the age of 50 years , also diabetes mellitus ,hyperlipidemia and the use of anticoagulation therapy becomes more frequent with ageing [3].

Aim-

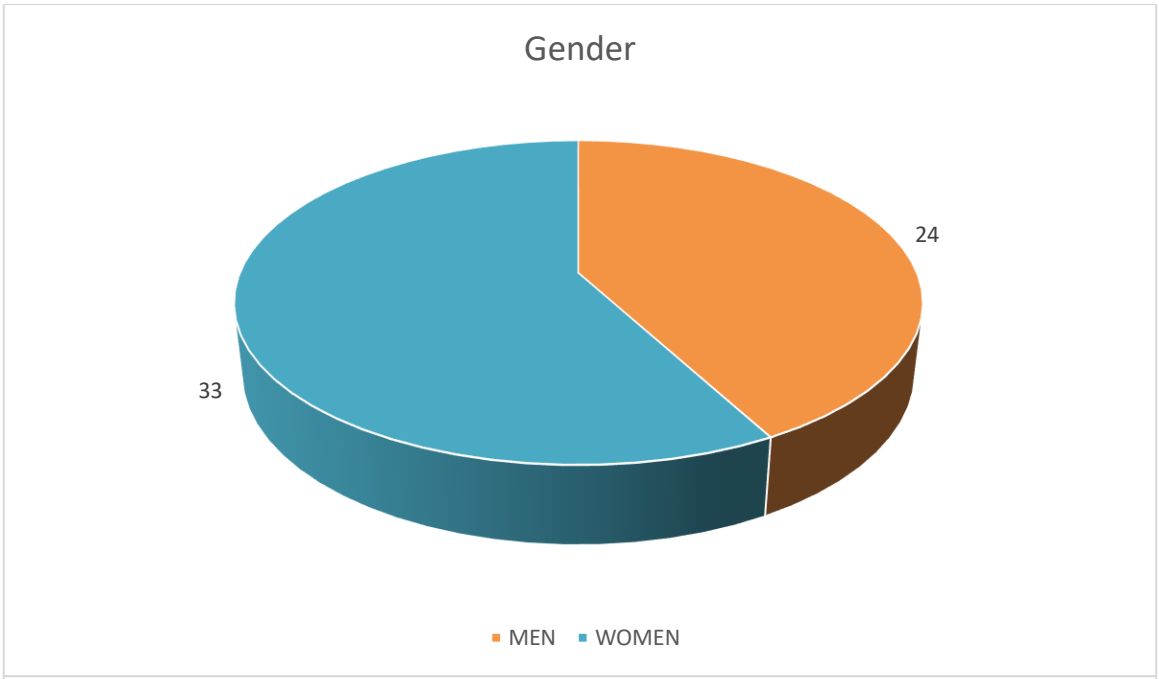
To determine the incidence of non-traumaticsubconjunctival hemorrhage (NTSCH) in the tertiary care centre of Jharkhand from December 2021 to December 2022.

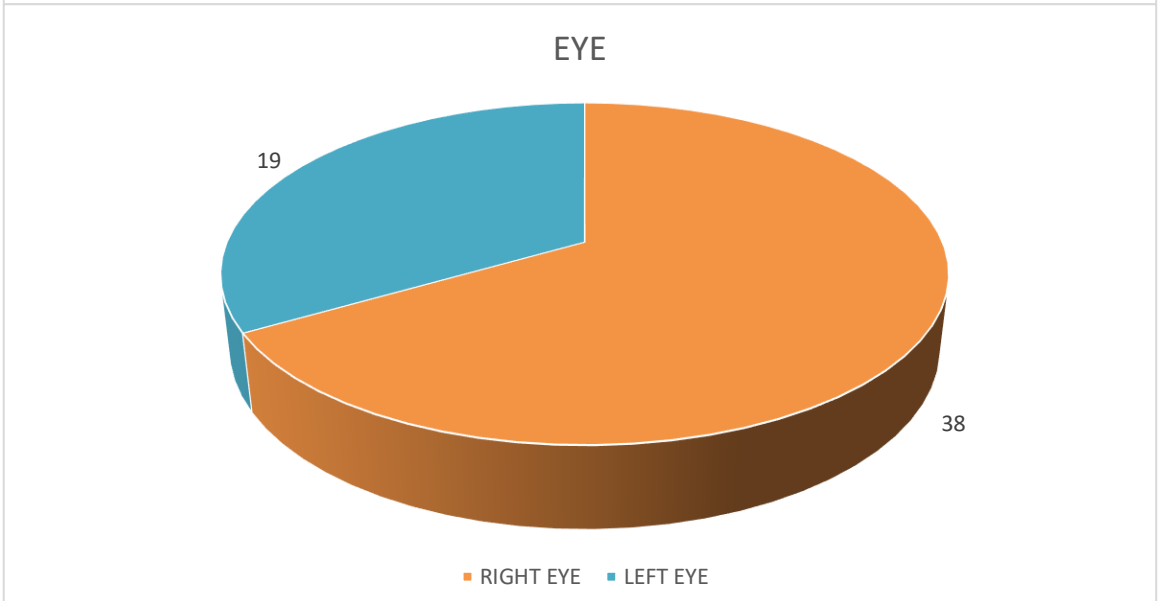
Method-

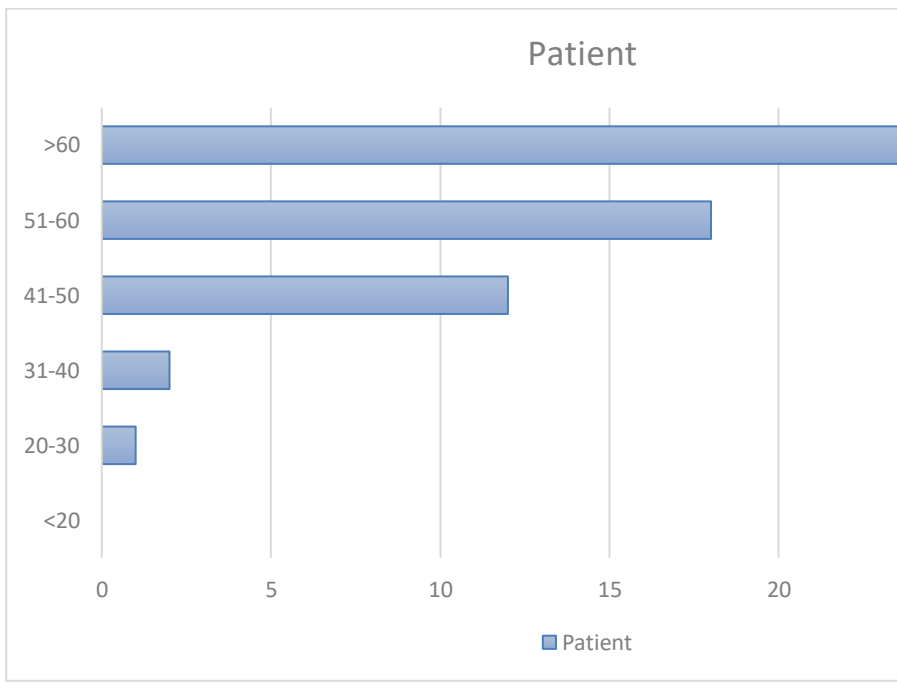
This was a cohort study.Individuals with the first diagnosis of SCH were identified by corresponding international classification of disease (ICD) 372.72.Traumatic SCH were excluded from the study.All demographic factors ,comorbidities present , use of any medications were recorded and studied.

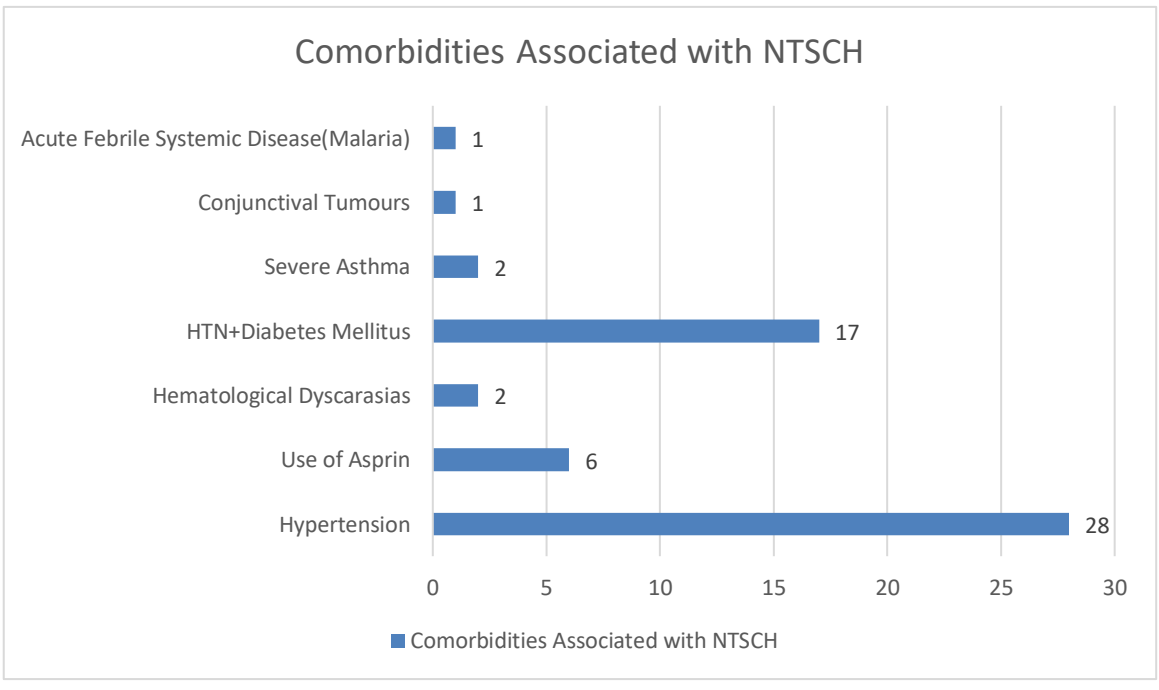
Results-

A total of 57 patients were identified in the period of one year.The incidence of NTSCH was higher in females than in males.(male(n=24),females(n=33)57.89%).Most common side affected was nasal. Most common co-morbidities associated with NTSCH was hypertension(49%)









Conclusion

SCH can be a sign of a serious systemic disorder.Our study was a prospective study and so regular follow up of patients was not possible. Traumatic SCH is very common so it was excluded from the study. *Sahinoglu et al* reported 32%(16/50) of cases as having NTSCH.But they considered traumatic cases in the total sample studies[4].After 60 years of age ,the incidence of NTSCH has increasing tendency which may be most probably due to increase in the incidence of systemic disease after the age

of 60Years and also due to increase fragility of vessels.In our study , the highest incidence wasfound in age group >60 years which is similar to the study conducted by Hu et al.

In our study the incidence of NTSCH was more in females which is similar to the study conducted by Hu et al[5] and Kaimbo[6].

In a follow up study of patients having SCH ,Wang et al reported a significant risk of developing cerebrovascular episode[7].

Anemia was also a systemic factor associated with SCH.In a study on anemia in the rural population of India,Alvarez et al has shown anemia to be prevalent in women and older adults[8].And this reason is in the favour of our study where SCH is more common in females and in more than 60 years of age.

In our study nasal side was more affected.This could be because of small area of nasal conjunctiva with crowded conjunctival vessels susceptible to SCH.However our study result was in contrast to Sahinoglu et al study who reported temporal conjunctiva as a common site for occurrence of SCH.

There was no preponderance of NTSCH in a particular eye.However right eye was more commonly affected which could be just an incidental finding.In conclusion SCH should be evaluated thouoghly as it itself is not a serious condition but it can be the sign of serious systemic illness.

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Original Article

Surge in current myopic incidence: A post pandemic boom

Dr. Neda Ahmadi, Dr. Sofia Ahmad, Dr. Aiswariya Mohanty, Dr. Priti Sinha

Purpose:to find the effect of digital screen time on incidence of myopia. **Methods:** A prospective observational study was conducted in Bokaro General Hospital, Bokaro, Jharkhand which included a total of 154 children with increased screen time over last 6-8 months between the age group of 12 to 20 years. It excluded patients with refractive errors,amblyopia, strabismus, retinal or congenital disorder and post traumatic or surgical eye. Data was collected through structured questionnaire and a comprehensive examination including cycloplegic refraction and fundoscopy was done. Patients were followed up for 1 year (November 2020 – November 2021). **Results:**Out of 154 children, 36 were newly diagnosed as myopes and incidence of myopia was 23.37%. Most used devices were of handheld types. The mean change in spherical equivalent was – 1.15 ± 0.85 D with mean screen time of 6.76 ± 2.25 hours and there was a positive correlation between the two ($r=0.58$ and $p<0.0001$).**Conclusion:** The incidence of myopia has increased tremendously over last few years and our study has identified digital screen time as a modifiable risk factor. The enormous increase in digital screen time together with significant reduction in outdoor activities might further accelerate the myopic epidemic which is anticipated by the year 2050. Therefore, regular screening must be done for early detection or to prevent progression of myopia. Measures should be taken to limit screen time and create public awareness about the effects of indoor near work and reduced outdoor time on the incidence and progression of myopia.

Key words: COVID-19, digital screen time, incidence of myopia, risk factor, myopic epidemic

The global prevalence of myopia is approximately 1950 million (28.3% of the global population)and it is predicted to increase to 4758 million (49.8%) by 2050 giving rise to myopic epidemic.[1]The development of myopia is driven by both genetic and environmental factors like prolonged near work, intensive education and limited time spent outdoors. During COVID -19 lockdown measures, the usage of digital smart devices has tremendously increased as a result of online education system and recreational activities. Our study aimed to find the effect of digital screen time on incidence of myopia.

Methods

A Prospective observational study was conducted in Department of Ophthalmology, Bokaro General Hospital, Bokaro Steel City, Jharkhand. It included all children between the age group of 12-20 years attending Eye OPD with increased screen time over last 6-8 months. Children with refractive errors, amblyopia, strabismus, retinal and congenital disorders, ectatic conditions of cornea, post traumatic and keratitic eye, any ocular surgery and ocular disease (congenital cataract, ptosis, corneal opacity, vitreous haemorrhage) were excluded.

A total of 154 children were taken up for study after satisfying inclusion and exclusion criteria. Written informed consent was taken.Data was collected through structured questionnaire on near work activities, type of device used and average daily time spent on smartphone/tablets/other devices (quantified by self-reported estimates). A comprehensive ophthalmic examination including uncorrected visual acuity (UCVA), cycloplegic refraction, slit lamp evaluation, fundus examination was done.Patients were followed up for 1 year (November 2020 – November 2021).

Results

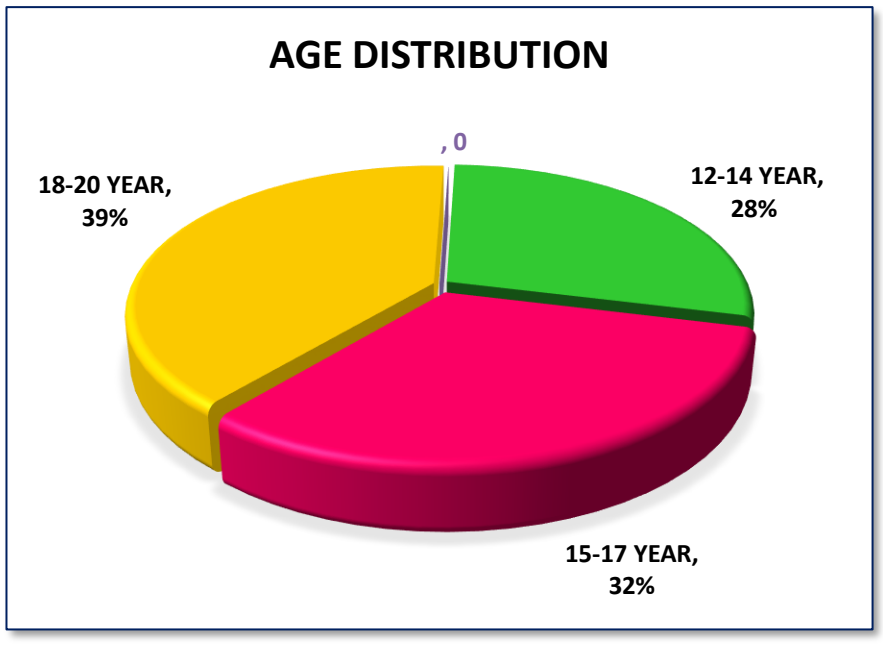

Figure 01: Shows age distribution among study population

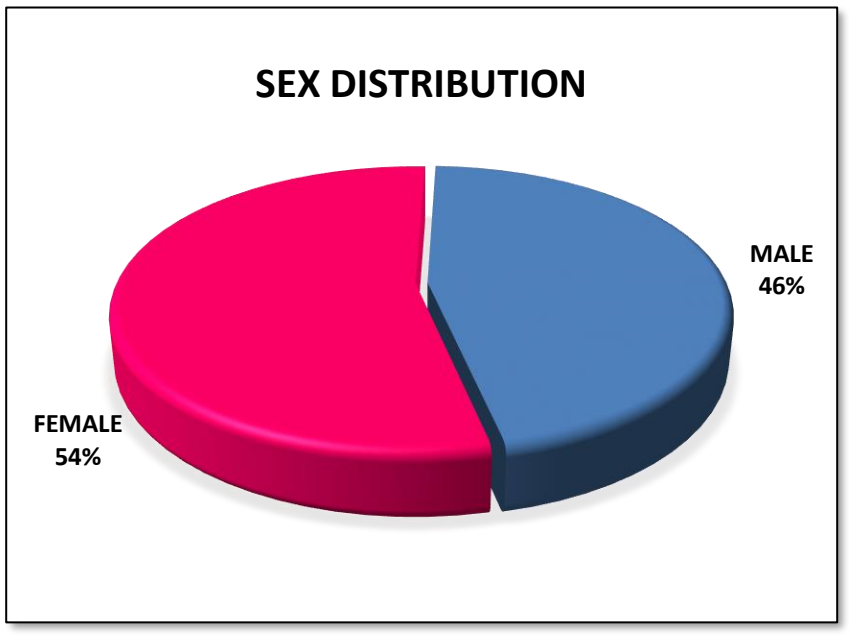

Figure 02: Shows sex distribution among study population

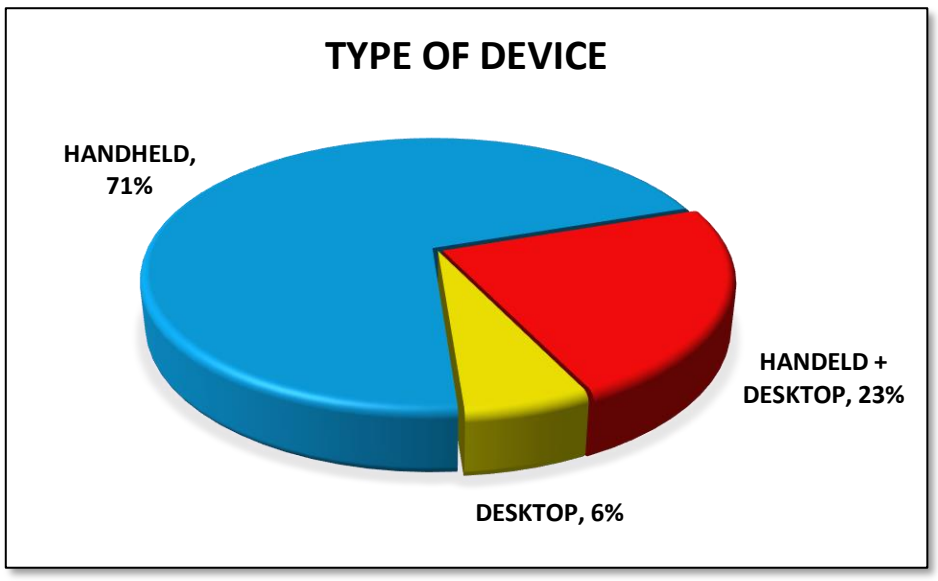

Figure03: Shows the type of device used among the population

Among 154 children selected, 36 children were newly diagnosed as myopes during 1 year of study.

Incidence = $\frac{36}{\quad} \times 100 = 23.37\ \%$

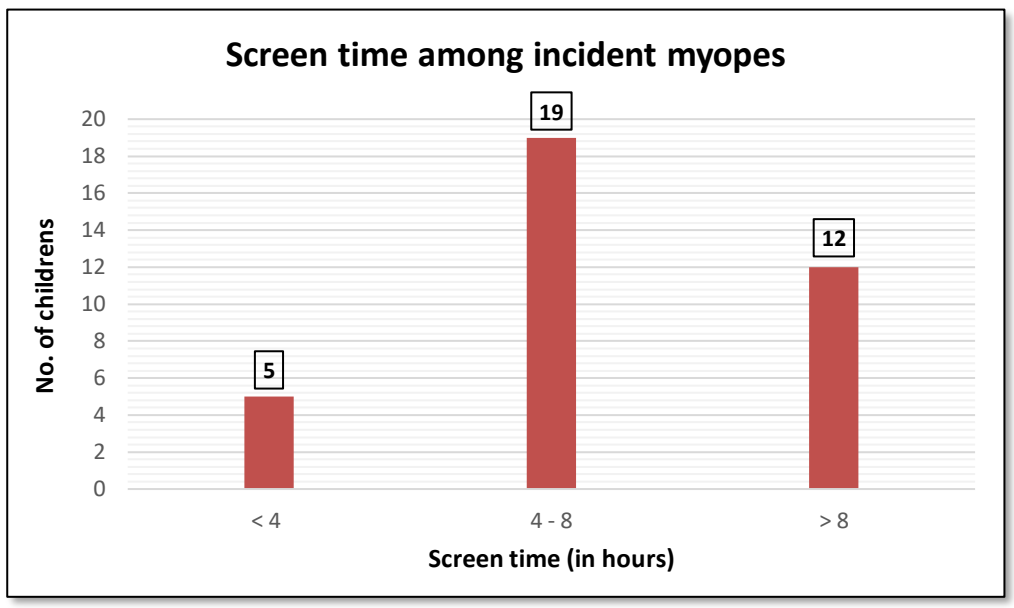

Figure 04: Shows screen time among incident myopes

Mean change in spherical equivalent with screen time of <4 hours =-0.70 ± 0.37 D

Mean change in spherical equivalent with screen time of 4-8 hours =-1.49 ± 0.89 D

Mean change in spherical equivalent with screen time of >8 hours =-1.89 ± 0.70 D

Mean screen time = 6.76 ± 2.25 hours

Mean change in spherical equivalent =-1.51 ± 0.85 D

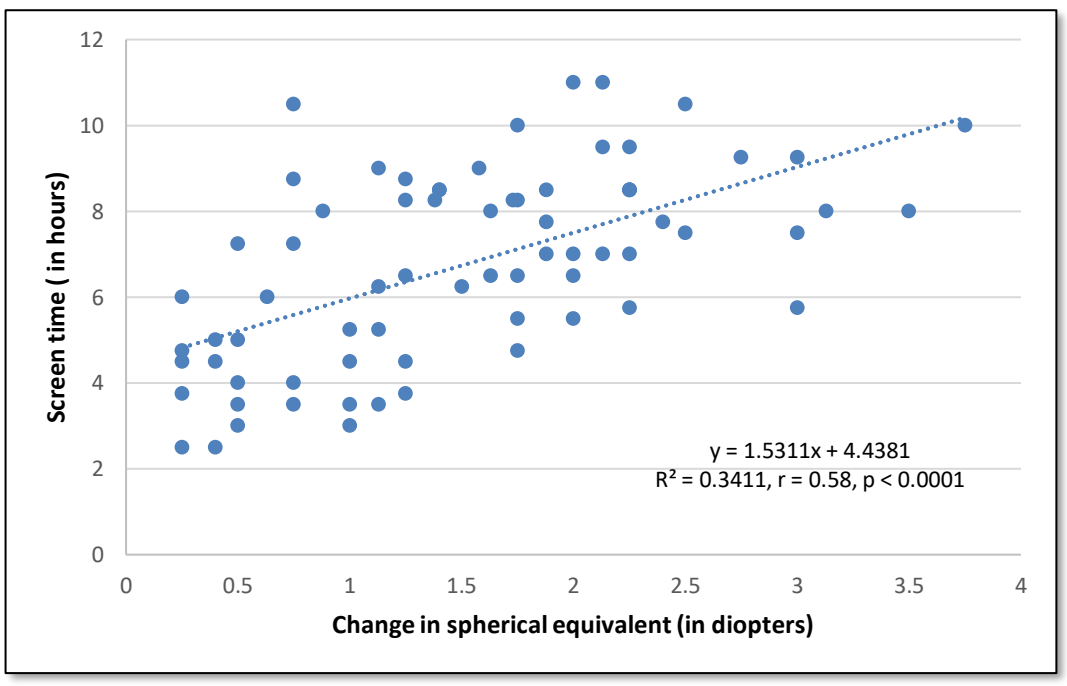

Figure 05: Scattered diagram shows positive correlation between screen time (in hours) with change in spherical equivalent (in diopters) among the incident myopes

The line of regression, $y = 1.5311x + 4.4381$, $R^2 = 0.3411$, $r = 0.58$, $p<0.0001$

Discussion

Simple /Developmental/school myopia usually occurs b/w 5 to 10 years of age and keeps on increasing till 18 – 20 years at a rate of about -0.5 D every year. [2]The development of myopia is driven by both genetic and environmental factors like prolonged near work, intensive education and limited time spent outdoors.

Education has a causal role in myopia because it is assumed that reading and writing (near work) are an integral part of education. Many hypotheses have been put forward to explain this mechanism like hyperopic defocus[3] and more accommodationrequired during near work can stimulate eye growth. [4]More recently, theuse of black print on white paper is suggested to have a role.[5]

The adoption of digital smart devices i.e. smartphones, tablets, computers etc. in past few decades, constitute a new form of near work wherein children spend prolonged uninterrupted period of time with closer viewing distance than conventional books.

Our study included 83 females and 71 males i.e. 54% and 46% respectively. The mean age was 15.93 ± 2.60 years. There was statistically no significant difference in age and sex distribution among the study population.

With the proliferation of online classes during home confinement of COVID -19, the conventional mode of education i.e. reading and writing via books was replaced by digital devices. It was noticed in our study, that the overall most commonly used devices were handheld types (smartphones, tablets etc.) because of its advantages of being able to tap into a cellular network to stay connected to the web while desktop requires using mobile hotspot to allow internet access. It is more convenient, portable, handy, quicker to answer and complete assessment works just with few taps and swipes. Also, it has an application for everything and using mobile data for games and social media is relatively easy.

But the screen-based devices causes glare, extra eye strain, dry eye and loss of focus flexibility i.e. eyes stay in long periods of accommodation which increases the risk of myopia. Also, abnormal posture especially decreased neck angle, is highly associated with poor vision. Ip JM et al (2008)[6]found significant independent associations of myopia with close reading distance (<30 cm) and continuous reading (>30 minutes). Also,Bao J et al (2015) [7] compared near-vision posture during different nearvision tasks and found that closest working distance was associated with handheld devices, which may be a risk factor for myopia progression.

According to a summary of 145 studies regarding the global prevalence of myopia, there are approximately 1950 million (28.3% of the global population) cases, and they are predicted to increase to 4758 million (49.8% of the global population) by 2050.[1] Moreover, it was observed that prevalence rates in East Asian and Southeast Asian countries (37–60%) [8] were generally higher than other parts of the world.

Amar Pujari et al (2022) published an article on January 2022 in which he showed region wise prevalence in India. Prevalence of myopia among school going age groups were: 4.1% [9] to 11.5% [10] in south zone; 3.21% [11] to 16.43% [12] in central zone; 0.63% [13] to 24.8% [14] in east zone; 2.15% [15] to 13.9% [16] in west zone and 4.1% [17] to 21.1% [18] in north zone. Our study was conducted in Jharkhand (north eastern part of India) for duration of 1 year and the incidence was found to be 23.37% which shows tremendous increase over past few years.

Among the incident myopes of our study, majority had screen time of more than 4 hours.The mean screen time was 6.67 ± 2.25 hours.This can be attributed to the digital education system- the online assignment works and compulsory attendance of the classes. In addition to this, restrictions to outdoors, indulged youngsters in indoor recreational activities particularly of smartphones usage. According to a study conducted by Merrie Y.A. et al (2019) [19] mobile phone exposure of >4 hours per day was independently a significant factor associated with visual impairment. Similarly, Hansen MH et al (2020) [20] in his study concluded that the prevalence of myopia was higher among teenagers who used digital screens for more than 6 hours/day.

In our study, it was observed that more change in spherical equivalent (SE) occurred with increasing duration of screen time. With screen time of <4 hours, mean change in SE was -0.70 ± 0.37 D; with 4-8 hours, mean change in SE was -1.49 ± 0.89 D and with >8 hours it was -1.89 ± 0.70 D.Overall, the mean change in SE was – 1.15 ± 0.85 D with mean screen time of 6.76 ± 2.25 hours and there was a positive correlation between the two ($r=0.58$ and $p<0.0001$).This fact is strengthened by a study of Liu S et al (2019) [21] done on children aged 6–14 years in which he concluded that each additional hour per day of smartphone screen time was associated with an increased myopic spherical equivalent (−0·07 D). Another study on digital screen use and myopic symptoms

done by Liu J et al (2021) [22] found that every 1 hour increase in daily digital screen use was associated with a 1.26 odds ratio higher risks of myopic progression. They also inferred that computers and smartphones are more likely to lead to myopia than watching television.

Conclusion

During COVID -19 pandemic, research has focused mainly upon the epidemiology, risk modelling, pathophysiology, and clinical features of severe acute respiratory syndrome-CoV-2, but the impact of increased digital screen time caused by the lockdown and quarantine measures worldwide on myopia has largely been unnoticed. Although schoolshave reopened, but the increased access and dependency on these digital devices may persist and lead to long term behavioural changes which can be a major concern in school going children.Our study has identified digital screen time as a modifiable risk factor which can decline the rising global burden of myopia and its complications.

Therefore, regular screening must be done for early detection or to prevent progression of myopia. Measures should be taken to limit the screen time and create public awareness about the effects of indoor near work and reduced outdoor time on the incidence and progression of myopia.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Fungal Keratitis:A case report

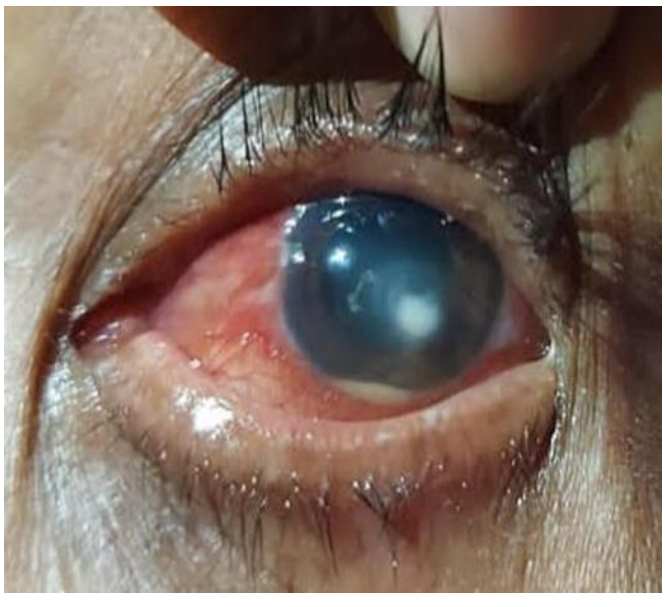
Dr.Alina Kujur,

Dr.M.Deepak Lakra

MicrobialKeratitisisapotentiallyvisionthreateningconditionthatrequirespromptdiagnosis and treatment to prevent untoward outcomes.[1] Fungal keratitis is one ofthe most difficult forms of microbial keratitis for the ophthalmologist to diagnose And treat successfully.[2,3]

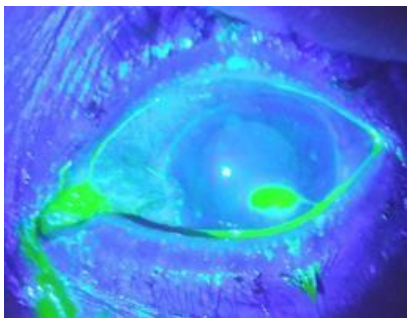
Case Report

A50yearoldfemale,farmerbyoccupation,presentedwithchiefcomplaintsofpain,watering,diminutionofvisionoflefteyesince1month.1monthbackshea ccidentally injured her left eye by bush while working in the field, few days latershe developed pain in left eye which was sudden in onset, gradual in progressionwhich was of pricking type. Diminution of vision in left eye was insidious in onset,gradual in progression. Since the time of injury, she is having watery discharge andrednessinlefteye.Sheisalsointoleranttolight.Nohistoryofuseofcontactlensorprolonguseof topicalsteroids.



a)Fungal Keratitis showinghypopyon(LeftEye)

On Local Examination of Left eye, visual acuity was finger count at 3 meter.Circumcorneal congestion was present in the conjunctiva. The cornea was found tohave a dry looking small ulcer of around 1x1mm in size, paracentral in location,grayishwhiteincolorwithfeatheryorirregularmarginandringinfiltrateinvolvingmid stroma with immobile hypopyon present in anterior chamber (1mm in height).Fluoresceinstain waspositive. Right eyewasexternallywithin normallimit.



b)Fluoresceinstainpositive(LeftEye)

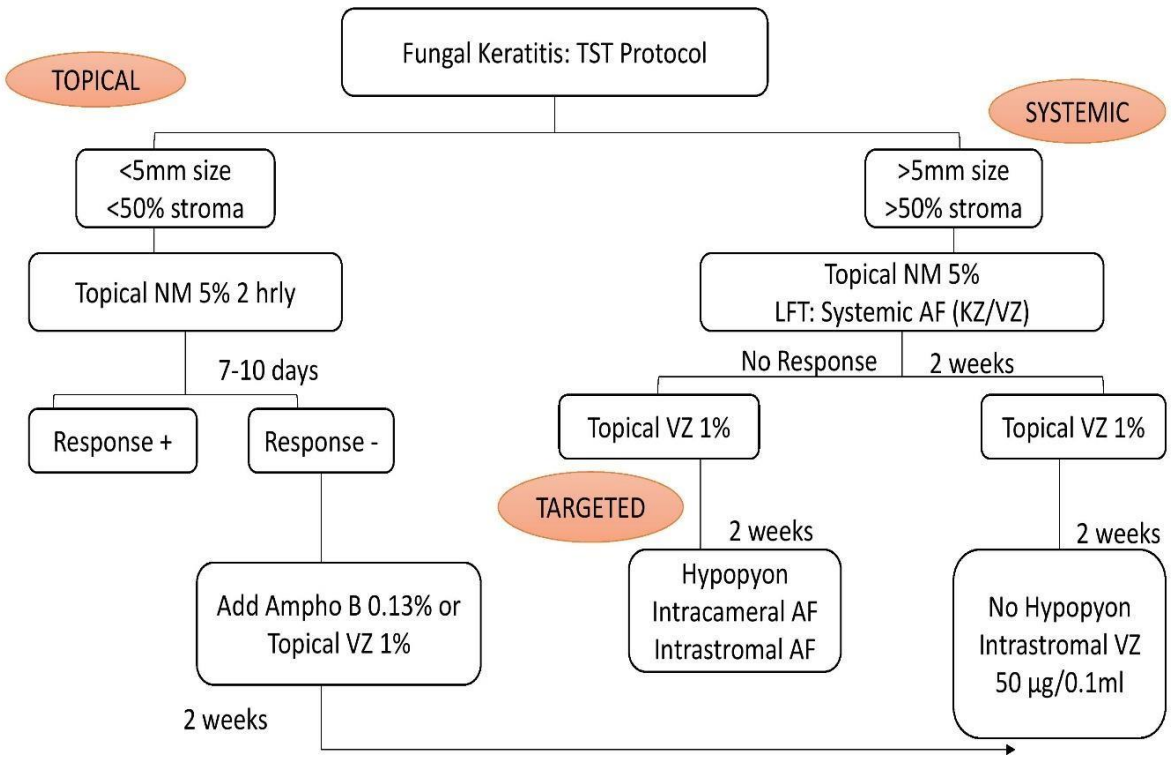
Routinelabinvestigationwasnormal.Formicrobiologicalanalysis,cornealscrapping done from edges and base of ulcer using kimura spatula/15 no. blade andsent for culture and sensitivity, 10% KOH wet preparation. Report of 10% KOHpreparation showedpresenceoffungalhyphae.

This was the case of Fungal Keratitis, treatment which was started includes i)Topical Antifungal: 5% Natamycin hourly daytime, two hourly bedtime, taper 4 to7 days interval ii) Antifungal ointment: 1% itraconazole iii) Cycloplegic: Eyedrop1% Atropine sulphate iv) Topical artificial tear v) Debridement: daily debridementwith aspatula or blade.

Discussion

Thefungalulcershavecharacteristicfindings,whichincludeelevatedareas,hyphae(branching) ulcers, irregular feathery margins, a dry rough texture, and satellitelesions.[4]

Management Algorithm for Fungal Keratitis: The TST (Topical, Systemic, andTargetedTherapy) Protocol.[5]



*NM-Natamycin,AmphoB-AmphotericinB,VZ-Voriconazole,AF-AntiFungal

Conclusion

The knowledge of clinical characteristics of fungal keratitis with its determinantswillcertainly help in early diagnosis and overall reduction in visual morbidityassociated withit.

Declarationofpatient consent

The authors certify that they have obtained all appropriate patient consent forms. Inthe form the patient(s) has/have given his/her/their consent for his/her/their imagesand other clinical information to be reported in the journal. The patients understandthat their names and initials will not be published and due efforts will be made toconceal their identity,but anonymity cannotbeguaranteed.

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Nil

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DIAGNOSIS OF MULTIPLE SCLEROSIS THROUGH THE EYES- A CASE REPORT.

Dr. Neha Kiran(JR2),Dr. Sunil Kumar (Associate Professor)

Dr. Md Raghib Tauheed, Dr. Archana Sinha, Dr. Anshu Jamaiyar

ABSTRACT

Ophthalmological and neurological signs and symptoms were assessed in a patient diagnosed with retrobulbar optic neuritis associated with multiple sclerosis (MS). The patient presented with progressive decrease of visual acuity, intermittent diplopia and photophobia. The complete ophthalmologic examination (clinical examination, visual field, optical coherence tomography) along with an MRI exam supported the diagnosis of MS with active lesions associated with retrobulbar optic neuritis. The corticosteroid therapy, followed by betaferon led to the remission of both ophthalmological and neurological signs. The multidisciplinary approach of the case played an important role in the early establishment of the diagnosis as well as the functional recovery of this patient.

INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system (CNS), of unknown etiology, in which loss of neurological functions occurs due to an autoimmune demyelination. Multiple sclerosis presents several clinical manifestations associated to brainstem lesions such as impaired motor and sensory functions, cognitive, visual, urogenital, and mental disorders. Periods of remission and exacerbation may alternate [1].

Ocular findings in MS include optic neuritis, retinitis, pars planitis, peripheral vasculitis, and ocular motility dysfunction, manifested as nystagmus or diplopia. Optic neuritis, the most common ocular manifestation of multiple sclerosis, may represent the first clinical sign of the disease. Recent long-term follow-up data shows that most patients with demyelinating optic neuritis have an excellent prognosis for recovery of central visual acuity [2].

The diagnosis is essentially clinical, although MRI, cerebrospinal fluid measurements, and visual evoked potential studies are often useful for confirmation [1].

CASE REPORT

A 30-year-old male from Gumla, Jharkhand presented with decrease of visual acuity, intermittent diplopia, photophobia in both eyes. Family medical history was non-contributory.

Ocular and medical history of this patient included: keratoconus in both eyes, operated in the right eye and craniocerebral trauma (2 years old) followed by right brachial hemiparesis. In June 2022, after an excessive food and alcohol intake, an acute diarrhea syndrome and vertigo installed. A native CT found no cerebral lesions. After the treatment of the hydroelectrolytic imbalance, the patient was discharged. Fourteen days after this event, he presented in the Ophthalmology OPD reporting decrease in visual acuity for 5 days, intermittent diplopia, photophobia, and vertigo.

Visual acuity was FC at 5m in the right eye and FC at 4m in the left eye. Intraocular pressure was 15 mmHg in both eyes. Slit lamp examination revealed segments of intrastromal rings in the right eye and a tight therapeutic contact lens in the left eye. Fundoscopic exam was normal.

Ocular motility examination revealed impaired adduction and abduction in both eyes, with the maintenance of vertical movements, esophoria at distance and dyschromatopsia in the red-green axis.

The visual field exam showed a slight narrowing in the inferior-nasal sector to 40 degrees from fixation in the right eye and up to 50 degrees from fixation in the inferior-nasal sector in the left eye.

The optical coherence tomography (OCT) showed reduction of the retinal nerve fiber layer (RNFL) thickness in the inferior sector in both eyes.

Native and contrast cerebral MRI were significant for multiple sclerosis, showing both inactive subtentorial and supratentorial lesions and 4 active, peripheral, gadolinophilic lesions, located posterior median in the pons, in the knee of the right callous body and in the left frontal and occipital lobes. The sequences of angio-MRI revealed no autoimmune vasculitis lesions.

Although an underlying systemic disease is not often found on the initial evaluation in patients with retrobulbar neuritis, the following entities are taken into account in establishing the differential diagnosis, when neurologic signs are present: Devic's disease, infectious diseases (Lyme Borreliosis, hepatitis B, cytomegalovirus, and herpes simplex), toxic neuropathy, and autoimmune disorders. In this case, the cerebral MRI supported the diagnosis of multiple sclerosis with ophthalmological onset.

Tests for other autoimmune disorders (pANCA, cANCA, totalANCA) and for Borreliosis have been performed and the results were negative.

In cooperation with the neurologist, the treatment with intravenous (iv) corticosteroids (CS) was initiated: Methylprednisolone 1 g/ day for 3 days, followed by oral prednisolone(1mg/kg daily) therapy.

At discharge, BCVA increased to 6/24 in the right eye and 6/36 in the left eye, with the persistence of a slight limitation of adduction in both eyes.

The patient was referred to the neurology department and was started the Interferon beta treatment.

At the 3 months evaluation, BCVA increased to the values of 6/9 and 6/12 for the right and left eye, respectively. The fundus exam was normal and dyschromatopsia in red-green axis persisted in both eyes. The immunomodulatory treatment was continued according to the indication of the neurologist.

DISCUSSION

Most often, the term retrobulbar optic neuritis (ON) refers to the optic neuropathy associated with a demyelinating disease. Optic neuritis is often present at the onset of MS and represents a common cause of visual loss in these patients [3].

It is estimated that in 15-20% of the MS cases, the onset manifests as optic neuritis and 75% of the patients have at least one episode throughout the course of their lives [4]. According to Rizzo and Lessel, more than 50% of the patients diagnosed with ON would develop MS in the following 15 years [5].

Optic neuritis associated with MS typically presents as a monocular, sometimes painful vision loss that occurs over hours to days and lasts for a few weeks. The neuro-ophthalmologic manifestations of multiple sclerosis can be divided into two main categories: those that affect the visual sensory system and those that affect the ocular motor system [3]. Disturbances of visual sensory function are caused by the impairment of the optic nerve in prechiasmal, chiasmal and retrochiasmal sectors. Disturbances of ocular motility or alignment may develop during the course of MS and usually result from demyelinating lesions in the brainstem that affect supranuclear, internuclear, nuclear, or fascicular pathways [6].

Virtually any type of visual field loss can occur, including altitudinal, arcuate, central or ceco-central scotoma, unilateral hemianopia or quadrantanopia. Visual field defects are often found also in the contralateral eye [7,8].

Acquired dyschromatopsia, in red-green axis is also present, the color deficit often being greater than the degree of visual acuity loss [9].

Contrast sensitivity seems to reflect disease progression and can be a valuable prognostic marker. Recent studies have demonstrated abnormalities even in patients who had a normal vision [10].

OCT is a useful tool in the evaluation of the retinal nerve fiber layer (RNFL) and the ganglion cell layer thickness. OCT studies have demonstrated the thinning of RNFL in patients diagnosed with optic neuritis due to multiple sclerosis. RNFL thickness reduction reflects the axonal degeneration and atrophy of the ganglion cells. OCT findings are related both to visual impairment as well as to disease progression [11,12]. OCT is also useful for the evaluation of treatment efficacy [13].

Magnetic resonance imaging (MRI) showing active lesions is compulsory for the establishment of the MS diagnosis. The characteristics of the demyelinating lesions include 3 mm ovoid lesions with T2 high-signal that are mostly located in periventricular area of the white matter and radiate toward the ventricular space [14,15]. Studies showed that patients with a first episode of ON, who have normal brain MRI, seem to have a lower risk of developing MS at 15 years [16].

The case discussed in this article presented with typical retrobulbar optic neuritis signs as the initial manifestation of MS, preceding other neurological signs and symptoms.

The visual field defect registered in this patient showed a slight narrowing in the inferior-nasal quadrant of both eyes. These signs are specific to demyelinating lesions of the sensory visual pathways, although the visual function damage at that moment was minimal due to early diagnosis of the disease. Acquired dyschromatopsia, in the red-green axis, was more important than the decrease of VA at the moment of diagnosis.

A short course of intravenous corticosteroids, followed by a 2-week course of oral prednisone hastened the visual function recovery and the remission of diplopia in this young patient.

Often, the diagnosis of optic neuritis is the main factor that contributes to the decision to initiate therapy in these patients. Without prior treatment with high doses of methylprednisolone, oral prednisone alone may increase the risk for recurrent ON and should be avoided [17,18].

CONCLUSION

The cooperation between the ophthalmologist and the neurologist plays an important role for both early diagnosis and periodic clinical evaluation of MS patients. As a result, the case discussed in this article benefited from early initiation of therapy. Both the neurological and the visual prognosis are favorable on long term.

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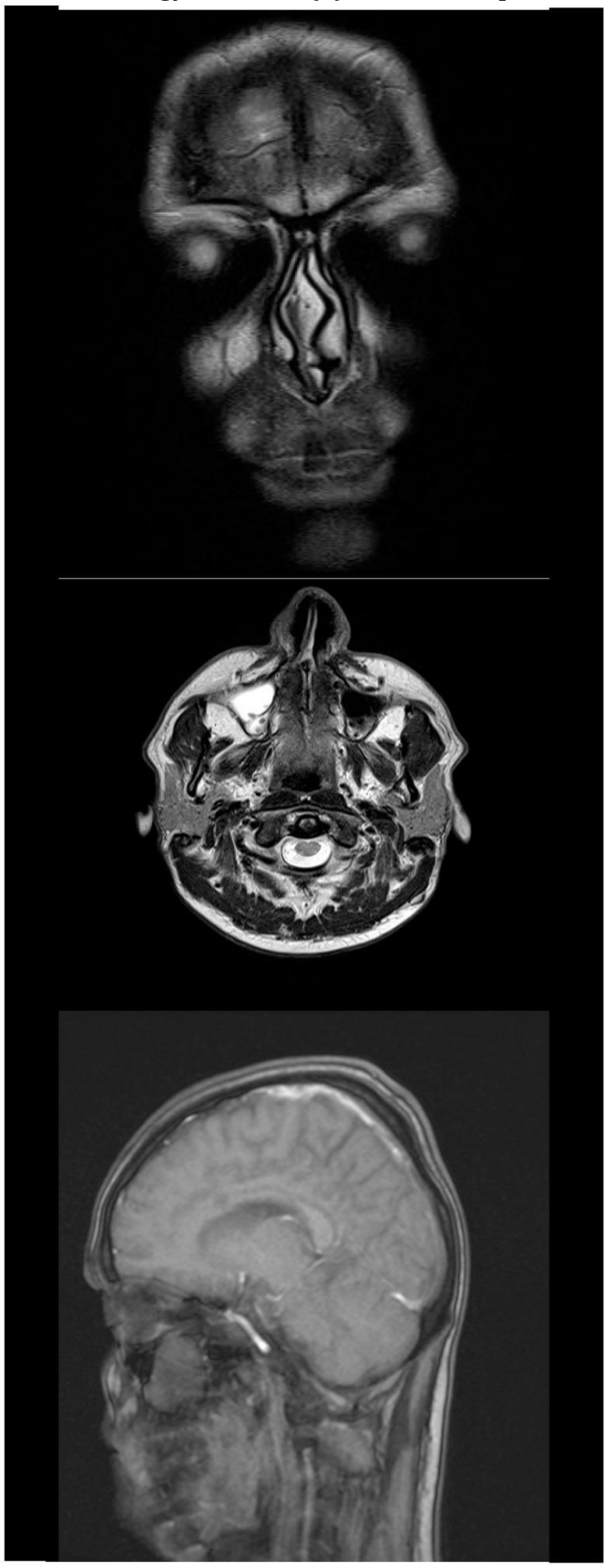

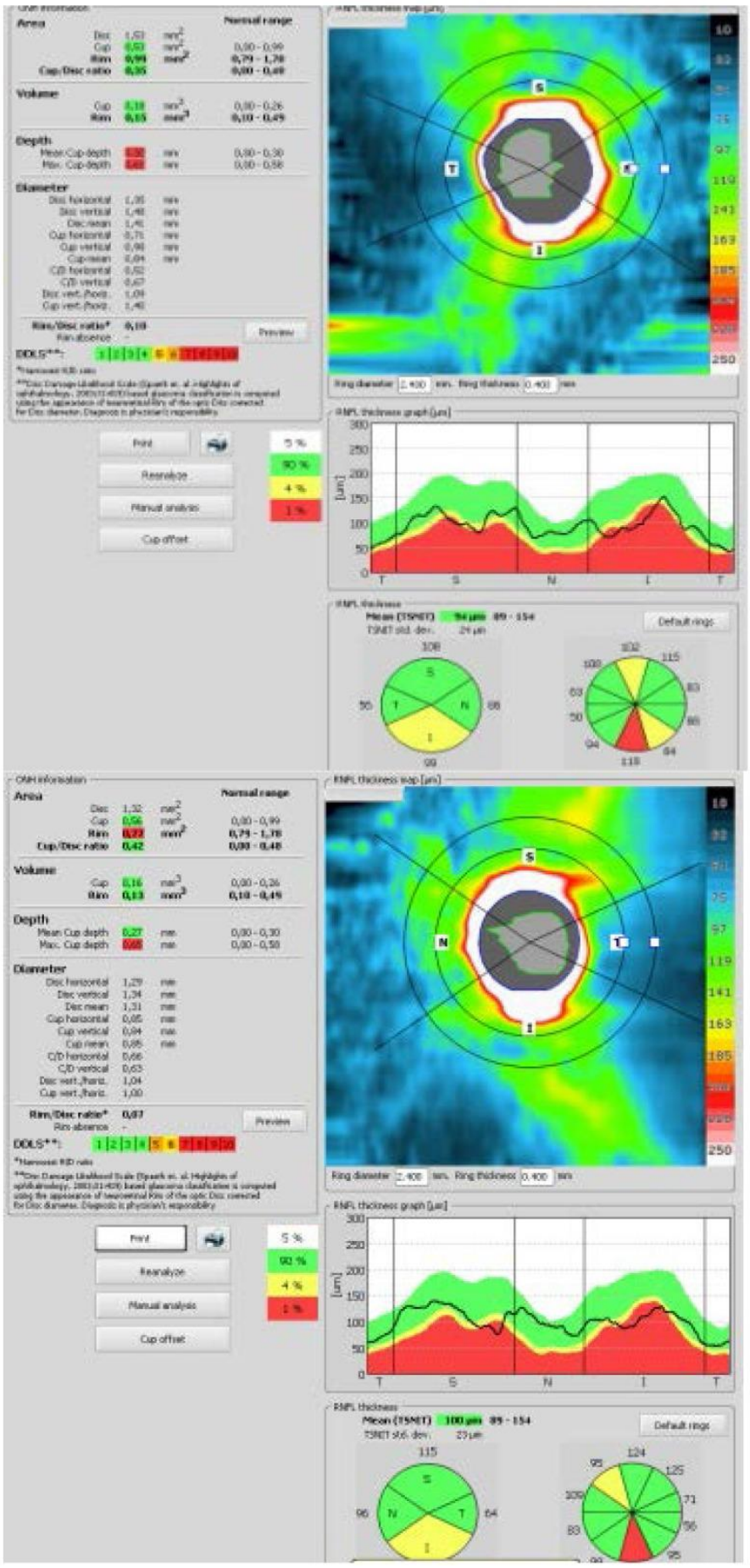
Area
Normal range
Disc 1,51 mm²
Cup 0,51 mm² 0,00 - 0,99
Rim 0,99 mm² 0,79 - 1,70
Cup/Disc ratio 0,35 0,00 - 0,48
Volume
Cup 0,18 mm³ 0,00 - 0,26
Rim 0,15 mm³ 0,10 - 0,49
Depth
Mean Cup depth 0,30 mm 0,00 - 0,30
Max. Cup depth 0,40 mm 0,00 - 0,58
Diameter
Disc horizontal 1,35 mm
Disc vertical 1,48 mm
Disc mean 1,41 mm
Cup horizontal 0,71 mm
Cup vertical 0,98 mm
Cup mean 0,84 mm
C/D horizontal 0,52
C/D vertical 0,67
Disc vert./horiz. 1,09
Cup vert./horiz. 1,40
Rim/Disc ratio* 0,10
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Preview
DDLS**: 1 2 3 4 5 6 7 8 9 10
Print
Reanalyze
Manual analysis
Cup offset
5 %
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RNFL thickness map [µm]
Ring diameter 3.400 mm Ring thickness 0.400 mm
RNFL thickness graph [µm]
[µm]
T S N I T
RNFL thickness
Mean (TSNIT) 94 µm 89 - 114
TSNIT std. dev. 24 µm
Default rings
108 S 66 N 99 I 56 T
102 115 83 86 84 118 94 93 63
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Default rings
115 S 64 N 96 I T
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Entropion correction by Jone’s procedure : A case series

DR. Marianus Deepak Lakra, DR. Manisha Kumari

Entropion is rolling inward of lid margin. Common symptoms associated with it are foreign body sensation, pain, redness and watering. In advanced cases, there is even a risk of corneal ulcer and perforation hence necessitating prompt management.[1]

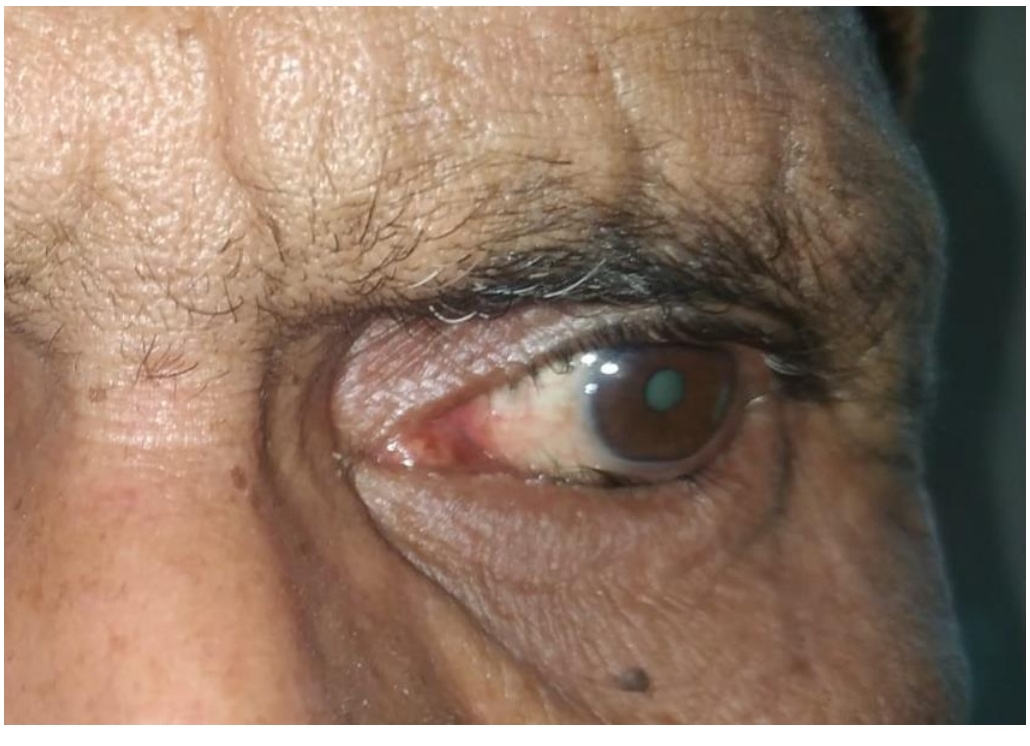
It is most commonly age related. It can also be cicatricial because of chemical injury or infection or spastic as a result of irritation or inflammation. Rarely it can be congenital.

Involutional entropion is a troublesome eyelid malposition commonly encountered in elderly patients with a prevalence reported as high as 2.1% in those aged 60 years and older.[2] Involutional entropion has classically been attributed to the triad of horizontal lower lid laxity, dehiscence of the lower eyelid retractors, and an over-riding orbicularis oculi muscle. [3,4] Surgery forms the mainstay for management of entropion. Surgical options are transverse everting sutures, lateral canthal sling, jone’s, weis, bick’s procedure.

Here we are presenting a case series of four patients with involutional entropion who were managed using Jone’s procedure.

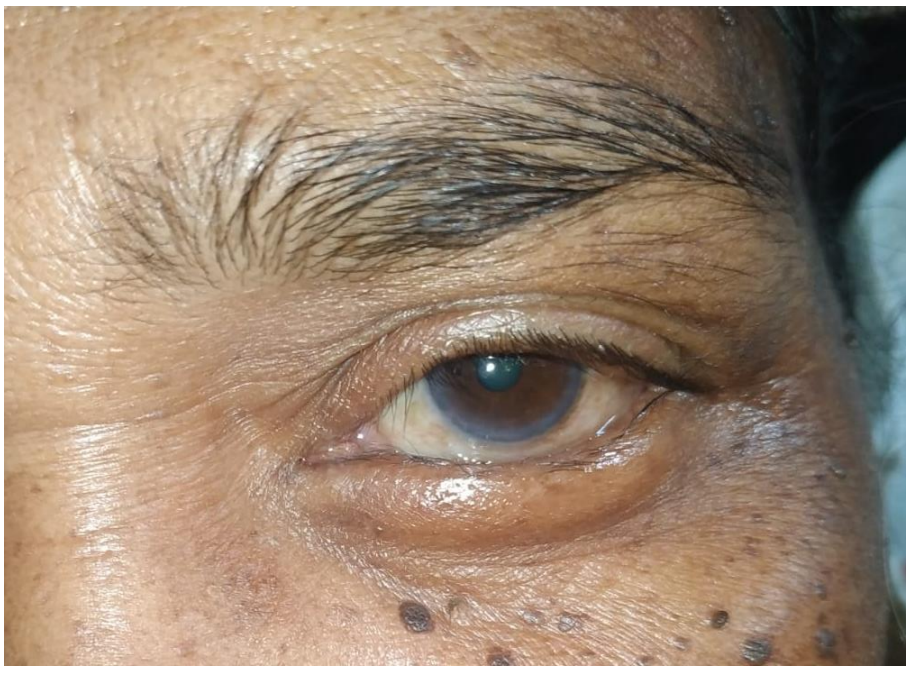
CASE SERIES

PATIENT 1:



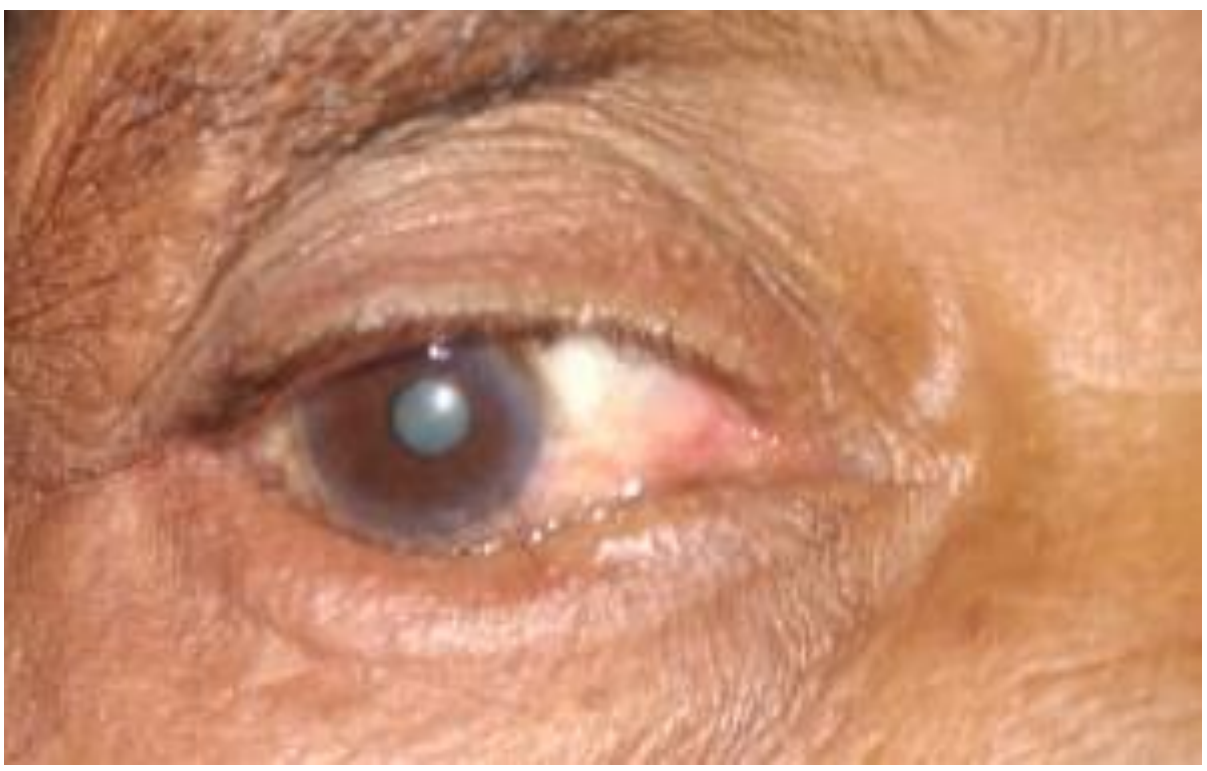
A 60 year old male presented with chief complaint of left eye foreign body sensation and redness from one year. On examination he had left eye lower lid grade 2 entropion.

PATIENT 2:



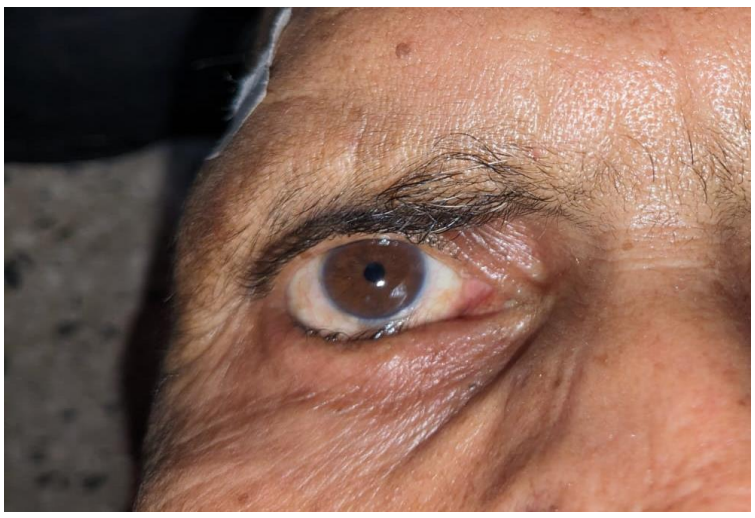
A 56-year-old female who complained of left eye foreign body sensation and watering from 5 months. She was diagnosed to have lower lid grade 1 entropion.

PATIENT 3:



A 62 year old female who presented with right eye foreign body sensation and decreased vision from 8 months. She was found to have right eye lower lid grade 2 entropion.

PATIENT 4:



A 58 year old male who had inward turning of right lower lid, right eye grittiness and watering from 6 months. On examination he had right eye lower lid grade 2 entropion.

Above patients were planned for entropion corrective surgery using Jone’s procedure. Surgery was completed using following steps –

Under local anaesthesia lower lid tractional sutures were given using 4-0 silk sutures.

Skin incision was made 4 mm below lower lash line from lateral canthus to junction of middle and inner third.

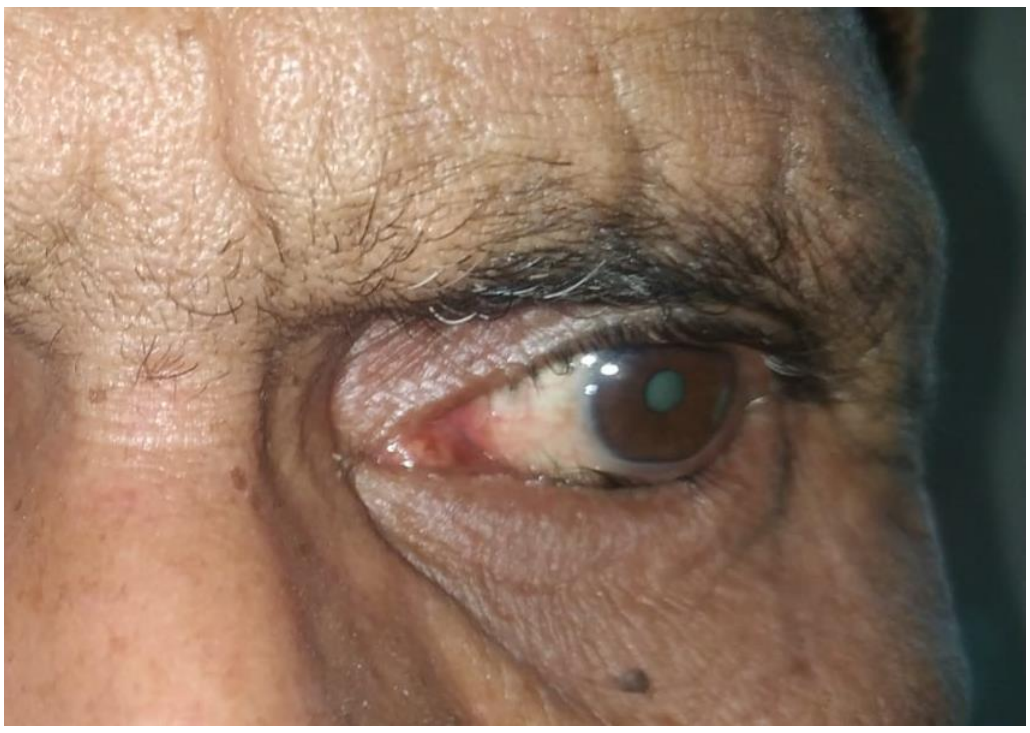
Pre tarasl part of orbicularis muscle was separated from pre septal part. Lower border of tarsal plate was identified.

The overlying fascia was separated from the pre septal muscle by blunt dissection after separating the inferior border of tarsus from orbital septum.

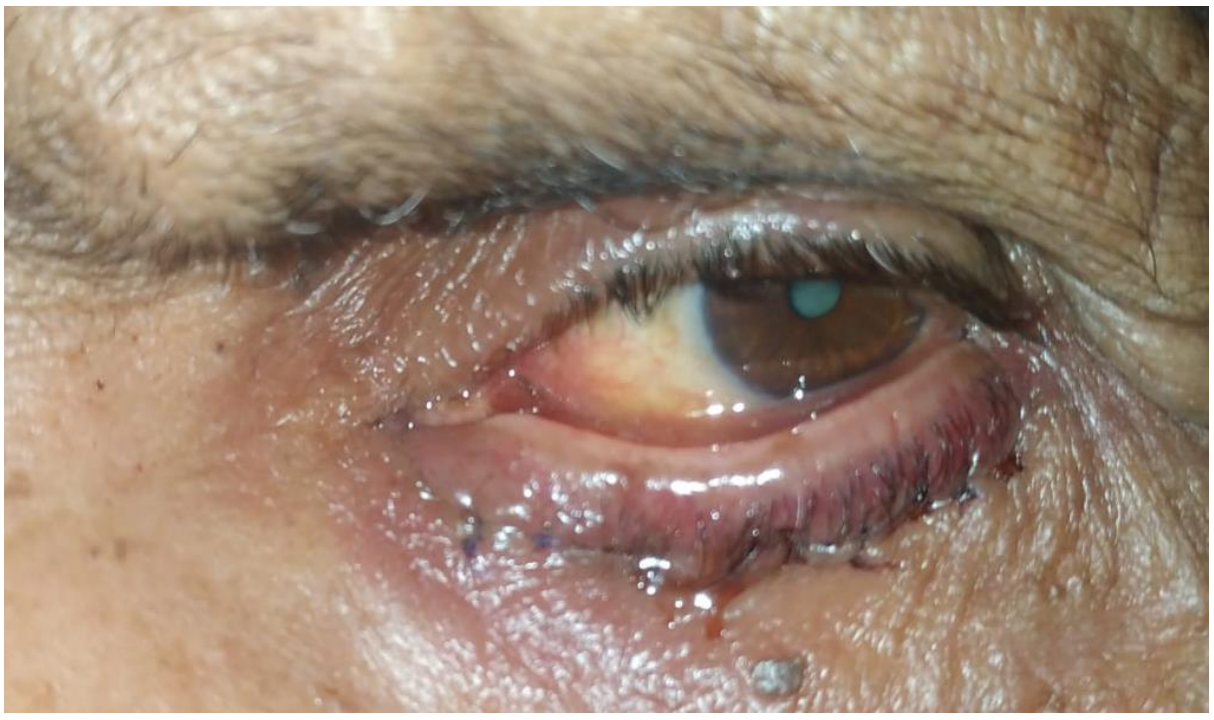
Three cardinal sutures were given using 6-0 vicryl passing through skin – orbicularis – lower lid retractor – tarsal plate – orbicularis – skin thus reattaching retactor to tarsal plate.

Remaining skin was closed with 6-0 vicryl.

PATIENT 1:

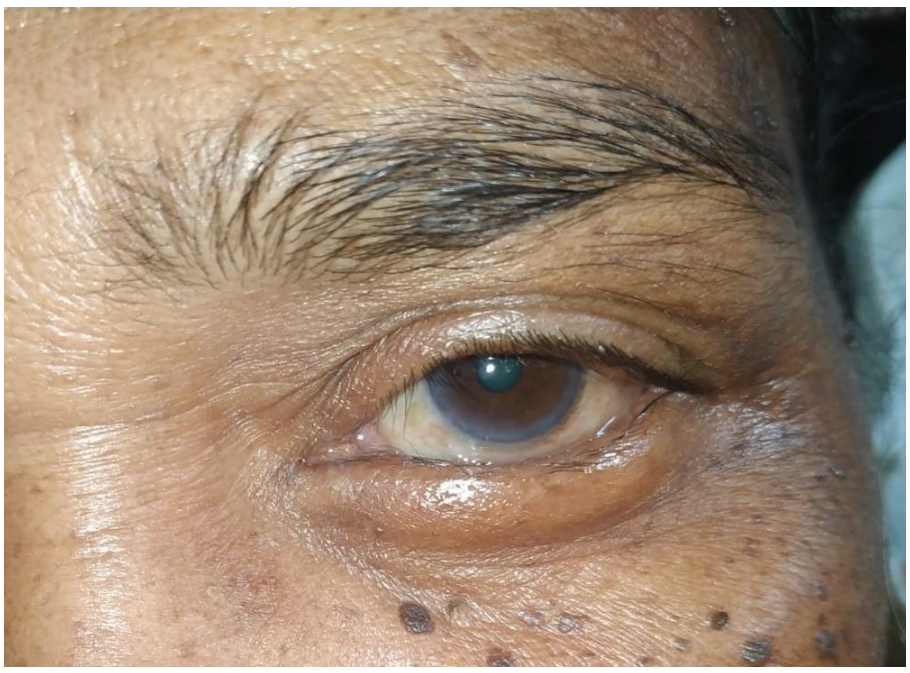


PRE OPERATIVE

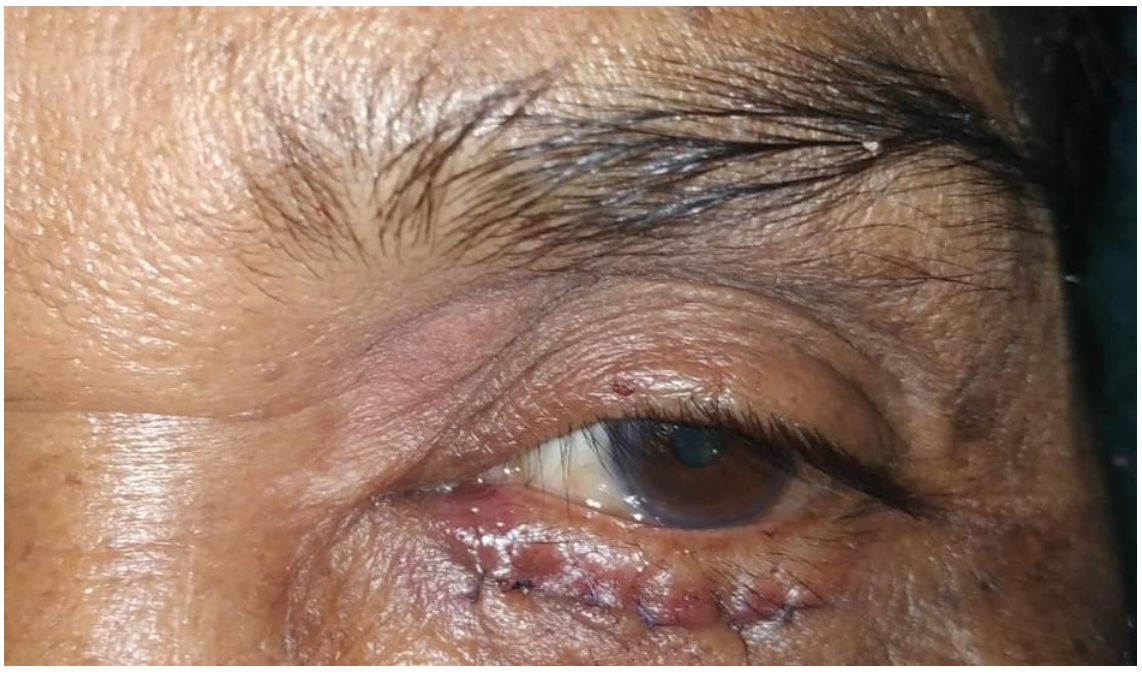


POST OPERATIVE

PATIENT 2:

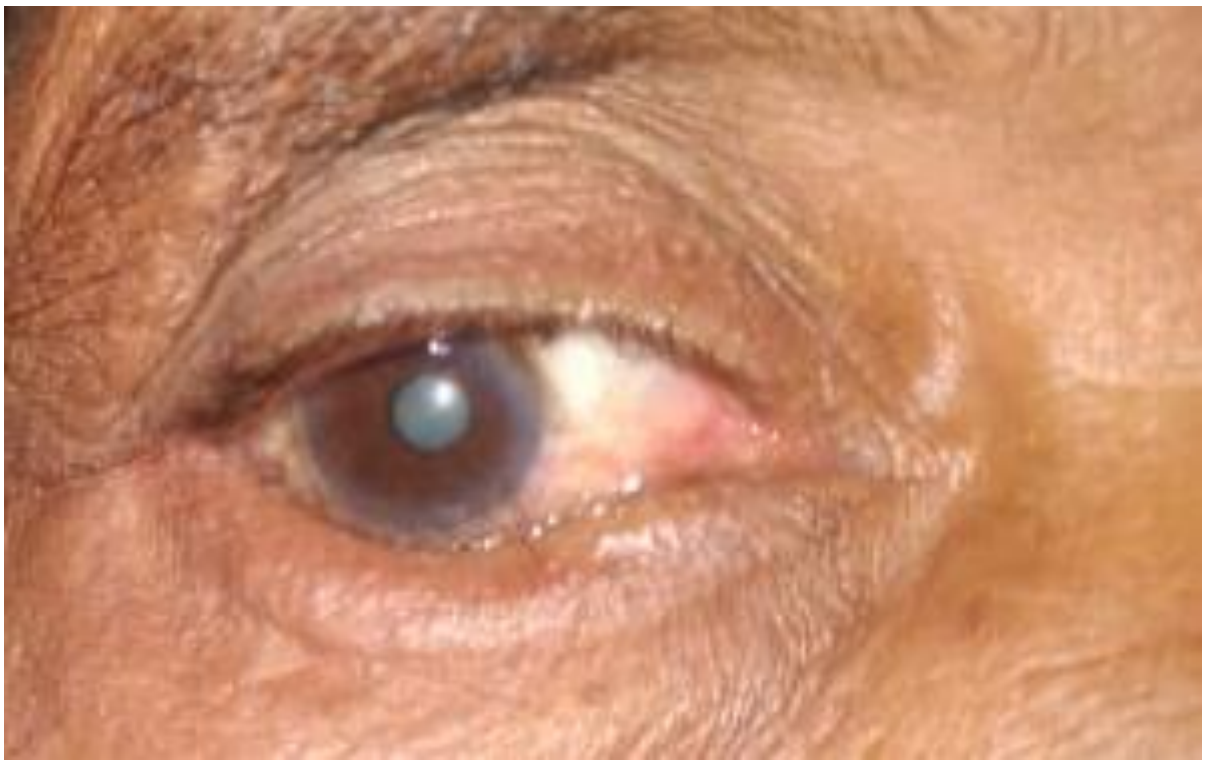


PRE OPERATIVE



POST OPERATIVE

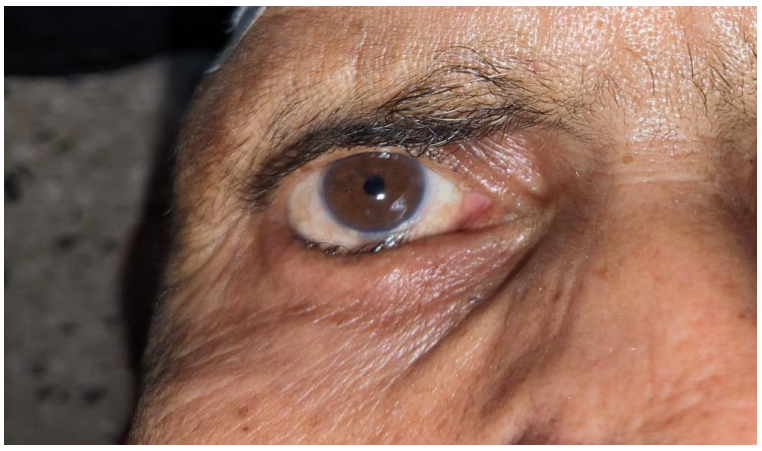
PATIENT 3:



PRE OPERATIVE

POST OPERATIVE

PATIENT 4:



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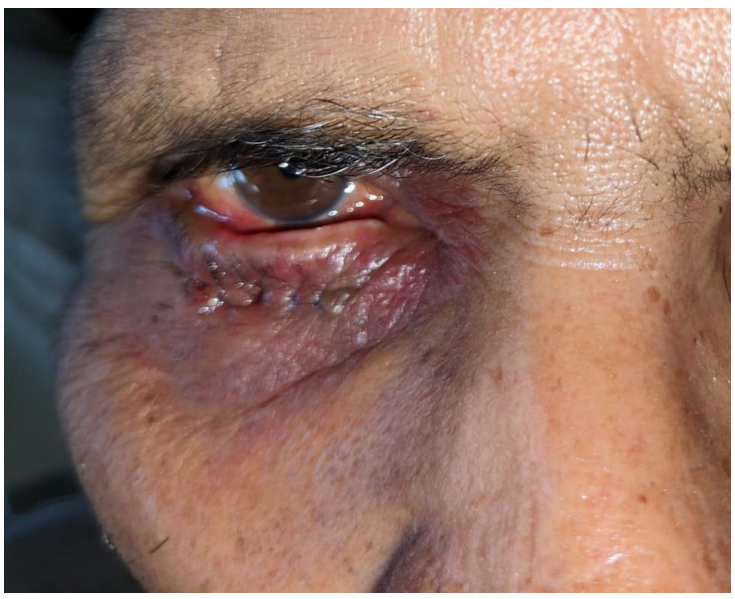

POST OPERATIVE

DISCUSSION

Entropion is graded as follows –

Grade 1 – only posterior border is turned inward.

Grade 2 – lid is turned till intermarginal strip.

Grade 3 – entire lid margin including anterior border is rolled inside.

Surgeries aim at restoring vertical and horizontal tautness of lid. In Jone's procedure, lower lid retractor is reattached to the tarsal plate. Histological examination of tarsal plate in patients with involutional entropion showed degenerated and disorganized collagen fibers with abnormal elastogenesis.[5]Because of the multifactorial nature of the disease, no entirely satisfactory surgical technique has yet been reported.[6]Boboridis et al[7] reported a recurrence rate of 5% after the Jone's retractor plication technique.

CONCLUSION

In this case series, the patients who were managed with Jone's retractor plication technique showed satisfactory post operative correction of entropion along with resolution of symptoms.All of them had good rectification at subsequent visits.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her /their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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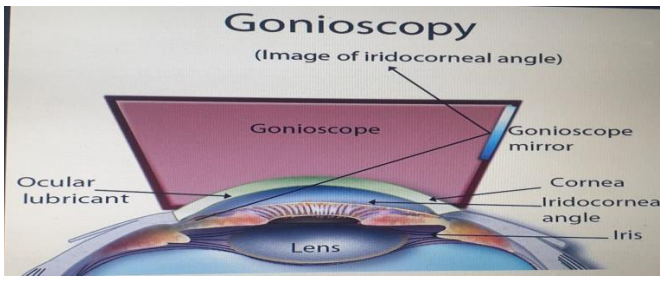
REVIEW ARTICLE

GONIOSCOPY IN CLINICAL PRACTICE

MARIANUS DEEPAK LAKRA , SHILPA HEMBROM, SHAZIA TABASSUM, MANISHA , ALINA KUJUR



Biomicroscopic technique to visualize the angle of anterior chamber of the eye.

INTRODUCTION

Trantas- first visualized the angle in keratoconus and coined the term Gonioscopy.

Salzman-He recognized as father of gonioscopy because he introduced Gonio lens.

Barkans-Used gonioscopy in the treatment of glaucoma.

The angle of anterior chamber cannot be visualized directly through an intact cornea because light emitted through angle structure undergoes total internal reflection.

Total internal reflection is an optical phenomenon that occur when a rays of light strike a medium boundary at an angle larger than a particular critical angle with respect to the normal to the surface.

Critical angle is the angle of incidence above which total internal reflection occurs.

In the eye total internal reflection occurs at the critical angle of 46 degree at the air cornea interface

Rare exception of this rule -the eyes with a very steep cornea and a deep anterior chamber like keratoglobus and keratoconus where the angle structure is directly visualized.

Type of Gonioscopy

1.Direct Gonioscopy

2.Indirect Gonioscopy

Contact lenses used for gonioscopy.

Lens	Descriptions / use
Direct Gonioscopy (Gonio lenses)	
Koeppe	Prototype diagnostic gonio lens
Richarson-Shaffer	Small koeppe lens for used in infant.
Laymen	For gonioscopic examination of premature infant
Barkan	Prototype surgical gonio lens
Thorpe	Surgical and Diagnostic lens for operating room
Swan-Jacob	Surgical gonio lens used for children.

Indirect gonioscopy (Gonio prism)

Goldman single mirror	Mirror inclined at 62 degrees for gonioscopy.
Goldman three mirror surface available for laser used.	One mirror for gonioscopy, two for retina; Coated front
Zeiss four mirror	All four-mirror inclined at 64 degrees for gonioscopy; required holder. Fluid bridge not required.
Posner four mirror	Modified Zeiss Four-mirror gonioprism with attached handle.
Sussman four mirror	Handheld Zeiss-type gonioprism
Thorpe four mirror	Four gonioscopy mirrors, inclined at 62 degrees required fluid bridge.
Ritch trabeculoplasty lens	Four gonioscopy mirrors, two inclined at 59 degrees and at 62 degrees with convex lens over two.
Latina trabeculoplasty lens	One mirror for trabeculoplasty

DIRECT GONIOSCOPY

-Useful but impractical for routine use.

-When we want to compare the angle of two eyes by looking at them simultaneously as when looking back and forth between the eyes for subtle signs of angle of recession.

-For examination of children under anesthesia (Under the microscope).

-Surgical procedure like Goniotomy.

INDIRECT GONIOSCOPY

The light rays light reflected by a mirror/ prism in the contact lens and leave the lens-air interface.

GOLDMANN TYPE LENSES.

ADVANTAGE

-Ease in learning technique.

-Less expensive.

-Greater visibility of detail than with the koeppe technique because of higher magnification.

-Stability of the lens over the cornea better.

DISADVANTAGE.

-Cannot perform dynamic or indentation Gonioscopy.

-Use of OVD as coupling agents

FOUR MIRROR LENSES -Zeiss type

ADVANTAGE:

Allows quick evaluation of the angle structures.

No coupling solution necessary.

Enables differentiation between appositional and synechial angle closure.

DISADVANTAGE:

Long learning curve.

Tendency to underestimate the narrowness to avoid inadvertently applying pressure to the central cornea, thus artificially widening the angle.

Comparison between Goldman and Zeiss Gonioscopic lens.

TYPE OF LENS	GOLDMANN SINGLE MIRROR	GOLDMANN THREE MIRROR	ZEISS FOUR MIRROR
Diameter of the corneal contact	12 mm	12 mm	9 mm
Overall diameter	15 mm	18 mm	9 mm
Size of the rim	1.5 mm	3 mm	none
Mirror angulation	62 degrees	59 degrees	64 degrees
Mirror height	17 mm	12 mm	12 mm
Distance from	3 mm	7 mm	5 mm

central cornea			
Radius of curvature	7.4 mm	7.4 mm	7.85 mm
Coupling fluid	Required	Required	Not
Dynamic Gonioscopy	Manipulation	Manipulation	Indentation

SLIT LAMP TECHNIQUE.

GENERAL GUIDELINES:

- Do an external examinationfirst**.**
- Perform tonometry before gonioscopy.
- Use anesthesia.
- Pay attention to the patient comfort.
- Pay attention to alignment.
- Use a magnification of 10-25 x.

- Use fairlyshort and narrow beam (2-3 mm).
- Use a dark room (Pupillary constriction makes a narrow angle appear more open)

TECHNIQUE.
-Patient is seated upright on the slit lamp.
-Cornea anaesthetized with 0.5% proparacaine or 4 % lignocaine.
-One drop of methylcellulose is placed on the concavity of gonio lenses with patient looking up, one edge of the lens is positioned in the lower fornix. Upper lid is elevated, and the patient is instructed to look straight.
-Lens is rotated into the position against the eye.
-lens is sterilized with 2% glutaraldehyde, 1:10 sodium hypochlorite or can be rinsed with soap/ water and allowed to dry.

THE IMAGE IS INVERTED BUT NOT LATERALLY REVERSED
USED FOR DIAGNOSTIC PURPOSE AS-
-Post traumatic increased IOP-to see angle recession.
-Rule out the foreign body in the angle after open globe injury.
-Neoplastic invasion into the angle (Ciliary body tumor).
-To view copper deposition on the Descemet's membrane.
-Epithelial down growth.
-Vitreous strands incarcerated in the surgical wound.
-To visualize the orientation of the haptics of ACIOL.

COMPARISION BETWEEN THE INDIRECT AND DIRECT GONIOSCOPY

INDIRECT GONIOSCOPY- ADVANTAGES	**DIRECT GONIOSCOPY-ADVANTAGES**
Convenient	Provides straight on view, The angle of visualization can be change by altering the height of the observer which may be enable evaluation over the curvature of the iris e.g., iris bombe or narrow angle
Patient need not lie flat	Less distortion of the AC is produced by gonio lens.
Slit lamp examination provides better details compare to direct gonioscopy techniques	The view is more panoramic.
Required less instrumentations	Lenses in botheyes simultaneously can make comparison easier
Less time consuming	Fundus examination through a small pupil is also possible
Dynamic gonioscopy is possible	No coupling agent needed
Indentation can be done	Direct view for surgery eggoniotomy

DISADVANTAGES	**DISADVANTAGES**
Mirror image is produced	Inconvenient procedure with the patient having

	to lie supine
Inadvertent pressure can open or closed the angle	Inability to performed indentation
Depth of the narrow angle cannot be seen	Low magnification
Segment view	
One eye at a time	
Viscous is required	

THERAPEUTIC USED FOR GONIOSCOPY
Laser trabeculoplasty / trabeculotomy.
Goniotomy / Gonioplasty.
Laser gonio photocoagulation.
Reopening of a blocked trabeculectomy.
Indentation gonioscopy to break an acute attack of PACG.
Trabectome surgery (MIGS)

TECHNIQUES OF GONIOSCOPY

MANIPULATION GONIOSCOPY

- Tangential view of the angle helps in identification of angle obscured by convex iris.

-Ask the patient to look towards the mirror
-Moving the mirror towards the angle being viewed.

`INDENTATION GONIOSCOPY

- Also known as pressure or dynamic gonioscopy
- Done with corneal type of gonio lenses which have smaller contact diameters than corneal diameters.
- Helpful in distinguishing appositional closure from synechial closure.
- Lens is placed centrally on the cornea and pushed posterior, so that aqueous is pushed into the angle which will deepen the appositionally closed angle.

ADVANTAGES OF INDENTATION GONIOSCOPY

- When iris covers the trabecular meshwork (TM) it's easy to mistake as the non-pigmented TM for scleral spur or Pigmented Schwalbe's line for TM or Apposition from synechiae.
- Useful when iris surface is convex.
- Done when recognition of angle structure is difficult.
- Differentiates appositional vs synechial closure in pupillary block.
- Measures extent of the angle closure.
- Identifies plateauiris configuration.
- Identifies lens induced angle closure.

VON HERRICK'S TECHNIQUE

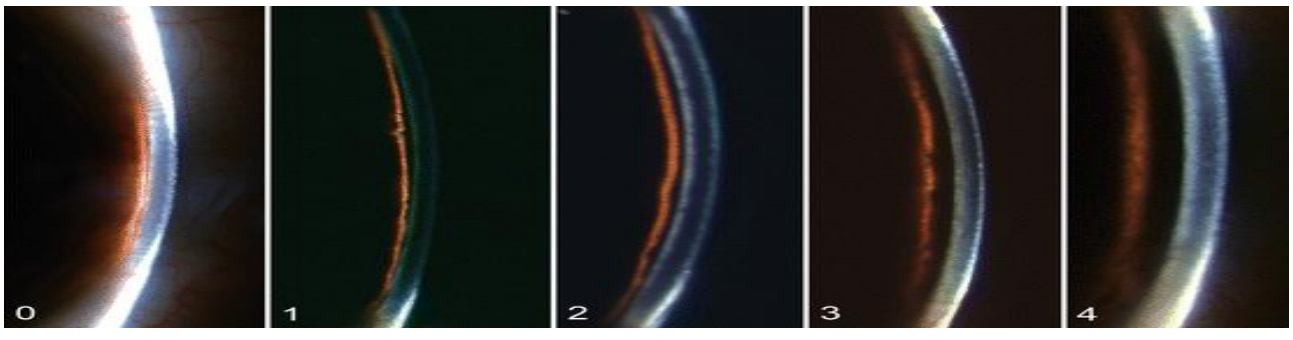
- Van Herrick's technique is qualitative method of assessing the size of the anterior chamber angle depth of the peripheral anterior chamber to the thickness of the cornea when a narrow beam is shone within the limbus at a 60 degree.

VAN HERICK'S GRADING

Width of the empty space (LACD) as compared to the corneal thickness.

Van Herick grade angle status

Width of the empty space (LACD) as compared to the corneal thickness	Van Herick grade	angle status
No black space observed	0	Closed
Less than1/4 corneal thickness	1	Extremely narrow
1/4 of corneal thickness	2	Narrow
More than1/4 to 1/2of corneal thickness	3	open
More than 1 of corneal thickness	4	Wide open



LACD = Limbal Anterior Chamber Depth

GONIOSCOPIC ANATOMY

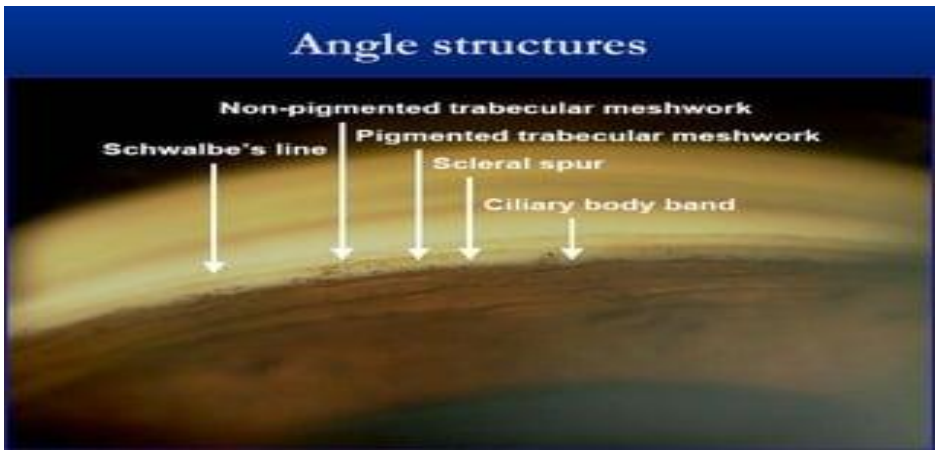
For identification of the angle, the scleral spur and Schwalbe's line are the most consistent landmarks.

Starting from the root of the iris the following structures are present normal adult angle.

1.Root of the iris

2.Ciliary body band

3.Scleral Spur



4.Pigmented trabecular meshwork

5. non-Pigmented trabecular meshwork

6.Schwalbe's line

IRIS

Contour of the iris

Concave – Shallow anterior chamber, hyperopia

Convex-High myopia, Pigmented dispersion syndrome

Flat-Deep anterior chamber

Site of insertion

Angulation between iris insertion and slope of inner cornea

Abnormal rolling – Plateau iris

IRIS PROCESSES

- Present in one third of the normal eye.
- Not indicative of any disease processes.
- Typically, grey, or brown lacy finger like extensions of periphery iris and follow the angle concavity.
- Frequently seen nasally.
- Never interfere with the aqueous flow.

DIFFERENTIAION BETWEEN THE IRIS PROCESS AND SYNECHIAE.

IRIS PROCESSES	SYNECHIAE
Fine	Broad
Extend into scleral spur	Extend beyond scleral spur

Follow concavity of the recess	Bridge concavity of the recess
Underlying structure seen	Obscure structure
Iris moves with indentation	Resist movement
Broken with the angle recession	Intact

CILIARY BODY BAND

- Width depends on the iris insertion.
- Wide in myopes, aphakia,angle recession and cyclodialysis.
- Narrow in hypermetropies, anterior iris insertion
- Width must be compared with other eye (angle recession)
- Color – Grey or dark brown

SCLERAL SPUR

It is the post lip of scleral sulcus seen as white line between ciliary body band and trabecular meshwork.

Importance – Filtering posterior trabecular meshwork and Schlemm's canal lie anterior to spur.

TRABECULAR MESHWORK

- It is pigmented band anterior to scleral spur.
- Extent of trabecular meshwork is from root of iris to Schwalbe's line is considered into two parts.
  a. Anterior- Between Schwalbe's line and anterior edge of Schlemm's canal.
     -Involved in lesser degree of aqueous flow.

  b. Posterior – Functional part. Primary site of the aqueous out flow.
     -Appearance of functional trabecular meshwork depend on amount of pigment deposition.

If Superior quadrant more pigmented than inferior – Suspect

- Exfoliation syndrome
- Pigmented dispersion syndrome
- Previous inflammation

Causes of trabecular pigmentation.

PHYSIOLOLOGICAL	PATHOLOGICAL
Senility	Pigmented dispersion syndrome Pseudophakia pigmented dispersion. Pseudo exfoliation Blunt ocular trauma Anterior uveitis Following acute angle closure Following YAG laser iridotomy Cataract surgery in advance diabetic mellitus. Neves of Ota Iris melanoma

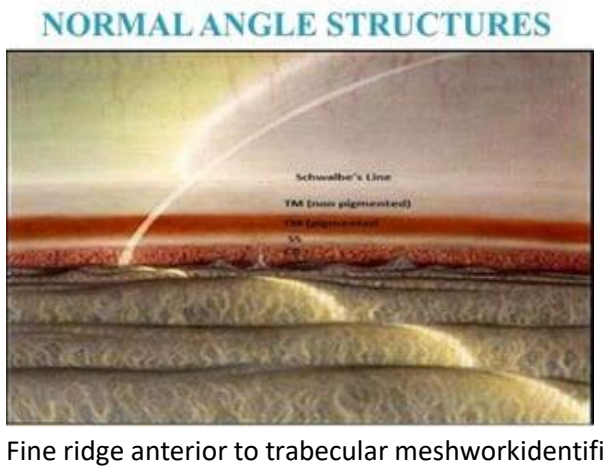
SCHLEMM'S CANAL:

- Generally, not seen.
- Lies deep within posterior trabecular meshwork and anterior to scleral spur.

IMPORTANCE- Blood in the Schlemm's canal seen as red streak in post trabecular meshwork.
When scleral gonio lens pressed too hard it raised episcleral venous pressure.

SCHWALBE LINE:

- Junction between anterior chamber angle structure and cornea where the descement's membrane terminates.



- Fine ridge anterior to trabecular meshworkidentified by a small built up of pigment.
- Landmark for trabecular meshwork in narrow angle.

HOW TO IDENTIFY:

- When a thin slit of light hits the irido-corneal angle at the angle of 10 – 15 degrees,two light reflections are seen from the external and internal corneal surfaces which pipe down at the Schwalbe's line, marking the anterior border of the trabecular meshwork.
- Corneal wedge is a useful technique to identify the trabecular meshwork in the eye that are either non pigmented or excessively pigmented.

OCCLUDABLE ANGLE:

If posterior pigmented part of the trabecular meshwork is not visible in more than 180 degrees without indentation or manipulation, this is known as occcludable.

NORMAL BLOOD VESSELS:

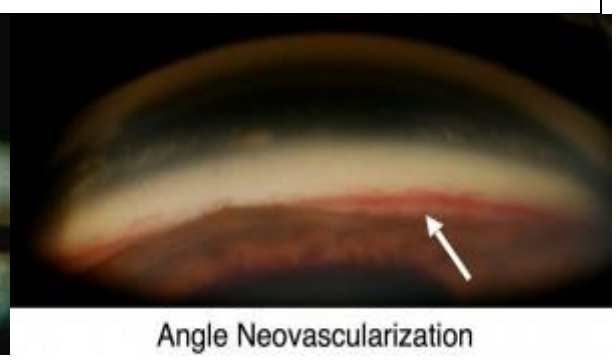
- Present in 50 to 80 % of the blue eyes and 10-16 % of brown eye.
- Three types
  a-Circular ciliary body band vessels (Most Common)
  b-Radial ciliary blood band vessels.

  c. Radial iris root vessels.

Origin of the trabecular blood vessel isUncertain.

ANGLE BLOOD VESSELS AT ANGLE

NORMAL BLOOD VESSELS	NEOVASCULARISATION
▪ Radial orientation ▪ Thick ▪ Non branching ▪ Do not cross the scleral spur	- Fine - Arborising - Crosses scleral spur



GRADING SYSTEM FOR THE ANGLE OF ANTERIOR CHAMBER

1. SCHEIE'S GRADING
2. SHAFFER'S GRADING
3. SPEATH GONIOSCOPIC GRADING
4. RP CENTRE GONIOSCOPIC GRDING

SCHEIE'S CLASSIFICATION

WIDE OPEN: ALL STRUCTURE ARE VISIBLE

GRADE 1: IRIS ROOT VISIBLE

GRADE 2: CILIARY BODY OBSCURED

GRADE 3: POSTERIOR TRABECULUM OBSCURED

GRADE 4: ONLY SCHWALBE'S LINE VISIBLE

SHAFFER'S GRADING

GRADE 4:(35-45 DEGREE) Ciliary body easily visible

GRADE 3: (25 -35 DEGREE) Scleral spur is visible.

GRADE 2: (20 DEGREE) Only trabeculum is visible.

Angle closure is possible but unlikely.

GRADE 1: (10 DEGREE)

Only Schwalbe's line and perhaps top of the trabeculum is visible.

High risk of angle closure

GRADE 0 :(0 DEGREE)

Iridocorneal contact is present.

Apex of the corneal wedge is not visible.

Used indentation gonioscopy.

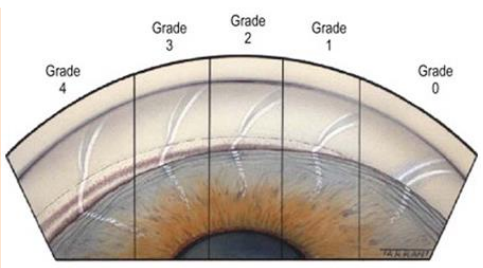
GRADING OF THE ANGLE WIDTH: SHAFFER'S

	GRADE 0	GRADE 1	GRADE 2	GRADE 3	GRADE 4
Shaffer	Closed	10	20	30	40
Modified Shaffer's	CLOSED	SCHWALBE'S LINE VISIBLE	ANTERIOR TM is visible	Scleral spur is visible	Ciliary body visible

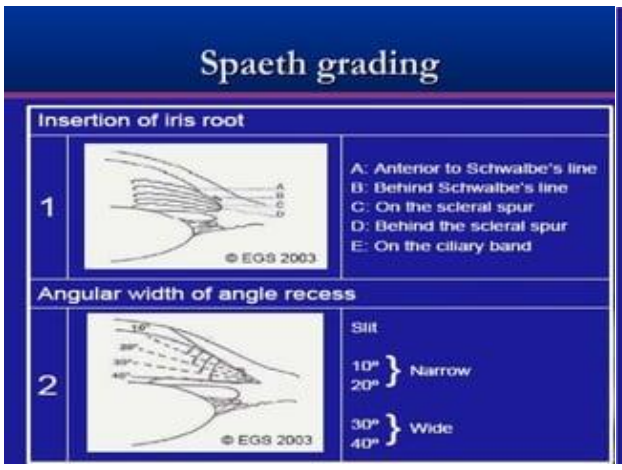
Red-High risk

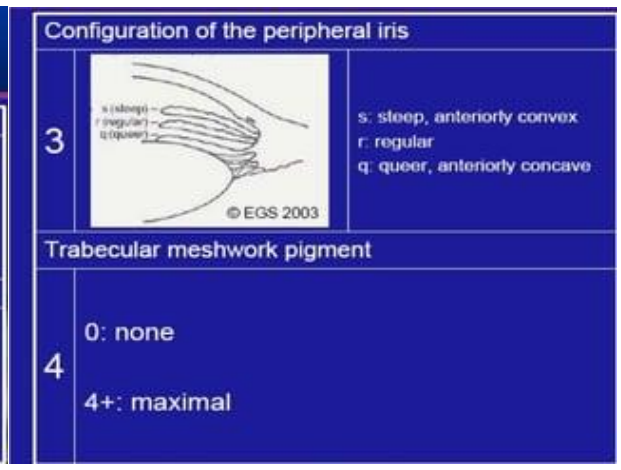
yellow-Medium risk

white – Lower risk

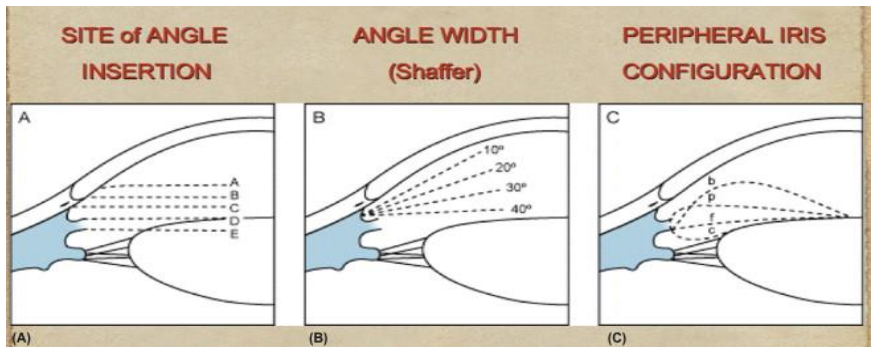


THE SPEATH METHOD:





THE NEWAR SYSTEM DISCRIBES FOUR IRIS COFIGURATION, INDICATED BY THE FIRST LETTER OF THEIR DESCRIPTIONS:b- Bowing anteriorly (1 to 4 +)



b- Bowing anteriorly (1to 4 +)
p= Plateau
f= Flat (Commonest iris appearance (Comparable to the older ‘r’ designation)
C-Concave (Comparable to the older ‘q’ designation)

R P CENTRE GRADING

N-NO dipping of the beam.
D-Dipping of the beam.
SL-Schwalbe’s line and anterior 1/3 of the trabecular meshwork.
TM-Middle 1/3 of the trabecular is visualized.
SC-Posterior 1/3 of the trabecular meshwork (location of the Schlemm’s canal visualized)
SS-Scleral spur is visualized.

CB-Ciliary body band visualized.

COMMON ERRORS WHILE PERFORMING GONIOSCOPE:

- Bright room light.
- Air bubble
- Inadequate coupling agent.
- Excessive pressure on the lens-Inadvertent indentation
- Light of slit passing through the pupil.

BIBILIOGRAPHY:

1.https://eyewiki.aao.org/User:Michael.D.Greenwood