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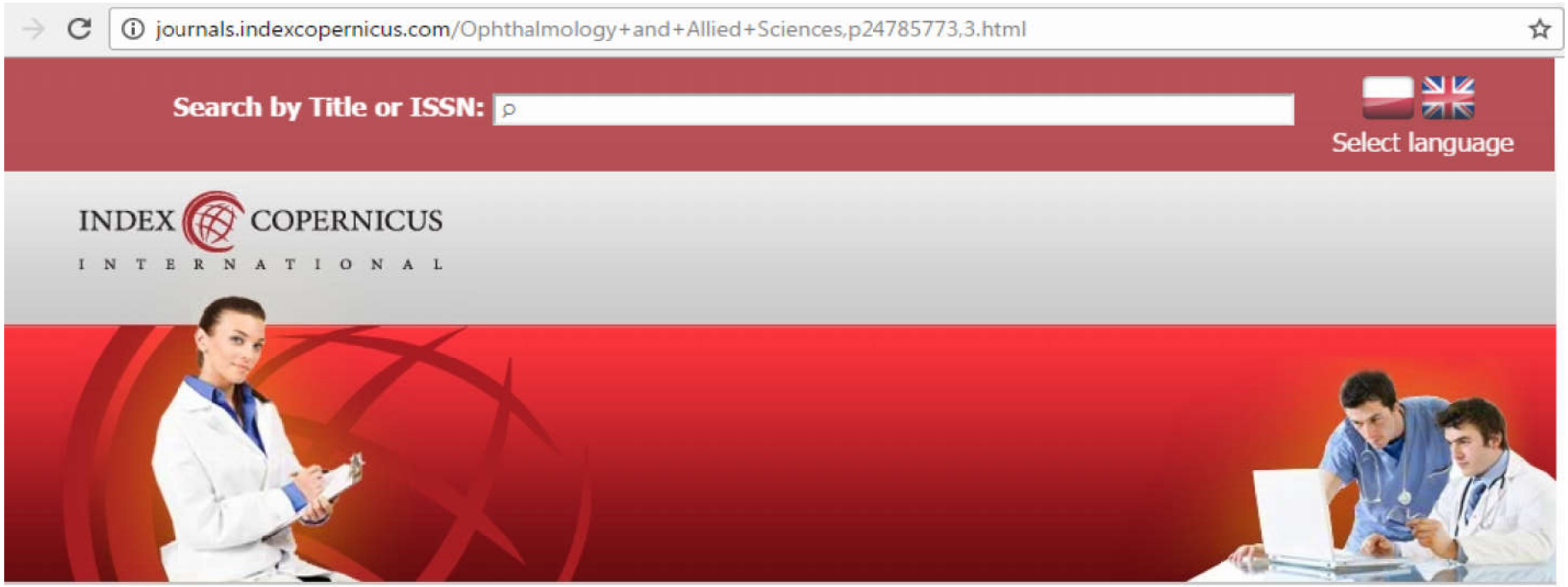

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Comparison of Optic Nerve Head and Retinal Nerve Fibre Layer Thickness Analysis by Spectral Domain OCT

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Abstract

Purpose: The aim of the study was to compare optic nerve head (ONH) and Retinal nerve fibre layer (RNFL) thickness tomographic parameters measured by Spectral Domain (SD) OCT and to identify which measurements are best able to differentiate between normal and glaucomatous eyes in Indian population. *Design*: Cross sectional prospective diagnostic study. *Methods*: Participants were recruited from a university-based clinic. 30 age matched normal and 30 Open angle glaucomatous eyes who full filled the inclusion criteria were selected. All cases were subjected for optic nerve head (ONH) and Retinal nerve fibre layer (RNFL) thickness evaluation with the SD OCT (Carl Zeiss). All parameters were compared with normal eyes. The areas under the receiver operating curves AROC were calculated for each single parameter and then compared. *Results*: Comparative analysis of SD-OCT parameters revealed statistically significant difference in all five RNFL parameters between both the groups. Most of the ONH parameters demonstrated statistically significant difference in glaucoma group when compared with control group. The inferior quadrant (0.976) and average RNFL thickness (0.970) obtained the highest AROC values in open angle glaucoma group. The rim area had the best diagnostic accuracy among the ONH parameters (AROC = 0.951). *Conclusion:* In the present study, RNFL parameters presented with better discriminatory abilities than ONH parameters in the normal and glaucomatous group. Out of all the RNFL and ONH parameters inferior quadrant RNFL thickness, average RNFL thickness and rim area had the best ability to discriminate between glaucomatous and normal eyes.

Keywords: Optical Coherence Tomography; Retinal Nerve Fiber Layer Thickness; Optic Nerve Head Analysis; Spectral Domain.

Introduction

Optical coherence tomography (OCT) was first described by Huaug et al. in 1991. It is a noninvasive technique for in vivo non-sectional imaging of ocular structures such as retina, RNFL and optic nerve head [1]. The most significant leap forward occurred when the moving reference mirror used during the collection of time-domain (TD) OCT data was abandoned in favor of Fourier analysis of collected data. As a result, the current spectral-domain (SD) OCT technology collects up to 55,000 A-scans per second with an axial resolution of 5 μm [2].

The clinical utility of SD-OCT in glaucoma has primarily focused on the evaluation of RNFL parameters because it enables a comprehensive assessment of all the RGC axons as they approach the ONH but this may not be reliable in cases of coexisting pathology. The SD-OCT is also able to provide topographical measurements of the ONH, including optic disc area, neuroretinal rim area and volume, as well as cup area and volume. The previous versions of OCT technology were also able to provide such measurements but they were less reproducible

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and accurate as a large amount of data interpretation was required [3,4]. However, the utility of the ONH parameters by SD-OCT for diagnosing glaucoma has not been well established. Some studies like by Mwanza et al have shown that ONH parameters are able to discriminate between glaucomatous age matched healthy controls similar RNFL thickness [5]. Other studies have reported that ONH parameters are inferior to RNFL measurements for glaucoma diagnosis [6]. So in our study we have compared the various ONH parameters with RNFL thickness parameters of SD-OCT to find out which are the most sensitive and specific parameters.

Methods

Study Participants and Examination

This study included 30 normal and 30 Glaucomatous eyes, recruited prospectively from the outpatient department of Ophthalmology at DY Patil Medical college Nerul, Navimumbai in a period from October 2015 to September 2016. This study was approved by the Ethics committee of the University. Informed consent was obtained from all participants.

Participants included normal subjects and glaucoma patients. Each study participant underwent complete ophthalmologic examination including a medical history review, best-corrected visual acuity (BCVA), slit-lamp examination, Goldmann Applanation tonometry, Gonioscopy, dilated fundus examination, Visual field testing (SITA 24-2 test of Humphrey visual field analyser 750i, Carl Zeiss Meditec, Dublin) and RNFL thickness with ONH analysis by Spectral domain OCT (Cirrus OCT, Carl Zeiss, Meditec Dublin,)

All of them had to meet the following inclusion criteria: Age more than 18 years, BCVA better than 20/80 (Snellen), refractive error less than-5 D or + 5D of spherical equivalent

The study included only patients with reliable VF testing with acceptable fixation losses as defined by Ocular Hypertension Treatment Study (OHTS) of less than 33% fixation loses [7]. Patients also had to have less than 20% false positives and 20% false negatives. Exclusion criteria included patients with 1) history of any intraocular surgery in normal and glaucoma group (except uncomplicated intraocular surgery), 2) traumatic glaucoma, 3) Diseases affecting vision (Pituitary lesions, demyelinating diseases) 4)Patient suffering from neurological disorder affecting visual field, 5)current use of medications that could affect visual field sensitivity, 6) uncontrolled hypertension and/or diabetes mellitus with retinopathy. Normal eyes were consecutively recruited from patients referred for refraction that underwent routine examination

without abnormal ocular finding except for clinically insignificant senile cataract on Slit lamp examination, intraocular pressure of <22mmhg on all occasions and normal Visual field test results that were defined as a pattern standard deviation (PSD) > 5% and glaucoma hemifield test (GHT) within normal limits [8]. Glaucoma patient included those with 1) Elevated intraocular pressure >21mmhg at two occasions, 2) Wide and Open angles on gonioscopy 3) Typical glaucomatous optic disc damage, 4) Eyes with Glaucomatous visual field defect showing GHT outside 99% of normal age specific limits, a PSD with p-value < 5%, or a cluster of 3 or more points in the pattern deviation plot in a single hemifield with p-values <5%, one of which must have a p-value < 1% [8]. When both eyes fulfilled the inclusion criteria, only one eye per subject was randomly selected.

Ciirus HD-Oct Measurements

The qualifying eye of each participant was dilated with tropicamide 1% and phenylephrine 2.5% eyedrops 10-15 min prior to scanning. All scans were acquired with a Cirrus HD-OCT (version 7.0.1.290) using the Optic Disc Cube 200 x 200 protocol.

OCT scans for ONH, RNFL of a signal strength of 6/10 and above without any discontinuity, blinking or involuntary saccades artifacts were only accepted. Blinking was indicated by a straight horizontal black line across the fundus OCT image whereas involuntary saccade artifacts present as breaks in the vessels within 1.73 mm radius around the ONH.

Statistical Analysis

Mann-Whitney U test and one-way ANOVA was used for comparison amongst the two groups. ROC curves were constructed to compare the diagnostic ability of parameters assessed by SD-OCT in discriminating glaucomatous and normal eyes for each parameter. The ROC curve provides the trade off between the sensitivity and 1- specificity.

All data was evaluated using statistical software Minitab13. Demographic and ocular characteristics of the normal and glaucoma groups were compared using chi-square and non-paired 2 tailed Student's t tests for categorical and continuous variables respectively. Mean values of peripheral RNFL thickness and ONH parameters were compared

between normal and glaucomatous eyes using One-way analysis of variance (ANOVA) test. Receiver operating characteristics (ROC) curves were used to describe the ability of each parameter to differentiate between normal and glaucomatous eyes. P-values <0.05 were considered statistically significant. The ROC curve plots the proportion of the false positives (1-specificity) against the proportion of true positives (sensitivity). It is useful way of showing the tradeoff between sensitivity and specificity of a given test or measure. The diagnostic performance of the test is then judged by its closeness to the upper left corner of the graph or the left-hand and the top border of the ROC space, which is assessed quantitatively by reporting the areas under receiver operating characteristic (AUCs). The AUC measures a test diagnostic ability, that is, its power to correctly classify those with and without the disease. An AUC of 1 (100% sensitivity and 100% specificity) represents a perfect test, while an AUC = 0.5 indicates a completely worthless test. The AUC was used to summarize the diagnostic accuracy of all the parameters.

Accuracy = (sensitivity + specificity) / 2.

Results

Table 1 shows the clinical characteristics of the study sample which comprised of 60 subjects in total. The normal group comprised 30 cases, 18 male and 12 female, and their average age was 57.0 ± 10.5 years. The glaucoma group comprised 30 cases, 20 male and 10 female, and the mean age was 59.2 ± 8.5 years. There was no significant difference between the normal and glaucoma group in terms of age, sex and refractive error. There was statistically significant difference between the normal and glaucoma groups in VF mean deviation (MD)(P < 0.001) and pattern standard deviation (PSD) (P<0.001).

Table 1: Patient Characteristics

Patient Characteristics	Normal Group		Glaucoma Group		
	Mean	SD	Mean	SD	P values
Age	57	10.5	59.2	8.5	0.152
Sex	18.12		20:10		0.961
Refractive error	-1.43	20.5	-1.05	2.20	0.325
VF mean deviation in dB	-1.31	1.62	-10.03	6.56	<0.001
VF pattern standard deviation in dB	1.41	0.3	6.05	3.8	<0.001

VF- visual field , SD-Standard deviation dB- decibels

In regard to the RNFL thickness in the normal & glaucoma group the results are as shown in (Table-2) In the normal group the Inferior quadrant (126.2 ± 15.1) was the thickest, followed in order by the superior, nasal and temporal quadrants.

In Glaucoma group the Average RNFL thicknesses was 66.4±15.3 μm, Superior 84.5±21.8 μm, Inferior 79.8±27.3 μm, Nasal 58.7±15.6 μm, and Temporal 52.7±12.9 μm . There was a significant reduction (p value >0.001 [S]) detected in all areas when compared to normal group.

Table 2: RNFL thickness (μm) of Normal and Glaucoma subjects

RNFL Parameters	Normal Group		Glaucoma Group		
	Mean	SD	Mean	SD	P Value
Average RNFL	102.3	9.3	66.4	15.3	<0.001
Superior	113.7	8.98	84.5	21.8	<0.001
Inferior	126.2	15.1	79.8	27.3	<0.001
Nasal	75.5	9.54	58.7	15.6	<0.002
Temporal	62.1	7.06	52.7	12.9	<0.003

Table 3 shows the ONH parameters of normal and glaucoma group. Disc area measured with Cirrus HD-OCT did not differ between the two groups (p=0.16). There was statistically significant difference between the rim area, average C/D ratio, Vertical C/D ratio and cup volume (p< 0.001) between the normal and glaucoma group.

Table 4 shows that the area under the AUC curve for inferior RNFL thickness was 0.976 with 93.6% specificity and 91.4% sensitivity. For average RNFL thickness, the AUC curve was 0.970 with 92.3% specificity and 87.7% sensitivity. The AUC curve for superior RNFL was 0.940 with a sensitivity of 86.7% and specificity of 85.6%. We found that the

inferior RNFL thickness followed by the average and superior RNFL thickness had the highest power to discriminate between glaucoma and normal eyes, with an area under the ROC of 0.976, 0.970 and 0.940 respectively.

In our study the best ONH parameters with high area under the ROC curve were Rim area with 0.951 AUC with 92.3% specificity and 87.0% sensitivity. For vertical C/D ratio the AUC was 0.930 with 91.6% specificity and 83% sensitivity. The AUC for Average C/D ratio was 0.901 with 90.1% specificity and 76.7% sensitivity.

Table 3: Optic Nerve Head Topographic Parameters of Normal and Glaucoma Subjects

ONH Parameters	Normal Mean	Normal SD	Glaucoma patients Mean	Glaucoma patients SD	P value
Disc Area (mm^2)	2.10	0.29	2.24	0.45	0.160[ns]
Rim Area (mm^2)	1.37	0.19	0.75	0.26	<0.001
Average C/D ratio	0.43	0.13	0.73	0.11	<0.004
Vertical C/D ratio	0.47	0.12	0.71	0.09	<0.002
Cup volume (mm^2)	0.23	0.14	0.567	0.33	<0.001

Table 4: Values of areas under AUC curve for ONH, RNFL OCT parameters.

RNFL Parameters	AUC (95 % CI)	Specificity	Sensitivity	Accuracy
Average RNFL thickness	0.970 (0.939 - 0.991)	92.3%	87.7%	90 %
Superior quadrant	0.940 (0.883 – 0.962)	85.6%	86.7%	86.1 %
Inferior quadrant	0.976 (0.947 – 0.998)	93.6%	91.4%	92.5 %
Nasal quadrant	0.820 (0.824 – 0.932)	88 %	65.3 %	76.6 %
Temporal quadrant	0.735 (0.801 – 0.899)	77.3 %	61 %	69.1 %
ONH Parameters				
Rim area (mm^2)	0.951 (0.917 – 0.987)	92.3 %	87.0 %	89.65%
Average C/D ratio	0.901 (0.860 – 0.955)	90.1 %	76.7 %	83.4%
Vertical C/D ratio	0.930 (0.889 – 0.972)	91.6 %	83. %	87.3%
Cup volume (mm^3)	0.862 (0.802 – 0.920)	86.4 %	79.3 %	82.8 %

Discussion

The present study was an attempt to evaluate the usefulness of OCT in detecting structural damage in Mild and moderate glaucomatous eyes. We compared RNFL and ONH OCT parameters in normal and glaucomatous eyes. We tried to identify parameters best able to discriminate between both the groups.

In regard to our study of RNFL analysis, there was significant reduction (P<0.001) in average and mean RNFL thickness in all quadrants compared to normal subjects .Our study had comparable results with a study by Mansoori et al [9]. In this study, the normal eyes had thickest RNFLT in inferior quadrant followed by superior, nasal and temporal quadrant. Statistically significant differences in RNFLT measurements were found for most of the parameters except temporal quadrant between glaucoma and normal eyes.

We found that the inferior RNFL thickness followed by the average and superior RNFL thickness had the highest power to discriminate between glaucoma and normal eyes, with an area under the ROC of 0.976, 0.970 and 0.940 respectively. Our observations were comparable to the findings seen by Budenz et al [10] in a study which included 18 mild, 21 moderate and 24 severe glaucoma subjects based on visual field damage. They reported that the RNFL thickness of the inferior quadrant, average RNFL thickness, and RNFL thickness of the superior quadrant had the highest AUCs of 0.97, 0.97 and 0.95, respectively. This study had more of severe glaucoma patients as compared to our study. In a recent study by Yüksel et al [11] that included 81 healthy eyes, 68 eyes with mild, 72 eyes with moderate and 73 eyes with severe glaucoma, RNFL thickness of the inferior quadrant (AUC = 0.74) and average RNFL thickness (AUC = 0.74) were the best parameters and performed equally in discriminating between normal eyes and those with mild glaucoma, followed by the RNFL thickness of the superior quadrant (AUC = 0.68).

Kanamori et al [12] showed an AROC of 0.93 with inferior RNFL as the best parameter for such a differentiation. Chen et al [13] showed that average RNFL was the best parameter for differentiating early glaucoma from normal eyes with AROC curve area of 0.793. However in this study a significant difference was not detected in the other quadrants,

possibly because of the difference of the sensitivity of measuring equipment's, the size of the study population, and the subjects. Manassakorn et al [14] compared the RNFL thickness and ONH parameters by Stratus OCT in 42 healthy and 65 glaucomatous eyes including 44 with early disease. They found that RNFL thickness at clock-hour 7 and 6 , inferior quadrant, and average RNFL were best at discriminating between normal and the glaucomatous group.

Park et al [15] compared stratus OCT and spectral domain Cirrus HD OCT in 72 normal subjects and 52 early glaucoma patients based on SAP results. They observed that Cirrus OCT showed better diagnostic capability (AROC of 0.94 for inferior quadrant and 0.937 for average RNFLT) than Stratus OCT (AROC of 0.898 for inferior quadrant and 0.896 for average RNFLT). This was explained by difference in measurement techniques , higher scan resolution and more accurate data registration by Cirrus HD OCT. Study by Mansoori T [9] in Indian eyes showed a largest AROC for 12 O clock hour (0.98), average RNFLT (0.96) and superior quadrant RNFLthickness (0.9). Here Superior thining of RNFLT faired better than inferior. This study was done by spectral domain OCT in early glaucoma patients only. This study showed loss mostly in superior quadrant probably due to selection of patient with RNFL loss in superior hemifield as explained by author.

Study by Rao et al (2014) [16] in preperimetric glaucoma by SD-OCT but by RTV machine showed all RNFL parameters to be be significantly thinner in glaucoma group compared to control group. In this study average RNFL thickness (0.786), temporal (0.762) and inferior (0.752) RNFL thickness parameters had the best AUCs. It is one of the few studies which has reported temporal thining & comparable AUC to average & inferior RNFL thickness.

According to our study, a significant difference was detected in the comparison of the parameters of the optic nerve disc between the normal and glaucoma groups, except the diameter of the optic nerve disc and the disc area. Our study had similar results compared to study by Mwanza et al [5] which showed that regardless of disease stage, the best parameters by Cirrus OCT were vertical rim thickness (VRT) , (0.963) rim area (0.962) vertical cup-to-disc ratio (VCDR) (0.951) average cup disc ratio (CDR) (0.930) and horizontal rim thickness (HRT) (0.883).

The largest AUCs obtained with Cirrus OCT in the study by Calvo P et al [17] were observed for vertical C/D ratio (0.980) and rim area (0.966). Here 156 glaucomatous eyes with perimetric glaucoma were evaluated. They evaluated only ONH parameters. Our observations were comparable to the findings seen in the study by Leung et al [18] examined the diagnostic accuracy of ONH parameters to detect mild glaucoma using Stratus OCT in a study comprising 41 normal and 30 eyes with early glaucoma. VRT (AUC = 0.968), VCDR (AUC = 0.962), and CDR (AUC = 0.960) had the highest ability to distinguish the two groups of eyes.

A Study was done by Garas A et al [19] in Caucasian population which showed that most RNFL thickness and GCC (Macular) Measurements had high specificity (94.6-100%) but it was low (72.0-76.3%)for optic disc parameters. Our study shows better accuracy of ONH as compared to this study. Probably because this study included half OHT and preperimetric glaucoma and perimetric glucomas, where as our study had only perimetric glaucoma. So Optic disc parameters fares better in perimetric glaucoma.

Using visual field defects as reference standard, Rao et al [20] evaluated the accuracies of the RNFL, ONH, and macular thickness scanning protocols obtained by SD-OCT to differentiate normal eyes from eyes with glaucomatous field defects and found that the RNFL and inner retinal macular thickness measurements had good diagnostic accuracy, with ROC curve areas of 0.88 and 0.87, respectively. The RNFL and macular parameters performed significantly better than the best ONH parameter, which had an ROC curve area of 0.81. This was a study in 140 perimetrically proven glaucomatous eyes but RTVue OCT was used. This was comparable to our study which showed that inferior RNFL thickness with AUC of 0.976 performed better than the ONH rim area parameter with AUC of 0.951 .This shows that results of various machine with spectral domain technology are comparable.

Another study with glaucoma, preperimetric glaucoma and healthy subjects demonstrated that RNFL thickness was better than any tested ONH parameter.This study had more of preperimetric patients (405)as compared to perimetric glaucoma (229). Lisboa et al [21] demonstrated that RNFL parameters performed significantly better than ONH for detecting preperimetric glaucoma in their observational study with RTVue SD-OCT.

Conclusions

Out of all the RNFL parameters compared our study shows that the inferior RNFL thickness followed by average and superior quadrant as the

best parameters in the differentiation of glaucoma from healthy eyes. Among ONH OCT parameters Rim area was the best parameter to differentiate between glaucoma and normal subjects. However, in our study, RNFL thickness parameters had higher sensitivity and specificity for the detection of glaucoma compared to ONH. Although each parameter alone can successfully discriminate between eyes with glaucoma and healthy eyes, combining parameters from various scanned region can improve diagnostic performance of OCT.

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Evaluation of Impression Smear Technique in Microbiological Diagnosis of Infectious Microbial Keratitis

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Abstract

Introduction: Infectious keratitis is one of the leading cause of preventable blindness, proper and early diagnosis of infectious keratitis paves way for treatment and prevention of ocular morbidity. from corneal scrapings is considered to be the Gold standard in microbiological diagnosis of keratitis. Smear from impression technique can be used for laboratory diagnosis of keratitis. *Purpose*: This study was under taken to know the sensitivity and specificity of impression smear technique in diagnosis of infectious keratitis. *Materials and Methods*: Study was conducted at tertiary hospital, after taking all enrolled patients with infectious keratitis underwent clinical examination followed by smear examination by impression technique on filter paper and corneal scraping sent to lab for gram staining and KOH mount. *Results*: Out of 50 cases Male: Female ratio was 3: 1.1. Age group was 30-70. Grams stain was positive in 70% patients with impression smear technique and in 64% patients with corneal scrapings. Sensitivity and Specificity of impression smear technique gram staining was 96.8% and 77.77% , positive and negative predictive value were 88.50% and 93.33%, accuracy of test was 90.0%. KOH mount was positive in 20% patients with impression smear technique and in 22% of patients with corneal scrapings. Sensitivity and Specificity of impression smear technique for KOH mount was 81.82% and 97.4%, positive an negative predictive value was 90.0% and 95.00%, accuracy of test was 92%. Specific therapy was started based on initial smear examination. *Conclusion*: Impression smear technique is safe simple and atraumatic procedure in lab diagnosis of infectious keratitis, with good sensitivity and specificity, it is also helpful in diagnosis of smaller lesions.

Keywords: Corneal Ulcer; Keratitis; Corneal Scraping.

Introduction

Microbial keratitis continues to be a leading cause of ocular morbidity and blindness worldwide, more so in developing countries like India [1]. Bacterial and fungal corneal ulcer occur frequently and in equal frequency but regional variations of corneal pathogens may be seen [2]. The occurrence of corneal ulceration is significantly associated with lower socioeconomic status [3]. Thus, patients with microbial keratitis are commonly managed by community ophthalmologists who do not conduct microbiological investigations [1]. It is recommended that all suspected microbial keratitis be scraped for smear and cultures before initiating antibiotic treatment [4,5]. In tropical countries like India, fungal infection amounts to high of all cases of central corneal ulceration [1]. Hence, starting empirical antibacterial treatment in all cases could be dangerous The utility of smear examination results and their impact on therapeutic decisions have already been established in the literature [5]. Impression cytology was first introduced in ophthalmology by Egbert et al. who reported the

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possibility of removing the cells from the surface of the epithelium by pressing a cellulose acetate filter paper on the bulbar conjunctiva [6]. Sensitivity and specificity of grams stain is less as compared to KOH preparation in corneal scrapings [7]. KOH smear has got more diagnostic value as compared to infective keratitis and can be utilised in clinics [8].

Instead of smear from scrapings impression smear can be used as it is safe alternative. Impression cytology is a non or minimally invasive biopsy technique which samples the superficial layers of the conjunctival and corneal epithelium IC has become a useful research tool in both basic and clinical aspects for sampling ocular surface epithelium .Impression smear technique has been used in the aetiological diagnosis of various ocular surface disorders .utility of impression smear for the detection of micro-organism invasion of ocular surface is also seen. Arora et al used impression technique for debridement and found that impression debridement improves the quality and efficacy of corneal ulcer debridement without harming the surrounding tissue [9].

Aim

To evaluate the accuracy of impression smear technique in microbiological diagnosis of infectious keratitis and compare it with conventional scrapping method

Objectives

- To evaluate the accuracy of impression smear technique in microbiological diagnosis of infectious keratitis
- To compare impression smear technique with conventional scrapping method in microbiological diagnosis of infectious keratitis

Materials and Methods

- *Type of study*: Prospective Non Randomized comparative study
- *Duration of study* :December 2015- May 2016
- *Sample size*: 50

Inclusion Criteria

- Clinically suspected cases of microbial keratitis attending ophthalmology OPD at KIMS, Narketpally

Exclusion Criteria

- Patients clinically suspected as viral keratitis
- Patients clinically suspected as non infectious keratitis

Patients under anti fungal or anti bacterial treatment

Procedure

Informed consent was taken from all patients who were willing to participate in the study, and were included in the study. Detailed history was taken for all cases. All cases were subjected to clinical examination including, slit lamp biomicroscopic examination. Xylocaine (4%) eye drops were instilled in the conjunctival cul de sac. A 3 x 5 mm precut and autoclaved strip of cellulose acetate filter paper (GSWP 02500 Millipore, 0.22 mì pore size) was applied over the lesion. The filter paper strip was gently pressed for five seconds with a blunt end of a glass rod, filter paper was gently peeled off using blunt forceps and immediately transferred on the surface of an autoclaved glass slide, leaving the impression on the slide. slides were stained with 10% KOH and Gram stain and the impression was observed under a standard light microscope . After taking impression Corneal scrapings were taken from the base and edge of the ulcers aseptically, with a sterile Bard-Parker blade (No 15), using local anesthetic solution (4% xylocaine) and were seen under direct microscopy with 10% KOH and Gram Stain. Corneal scraping was taken as golden standard for diagnosis of microbial keratitis, True Positives, True Negatives, False Positives and False Negatives were identified and statistical analysis of the test done with MedCalc Version 17.5.3 software.

Results

50 cases of suspected microbial infectious keratitis were enrolled in the study. Most common age group was 30-70 years with male to female ratio of 3.1:1. Grams stain was positive in 35 (70%) patients with impression smear technique and in 32 (64%) patients with corneal scrapings. sensitivity and specificity of impression smear technique in comparison to corneal scraping in gram staining was 96.8% and 77.77%, Positive Predictive Value was 88.50% and Negative Predictive Value was 93.33%, Accuracy of the test was 90.0% , Disease Prevalence was 64.0%. KOH mount was positive in 10(20%) patients with impression smear technique and in 11 (22%) patients

with corneal scrapings. Sensitivity and Specificity of impression smear technique in comparison to corneal scraping in KOH mount was 81.82% and 97.4%, positive predictive value was 90.0% and negative predictive value was 95.00%, accuracy of the test was 92%, disease prevalence was 22.0%. 5 Patients were negative for KOH and Gram Stain in both corneal scrapings and impression smears. Specific therapy was started based on initial smear examination.

Table 1: Age distribution of the study population(n=50)

Age	No. n=50
10-30	5(10%)
31-50	22(44%)
52-70	20(40%)
>71	3(6%)

Table 2: Sex distribution in the study population(n=50)

Sex	n =50	%
Male	38	76%
Female	12	24%

Table 3: Comparison of Impression smears and conventional scraping smears stained in KOH mount (n=50)

KOH Mount	Positive	Negative	Total
Corneal Scrapings (Gold standard)	11	39	50
Impression Smear	10	40	50

KOH Mount (Impression smear)	KOH mount (corneal scrapings) n=50 Positive	Negative	Total n=50
Positive	09 (TP)	1(FP)	10 (Test Positive)
Negative	02(FN)	38(TN)	40(Test Negative)
	11 (Total Disease -TD)	39 (Total Non Disease)	50 (T)

Disease Prevalence (TD/T)X100 = 22.00%(95% CI) 11.53% to 35.96%
Sensitivity (TP) /(TP+FN) X 100 = 81.82%(95%CI - 48.22% to 97.72%)
Specificity (TN/FP+TN)X 100 = 97.4% (95%CI - 86.52% to 99.94%)
Positive Predictive Value (TP/TP+FP) X 100 = 90.0% (95%CI - 56.03% to 98.45%)
Negative Predictive Value 94.87% (TN/TN+FN)X100 = 95.00%(95%CI- 84.42% to 98.52%)
Positive likely hood ratio = sensitivity /100- specificity = 31.91(95% CI - 4.52 to 225.33)
Negative likely hood ratio = 100- sensitivity/specificity =0 .19 (95% CI 0.05 to 0.65)
Accuracy = (TP+TN)/(TP +TN +FP +FN)X100 = 92%

Table 4: Comparison of Impression smears and Conventional scraping smears stained with Gram stain (n=50)

Gram Stain	Positive	Negative	Total n=50
Corneal Scrapings (Gold standard)	32	18	50
Impression Smear	35	15	50

Gram Stain (Impression Smear)	Gram stain (corneal scrapings) Positive	Negative	Total
Positive	31(TP)	4(FP)	35 (Test Positive)
Negative	1(FN)	14(TN)	15 (Test Negative)
	32 (Total Disease)	18 (Total Non Disease)	50

Disease Prevalence (TD/T)X100 = 64% (95% CI) 49.19% to 77.08%
Sensitivity (TP) /(TP+FN) X 100 = 96.8 (95% CI- 83.78% to 99.92%)
Specificity (TN/FP+TN) X 100 = 77.77 (95% CI) 52.36% to 93.59%
Positive Predictive Value (TP/TP+FP) X 100 = 88.5 (95% CI) 76.52% to 94.85%
Negative Predictive Value (TN/TN+FN) X 100 = 93.33 (95% CI) 66.69% to 98.99%
Accuracy (TP+TN)/ (TP +TN +FP +FN) X 100 = 90.0% (95% CI)
Positive Likely Hood Ratio = Sensitivity /100- Specificity = 4.36 (95% CI) 1.83 to 10.37)
Negative Likely Hood Ratio = 100- Sensitivity/ Specificity = 0 .04 (95% CI) 0.01 to 0.28)

Discussion

Present study was under taken to compare the impression smear technique with corneal scrapings. KOH wet mount, Gram stain and Giemsa stain are widely used for rapid detection of microbes [9], Smear examination in early stages helps in starting empirical therapy in corneal ulcers which has got greater impact on the outcome of the disease [10]. Mc Donell et al. reported that only half of all corneal ulcers seen by community ophthalmologists in southern California were sent for microbiological analysis. A Survey of 30 yrs of laboratory experience concluded that the use of Gram Stain and culture in combination seems to yield the highest percentage of bacterial recovery [12]. Sharma S and Gopinathan et al [3] in their series of fungal keratitis, have reported the diagnostic utility of smears of corneal scrapings using KOH preparation, Calcofluor White (CFW), Gram and Giemsa-stains. KOH preparation alone revealed fungal cause in 91.0%. Sharma et al [7] in their series of 114 patients of early keratitis and 363 cases of late keratitis, found that in early keratitis, KOH with CFW stain had a sensitivity of 61.1% and a specificity of 99.0%. These studies clearly establish the superiority of KOH smear of direct corneal scrapings over culture as gold standard in diagnosis of fungal keratitis. Nitin Goel and BL chowdhary have highlighted the sensitivity of KOH examination as a simple and rapid means of making a tentative diagnosis of fungal keratitis [11]. In the light of above studies, impression smear with KOH preparation were compared with corneal scrapings In the present study Keeping KOH positivity from mechanical corneal scraping as the gold standard, the sensitivity of impression smear technique was 81.8%, the specificity was 97.94%, Positive predictive value was 90.0%, Negative predictive value was 95.0% and the accuracy of the technique was 92% Which was similar to study by Arun K Jain et al in 2007 reported sensitivity of 97.14% and specificity of 92.86% in evaluation of impression smear technique in fungal keratitis [13].

In present study Keeping Gram Stain positivity from mechanical corneal scraping as the gold standard, the sensitivity of impression smear technique was 96.8%, the specificity was 77.7% with Positive predictive value 88.5% and Negative predictive value 93.3% and the accuracy of the technique was 90.0%. Sharma et al [7] in his study reported sensitivity of Gram Stain is better but less as compared to results of KOH mount in diagnosing microbial keratitis which is similar to studies by Levey et al[11] and Mc Leod et al [14].

Conclusion

In the present study, an attempt has been made to establish the use of impression cytology in the diagnosis of microbial keratitis. It is safe, simple and atraumatic procedure. It gives quick results and does not require expensive equipments. It is helpful in obtaining specimen from small lesions which is otherwise difficult by conventional scraping method .By the above study, we conclude that impression smear and mechanical scraping are equally sensitive and specific in making tentative diagnosis of microbial keratitis. However, further studies are needed to substantiate the safety of this newer procedure.

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Conjunctiva Impression Cytology as a Diagnostic Tool for Assessment of Dry Eye in Presence of Normal Tear Film Function Tests

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Abstract

Aims: To explore the conjunctival impression cytology as a tool for the assessment of the cytological changes in type 2 DM & pterygium patients with normal tear film function tests. *Materials & methods:* This case control study was conducted in Navodaya Medical College Hospital & Research Centre in dept of Ophthalmology. Total 80 cases were examined i.e.20 patients with pterygium, 20 patients with type 2DM & 40 control group and conjunctival imprint smear cytology results were analysed. The presence of local tear film abnormalities was assessed by TBUT & Schirmer test. The changes in cytomorphology was studied using conjunctival imprint cytology. The data is entered on excel sheet & analysis is carried out by using SPSS 19.0 statistical software. *Results:* In our study inspite of normal tear film function tests, abnormal conjunctival impression cytology reports were found in 10 type 2DM cases & 11 cases of pterygium. Statistically significant difference was found between study & control group ($p<0.001$). *Conclusion:* Thus conjunctival impression cytology is a useful tool to assess the dry eye in pterygium & type 2 DM patients in presence of normal tear film function tests.

Keywords: Conjunctival impression cytology; Dry eye; Tear film; Pterygium; Type 2 DM.

Introduction

Dry eye

Disorder of tear film due to tear deficiency or excessive tear evaporation, which causes damage to the interpalpebral ocular surface & is associated with symptoms of ocular discomfort.

Conjunctival impression cytology refers to application of cellulose acetate filter paper to the ocular surface to remove superficial layers of ocular surface epithelium therefore allows analysis of the cells having reached their final differentitation. Cells then further processed for histological, immunohistological or molecular analysis . It is non invasive, painless, easy to perform, yields the minimum. 3 main populations of conjunctival cells can be found in impression cytology specimens – epithelial cells, goblet cells & inflammatory cells.

AIMS: To explore the conjunctival impression cytology as a tool for assessment of the cytological changes in type II DM & pterygium patients with normal tear film function tests.

Materials & Methods

This case control study was conducted in Navodaya Medical College Hospital & Research Centre, Raichur in Department of Ophthalmolgy. Total 80 cases were examined i.e. 20 patients with type II DM , 20 patients with pterygium & 40 control group. Complete history was taken. Thorough slit

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lamp examination, Tear film break up time, RBS , Basal Schirmer test was done & then Impression Cytology was done. Patients with abnormal tear film function tests were excluded from the study TBUT was done using 2% fluorescein strip. Mean of three readings was taken. Reading of more than 10 seconds was taken as normal. RBS was performed before Schirmer's test to avoid false positive staining of conjunctiva obtained at a place where strip is placed. Basal Schirmer test was done using Whatman no. 41 filter paper strips (5x35mm) wetting of atleast 15mm was taken as normal.

Conjunctival impression cytology was done using; Acetate cellulose filter paper strips of pore size 0.20µm size, 13 mm in diameter. The filter paper was divided into two 'D'- shaped halves & smooth surface was marked. After anaesthetizing eye with 4% xylocaine drops & drying the lacrimal lake at inner canthus, filter paper strip was applied on the inferonasal bulbar conjunctiva with a blunt smooth edged forceps. The paper was allowed to remain in contact with the eye for approximately 5-10 seconds, gentle pressure was applied over strip with blunt end of the forcep & then the strip was removed in a peeling off motion. The paper was fixed for 10 minutes in a solution containing glacial cetic acid, formaldehyde, & ethyl alcohol in a 1:1:20 volume ratio.

Steps for Staining the Strip were

1. Fresh tap water – 2 min
2. 0.05% periodic acid – 2 min
3. Tap water – 2 min
4. Schiff's reagent diluted 1:1 – distilled water – 8 min
5. Tap water - 2 min
6. 0.05% sodium metabisulfite – 2 min
7. Tap water – 2min
8. Harri's haematoxylin – 30 sec
9. Tap water – 2 min
10. 95% ethyl alcohol – 2 min
11. Absolute alcohol – 3 min
12. Xylene – 20 min

Xylene makes filter paper transparent . Before mounting , the filter paper is placed with the epithelial cells facing up. The completed slides are examined by light microscopy for squamous metaplasia & goblet cell density. The grading was done according to Nelson's classification .

Grade 0: Small round epithelial cells with a eosinophilic staining cytoplasm, large basophilic nuclei with an n/c ratio of 1:2, abundened goblet cells(>5oo cells/mm2)

Grade 1: Slightly larger andmore polygonal cells ,smaller nuclei,with n/c ratio of 1:3 , goblet cells are reduced in number (350-500 cells/mm2), preserved plump , with an intensely oval shape PAS positive cytoplasm.

Grade 2: Even larger& polygonal epithelial cells, occassionaly multinucleated with variable staining cytoplasm, small nuclei with n/c ratio 1:4- 1:5, goblet cells markedly decreased in number (100-150 cells mm2) , smaller and less intensely PAS positive.

Grade 3: Large &polygonal with basophilic staining cytoplasm small pyknotic nuclei , occassionly completely absent, n/c ratio >1:6, very few goblet cells(100 cells/mm2).

The data is entered on excel sheet & analysis is carried out by using SPSS 19.0 statistical software.

Table 1: Result of impression cytology in cases & controls

Impression	Grade 0	Grade 1	Grade 2	Grade 3	Total
Cases	31	5	2	2	40
Controls	40	0	0	0	40

Table 2: Result of impression cytology in Type II DM & pterygium (Compared with control)

Disease	Grade 0	Grade 1	Grade 2	Grade 3
DM II (n=20)	10	4	3	3
Pterygium (n=20)	9	9	2	0

Table 3: Comparison between cases & controls

Cases	Mean	S.D.	t- value	'P'	Remarks
DM II	0.95	1.14	3.7	<0.001	H.S.
Pterygium	0.65	0.67	4.3	<0.001	H.S.

Results

Total 80 cases (pterygium – 20, type II DM – 20 & control group – 40) were studied & no significant difference in terms of results of TBUT & Schirmer test between study & control group population. However statistically significant difference ($p<0.01$) was found between two population in terms of impression cytology results.

In our study inspite of normal tear film function tests, abnormal conjunctival impression cytology reports were found in 10 type 2DM cases & 11 cases of pterygium. Statistically significant difference was found between study & control group ($p<0.001$).

Discussion

- Conjunctival impression cytology is a valuable tool in investigating ocular surface disorders [2].
- Can calculate goblet cell density & staging of squamous metaplasia, especially in dry eye, monitoring effects of treatment [1].
- Dr. Pushpa (2008) studied 20 eyes of patients with pterygium, DM II & allergic conjunctivitis for TBUT, Schirmer's & impression cytology. They found statistically significant difference between cases & control groups in terms of CIC [3].
- Ranjana Bandyopadhyay, Dipanwita Nag, studied ocular surface abnormalities in 50 patients with pterygium by using CIC. They found, in case of Schirmer's test (2%) had borderline results while in case of CIC significant difference was found between cases & control groups [5].
- Chan et al. have evaluated CIC technique to study ocular surface changes in pterygium. They have found significant squamous metaplasia with altered goblet cell density in these patients [6].
- Martin goebbel (2000) studied TBUT, Schirmer's test & CIC in 86 pateints with DM II. They found significant difference in terms of CIC in controls & cases groups but no difference in terms of TBUT [7].
- In our study, we found there is no significant difference in terms of results of TBUT & Schirmer's DM II can be diagnosed early by using CIC compared with commonly used tear film function tests.
- It is helpful in early establishment of treatment ocular surface disorders found in pterygium & DM II can be diagnosed early by using CIC compared with commonly used tear film function tests.
- It is helpful in early establishment of treatment .

Conclusion

Thus conjunctival impression cytology is a useful tool to assess the dry eye in pterygium & type 2 DM patients in presence of normal tear film function tests.

Abbreviations

- DM II – Diabetes Mellitus type 2
- CIC – Conjunctival Impression Cytology
- TBUT – Tear Break Up Time

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Incidence & Associated Symptoms of Convergence Insufficiency among General Population

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Abstract

Introduiction: Convergence Insufficiency (CI) is the leading cause of eyestrain, blurred vision, double vision (diplopia), and/or headaches. In the evaluation of patients with ocular asthenopia, convergence insufficiency should be suspected. Convergence insufficiency disorder interferes with a person's ability to see, read, learn, and work at near.In studies that used standardized definitions of Convergence insufficiency, investigators have reported a prevalence of 4.2% to 6% in school and clinic settings. *Objectives:* To assess the incidence & associated symptoms of convergence insufficiency among general population. *Materials & Methods*: Patients visiting the ophthalmology OPD of SSIMS & RC were included for the study. patients were given CISS(convergence insufficiency symptoms survey) questionnaire & convergence insufficiency was tested was tested with RAF rule. *Result:* In group A total 68 patients (13.6%) out of 500 were diagnosed with convergence insufficiency. Most common associated symptom was headache (32.35%) [p value<0.04]. In group B 50 patients(10%) out of 500 had convergence insufficiency. Most common associated symptom was headache(17.64%). *Conclusion*: Convergence insufficiency is more common in Group A (<18 yrs. of age) & is one of the important causes for headache (32.35%). So all the patients with headache should be tested for convergence insufficiency.

Keywords: Convergence Insufficiency; Diplopia; Ocular asthenopia.

Introduiction

Convergence Insufficiency (CI) is the leading cause of eyestrain, blurred vision, double vision (diplopia), and/or headaches. In the evaluation of patients with ocular asthenopia, convergence insufficiency should be a part of the differential diagnosis.

As convergence insufficiency is the most frequent cause for muscular discomfort it is of considerable clinical significance [1,2]. Convergence insufficiency is a common near vision problem that — due to recent scientific research — is gaining public recognition. Convergence insufficiency disorder interferes with a person's ability to see, read, learn, and work at near (close distances). In the past, convergence insufficiency disorder has often gone undetected because testing is not included in (1) pediatrician's eye tests; (2) school screenings; or (3) basic eye examination. A person can pass the 20/20 eye chart test and still have convergence insufficiency. In studies that used standardized definitions of Convergence insufficiency, investigators have reported a prevalence of 4.2% to 6% in school and clinic settings. The standard definition of Convergence insufficiency is exophoria greater at near than at distance, a receded near point of convergence, and reduced convergence amplitudes at near [2].

Objective

To assess the incidence & associated symptoms of convergence insufficiency among general population.

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Table 1:

Patients	Most Common Symptom	Second Most Common Symptom
With convergence insufficency	Headache[P value<0.04]	Uncomfortable feel while reading
Without convergence insufficiency	Headache	--

Materials & Methods

Patients visiting the ophthalmology OPD of SSIMS & RC were included for the study. Patients were given CISS (convergence insufficiency symptoms survey) questionnaire & convergence insufficiency was tested was tested with RAF rule. Patients were divided into groups. Group A (<18 yrs. of age), & group B (> 18yrs. Of age). Total one thousand patients were included for the study. Both group A & group B had had 500 patients.

Results

In group A total 68 patients (13.6%) out of 500 were diagnosed with convergence insufficiency. Most common associated symptom was headache (32.35%) [p value<0.04]. Uncomfortable feel while reading or doing close work (17.64%). In group B 50 patients(10%) out of 500 had convergence insufficiency. Most common associated symptom was headache(17.64%).

Discussion

Convergence insufficiency is one of the most frequent cause for muscular discomfort, it should be a part of differential diagnosis in the evaluation of patients with ocular asthenopia [1]. This condition is characterized by inability to converge the eyes effectively as the object of visual interest moves from distance to near. Associated with convergence insufficiency is a wide range of symptoms that can vary from mild to severe [1]. It is more common in younger age groups & most common associated symptom is headache [1,2].

Our study also showed that similar results headache being most common symptom followed by uncomfortable feel while reading or doing close work so all the patients with headache should be examined for convergence insufficiency.

Conclusion

Convergence insufficiency is more common in Group A (<18 yrs. of age) & is one of the important causes for headache (32.35%). So all the patients with headache should be tested for convergence insufficiency. This study need to be further evaluated for treatment outcome.

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Occurrence of Glaucoma among Fishermen Community of Naliya Taluka of Kutch District: An Observational Study

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Abstract

Aim: To determine the Occurrence of glaucoma and risk factors for primary open-angle glaucoma among fishermen community of Naliya taluka of Kutch district. *Material and Methods:* A Observational Study was conducted to assess the prevalence of glaucoma among fishermen community of Naliya Taluka of Kutch district. All participants had a comprehensive eye examination at the base hospital, including visual acuity using logarithm of the minimum angle of resolution illiterate E charts and refraction, slit-lamp biomicroscopy, gonioscopy, applanation tonometry, dilated fundus examinations, and automated central 24-2 full-threshold perimetry. *Results:* The prevalence of any glaucoma was 2.5%, of POAG it was 1.6%, and if PACG it was 0.6% and secondary glaucoma excluding pseudoexfoliation was 0.2%. On multivariate analysis, increasing age, male gender, myopia greater than 1 diopter, and pseudoexfoliation were significantly associated with POAG. *Conclusion:* The prevalence of glaucoma in this population is not lower than that reported for other populations elsewhere. A large proportion of those with POAG had not been previously diagnosed. Early detection of glaucoma in this population will reduce the burden of blindness in India.

Keywords: Cross Sectional; Glaucoma; Fishermen; Naliya; Prevalence.

Introduction

Glaucoma is second only to cataract as a leading cause of global blindness, and is the leading cause of irreversible visual loss, largely due to primary open-angle glaucoma (POAG). The term "glaucoma" covers a number of different eye conditions, all of which involve damage to the optic nerve. One common cause is that there is too much pressure inside the eye. This pressure is called intraocular pressure. Intraocular pressure is caused by a fluid called aqueous humor produced by the eye itself in the chambers of the eye between the cornea and the lens. If the aqueous humor is prevented from draining properly, it starts to collect and pressure within the eye builds up. This presses against the optic nerve and there is a risk that nerve cells die. Whether the increased intraocular pressure does cause damage depends on, among other things, how well the optic nerve can resist this pressure. Intraocular pressure is measured in mm Hg (millimeters of mercury), the same unit used for blood pressure. Readings between 10 and 21 mm Hg are considered normal. Someone who has glaucoma does not always have above-average intraocular pressure [1].

By the year 2020 this number is predicted to increase to 79.6 million. The majority (74%) of these individuals will have OAG. Of the group with ACG, 70% will be women and 87% will be Asian. Bilateral blindness from glaucoma is projected to affect 8.4 million individuals worldwide by 2010 and greater than 11 million by 2020. Globally, glaucoma is a significant cause of vision loss that disproportionately affects women and Asians.India

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is the second most populated country and has more than 1 billion people. The impact of visual disability and blindness from glaucoma is most likely costly. Despite its public health significance, there have been limited data available on the prevalence of glaucoma and possible risk factors for glaucoma in India. Previous population-based studies from India have reported the prevalence of glaucoma in urban populations. There has been no report on the prevalence of glaucoma in rural populations from India. In addition, in these prior studies, perimetry was limited to those who fulfilled certain conditions, such as elevated intraocular pressure (IOP) or optic disc cupping. In this article, we report on the prevalence of glaucoma in a rural population of southern India and evaluate possible associated risk factors for primary open-angle glaucoma (POAG) [2].

Material and Methods

A descriptive cross sectional survey was conducted to assess the occurrence of glaucoma among fishermen community of Naliya taluka of Kutch district.

Sampling Design

Present Study was conducted at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. Multi-stage random sampling was employed to select the study population. Trained social workers performed enumeration after a door-to-door survey; demographic details were recorded for all enumerated subjects. Subjects aged 40 years and older were invited to the base hospital for comprehensive ocular examinations.

We measured presenting distance and near visual acuity and visual acuity with best correction after refraction using illiterate E logarithm of the minimum angle of resolution charts. Blindness was defined as a best-corrected vision 3/60 in the better eye. For all fishermen subjects 45 years or older, all examinations consisted of the following: subjective retinoscopic refraction, measurements of presenting and best-corrected visual acuity, automated full-threshold visual fields for subjects with best-corrected visual acuity better than 6/60 using the C-24-2 full-threshold program on the Humphrey 650 Visual Field Analyzer, evaluation of pupillary response, external and anterior segment examination at the slit-lamp biomicroscope, measurement of IOP with a Goldmann applanation tonometer, and gonioscopy using a Goldmann lens. After papillary dilatation, grading of the lens was conducted using the Lens Opacities Classification System III9; stereoscopic examination of the vitreous, retina, and optic nerve was done at the slit lamp with a 78-diopter lens and with an indirect ophthalmoscope using a 20-D lens.

Visual field examination was deferred for participants who either refused or had visual acuity less than 6/30 in the eye to be tested. If the visual field was determined to be abnormal and/or unreliable, it was repeated on a subsequent day or on the same day after the subject had adequate rest. Criteria used to determine abnormality included abnormal glaucoma hemifield test or corrected pattern standard deviation $P \leq 0.05$. Criteria used to determine unreliability of the fields included false-positive results ≥50%, false-negative results e ≥33%, and fixation losses ≥50%, 16 IOP was measured using Goldman applanation tonometry at the slit lamp with the patient under local anesthesia; three consecutive measurements were taken and recorded, and the median measurement was considered as the IOP for analysis. Gonioscopy was attempted on all subjects using a single-mirror Goldman contact lens, and the angle was graded using the Shaffer system of classification. The clock hours for each grade were also recorded. Angles were considered open if more than 10 clock hours were clearly visible up to the scleral spur in each eye. All participants with open angles determined on gonioscopy had their eyes dilated using tropicamide, 1%, and/or phenylephrine, 10%. Participants who had dilatation deferred because of occludable/narrow angles had dilated examinations performed after laser iridotomy either on the same day or on a subsequent day.

Before dilatation, we looked for pseudoexfoliation (PXF) deposits on the corneal endothelium, iris, and iris margins using detailed high-magnification slit-lamp assessment. We also looked for changes in the angle, including increased pigmentation, PXF deposition, and PXF material within the angle during gonioscopy. After dilatation, the anterior lens surface was examined from left to right using a narrow slit-lamp beam under full illumination and high magnification. Early signs of PXF were looked for, including pregranular radial lines and established granular deposits. PXF was diagnosed by the presence of typical white deposits on the iris and/or anterior lens surface; additional sites where we found PXF included the cornea, anterior vitreous face, posterior capsule, and even intraocular lenses. Lenses were graded at the slit lamp using the Lens Opacities Classification System III [3]. Posterior segment assessments, including optic disc were performed after dilatation using both a 78-D fundus

lens at the slit lamp and indirect ophthalmoscopy using a 20-D lens. Vertical and horizontal cup-to-disc ratios were measured and recorded; asymmetry of discs, notching, bayoneting, disc hemorrhages, nerve fiber layer defects, peripapillary atrophy, tilted discs, and atrophy of discs were looked for and recorded. The width and location of the thinnest neuroretinal rim was also recorded in clock hours. A standard set of photographs of discs ranging from 0.0 to 1.0 was used to grade the disc. The study ophthalmologists were standardized to each other and to a senior ophthalmologist, considered the "gold standard" before the actual study. Such standardization was repeated during the study.

Assessment of Glaucoma

The definition of glaucoma used in this study required evidence of glaucomatous optic nerve damage and did not rely on IOPs. Such evidence was demonstrated by the presence of one or both of the following: glaucomatous changes in the appearance of the optic nerve head or nerve fiber bundle pattern perimetric defects typical of glaucomatous damage. To operationalize this criterion, subjects with a vertical cup-to-disc ratio >0.8 or a narrowest neuroretinal rim width <0.2 (including classic notching) or asymmetry <0.2 between eyes coupled with a visual field defect in the matching location were considered cases of glaucomatous optic nerve damage. In individuals in whom visual fields were not available because of poor visual acuity or poor reliability, the presence of significant optic disc excavation compatible with glaucoma, or end-stage glaucoma with severe central vision loss, or total optic disc cupping was sufficient for diagnosing glaucomatous optic nerve damage.

The following definitions were used to classify persons into specific diagnostic categories: Ocular hypertension. Intraocular pressure >21 mmHg without evidence of optic nerve damage or visual field abnormalities characteristic of glaucoma; open and normal-appearing anterior chamber angle by gonioscopy.

POAG. Anterior chamber angles open and normal appearing by gonioscopy, typical features of glaucomatous optic disc as defined earlier, and visual field defects corresponding to the optic disc changes. Primary angle-closure glaucoma. At least two of the following criteria: glaucomatous optic disc damage or glaucomatous visual field defects in combination with anterior chamber angle partly or totally closed, appositional angle closure or synechiae in angle, absence of signs of secondary angle closure (e.g., uveitis, intumuscent, or dislocated lens; microspherophakia; evidence of neovascularization in the angle; or congenital angle anomalies).

Statistical analysis was performed using SPSS 16 software. P values ≤ 0.05 have been taken to indicate statistical significance.

Results

Four thousand Nine Hundred of the eligible 5500 persons aged 45 years or more were examined. The median age of those examined was 51.0 years, and 54.9% were females. The prevalence of glaucoma of any type was 2.6%. The prevalence of POAG was 1.2%. In decreasing prevalence were primary angle-closure glaucoma, PXF, secondary glaucoma from other causes excluding pseudoexfoliation, and absolute glaucoma.

Of the 65 persons diagnosed with POAG, 46 underwent visual field testing at least once. Visual fields could not be performed on 20 of those diagnosed with POAG; 15 of the 19 subjects had visual acuity ≤ 6/60; the 4 remaining subjects had a visual acuity of 6/48. Diagnosis of POAG in such subjects was primarily based on optic disc findings alone.

After best correction with refraction, 19 persons with POAG were visually impaired, including a person who was blind. An additional 12 persons had unilateral blindness caused by glaucomatous optic neuropathy in that eye, thus 13 (20.3%) per sons with POAG were blind in one or both eyes as a result of POAG. The prevalence for POAG with increasing age is shown in Table 1.

Table 1: Prevalence of Primary Open-angle Glaucoma by Age and Gender

	Females		Males		Overall	
Age	N	N (p)	N	N (p)	N	N (p)
40-49	1100	2 (0.2,)	786	5 (0.6)	1886	7 (0.)
50-59	795	7 (0.9)	601	16(2.4)	2261	23(1.6)
60-69	607	8 (1.3)	594	9 (2.4)	1201	22 (1.8)
70 or more	154	3 (1.9)	263	14 (3.4)	417	12 (2.9)
Total	2656	28 (0.7)	2244	58 (1.9)	4900	64 (1.2)

N _ total subjects; n _ number with POAG; p _ prevalence

Of the 65 subjects diagnosed with POAG, 33 had seen an ophthalmologist previously; none of these 32 subjects had an ocular consultation within the year before our study. Six of these 32 subjects who had an ocular consultation had previously been diagnosed with glaucoma, 2 had undergone trabeculectomies, and 4 were taking antiglaucoma medications. After best corrections with refraction, six persons with POAG were bilaterally blind (Table 2). An additional 12 persons had unilateral blindness because of glaucomatous optic neuropathy in that eye; thus 18 persons (20.9%) with POAG were blind in one or both eyes as a result of POAG. We did not find a significant difference in IOP across ages.

Ocular hypertension was present in 57 subjects (1.1%; 95% CI, 0.84,1.4). The median age of those with ocular hypertension was 52.0 years (range, 40–75 years), and there was no significant gender difference in prevalence (P 0.59).

Discussion

To date, limited data from India are available on the prevalence of glaucoma. Previous studies have reported the prevalence from two urban populations in southern India. 12–14Definite POAG was considered present in 3.8% of those aged 40 years and older. This is higher than that reported for white populations [4,5] 18–20 in North America, Europe, and Australia but still lower than that reported for populations of West African origin [6].

Because approximately half of our eyes with glaucoma had screening IOPs < 21 mmHg, these eyes would have been missed had perimetry not been performed. Another reason might be the difference in the age of the study participants; the Vellore study did not include those aged more than 60 years, whereas we found significant increasing odds for glaucoma older than the age of 60 years. Our prevalence of POAG among those aged 40 to 60 years is 0.7, similar to that found in Vellore.

The potential relationship between diabetes and POAG has been controversial. The Baltimore Eye Survey [7] suggested that diabetes and POAG were not related; more recently, the Blue Mountains Eye Study [8] supported the association between diabetes and POAG. We did not find any significant association between diabetes and POAG in our study.

Females were less likely to have POAG in our study even after adjusting for other potential risk factors. This is different from what has been seen in Andhra Pradesh of south central India [9], where the odds of females having POAG were 1.3, although this was not statistically significant.

The prevalence of glaucoma in this population is not lower than that reported for white populations elsewhere. A large proportion of those with POAG had not been previously diagnosed. One fifth of those with POAG had blindness in one or both eyes from glaucoma. Early detection of glaucoma in this population will reduce the burden of blindness in India.

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Knowledge, Attitude and Practice in Self Reported Diabetics in Patients Attending Gujarat Adani Institute of Medical Science Bhuj, Kutch

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Abstract

Aim: To determine and compare current levels of knowledge, attitude and practice patterns in known diabetics attending hospital and amongst diabetic patients in villages. *Methods*: Present Study was conducted at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. 307 known diabetics coming to hospital for screening (group1) and 300 known diabetics in the villages (group 2) were evaluated and knowledge-attitude- practice regarding diabetic retinopathy was determined. *Results*: Majority 58.3% among hospital patients knew that diabetic retinopathy is a complication of diabetes as compared to only 18% of camp patients. Group 1 had better knowledge about diabetic retinopathy than group2. Attitude for eye checkup was poor both in group 1 and 2. Practices regarding need for eye checkup followed by patients in both groups were similar. *Conclusion*: The sex, literacy, occupational status, economic status and duration of diabetes mellitus were factors that were found to be significantly associated with knowledge, attitude and practices of the patients.

Keywords: Bhuj; Non-Proliferative Diabetic Retinopathy; Knowledge; Attitudes; Practice.

Introduction

Guidelines published by World Health Organization (WHO) in 2006 called DR "a leading cause of new-onset blindness and a more and 1 more frequent cause of blindness in middle-income countries." This is an emerging problem and is likely to get compounded by changing life styles and ageing of the population. Thus, the need is to develop the capacity for treatment as well as mechanisms that can screen the diabetics at the first level and at the second level those 2 who have developed diabetic retinopathy. This indicates that the diabetes patients should have good knowledge, attitude and practices. Effective management of disease, control of risk factors associated with the disease, its diagnosis and prevention awareness are associated with knowledge, attitude and 3 practices among patients.

This " KAP" study was conducted to know and compare the Knowledge, Attitude and Practices of the known diabetic patients attending hospital and those that were screened in the villages. Thus the aim of this study was to determine and compare current levels of knowledge, attitude and practice patterns in known diabetics attending hospital and amongst diabetic patients in villages.

Materials and Methods

It was a Prospective Observational study conducted at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. All were known diabetics with age >40 yrs. The two groups were Hospital – Diabetic patients attending GAIMS Hospital, Bhuj, Camp - Diabetic patients from outreach screening camps which were conducted in the villages in Kutch District.

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A proposal of this study was prepared, presented and approved by the department of ophthalmology and research and ethics committee. A total of 307 known diabetic patients were randomly recruited from both the outpatient clinics and the general medical and general surgical inpatient wards from the hospital and 300 diabetic patients were recruited from the door-to-door survey of all the households of a selected village. Knowledge, attitude and practice (KAP) was the primary outcome variable in this study. The study was conducted on a total of 607 type II diabetics. Semi structured questionnaires were constructed for face to face interviews with diabetic patients which was performed according to the guidelines of the declaration of Helsinki and approval was sought from the Ethics Committee of the institute.

Patients below 40 years and those with mental illness were excluded from the study. Eligible diabetic patient was interviewed only once during the study period. All patients were examined for presence or absence and severity of retinopathy which was graded according to the ETDRS classification of diabetic retinopathy. Whichever patient required investigations and treatment for diabetic retinopathy was admitted and further investigations were carried out.

The next part which contained data on knowledge, attitude and practices was filled on the questionnaire as the patient gave his/her responses. The questionnaire had 18 questions based on knowledge, attitude and practices of diabetes and its eye complications. Consent forms were also translated into two regional languages. Patients were interviewed to assess their knowledge of diabetes and DR, to assess their health seeking behaviour and the challenges they face in controlling their diabetes and/or in accessing services.

Statistical Analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 15 (SPSS Inc. Chicago, IL, USA) Windows software program. Descriptive statistics included computation of percentages. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

The present study was conducted in a total of 607 patients >40 years of age, out of which 307 were from hospital and 300 were from camp. Out of all the 607 diabetic patients it was found that all the patients had type 2 diabetes. The age and sex distribution among the hospital and camp patients was similar. The patients were aged between 40 and 85 years with the mean age being 59.53±9.9 years in hospital patients and 59.32±10.6 years in camp patients. Patients coming to hospital had a better socioeconomic status as compared to patients who were screened in the villages. Among hospital patients 211(68.72%) patients had per capita monthly income of > Rs.1800 and 96(31.27%) patients had per capita monthly income between Rs.1800 to <900. The per capita income was higher in the hospital patients as compared to the camp patients Among camp patients 16(5.33%) patients had per capita monthly income of > Rs.1800 and 284(94.66%) patients had per capita monthly income between Rs.1800 to <900. There was a significant difference in the literacy levels of the hospital and camp patients, the literacy levels being higher in the hospital patients as compared to the camp patients.

Out of 307 hospital patients, majority of hospital patients 179(58.30%) had formal education > 10 standard. Remaining 128(41.69%) had formal education of < 10 standard and 46 (35.93%) of them were illiterate.

Out of 300 camp patients, Majority 180 (60.0%) had formal education of < 10 standard. Remaining 120(40.0%) patients had formal education more than 10. In both the groups majority of patients were housewives, 123(40.07%) in hospital and 127(50.8%) in camp. Out of 300 camp patients, farmers 101(33.67%) constituted next major population group which was not seen among the hospital patients where patients in service were 68 (22.15%).

When the knowledge responses of both groups were compared and analysed, among hospital patients 76 (24.8%) had poor knowledge and 231 (75.2%) had good knowledge. Among camp patients, 185 (61.7%) patients had poor knowledge and 115 (38.3%) had good knowledge. (Table 1 Figure 1b) Thus, there was a significant difference in the knowledge scores of hospital and camp patients, the knowledge scores of hospital patients being better than those of camp patients.

When the attitude responses of both groups were compared and analysed, among hospital patients 153 (49.83%) had poor attitude and 154 (50.16%) had good attitude. Among camp patients, 260 (86.66%) patients had poor attitude and 40 (13.33%) had good attitude. Both the hospital as well as the camp patients had similar level of attitude towards diabetic retinopathy but hospital patients still had a better

attitude as compared to camp patients.

When the practice responses of both groups were compared and analysed, among hospital patients 24 (7.81%) had poor practice and 283 (92.18%) had good practice. (Table 1 Figure 1a) Among camp patients, 248 (82.6%) patients had poor practice and 52 (17.3%) had good practice. Thus, hospital patients showed better practices as compared to camp patients.

When the total KAP scores of both groups were compared and analysed, among hospital patients 246 (80.13%) had good KAP score and 61 (19.87%) had poor KAP score. (Table 1 Figure 1a) Among camp patients, 55 (18.33%) patients had good KAP scores and 245 (81.67%) had poor KAP score. (Table 1 Figure 1b) Hospital patients showed better KAP as compared to camp patients. When the KAP scores of both the groups were analysed they were found to be statistically significant.

The people in "good" and "poor" knowledge, attitude and practice groups were then analysed statistically using the χ2-test for association with variables such as sex, literacy and duration of diabetes mellitus. The value of $P < 0.05$ was considered statistically significant.

On statistical analysis, sex had significant association with good attitude (p=0.002) and good practice patterns (p=0.0001) showing that females had a better attitude and better practice patterns as compared to males. Literacy showed a significant association with good knowledge (p= 0.002), good attitude (p = 0.002) and good practice culture ($p < 0.001$).

Duration of diabetes mellitus showed significant association with possessing good knowledge ($p < 0.045$) showing that as the duration of disease increases patient is more aware of DR and has better knowledge scores. Attitude (p=0.24) and practice patterns (p=0.27) did have any association with duration of diabetes.

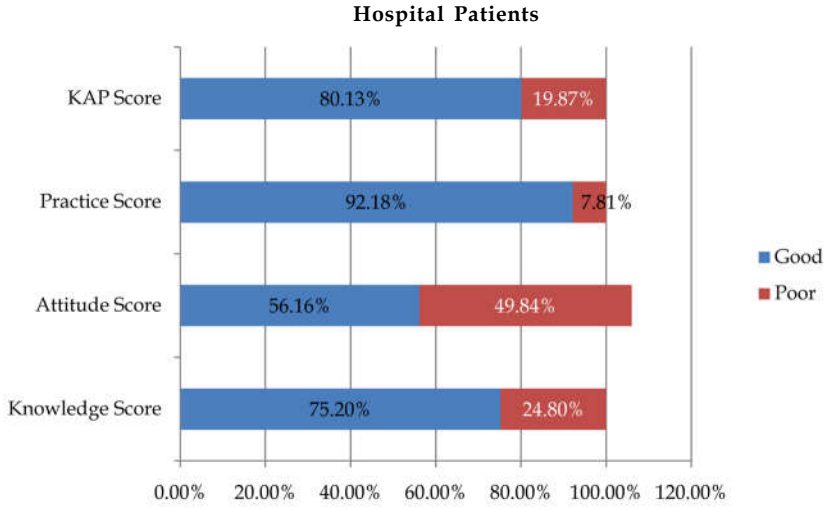

Fig. 1: Good and poor scores of KAP in hospital patients

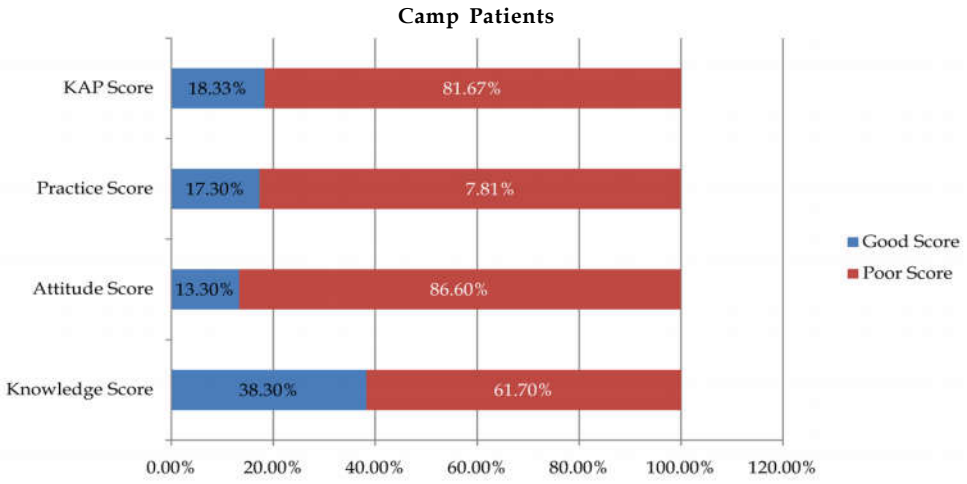

Fig. 2: Good and poor scores of KAP in camp patients

Discussion

It is well known fact that prolonged duration of disease results in various disease-associated complications mainly as a result of ignorance and poor disease control. This leads to the disease-related morbidity. Thus, the main objective of this study was to ascertain the awareness level and the practice patterns of the people. Among hospital patients majority 51.7% knew that diabetes affects vision in comparison to camp patients in whom more than half 65.67% did not know that diabetes affects vison. There was a significant difference in the knowledge between hospital and camp patients regarding the effect of diabetes on vision. Thus, camp patients were less aware than the hospital patients, that diabetes affects vision which was more than 37.1% as quoted by Rani PK et al [5,6] and 46.6% as quoted by Thapa R et al. However the population studied by Rani PK et al was rural general population whereas the present study included only known diabetic individuals.

Diabetic individuals are expected to be more aware regarding diabetic retinopathy as compared to non-diabetics. When asked if DR is a complication of DM or not, among hospital patients 58.3% were aware of DR and among camp patients 18% were aware of DR. According to the Chennai urban rural epidemiology study [7], only 19.0% (4951/26,001) of the total population and only 40.6% (621/1529) of diabetics were aware that DM could produce some complications. In another KAP study by Rani et al. 966 (49.9%) individuals had knowledge about diabetes and 718 (37.1%) about diabetic retinopathy.

Nearly half of the population of both hospital patients and camp thought that regular eye check up was not required periodically. This was different from a study by Hussain et al [8]. Which revealed that 75.3% (4378/6211) strongly felt that all patients with DM should undergo periodic eye check-ups irrespective of visual loss.

Source of information for DR in hospital patients for 50.16% was their general practitioners, for 42.9% patients it was ophthalmologist and optometrist for 6.5%. 0.32% of them claimed to have got information from family members, friends or relatives who suffered from diabetes. None of the patients obtained information from mass media such as television, radio, newspaper, magazines. In camp patients the source of information for 11.3% was their general practitioners, for 73.6% it was their ophthalmologist and for 4% patients it was optometrist. 10.3% of them claimed to have got information from eye check up camps held in their villages. 0.6% of them claimed to have got information from family members, friends or relatives who suffered from diabetes. Thus, media played no role in disseminating information in present study population, unlike in the study by Saikumar et al (2007) [9] where media was the main source for awareness. This finding emphasizes the need of better media coverage to spread the awareness about diabetes and diabetic retinopathy in our country.

In the present study literacy and duration of diabetes showed a significant association with levels of knowledge. When asked if DR causes blindness or not, 51.79% answered yes, 48.21% said don't know among hospital patients. Among camp patients 20.3 % said yes, 5.6% said no and 74% said don't know. This was far less than the findings of Hussain et al [8] which showed that about 66.6% of the study population knew that diabetes could cause blindness. 98.3% patients among hospital patients said that they will go an ophthalmologist for eye check-up and 1.63% said will go to general practitioner. Among camp patients 72.6% said ophthalmologist, 4.3% said optometrist and 23% to a general practitioner [9].

When asked whether their eyes had a dilated fundus examination or not, among hospital patients 96.74% said Yes and 3.26 said No. Among camp patients 70% said Yes and 30% said No. Namperumalsamy et al [10] observed that only 6.8% of the patients with DM had undergone dilated fundus evaluation before their screening project and only one-fourth of the screened population with retinopathy returned for examination at the hospital. This highlights the fact that despite good knowledge and attitude, insufficient motivation of the patients with DM for evaluation and follow-ups is a potential barrier to improve their practice patterns.

When asked if blood sugar control is required to prevent DR, among hospital patients, 0.98% strongly disagreed, but maximum i.e. 31.6% strongly agreed 26.06% moderately agreed and 41.3% were neutral about it. Among camp patients 56.3% were neutral about it followed by 40% who moderately agreed, 2.3% strongly agreed, 1% moderately disagreed and 0.33% strongly disagreed.

Among the known hospital diabetics 75.2% had good knowledge and 24.8% had poor knowledge, 50.16% had a positive attitude and 49.8% had negative attitude, 89.5% had good practice patterns and 10.4% had poor practice patterns. Although half of them followed general diabetic care, 61.8% hospital patients had undergone screening for retinopathy vis a vis 33.3% among camp patients had undergone

screening for retinopathy.

This was different as found in a study conducted in a South Indian state by Hussain et al (99) in which among 6211 people. Among the known diabetics 40.7% had good knowledge, 53.8% had a positive attitude, and 57.6% had good practice patterns. Also, 61.8% pf hospital patients and only 33.3% of camp patients were actually screened for diabetic retinopathy, which reflects insufficient motivation among camp patients with DM.

Our survey population showed a significant association between literacy and good knowledge as well as a positive attitude in the hospital group and also the camp population, which is similar to the results of other population studies [11,12].

There was a statistically significant association between monthly income and knowledge on DR. Diabetic patients who had higher monthly income had better knowledge on diabetic retinopathy. This explains the higher level of education among the hospital patients as 5 compared to the camp patients. Rani PK et al [5] in a study done in India found that knowledge on diabetes and DR being significantly higher in those with upper socioeconomic status compared with extreme lower socio-economic.

Conclusion

This KAP study showed difference in level of Knowledge, Attitude and Practices between hospital and camp patients and showed that hospital patients were better aware of diabetic retinopathy than camp patients. Study emphasises the need to create awareness regarding diabetic retinopathy and to motivate them to improve their practices towards diabetic retinopathy. The level of education, economic status and duration of diabetes were the factors that were found to be significantly associated with knowledge, attitude and practice on diabetic retinopathy between the two groups and the total study population. Better literacy is means to better public awareness; however, the trend for poor practice patterns needs to be drastically changed with aggressive public motivation emphasizing the necessity of screening for retinopathy and periodic follow-ups.

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Retinal Changes in Pregnancy Induced Hypertension and Its Impact on Vision

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Abstract

Introduction: Pregnancy Induced Hypertension (PIH) is an entity involving multiple systems, changes during pregnancy bring about many alterations in human body which are reversible. PIH in turn has got its effect on the visual system of the eye involving the retinal vasculature and producing myriad signs and symptoms. *Purpose*: This study was undertaken to bring out the various retinal changes in pregnancy and their post partum reversal time. *Materials and Methods*: This was a prospective study done on 100 patients with Pregnancy Induced Hypertension (PIH) who were referred to Department of Ophthalmology, KIMS, Narketpally, from October 2015 to September 2016. Detailed ocular examination including fundoscopy was done in all 100 patients and results were interpreted. *Results*: Out of 100 patients of pregnancy-induced hypertension (PIH) 16 were gestational hypertension patients, 60 were pre-eclamptic patients and 24 were eclamptic patients. Headache was the most common symptom encountered in 68% of cases Visual disturbances were seen in 16% of cases .percentage of patients developing retinopathy due to PIH increased as we moved from mild preeclampsia group to eclampsia group. The relationship between retinal changes and severity of PIH was statistically significant (<0.0001) . Grade 4 retinopathy changes were seen in systolic blood pressure >180mm of Hg and diastolic blood pressure > 120 mm Hg. The percentage of patients developing severe retinopathy changes due to PIH was directly proportional to BP. Range of gestational age at which most of the patients developed PIH was from 30-34 weeks .Pregnancy induced retinopathy changes were seen more in primigravidas. Reversal of signs and symptoms l occurred in all the cases by 10 weeks postpartum. *Conclusion*: We conclude that fundus changes in PIH are proportional to severity of PIH and BP, all signs and symptoms including visual acuity are reversible with proper control of PIH and periodic fundus examination and follow up is mandatory to prevnent complications..

Keywords: PIH-Pregnancy Induced Hypertension; Pre-Eclamsia; Eclamsia; Post-Partum; Visual Acuity.

Introduction

Pregnancy is associated with group of physiological and pathological changes in body. most important pathology accompanying pregnancy is Pregnancy Induced Hypertension(PIH). Pregnancy induced hypertension involves multiple system including Cardiovascular system, Hepatic and renal and Neurologic system with Hematologic changes [1]. It can also affect the retinal vasculature & the visual pathway upto the visual cortex. Retinal vascular changes are associated with severity of hypertension and these changes are reversible and return to normal after delivery.

Pregnancy Induced Hypertension is defined as recording of hypertension (blood pressure at least

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140 mmHg systolic and/or 90mmHg diastolic) on at least two occasions, at least 6 hours apart after 20th week of gestation , in women known to be normotensive before and before 20 weeks of gestation [2].

Hypertension in pregnancy can be classified as [3].

1. Chronic pre existing hypertension
2. Gestational hypertension
3. Pre eclampsia
4. Eclampsia

The incidence of PIH is 10% and eclampsia affects 5% leading to 17.2% of maternal mortality and 22% of fetal mortality [4]. Preeclampsia occurs in 5% of first pregnancies [5]. Ocular involvement is common in PIH occurring in as many as 30 -100% of patients [6]. Progression of retinal changes correlates progression of PIH and foetal mortality due to similar vascular ischemic changes in Placenta [7-10]. This study was undertaken to study the retinal changes seen in pregnancy induced hypertension.

Aim

Retinal changes in Pregnancy Induced Hypertension and its impact on vision

Objectives

1. To study retinal changes in pregnancy induced hypertension.
2. To study relationship between pregnancy induced hypertensive retinopathy changes and severity of PIH.
3. To study relationship between pregnancy induced hypertensive retinopathy changes and blood pressure.
4. To study the reversal of retinal changes in postpartum period in pregnancy induced hypertension.
5. To study the visual acuity changes in PIH and its impact with respect to reversal of normal.

Materials & Methods

This prospective study was undertaken in patients who were referred to the Department of Ophthalmology Kamineni Institute of Medical Sciences, Narketpally. The study was conducted from october 2015 to September 2016. A total of 100 cases of PIH were enrolled into the study after taking informed consentand institutional ethicsl committee clearance. Complete Ocular examination was done in all cases. Stable patients were examined in Ophthalmology Department. In patients who were unstable- bed side evaluation was done. Visual acuity was recorded , any improvement with pin hole was noted and retinoscopy was done. Slit lamp examination was done and fundoscopy done after attaining mydriasis using Tropicamide 0.5% eye drops. Both direct and indirect Ophthalmoscopy were done . Fundus findings were documented with colour coding. Postpartum ocular examination was repeated after 10th week of delivery. Fundus findings and visual acuity with or without correction of refractive error if any were documented and observations were analysed for reversal of signs and symptoms including visual acuity after delivery.

Grading of hypertensive retinopathy was done as per (SCHEIE'S) [11] classification

Grade 0 - No changes

Grade 1 - Barely detectable arteriolar narrowing

Grade 2 - Obvious arteriolar narrowing with focal irregularities

Grade 3- Grade 2 plus retinal hemorrhages and/ or exudates

Grade 4- Grade 3 plus papilledema

The results were analyzed using SPSS software (19th version). Chi-square test was used to determine the association between the retinal changes and blood pressure and severity of PIH. P value < 0.0001 was taken as significant.

Results

Out of 100 patients of pregnancy-induced hypertension (PIH) 16 were gestational hypertension patients, 60 were pre-eclamptic patients and 24 patients were eclamptic. Headache was the most common symptom encountered in 68% of cases. Visual disturbances were seen in 16% of cases. Retinal changes were observed in 52% of cases. In 24 eclampic cases 16 had grade-2, 8 had grade-3 hypertensive retinopathy, 4% of cases had grade-4 hypertensive retinopathy. Out of 60% preeclamptic patients 32 % of cases had grade 0, 16% of cases had grade 1, 8% of cases had grade 2, 4% of cases had grade 3 hypertensive retinopathy changes. Out of 24% eclamptic patients 8% had grade 1, 8% had grade 2, 4% had grade 3, 4% had grade 4 . Retinopathy due to PIH increased as we moved from mild

preeclampsia group to eclampsia group. The relationship between retinal changes and severity of PIH was statistically significant (<0.0001). Retinopathy was more common in the age group of 23-27yrs. There was Association between the presence of retinal changes and age was statistically not significant (p= 0.706). Grade 4 retinopathy changes were seen with systolic blood pressure >180mm of Hg and diastolic blood pressure > 120 mm Hg. The percentage of patients developing severe retinopathy changes due to PIH was directly proportional to BP. Range of gestational age at

Table 1: Age Distribution in Study Group

Age	No Cases	%
18-22	20	20
23-27	40	40
28-32	27	27
>32	13	13
Total	100	100

In this study of 100 patients, 40% patients were between 23-27 years of age, followed by 27% patients between 28-32 years of age, mean age group was 29.67 years

Table 2: Gestational Age

Gestational Age in weeks	No. of cases	%
20-24	20	20
25-29	24	24
30-34	32	32
>34	24	24
Total	100	100

In this study of 100 patients, maximum patients 32% were between 30-34 weeks of gestation and minimum patients are between 20-24 weeks of gestation.

Table 3: Gravida

Gravida	No of cases	%
G1	57	57
G2	24	24
G3	14	14
G4	5	5

In the present study of 100 cases, 57% were primigravidas followed by 24% were Gravida II.

Table 4: Symptoms at The Time Of Presentation and reversal at 10 weeks post partum

Symptoms	No of cases	%	10 Weeks n =86
Headache	68	68	68
Blurred vision	16	16	16
Photopsia	4	4	4
Diplopia	2	2	2
None	32	32	-

Headache was the most common symptom in about 68% of patients, followed by blurred vision in 16% of patients

Table 5: Visual Acuity

Visual acuity	No. of cases	%	10 Weeks
6/6	72	72	93
6/9	12	12	7
6/18	8	8	-
6/24	3	3	-
6/36	2	2	-
6/60	2	2	*
<6/60	1	1	*
Total	100	100	100

72% of patients had 6/6 and 16% of patients had decreased vision <6/9 which improved to 6/6 at 10 weeks post partum.
*3 cases had Pre- existing refractive error which improved to 6/6 with correction at 10 weeks post partum.

Table 6: Severity of PIH

Severity of PIH	No. of cases	%
Gestational Hypertension	16	16
Pre eclampsia	60	60
eclampsia	24	24
Total	100	100

60% of the patients were pre-eclamptic and 24% patients were having eclampsia.

Table 7: Grading of Retinopathy

Grades of retinopathy	No of cases	%
Grade -0	48	48
Grade -1	24	24
Grade -2	16	16
Grade -3	8	8
Grade -4	4	4
total	100	100

Retinopathy changes were observed in 52 patients , in which 24% of patients had grade 1 retinopathy changes.

Table 8: Severity of Preeclampsia and Retinopathy

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
Gestational Hypertension	16(16%)	0	0	0	0	16(16%)
Pre -Eclampsia	32	16(16%)	8(8%)	4(4%)	0	60(60%)
Eclampsia	0	8(8%)	8(8%)	4(4%)	4(4%)	24(24%)
Total	48(48%)	24(24%)	16(16%)	8(8%)	4(4%)	100

*p value <0.0001 (chi square test) statistically significant

Table 9a: Severity of PIH and systolic BP.

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
140 -150	32 (32%)	16(16%)	4(4%)	0	0	52(52%)
151-160	12(12%)	4(4%)	4(4%)	0	0	20(20%)
161-170	4(4%)	4(4%)	0	4(4%)	0	12(12%)
171-180	0	0	8	4(4%)	0	12(12%)
>180	0	0	0	0	4(4%)	4(4%)
total	48(48%)	24(24%)	16(16%)	8(8%)	4(4%)	100

*p value <0.0001 (chi square test) statistically significant

Table 9b: Severity of PIH and diastolic BP

Severity of PIH	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Total
90 -100	40	20	8	0	0	68
101-110	8	4	8	4	0	24
111-120	0	0	0	4	0	4
>120	0	0	0	0	4	4
Total	48	24	16	8	4	100

*p value <0.0001 (chi square test) statistically significant

which most of the patients developed PIH was from 30-34 weeks. Pregnancy induced retinopathy changes was seen more in primigravidas. The relationship between retinal changes due to PIH and blood pressure (<0.0001) was statistically significant. Reversal of Signs: 86 patients had symptoms related to PIH out of which headache was most common, seen in 68% of patients followed by decreased visual acuity <6/9 seen in 16 patients which improved to 6/6 at 10 weeks post partum, out of which 3 cases had Pre- existing refractive error which improved to 6/6 with correction at 10 weeks post partum. There was total reversal of symptoms in all 100 cases at 10 weeks postpartum.

Discussion

In present study, 52% of patients with pre eclampsia and eclampsia had retinal changes, Reddy SC et al [12] in their study reported occurrence of retinopathy changes as 45% , Sagili et al [13] reported it to be 59%, and Rajalaxmi kamath et al [14] reported as 60%. Sunness JS [15] and Beck RW et al [16] observed retinal changes in 40-100% patients with pre-eclampsia**.**

Severity of PIH: In present study, out of 52% of patients with pregnancy induced hypertensive retinopathy changes, 24% of patients had grade 1 retinopathy changes and Grade 4 retinopathy changes were seen in 4% of cases. Degree of pregnancy induced hypertensive retinopathy was directly proportional with severity of preeclampsia (P value-<.0001 significant). S C Reddy et al [12] observed retinopathy was seen in 59% of cases and maximum number of cases were of Grade I hypertensive retinopathy (52.6%) there was positive association between retinal changes and blood pressure (p=.001). Exudative retinal detachmaent is seen rarely in PIH patients. It is thought to be caused by choroidal ischemia [17]. Retinal detachment is seen in 1-2% of all patients with PIH [18]. No of cases of retinal detachment in our study was Nil. In the present study, retinal hemorrhages, A/V nipping, cotton wool spots and hard exudates were seen which was comparable to Mithila et al [28] and Rasdi et al study.

Presentation: In the present study, 68% of patients had headache as one of the complaints while approximately 16% of patients complained of visual symptoms like decreased vision, flashes of light, and diplopia.

Visual Acuity: A.R Rasadi observed , 96.7% of patients had visual acuity of 6/6 in both eyes and 3.3% had visual acuity of 6/9 [19]. In Mithila et al [28] study, 98% of patients had visual acuity of 6/6 and 2% had vision of 6/9.In present study 84% of patients had visual acuity between 6/6 and 6/9 and 16 patients had visual acuity less than 6/9 out of which 3 patients had refractive error <6/60 which was attributed to pre existing myopia. All the patients gained vision of 6/6 during 10 weeks postnatal follow up. The etiology of vision loss in cortical blindness may be due to occipital ischemia in watershed areas [20-23]. Cortical blindness was not seen in this study which was comparable to Shah et al [24] and Reddy et al [25]. This may be due to early detection and prompt treatment.

Age: In this present study of 100 patients, 40% patients were between 23-27 years of age mean age of the cases were 29.67 years which was comparable to previous study done by Sagili et al [13], Smitha et al [26] and Shah et al [24]. Rajalaxmi kamath et al [14] in her study observed 60.8%of patients with retinopathy changes were in the age group between 26-40 years [14]. In Reddy et al study [12] 56% of patients with retinopathy changes were in the age group between 26-40 years mean age of the patient was 30.2 years.

Gestational Age: In present study, range of gestational age at which most of the patients developed PIH was from 30-34 weeks. Cunnigham et al [3], reported average gestational age as 34 weeks [3]. Rajalaxmi kamath et al [14] reported the gestational age when pre-eclampsia and Eclampsia developed as between 24-41 wks.

Gravida: In the present study of 100 patients with pregnancy induced hypertension 57% of patients were primigravidas. This result of present study is comparable to shah et al [24], Mithila et al [28] 74% were primigravidas and 26% were multigravidas which have concluded that PIH is more common in primigravidas. Rajalaxmi kamath et al [14] in her study observed 65% of cases were Primigravida and 35 % of patients were multigravida.

Retinopathy and Hypertension: There was significant association between retinopathy changes and blood pressure readings , Retinopathy changes were mostly seen in systolic blood pressure between 140-150mm Hg(52%) and diastolic blood pressure between 90-100(68%). Grade 4 hypertensive retinopathy was seen in patients with systolic blood pressure >180 mm of Hg and diastolic blood pressure >120mmHg. In Shah et al study [24], 72 patients had <160 mmHg systolic and <100 mmHg diastolic blood pressure, 4 (5.56%) patients had developed hypertensive retinopathy changes while out of 78 patients who had >160 mmHg systolic and/or >100mmHg diastolic blood pressure, 14 (17.95%) patients developed hypertensive retinopathy changes. Mithila et al [28] in her study observed mean systolic pressure of 156.9±17.96 and mean diastolic blood pressure of 104.88±13.58. S C Reddy et al in his study documented statistically significant association between retinopathy and degree of hypertension. In our study association between retinopathy and degree of systolic and diastolic BP was statistically significant (p<0.0001).

Reversal of Retinopathy: In Rajalaxmi kamath et al [14] study, 60% had retinopathy changes before delivery. When fundus examination was repeated on 10th postpartum day in patients who showed retinal changes in the ante partum period had normal

fundus. Other 5% in whom the changes persisted were lost in further follow up [14]. In this study, out of 52% of patients with retinopathy changes, 94.2% had normal fundus at 6th week of post partum period and remaining 5.7 % had normal fundus at 10th week of post partum period. This shows that retinopathy changes due to pregnancy induced hypertension usually returned to normal by 10th week of post partum period.

Conclusion

With this study we conclude that Pregnancy Induced Hypertension is associated with various ocular and retinal changes, retinal changes are directly proportional to severity of PIH, Systolic BP and Diastolic BP all signs and symptoms including visual acuity are reversible in post partum period. except in cases of retinal detachment and cortical blindness which can avoided by proper control of PIH in conjunction with periodic fundoscopy and follow up.

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Original Article

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Comparative Study of Surgically Induced Astigmatism (SIA) in Straight and Inverted V Shape (Chevron) Incisions in Manual Small Incision Cataract Surgery (MSICS) at Bhuj, Kutch

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Abstract

Background: This study was undertaken to compare two types of incisions- straight and inverted V 'Chevron' incisions in manual small incision cataract surgery (MSICS) with regards to surgically induced astigmatism. *Methods:* A prospective comparative study involving 100 eyes of 100 patients who underwent MSICS at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. All patients were subjected to a detailed ocular examination. Out of the 100 patients who underwent MSICS, 50 were randomized into Straight incision group and 50 into Inverted V shaped 'Chevron' incision group respectively. *Results:* No statistically significant difference noted in post-operative uncorrected and best corrected visual acuity. However, only 22% (n=11) of the patients who underwent MSICS with inverted chevron incision had SIA > 1.5 D, as compared to 48% (n=24) in the straight incision group, which was statistically significant. *Conclusions:* Inverted V shaped 'chevron' incision results in lesser post-operative astigmatism.

Keywords: Bhuj; Cataract Surgery; Incisions; Stigmatism.

Introduction

Cataract has been found to be the leading cause of blindness [1]. Worldwide Senile cataract alone is estimated to be responsible for 2, 33% of visual impairment and 51% of blindness wordwide. The prevalence of cataract depends on multiple factors such as genetic, environmental and geographic factors and the access to cataract surgery. The surgical backlog of cataract in any population can be reduced only when the number of cataract surgeries being performed is equal to, if not more than the incidence of cataract [2].

There are a variety of surgical techniques that can be used for cataract extraction. Two such techniques-manual small incision cataract surgery (MSICS) and phacoemulsification are widely practiced in our country. While the western world switched over from extracapsular cataract extraction to phacoemulsification, this wasn't possible in developing countries where cost is a major factor. Hence, MSICS was developed as a safe, simple and cost effective method of cataract extraction [3]. Over the past decade, manual small incision cataract surgery (MSICS) has become an established alternative to phacoemulsification. MSICS which has almost half the cost of phacoemulsification with easier learning curves is more 3 suited for developing countries with a backlog of cataract patients. It is evolving from being a procedure that restores vision loss due to the lenticular opacity, into a procedure that aims for postoperative emmetropia [4].

Wound construction plays a major role in the outcome of MSICS. 'As the section goes, so goes the operation' this dictum initially framed when the Von Graefe section was in vogue, still holds true to this day. A variety of scleral incisions are being used in MSICS with the aim of minimizing post-surgical

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astigmatism [4]. Self-sealing cataract incisions were described by Kratz et al [5] in 1980 and later by Girard in 1984 [6]. Kratz was of the view that scleral tunnel is an astigmatic neutral way of entering the anterior chamber. The external configuration may either be straight or curved.

Paul Koch described the "Incisional Funnel" indicating the astigmatic neutral zone. Thrasher et al. in 1984 [6] showed that a 9.0- mm posterior incision induces less astigmatism than a 6.0-mm limbal incision. Michael Mc Farland developed the sutureless incision in 1990. Around the same time, Pallin and Singer described the Chevron shaped and frown incisions respectively. Randeri et al in 2008[7] showed that inverted V shaped 'Chevron' incision was associated with lower surgically induced astigmatism which they attributed to its triangular configuration, which renders it geometrically more stable, thereby causing minimal sliding of the tips of the incision.

Previous studies have analyzed the relationship between the site of incision and the resulting surgically induced astigmatism (SIA) [8-12]. There are only few studies which have compared SIA between various types of scleral incisions [13-14]. In our study, we have performed a comparative analysis of SIA associated with 2 types of incisons in manual SICS- Straight and Inverted V 'Chevron' incisions. The purpose of this study was to compare surgically induced astigmatism (SIA) in Straight and Inverted V shape (Chevron) incisions in manual small incision cataract surgery (MSICS).

Materials and Methods

It was a prospective cross sectional study.100 eyes of 100 patients with uncomplicated senile cataract undergoing MSICS was included in the study. The study was performed over a period of two years at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. The study was conducted in accordance with the tenets of the Declaration of Helsinki. Informed consent was taken from all the patients included in the study. Patients who had pre-existing astigmatism of ≥2DC, subluxated cataract, cataracts other than age related & combined surgeries were excluded. All patients were subjected to a detailed ocular examination including visual acuity testing (Snellen chart), slit lamp examination, fundoscopy, lacrimal sac syringing and applanation tonometry.

Manual keratometry was performed prior to surgery and 4 weeks after surgery. Axial length was measured using ultrasound A-scan and intraocular lens power was calculated using SRK II formula. Out of the 100 patients who underwent MSICS, 50 were randomized into group A (Straight incision) and 50 into group B (Inverted V shaped 'Chevron' incision) respectively.

Operative Procedure

On the morning of the surgery patients were advised to take two tablets of acetazolamide 250 mg half hour prior to being shifted to the operating room. Pupil was dilated with a combination of 0.8% tropicamide and 5% phenylephrine drops. Ketorolac 0.4% was instilled to aid in maintenance of mydriasis. All surgeries were performed by the same surgeon under peribulbar anaesthesia. A fornix based conjunctival flap was raised.

In group A, this wasfollowed by a 6mm straight incision made 2mm posterior to the superior limbus. In group B, and inverted V shaped 'Chevron' incision was made such that the apex of the V was 1.5 mm from the superior limbus and the ends of the 2 limbs being 4mm from the superior limbus. The distance between the two ends of the limbs was 5mm. A self-sealing sclerocorneal tunnel was fashioned using a 2.8mm sterile disposable crescent knife. The anterior chamber was entered through the tunnel using a 3.2 mm keratome.

Continuous curvilinear capsulorrhexis was made using a 26G cystitome through the main wound. Anterior chamber was maintained by injecting viscoelastic agent. The inner wound was extended to 8-10 mm to facilitate nucleus delivery even in case of larger nucleus. Incisions were not enlarged in any of the cases. Hydrodissection and hydrodelineation were performed. Nucleus was delivered using sandwich technique. A single piece rigid PMMA posterior chamber IOL was implanted in the capsular bag and dialed into position. After ruling out any wound leak, self-sealing scleral wound was left sutureless.

Postoperatively patients were examined on day 1, day 7 and week 4. A combination of gatifloxacin and dexamethasone eye drops was started on post-op day 1 and tapered over the next 4 weeks. When required, mydriatic and anti-glaucoma medications were also advised. At each visit, uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA) and slit lamp examination findings were documented. At 4th week postoperatively, manual keratometry was repeated. Statistical analysis was performed using SPSS version 17.0.

Results

This study included 100 eyes of 100 patients, randomised into two groups of 50 each – Group A and B- undergoing manual SICS surgery using straight and inverted V shaped 'Chevron' incision respectively. The number of males and females was almost equal with 48 males (48%) and 52 females (52%) respectively. The mean age of patients included in the study was 54.73±6.29 years. Pre-operatively, majority of patients had against the rule astigmatism (57%).

From the first post-operative day to the 4 week visit, a progressive increase in UCVA was noted in both groups, but this increase was more in the group that underwent inverted V shaped 'Chevron' incision. However, the difference in UCVA between the two groups was not statistically significant (p >0.05)

An increase in BCVA was noted in both groups. No significant difference was observed between the two groups. The mean SIA in straight and inverted V 'Chevron' incision was found to be -1.08+- 0.67 D and -0.88+/-0.61 D respectively at four weeks postoperatively. Majority of the patients in both groups- 70% (n=35) in inverted V shaped 'Chevron' group and 48% (n=24) in straight incision group showed SIA between 1- 1.5D. However, only 22% (n=11) of the patients who underwent MSICS with inverted chevron incision had SIA > 1.5 D, as compared to 48% (n=24) in the straight incision group. 8% (n=4) of patients in inverted chevron group had SIA < 1D versus 4% (n=2) in the straight incision group. Statistical analysis showed that the difference in SIA between the two groups was statistically significant (p< 0.05).

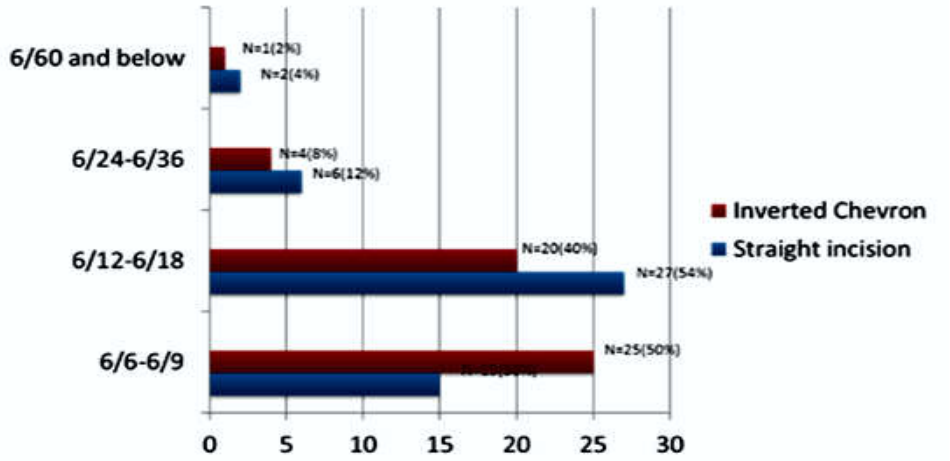

Fig. 1: UCVA at 4 post-operative week

Discussion

Earlier studies have shown that MSICS is associated with an early visual rehabilitation due to little inflammation and less SIA. Randeri et al [7] in 2008 showed that 57.14% of patients in the inverted chevron group had astigmatism of <1 D. In our study, 8% of the eyes in inverted chevron group had postoperative astigmatic error < 1D. Induced astigmatism >1 and < 1.5 D was seen in 70% eyes. Jha and Vats [15], reported that in MSICS by 6mm straight incision, 85.5% of patients had astigmatism up to 1 D, and 8.7% cases having astigmatism >2 D. However, in our study the straight incision group shows only 4% patients with astigmatism up to 1 D with 48% patients with astigmatism between 1 to 1.5 D.

The mean SIA in Straight and Chevron incision was found to be - 1.08+- 0.67 D and -0.88+/-0.61 D respectively at four weeks postoperatively in our study [14]. In a study by Jauhari et al 33.3% of the eyes in the inverted V shaped 'Chevron' group did not have any postoperative astigmatic error. Induced astigmatism up to 1 D was seen in major proportion of eyes (47.6%) in inverted V shaped 'Chevron' group. Straight incision group showed only 27.8% patients with astigmatism up to 1 D with 50% patients having astigmatism between 1.25 to 2 D.

Conclusion

We conclude that inverted V shaped 'chevron' incision results in lesser post operative astigmatism compared to straighter incisions. Although more difficult to perform and difficult to maneuver with a

steeper learning curve, once mastered, inverted V 'chevron' incisions can improve patient outcomes following MSICS surgery by reduction in SIA.

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Knowledge, Attitude and Practice towards Strabismus among Medical Practitioners

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Abstract

Purpose: To determine the knowledge, attitude and practice towards strabismus among medical practitioners. *Methods*: A structured questionnaire was constructed with questions regarding awareness, knowledge of etiology, consequences, prevention and the treatment of strabismus. Questionnaire were randomly distributed among all doctors and answers obtained were tabulated. Total of 170 questionnaire sheets were distributed among them 150 completely answered sheets were collected. Results were calculated using proportions and percentages. *Results*: Only 54% of subjects included in the study knew about the aetiology and 70% of them knew that strabismus can be prevented. 95% prefer to refer strabismus patients to an ophthalmologists and 76% agree that every school going child to be screened for strabismus. 58% think that surgery is the only treatment and 59% knew strabismus can also be corrected optically. *Conclusion:* Although medical practitioners showed fair knowledge about the condition, still there is a need to create awareness regarding the etiological factors and varied treatment approaches is required.

Keywords: Strabismus; Quessionnaire; Medical Practitioners.

Introduction

Strabismus means ocular misalignments whether caused by abnormalities in binocular vision or by anomalies of neuromuscular control of ocular motility. The term strabismus derived from Greek word strabismus "to squint or look obliquely". It is a common condition with a prevalence of 5% in children aged 5-6 years [1]. A study conducted in Butajira town in 2001 among pre-school children showed a prevalence of strabismus to be 1.5% and strabismic amblyopia was found in 51.7% of the children [2].

As strabismus is one of the major cause of amblyopia there is a need for its early detection and treatment. This is possible if all medical practitioners are aware of detection and treatment options of strabismus. So we have made an attempt to study the knowledge , attitude and practice about strabismus among medical practitioners in a tertiary health care centre.

Materials and Methods

A cross sectional study was conducted in a tertiary care Centre. The sample includes mainly doctors including post graduates working in various departments. The well structured questionnaire was given to randomly sampled number of doctors . The questionnaire included 20 questions based on etiology, consequences and treatment aspects of strabismus . The respondents were supposed to fill the questionnaires as and when they were given. Questionnaire sheets in which all 20 questions were answered were included in the analysis. Obtained responses were tabulated in a master chart. Results were calculated using proportions and valid percentages.

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Results

A total of 150 completed questionnaires sheets were collected and included for analysis. 54% of them know about varied etiological factors and the response is shown in Figure1. While 70% of them know that strabismus can be prevented. Only 40% of doctors think that strabismus can lead to blindness. But 80% have agreed that strabismus should be treated early.

For the questions regarding social impact, 82% of them think that squint can lead to low self esteem of a person. 81% had responded that marriages are denied because of squint .

59% of them know that squint can be corrected by refraction and 58% thinks that surgery is the only treatment to strabismus. 95% prefer to refer a case of strabismus to an ophthalmologists.

Discussion

Even though there is no similar study for comparison, this cross-sectional study has provided baseline information on the knowledge, practice and attitude of medical practitioners towards strabismus.

Kefale Geta and Abebe Bejiga [3] conducted a study among rural population and they concluded that rural community had very less knowledge about the causes and treatment of strabismus with lot of misconception.

Majority of strabismus cases can be treated early provided they are identified and treated at early age, particularly before the age of 2 years.[3] In our study also 87% of subjects agreed that strabismus should be treated early.

The consequences of untreated strabismus are amblyopia, loss of binocular vision and cosmetic stigma [3-5]. In our study only 68% were aware of all possible consequences.

Studies done on elementary school children in Keelung Ann-Lo community and strabismus children in Tunisia [6,7], show very high prevalence of strabismic amblyopia in the tune of 42.9% and 58 % respectively. Only 42% of our study subjects know about strabismic amblyopia.

It has been concluded that Amblyopia and strabismus patients have difficulty in seeing 3D movies [8]. 23.3% of the subjects have answered correctly in our study.

In a study conducted on Premature babies had showed that Retinopathy of Prematurity places the premature infants at the increased risk of strabismus [9]. In our study only 38% of the subjects know that premature babies are prone for strabismus. 76% of subjects have agreed that every school going child should be evaluated for squint.

There is now growing evidence on the psychosocial impacts of strabismus, with three studies reporting that strabismus may create significant negative social prejudice [10-12] and significantly reduce a person's chances to obtain employment [13]. In addition, affected adolescents and adults report that strabismus negatively affect their self-image and interpersonal relationship with others [14]. In our study also 82% of them agree that strabismus can cause low self esteem and 81% had told marriages are denied because of strabismus.64% agreed that strabismus reduces chances to obtain several jobs.

Conclusion

As doctors are the reliable source of information to the community, a sound knowledge about strabismus among medical practitioners will help in managing strabismus patients effectively. Though our study subjects have shown fair knowledge about strabismus, still need education in the area of causes, consequences and treatment options available. Hence this calls for conducting education programmes for thorough knowledge of strabismus.

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Analysis of Variations in Central Macular Thickness in Patients with Myopia Using Spectral Domain Optical Coherence Tomography

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Abstract

Aim: To investigate the variation in average retinal thickness in macular region in otherwise normal young myopic subjects by using optical coherence tomography (OCT). *Methods:* One hundred and thirty ophthalmologically normal men 20 to 24 years of age with myopia (spherical equivalent, - 0.25 to -14.25 D) underwent examination of one randomly selected eye. Tests performed were - Visual acuity, BCVA with refraction, slit lamp examination, IOP by applanation tonometry, gonioscopy, A-scan ultrasound, fundus examination, visual field testing by HFA, and optic disc photography. Exclusion criteria were visual acuity better than 6/9, previous intraocular surgery, intraocular pressure >21 mm Hg or other ocular diseases. Three horizontal transfixation and three vertical transfixation OCT scans of 6 mm each were conducted on each eye by a single investigator. Neurosensory retinal thicknesses was measured, and the overall average, maximum, and minimum retinal thicknesses were analyzed. *Results:* The average retinal thickness of the macula does not vary with myopia. However, the parafovea was thinner and the fovea thicker with myopia.

Keywords: Myopia; OCT; Retina; Average Retinal Thickness; Elongated eye; Myopic Retina.

Introduction

Optical coherence tomography (OCT) is a newer noninvasive technique which can easily be used for the measurement of retinal thickness and RNFL thickness or foveal thickness by using time delays in the reflected or backscattered light by utilizing the principle of interferometry [1,2]. It is increasingly being used in a clinical practice as well as researches for imaging the lesions located in the macula, such as increased macular thickness in diabetic macular edema [3]. OCT also has a role to play in the clinical assessment of glaucoma, as studies have proved macular as well as peripapillary thinning that occurs in glaucomatous eyes [4-6].

The prevalence of myopia is continuously increasing in East Asia. This trend has been well documented in Taiwan [7] and Singapore [8]. Estimation of the proportion of this refractive error in the young population of Singapore ranges from about 30% to 65%. According to the histopathologists Yanoff and Fine [11], in pathological myopia (generally greater than -6.00 D), the retinal thinning occurs and it degenerates, mostly at the posterior pole. These changes in the retina with increasing myopia and axial length can be studied easily by retinal thickness measurements on OCT. The purpose of our study was to investigate the variation in macular retinal thickness in otherwise normal young myopic subjects by using optical coherence tomography (OCT).

Aim

To investigate the variation in macular retinal

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thickness in otherwise normal young myopic subjects by using optical coherence tomography (OCT).

Material and Methods

A prospective observational study was carried out on 130 myopic eyes; with the varying degrees of myopia. Cases were randomly selected from the patients attending Ophthalmology OPD, PDVVPF's Medical College.

Inclusion Criteria

1. Subjects attending Ophthalmology OPD for refraction and did not have any other ocular abnormality apart from optic disc and peripapillary changes associated with myopia.

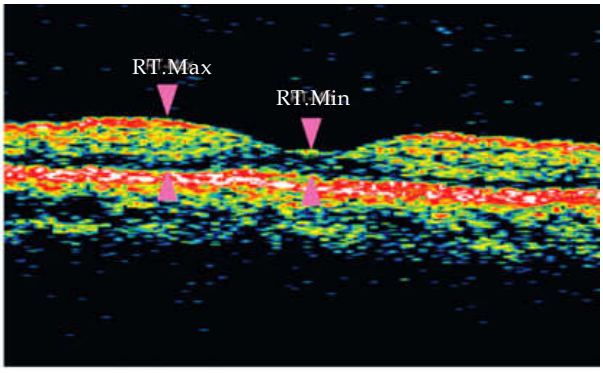
Exclusion Criteria

1. Best corrected visual acuity worse than 6/9.
2. Previous intraocular or refractive surgery.
3. IOP greater than 21 mm Hg.
4. Gonioscopic findings: angle closure, evidence of pseudoexfoliation, uveitis, or pigment dispersion syndrome.
5. Corneal or media opacities, retinal disease or neurologic conditions that could affect visual fields.
6. In addition, a history of glaucoma in a first-degree relative and a history of glaucoma or any other optic neuropathy were excluded.
7. In an earlier conducted studies, correlation with automated static perimetry was performed and the results were available [12].

After informed consent was signed, all participants underwent the following examinations:

- Visual acuity (BCVA),
- Slit lamp biomicroscopy
- Subjective refraction
- Goldmann applanation tonometry
- Gonioscopy
- Automated refraction
- Ophthalmoscopy - Direct and 90D
- Ultrasonic A Scan Biometer (APPASAMY)
- Humphrey (central 24-2 threshold) visual field examination.
- CMT was assessed in all patients using spectral domain OCT (3D OCT maestro).
- Pupils were dilated to at least 5-mm diameter during the OCT examination.
- All eyes axial lengths and refractive errors were recorded.
- Scan length was adjusted to 6 mm before scanning, to allow for correction of scan size.
- Retinal thickness was measured automatically with the retinal thickness algorithm built into version 4.1 of the OCT software, which automatically determines the anterior and posterior borders of the ILM and RPE respectively.
- Horizontal and vertical 6-mm scans centered against the point of fixation of each eye were taken by the same operator. Three good-quality horizontal and three good-quality vertical scans were retained for analysis.

Two points of maximum retinal thickness (RT-Max) measured on either side of the fovea were recorded from each scan.



From the direction of the scan, it was also possible to correspond the point to the area of the macula—that is, superior, inferior, temporal, or nasal to the fovea. These were termed RT-Max (sup), RT-Max (inf), RT-Max (temp), and RT-Max (nas), respectively. The point of minimum retinal thickness measurement, which is presumed to correspond to the fovea (RT-Min), was also recorded.

Results

- *Study Population Details*

The average macular retinal thickness (overall) was 230.9+/- 10.5 m and was not significantly related to the degree of myopia.

The mean maximum retinal thickness (at the parafovea) was 278.4+/- 13.0 m, and was not

correlated to the spherical equivalent.

The mean minimum retinal thickness (at the foveola) was 141.1 +/- 19.1 m, and this was positively correlated with *spherical* equivalent (*P 0.0002).*

The retina was thicker at the superior and nasal parafovea compared to the inferior or temporal parafovea.

Table 1: Patient data

Total Number of Studied	130
Averag age of patient (year +/-SD)	21.2 +/- 1.1
Range of age in years	19 to 24 years
mean spherical equivalent	-5.9+/-3.5 D
range of spherical equivalent	-0.25 to -14.25 D
mean axial length	26mm +/- 1.43

Table 2: Spherical Equivalent in study subjects

Spherical Equivalent	No. of Study Subjects
-0.25 to -4D	46 (55%)
.4 to -8D	49 (38%)
Greater than -8 D	35 (27%)

Table 3: Macular Thickness

Macular Thickness	Mean	SD	Spherical Equivalent	p
Average thickness (overall)	230.9 (229.1 to 232.7)	10.5	0.11 (0.63 to 0.42)	0.69
RT - max	278.4 (276.1 to 280.7)	13 .0	0.23 (0.42 to 0.88)	0.48
RT-max (SUP)	288.3 (284.8 to 291.8)	20.2	0.74 (0.15 to 1.63)	0 .10
RT-max (inf)	278.4 (275.5 to 281.3)	16.3	0.54 (0.21 to 1.29)	0. 16
RT-max (temp)	262.2 (259.6 to 264.8)	14.6	0.26 (0.37 to 0.89)	0. 42
RT-max (nas)	284.2 (281.2 to 287.2)	17.1	0.21 (0.58 to 0.99)	0. 60
RT-min	141.1 (137.8 to 144.5)	19.1	1.78 (2.68 to 0.87)	0. 0002

Discussion

This study has shown that in a young healthy cohort of myopic subjects, overall average macular retinal thickness does not vary with increasing myopia or axial length.

This is in agreement with recent reports in which OCT was used to investigate retinal thickness variations in myopia [13].

In one another study, chorioretinal overall atrophy at posterior pole was found to be more common in eyes with long axial length [14]. We concluded that this disparity in our findings are related to the different methods used for the measurement of retinal thickness, but the method used by us i.e. OCT results are shown to be highly reproducible [15] are more sensitive for detection of subtle and regional variations in retinal thickness as compared to histological mounts. They are more susceptible to the shrinkage plus processing artifacts. One more study [16] showed increased chances of chorioretinal degenerative changes in the peripheral fundus in patient with myopia. Unfortunately, it is not possible to measure accurate peripheral retinal thickness at present with the tool of OCT. One report with ultrasound and Fourier analysis had proved that the midperipheral retina in myopic eyes was thinner as compared to the emmetropic eyes [17]. If this is the case, then retinal thinning in myopia may be more common in the peripheral retina. In a similar study group, Asrani et al [18]. Concluded that an average retinal thickness at the posterior pole was of 229 micron. These comparable values of mean macular thickness found in all these studies suggests that there may not be great variation in average retinal thickness with age [18,19], though one paper that on OCT reported macular retinal thinning occurred with increasing age. 20- The mean thickness of the thinnest retinal point was 141.1 micron to 19.1 micron, that was similar to the mean thickness of the foveola of 142 to 18 micron, as measured by Gobel et al [21].

Conclusion

- Average retinal thickness of the macula does not vary with myopia.

- However, the parafovea was thinner and the fovea thicker with myopia

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Study on Incidence and Various Modes of Presentation of Thyroid Orbitopathy

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Abstract

Introduction: Thyroid associated ophthalmopathy is an autoimmune disorder affecting the orbital and periorbital tissues. Hyperthyroidism is commonly associated with thyroid associated ophthalmopathy, however in 5% to 10% of cases it is euthyroid. Genetic, environmental and endogenous factors play a role in the initiation of the thyroid ophthalmopathy. *Materials and Methods:* This is a prospective study conducted on total 40 patients according to inclusion criteria. All patients underwent a comprehensive ophthalmological examination and radiological examination. *Results*: In the present study, 5th decade was the most common age group observed with thyroid orbitopathy in 12 cases (30%). Female preponderance was seen with females twice more common than males. Hyper thryroidism (67.5%) is most common thyroid status observed. Uniocular presentation (75%) with right eye involved more frequently 40% than left eye. Sandy and Grittiness (60%) was the most common symptom, Proptosis (90%) was the most common sign and Lid retraction (85%) was the second most common sign observed. Inferior rectus most commonly involved muscle (62.5%) and least involved muscle was lateral recuts (22.5%). Corneal involvement with tear film abnormalities 10%, optic nerve compression 5% and ptosis 5% were observed less severe in our study. *Conclusion*: In present study we found that 5th decade 12 (30%) with female preponderance and most of the cases are with proptosis.

Keywords: Graves Ophthalmopathy; TAO; Hyperthyroid; Proptosis; Uniocular.

Introduction

Thyroid-associated orbitopathy (TAO), frequently termed Graves ophthalmopathy, is part of an autoimmune process that can affect the orbital and periorbital tissue, the thyroid gland, and, rarely, the pretibial skin or digits (thyroid acropachy) [1,2,3]. Although the use of the term *thyroid ophthalmopathy* is pervasive, the disease process is actually an orbitopathy in which the orbital and periocular soft tissues are primarily affected with secondary effects on the eye.

Thyroid-associated orbitopathy may precede, coincide, or follow the systemic complications of dysthyroidism. The ocular manifestations of thyroid-associated orbitopathy include eyelid retraction, proptosis, chemosis, periorbital edema, and altered ocular motility with significant functional, social, and cosmetic consequences. Of those patients affected, 20% indicate the ocular morbidity of this condition is more troublesome than the systemic complications of dysthyroidism.

The annual incidence rate of thyroid-associated orbitopathy has been estimated at 16 cases per 100,000 women and 2.9 cases per 100,000 men in one rural Minnesota community [4]. There appears to be a female preponderance in which women are affected 2.5-6 times more frequently than men; however, severe cases occur more often in men than in women. In addition, most patients are aged 30-50

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years, with severe cases appearing to be more frequent in those older than 50 years.

Although most cases of thyroid-associated orbitopathy do not result in visual loss, this condition can cause vision-threatening exposure keratopathy, troublesome diplopia, and compressive optic neuropathy. Therefore, although the prognosis is generally favorable for patients with this condition, and most patients do not require surgical intervention [5,6], all clinicians should be able to recognize thyroid-associated orbitopathy.

The objective of the present study is to study the orbital manifestations of Thyroid orbitopathy at Sarojini Devi Eye Hospital, Hyderabad conducted from October 2009 to November 2011.

Materials and Methods

This is a prospective study on incidence and various modes of presentation of Thyroid Related Ophthlamopathy. In the present study, a total number of 40 cases of Thyroid Ophthalmopathy examined at Sarojini Devi Eye Hospital, Hyderabad from November 2009 to November 2011.

Inclusion Criteria

All ages and both sexes were included. All cases of Proptosis with signs and symptoms investigations suggestive of thyroid related ophthalmopathy were included.

Exclusion Criteria

All cases with similar presentation not proved to be thyroid orbitopathy were excluded.

All the patients were subjected to a thorough history taking and clinical examination with special emphasis to thyroid dysfunction with or without treatment. Detailed ocular evaluation comprising of examination for lid signs, ocular motility, LPS functions, visual acuity, colour vision, Slit lamp evaluation of anterior segment, Hertel's exophthalmometry, IOP, and fundus evaluation were done.

Apart from routine haematological examinations, the patients were subjected to radiological investigations like CT scan as per the clinical requirement to assess the lesion as well as monitor its progression or regression was done.

Serological investigations included Thyroid profile. Once the case is confirmed to be of thyroid orbitopathy, depending on the stage of clinical presentation, the patients were reassured and observed or medical with or without surgical treatment initiated. All the patients were referred to an endocrinologist for management of thyroid dysfunction.

The data analyzed for the following observations regarding Thyroid Ophthalmopathy: Age distribution, Sex distribution, Thyroid status, Laterality, Mode of presentation, Symptoms, Signs and Extra ocular muscle involvement. All these cases are included regardless of age and sex.

Results

The 1 table showing age distribution with, maximum number of cases in our study seen from 3rd, 4th, and 5th decades, with most number of cases observed in 5th decade 12 (30%), least number of cases 2(5%) observed in extreme ages, 1st and 7th decades. Mean age 39.5 yrs was noted. In sex distribution with a female preponderance 26(65%) and 14 male cases with (35%). Based upon the Thyroid Status of the patients they were sub divided in to three groups Hyperthyroid, Euthyroid, Hypothyroid. In our series 27 cases out of 40 patients were Hyperthyroid (67.5%) 10 cases euthyroid (25%), Hypothyroids seen only in 3 cases (7.5%).

The thyroid status was correlated with the sex of the patients. In both the sexes, the hyperthyroid status was most common followed by euthyroid and hypothyroid. No male was reported to be hypothyroid. The laterality of orbitopathy was analyzed in above table. The most common presentation was unilateral (75%) in which the right eye (40%) was found to be frequently involved compared to the left eye (35%).

Table 2 shows, common presentation of the complaints by the patients in our study was proptosis seen in 36 cases (90%), Lidretraction in 34 cases (85%), Mild restrictions of extraocular muscles in 17 cases (42.5%), Diplopia in 10 cases (25%) and dry eyes in 4 cases (10%).

Commonest symptom encountered in the present study was sandy and gritty sensation of eyes 60% followed by excessive tearing 45%, Diplopia 25%, Photophobia 7.5%, pain on upward attempted gaze 5% respectively.

None of the patients reported loss of vision. Most common sign in our study was Exophthlamos 36 (90%), Lid retraction 34 (85%) second most common sign observed.

Table 1: Age distribution

Age Distribution in Years	No of Cases	Percentage
1 – 10	0	0
11-20	2	5%
21-30	10	25%
31-40	9	22.5%
41-50	12	30%
51-60	5	12.5%
61-70	2	5%
Sex distribution		
Males	14	35%
Females	26	65%
Total	40	100%
Category		
Hyperthyroids	27	67.5%
Euthyroids	10	25%
Hypothyroids	03	7.5%
Laterality		
Unilateral	30	75%
Right eye	16	40%
Left eye	14	35%
Bilateral	10	25%

Table 2: Mode of Presentation

Modes of Presentation	No of Cases	Percentage
Lid retraction	34	85%
Proptosis	36	90%
Periorbital swelling	24	60%
Congestion	18	45%
Chemosis	24	60%
Muscle restrictions	17	42.5%
Diplopia	10	25%
Dry eyes	04	10%
Ocular symptoms		
Excessive tearing	18	45%
Sandy and Gritty sensation	24	60%
Photophobia	3	7.5%
Pain on upward attempted gaze	2	5%
Diplopia	10	25%
Loss of vision	0	0
Ocular signs		
Dalrymple sign	34	85%
Von Grafe's sign	18	45%
Enroth's sign	30	72.5%
Gifford 's sign	10	25%
Stellwag's sign	06	15%
Joffroy's sign	14	35%
Convergence weakeness (Moebius)	14	35%
Exophthalmos	36	90%
Conjunctival injection	18	45%
Corneal involvement	04	10%
Colour vision abnormalities	02	5%
Increase in IOP in up gaze	13	32.5%

Table 3: Extra ocular Muscle Involvement

Muscle Involved	Number		Percentage
	Alone	In combination	
Inferior Rectus	9	16	62.5%
Medial Rectus	5	17	55%
Superior Rectus LPSComplex	5	8	32.5%
Lateral Rectus	0	9	22.5%

Above table shows that inferior rectus muscle was the commonest muscle involved with 62.5%, followed by Medial Rectus 55%, Superior Rectus – LPS complex 32.5%, Lateral Rectus involved least with 22.5% in descending order. The incidence of involvement of various recti muscles was analyzed based upon computerized tomographic scan (CT scan) findings.

Discussion

The present study conducted in department of oculoplastics at Sarojini Devi Eye Hospital, Hyderabad for a period of 24 months, from November 2009 to November 2011.

A detailed ocular examination was done in 40 cases of Thyroid related Ophthalmopathy.

During our study a maximum number of cases in different age groups observed in 3rd, 4th and 5th decades, with highest number of cases seen in 5th decade 12 (30%) and lowest number of cases 2 (5%) noted in extreme age groups 1st and 7th decade, with a mean age 39.5 yrs. A study done by Cemola J et al [7] observed a mean age 46.5 + 11.4 years.

In our study females are 26 (65%) and males 14 (35%), with female ratio twice more than males. Female Preponderence observed. In a study done by Khurana AK et al [8] found a female preponderance with female to male ration 1.5:1.

In our study 27 cases (67%) are hyper thyroids followed by euthyroids 10 cases (25%) and 3 cases hypothyroids with less than 10%. In our study hyperthyroidism observed high in both sexes, among them females more commonly associated with hyperthyroidism (40%) than males (27.5%). No male reported hypothyroid in our study. Morcocil, Bartalene et al [9] found hyperthyroidism in 91.4% of females, euthryroids in 8.6% in total of 202 patients.

In the present study thyroid ophthalmopathy most commonly presented with uniocular involvement 30 cases (75%) and bilateral involvement seen in 10 cases (25%). In a study done by Jack Root man [10] quoted most common lid malposition was lid retraction particularly upper lid retraction, in contrary in our study we have noted lid retraction as 2nd most common sign in 34 cases with 85%.

In our study exophthalmos observed as most common sign 36 cases (90%) in contrary to the study done CemeloJ et al [7] in 126 cases found exophthalmos (77%) 2nd most common sign.

In our study chemosis and periorbital swelling seen in 24 cases (60%). A study done by 21 Jakuanskine and Imbriasiene in 27 cases observed similar occurrence 60%.

Differential involvement of extraocular muscles were correlated with CT images and found inferior rectus most commonly involved muscles 62.5% followed by medial rectus 55%, superiorectus-LPS complex 32.5% and lateral rectus involved least with 22.5% in decending order. In one study done khurana et al [8] in 30 cases observed medial rectus most commonly involved followed inferior rectus superior rectus-LPS complex and lateral rectus least involved. In controlled radiologic study done by Jack Rootman [10] superior rectus-LPS complex most commonly involved.

In the present study, differential increase in intraocular pressure observed in 5 males (12.5%) and 9 females (22.5%). Cemelo J et al observed increase in intraocular pressure among males with 70% as compared to females 77%.

In addition our study analyzed the data regarding extraocular muscles restrictions observed in 17 cases (42.5%), diplopia seen in 10 cases (25%), corneal involvement with dry eyes and exposure keratopathy observed in 4 cases (10%), compressive optic neuropathy with decrease in colour vision noted in 2 cases (5%), strabismus 3 cases (7.5%), ptotis observed in 2 cases (6.6%).

Conclusions

After analyzing our data we reached following conclusions.

- 5th decade most common age group observed with thyroid orbitopathy 12 cases (30%), mean age 39.5.
- Female preponderance seen with females twice more common than males.
- Hyper thryroidism 67.5% is most common thyroid status.
- Uniocular presentation 75% with right eye involved more frequently 40%
- Sandy and Grittiness most common symptom 60%.
- Proptosis most common sign 90%.
- Lid retraction second most common sign 85%.
- Inferior rectus most commonly involved muscle 62.5%, least involved muscle lateral recuts 22.5%.

- Corneal involvement with tear film abnormalities 10%, optic nerve compression 5% and ptosis 5% were observed less severe in our study.

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Risk Factors and Visual Outcome after Surgical Repair of Open Globe Injuries in Gujarat Adani Institute of Medical Science, Bhuj

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Abstract

Introduction: The study aims to study the mechanism, type , site, size, severity of injury and to see the final visual outcome after surgical repair at the end of 3 months. *Material Methods:* It is a single centric prospective study done at tertiary care centre over 1 and half year with 150 patients. Parameters taken were age, sex, profession of the patient, visual acuity and final vision at 3 months, anterior and posterior segment evaluation, imaging when required. *Result:* Males were affected more (3.8:1) involving unskilled labourers and farmers (30.6%) and students (28%). Majority of these were caused by sharp objects (93.33%), stick followed by stone. 80% patients were brought within 24 hours. In this study majority (58.66%) patients had vision worse than 2/60 at presentation. It was also observed in this study that corneal laceration (50%) is more common compared to scleral laceration (32%) while 18% had a corneo-scleral laceration. Zone 3 injuries have the worst visual prognosis followed by zone 2 followed by zone 1. *Conclusion:* In our study factors associated ultimate with poor vision (<2/60) at 3 months were presenting visual acuity, extensive lid laceration (66.66%), relative afferent pupillary defect (96.14%), hyphaema (56.7%), vitreous loss (61.8%), retinal detachment (50%).

Keywords: Open Globe Injury; Ocular Trauma; Visual Outcome Post Trauma.

Introduction

Blindness due to ocular trauma is a serious problem in developing as well as developed countries. Ocular trauma is more important since it is a preventable public health problem worldwide. Incidence of blindness varies in different communities ranging from 0.2-1.0 percent. About half a million people in the world are blind as a result of eye injuries. About 30-40% of monocular blindness is due to ocular trauma [1,2].

Ocular trauma represents a significant workload for ophthalmic services and accounts for about 38% to 52% of all new patients presenting as ophthalmic emergencies. Road traffic accidents are the leading cause of ocular injuries in patients with major trauma. It is vital that all patients with major trauma are examined specifically for an ocular injury [3,4].

The cumulative incidence of ocular trauma necessitating admission to hospital is estimated to be 8.14 per 100 000 population. Ocular trauma remains an important cause of avoidable and predominantly, monocular visual morbidity (visual impairment and blindness). Visual impairment in penetrating ocular trauma may be due to corneal scarring, hyphaema formation with glaucomatous complications, lens damage, vitreous hemorrhage, retinal tear, dialysis or detachment, hypotony, phthisis bulbi, optic nerve damage and endophthalmitis [5-7].

Our aim of this study is to see for the factors affecting the vision and subsequent visual outcome after surgical repair in cases of open globe injuries.

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Materials and Methods

Sampling Design

Present Study was conducted at Department of Ophthalmology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch. 150 patients were selected from outpatient department emergency with trauma patients who fulfilled inclusion criteria and requiring medical or surgical intervention. Parameters studied were age, sex, profession of the patient, presenting visual acuity and final vision at 3 months (snellen's visual chart), anterior segment evaluation with slit lamp biomicroscopy, fundus visualization with +90 D lens/direct and indirect ophthalmoscope, +20 D lens, gonioscopy with goldmann 2 mirror gonioscope, intraocular pressure measurement with goldmann applanation tonometer (wherever applicable), ultrasonography B scan, radiograph, CT scan , MRI orbit (in relevant cases).

Inclusion Criteria

All patients with open globe injury with or without

Lid lacertion

Hyphaema

Traumatic cataract

Subluxated or dislocated lens

Exclusion Criteria

Ocular surface foreign body

Optic nerve injury

Subconjunctival haemorrhage only

Chemical ocular injury

Closed Globe Injury

No full-thickness wound of eye wall. The cornea and the sclera are not breached through and through.

Open Globe Injury

Full-thickness wound of the eye wall. The cornea and,or sclera is breached through and through.

Closed globe is further classified as

1. Contusion

There is no wound of the eye wall. The damage (e.g., choroidal rupture) may be due to direct energy delivery or shock wave by the object, or due to changes in the shape of the globe (e.g., angle recession).

2. Lamellar Laceration

Lamellar laceration is partial-thickness wound of the eye wall. The wound in the eye wall is not "through" but "into" the eye wall. The Ocular trauma classification group has developed a classification system based on the Birmingham eye trauma terminology for open globe injuries.

The further classification of open globe injuries is as follows

A. Type (Mechanism of Injury)

1. Rupture-full thickness wound of eye ball caused by blunt object
2. Penetrating- full thickness wound of eye ball having only entrance wound
3. Intraocular foreign body
4. Perforating- has entrance and exit wound both caused by same object
5. Combined

B. Grade (Presenting Visual Acuity)

1. > 20/40
2. 20/50 to 20/100
3. 19/100 to 5/200
4. 4/200 – No light perception

C. Presence or Absence of Relative Afferent Pupillary Defect (RAPD)

1. Positive, relative afferent pupillary defect present (RAPD)
2. Negative, , relative afferent pupillary defect not present

D. Zone (Location of Wound)

I. Cornea

II. Limbus to 5 mm posterior into sclera

III. Posterior to 5 mm from limbus

Steps of Repairing an Open Globe Injury

1. Limbal paracentesis
2. Reposit the iris into the anterior chamber (in fresh cases)

This is best achieved through pulling the iris in rather than pushing through the wound.

3. Intracameral viscoelastics to restore the anterior chamber.
4. Thoroughly cleanse entrapped lens material and vitreous to leave the wound edges free.
5. Approach corneoscleral and scleral lacerations,

by first closing the corneal or distal portion and then examining the extent of the sclera portion by carefully removing the conjunctiva and Tenon's capsuleThen the uncovered part of the wound is closed.

6. Disinsert one of the extraocular muscles to visualize and repair a wound that extends posteriorly.
7. Once the eye is sealed, restore the intraocular pressure by injecting balanced salt solution.

Result

Out of 150, 119 patiets (79.33%) were males while 31 (20.66%) patients were femalesThe male is to female ratio of the study was 3.8:1. Hence a male predominance was seen in the study.

Most of the ocular injuries were seen in patients in the age group of young adults. Image 1 shows patients between 11- 40 years age group contributed to 65.32% of the injuriesThe percentage of individuals of less than 10 years age was 17.33% while those above 40 years was

17.32%. Unskilled labourers and farmers (30.6%) and students (28%) contributed to highest victims of the open globe injuries. Less commonly affected were skilled labourer, pediatric age group (pre school), (10.6% each), housewife and service holders. Majority of these were caused by sharp objects (93.33%) while the rest were caused by blunt objects.

Visual acuity at presentation is described in image 3. 58.66% patients had vision of < 2/60. Only 2.66% patients had vision better than 6/12. While 80% patients received treatment within 24 hours, 20 (13.33%) and 10 (6.67%) patients were brought on day 2 and 3.

Majority patients had zone 1 injury (50%) followed by zone 2 followed by zone 3. 50% of the patients had corneal laceration, 32% had scleral laceration while 18% had a corneo-scleral laceration.

As summarized in the table 1 below majority of the patients had a final vision worse than 2/60 (45.99%). 10% had visual acuity of 6/12 or better. In 12% patients (pediatric) visual acuity couldn't be assessed.

27% patients with zone 1 injury had a vision worse than 2/60, while 62.9 % with zone 2 injury had vision worse than 2/60. All Zone 3 had worst visual prognosis. Subconjunctival hemorrhage was present in highest no. of cases (75 %). Out of the 18 patients in whom vision could not be assessed, 10 had subconjunctival hemorrhage, 12 had uveal prolapse, 2 had cataractous lens, 2 had relative afferent pupillary defect, 3 had vitreous loss, 2 had vitreous hemorrhage, 1 had tractional retinal detachment and 1 had intraocular foreign body.

Table 1: Final visual acuity of open globe injury patients after 3 months

Final Visual Acuity	Number of patients
6/6-'6/12	15
6/18-6/36	28
6/60-3/60	20
2/60- accurate projection of rays	41

Discussion

The male is to female ratio of our study was 3.8:1.Hence a male predominance was seen in the studyThis result was similar to a study 10 conducted by Casson R et al (4:1) [10], Haryana (3:1) [11], University college study (4:1) [12]. Males are generally more affected as they are more exposed to outdoor and work related injuries.

Most of the ocular injuries in this study were seen in patients in the age group of young adults. Patients between 11-40 years contributed to 65.32% injuries. Similar results were found by previous studies conducted in University College (median age 18) [12], Meneschg et al. (32.29 years) [13]. Young population is more exposed to trauma as a result of exposure to outdoors, sports etc. In this study unskilled labourers and farmers contributed to 30.6% of the open-globe injuries while students contributed to 28%. According to a study conducted in Haryana, in occupational injuries (38.26%), those occurring during agricultural activities (19.9%), were most common.

The most common setting where the ocular trauma occurred was during agricultural labor because of lack of eye protection [14].

In this study it was observed that amongst the most frequent causative agents are stick followed by stone. Road traffic accident was responsible for 10.66% of the cases noticeably in young adults. In case of children especially pen, pencil, toy frequently caused openglobe injury (9.99%) Krishnaiah S et al study

shows a injury with vegetable matter such as a thorn, branch of a tree, plant secretion, etc. was the major cause of trauma reported in this population [15]. Study conducted in Turkey showed that most common cause of the perforation was metallic substance in 32.6%, wood in 15.3%, stone in 12.0%, glass in 12.3%, pellets in 12%, and injection needles in 8.3%.16

In this study majority (58.66%) patients had vision worse than 2/60This result was similar to study conducted in Ibadan, where in the majority of patients (63%) had presenting visual acuity less than 3/60 [12].

It was also observed in this study that 50% of the patients had corneal laceration, 32% had scleral laceration, while 18% had a corneoscleral laceration. Similar results were seen in study conducted in Ibadan (corneal 43.7% or corneo-scleral 41.5%). 12 According to a study conducted in Haryana, cornea was the most affected part of eyeball (47.6%) followed by iris injury (32.64%) [11].

In this study it was observed that majority of the patients had a final best corrected vision worse than 2/60. (45.99%) as against 58.66% having presenting vision worse than 2/60. 10% had final best corrected visual acuity of 6/12 or better. Sharma T et al found improvement in visual acuity of two Snellen lines in eyes with measurable pre operative acuity or improvement to at least 2/60 with pre operative acuity of hand movements, was attained in 62% of the eyes; acuity of 6/9 or better was achieved in 28% [17].

In our study vision was better in zone 1 followed by zone 2. Zone 3 had the worst visual prognosisThis result was similar to that observed by Sharma T et al [17], Russell SR et al [18] (large > 10 mm lacerations and scleral lacerations posterior to the insertion of the rectus muscle).

Posterior segment injury can cause irreversible damage to the retina and optic nerve hence zone 2 and 3 injuries have a worse visual prognosis. In our study factors associated ultimate with poor vision (<2/60) at 3 months were, extensive lid laceration, relative afferent papillary reflex, hyphaema, vitreous loss, retinal detachment. 66.66%, 96.14%, 56.7%, 61.8%, 50% patients presented with these symptoms had final poor vision respectivelyThese study findings corresponded with previous studies [18-24].

We also observed that uveal prolapse was seen in 81.8% and cataract was seen in 11.35% patients, lens subluxation or dislocation was seen in 4 patients (3%). The patients with traumatic cataract underwent surgery with cataract extraction and had final visual acuity better than 2/60 (53.3%) and worse than 2/60 was seen in 46.6%. 48.6% of the patients with uveal prolapse had vision- worse than 2/60. Study findings were similar as University College study [12].

In this study intraocular foreign body was seen in total 3 adult patients (2.2%). However all had a vision better than6/60. Two of these were intralenticular and these patients underwent lens extraction with implantation of intraocular lens. While the third patient had a corneal rupture with a penetrating foreign body partly in the anterior chamber which was subsequently removed and the wound was sutured. Intraocular foreign body has been correlated with poor outcome in a study by Punnonen E et al, and Pieramici DJ et al [25,26].

The limitations of this study are short time, single centric data of predominantly low socio-economic strata, exclusion of endophthalmitis, optic nerve involvement and orbital fracture; all 3 are important predictor of final visual outcome.

Conclusion

In case of trauma, early and proper intervention does not always significantly influence the final visual outcome, makes it imperative that preventive eye care programs consider ocular trauma in the population as a priority. Public health education, aimed strategy for protection of vulnerable group, taking safety measures at work, immediate referral is all important.

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Original Article

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Clinical Study and Management of Bacterial Corneal Ulcer

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Abstract

Context: Corneal blindness is a major challenge faced today in the whole world; corneal ulcers being the most common cause. Bacterial corneal ulcers should be recognized and treated at the earliest as they can lead to permanent sight threatening complications. *Aims:* To study clinical course, antibiotic sensitivity pattern and treatment aspects of bacterial corneal ulcers. *Settings and design:* Prospective clinical study carried out at department of Ophthalmology, Karnataka Institute of Medical Sciences, Hubli. *Methods and Material:* A prospective clinical study was carried out. All patients attending ophthalmology out patient during the study period of November 2010 to May 2012 with definitive signs and symptoms of corneal ulcers were included in the study. Bacterial corneal ulcers were specifically studied in detail after microbiological evaluation. *Statistical Analysis:* Data was entered in Microsoft Excel worksheet and analyzed using proportions. Statistical test like chi square test was used wherever appropriate. P value of less than 0.05 was considered as statistically significant. *Results:* Majority of ulcers were caused by staphylococcus aureus (33.34%), followed by Pseudomonas (23.81%), Klebsiella (14.29%), Staphylococcus epidermidis (9.52%), alpha hemolytic streptococci (7.14%), beta hemolytic streptococci (4.76%), Streptococci pneumonia (4.76%), E. coli (2.38%). Fluorquinolone monotherapy was used in 64.39% cases. Surgical debridement was done in 76.2%. Most common complication was healed corneal *scar in 69.05% of cases. Conclusion:* Microbiological evaluation is the most important step in the management of bacterial corneal ulcer.

Keywords: Ulcer; Evaluation; Management; Intervention; Complications.

Introduction

Corneal blindness is a major challenge to ophthalmologists worldwide. Corneal ulcer is a major cause of corneal blindness and is an important ophthalmic condition causing significant morbidity especially in developing countries. According to several epidemiological studies, it is estimated that nearly 1.5 to 8 million corneal ulcer occur each year in developing nations [1]. Scarring of cornea developed secondary to suppurative corneal ulcer is the second commonest cause of preventable blindness after un-operated cataract among people in Asia, Africa and in the Middle East [2]. It is estimated that 30,000 cases of microbial keratitis (including bacteria, fungus and Acanthamoeba) occur annually in the United States [3].

Corneal ulcer is special as they cause permanent opacities leading to loss of vision. It also leads to complications that are fatal for the eye. The corneal ulcer are 10 times more common in developing countries as compared to developed countries [4], suppurative keratitis is becoming the major cause of corneal blindness in the developing world [5].

While contact lens use is a major risk factor for corneal ulceration in the developed world, a high prevalence of fungal infections, agriculture related

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trauma, and use of traditional eye medicines [6] is unique to the developing world.

Corneal ulcers may be infective or non-infective. Bacterial, fungi, viruses are the commonest causes of infectious bacterial ulcers. Though bacteria causing corneal ulcers have gradually decreased over years following the advent of antibiotics, they are still responsible for majority of infective ulcers occurring in our country [7].

The proper understanding of changing pattern of bacteria affecting cornea, the changing antibiotic sensitivity pattern and the altered clinical presentation with indiscriminate use of antibiotics are important in the management of bacterial corneal ulcer. Also emerging antibiotic resistance has posed a difficult task in the management of bacterial corneal ulcer. Skilful usage of antibiotics, adequate supportive therapy, and management of co-existing morbidities are the challenges today in order to prevent or reduce corneal blindness due to bacterial corneal ulcers. Keeping this in mind, present study was carried out to study clinical course, antibiotic sensitivity pattern and treatment aspects of bacterial corneal ulcers.

Material and Methods

A prospective clinical study was carried out. Institutional Ethics Committee permission was obtained. All patients attending ophthalmology out patient during the study period of November 2010 to May 2012 with definitive signs and symptoms of corneal ulcers were included in the study. Patients were selected at random. They were subjected to microbiological evaluation for both bacteria and fungi. Out of total 106 corneal patients, 42 (39.6%) were of bacterial etiology, 48 (45.3%) were of fungal origin and 6 (5.6%) were of mixed (bacterial and fungal) etiology and remaining 10 (9.5%) were sterile. Viral studies were not done as the facilities were not available.

Thus ultimately we included only 42 cases which were of bacterial etiology for corneal ulcer in the present study after their due informed consent. Detailed clinical history and examination was carried out. Ocular examination was done to rule out any predisposing factors like lid abnormalities, lid infections, lacrimal sac infections, dry eye syndrome. Amount of lid edema, type of discharge per cul-de-sac, type of conjunctival reaction to corneal ulcer was noted.

The corneal ulcer was defined on the basis of size, shape and position. The tear film was stained with sterile fluorescein strips to know the size and extent of the associated epithelial defect. Anterior chamber was examined for cells, flare and hypopyon. The hypopyon was measured from the limbus in mm. All patients were subjected to microbiological evaluation. The corneal scrapings were taken in Microbiology department to facilitate direct inoculation on to different media; thereby eliminating the chances of contaminating media/material during transit.

The cornea was anesthetized with 4% lignocaine. Using sterile 21 gauge needle, the floor and the edges of the ulcer were scraped carefully. The scrapings were transferred carefully on sterile microscopic slides and culture media. They were subjected to gram's staining and KOH staining. The culture media in which they were inoculated were blood agar plate, chocolate agar plate, Mac-conkey's agar, Sabauraud's agar and Thioglycolate broth. The antibiotic sensitivity tests were done by disc diffusion technique. In case of perforated ulcers, the conjunctival swabs were taken to inoculate from the discharge.

Once the etiology was confirmed as bacteria by gram staining and microscopy, empirical therapy with broad spectrum antibiotics was initiated. Later depending upon the culture and sensitivity reports and the response to treatment, the antibiotics were changed accordingly. Other supportive treatment like cycloplegics, anti-inflammatory drugs and vitamin supplementation were given.

Patients were asked to come on every third day in out patient department for follow up for first four week, every week afterwards till one month to three moths. During follow up, size of the epithelial defect, amount of stromal infiltrate, amount of hypopyon, amount of congestion and visual improvement was noted. Patients presenting with impending perforation or perforation were asked to get admitted. Admitted cases were debrided daily and other cases were debrided during follow up. Debridement was done till the slough reduced and the epithelium healed. In case of sac infection, sac excision was done.

Statistical Analysis

Data was entered in Microsoft Excel worksheet and analyzed using proportions. Statistical test like chi square test was used wherever appropriate. P value of less than 0.05 was considered as statistically significant.

Results

Table 1 shows visual status of patients at the time of presentation and at the end of 4 weeks of treatment. At the time of presentation only 9 patients (21.4%) had visual status of counting fingers up to 5 meters and better which improved to 47.6% (20 cases) at the end of 4 weeks. At the time of presentation majority i.e. 33 patients (78.6%) had poor visual status like no perception of light or only perception of light or hand movement's only or counting fingers close to face and this decreased significantly to 52.4% at the end of 4 weeks of treatment. This difference was found to be statistically significant ($p < 0.05$).

Table 2 shows bacteriological profile of corneal ulcers. The most common organism found causing corneal ulcer was Staphylococcus aureus in 33.34% of cases followed by Pseudomonas in 23.81% of cases. 14.29% of cases were due to Klebsiella. Only one case was due to E. coli.

Table 3 shows incidence and amount of hypopyon. Majority of cases had moderate degree of hypopyon. Overall incidence of hypopyon was 71.43%. Only 14.29% of cases had marked (> 4 mm) hypopyon.

Out of 14 cases of S. aureus, 12 cases (85.72%) were sensitive to moxifloxacin, 11 cases (78.47%) to gatifloxacin, 10 cases (71.4%) to cefazolin, and 7 cases (50%) to tobramycin. Out of 10 cases of pseudomonas, 9 cases (90%) were sensitive to tobramycin, 3 cases (30%) to gatifloxacin, and 4 cases (40%) to moxifloxacin. Out of 6 cases of Klebsiella, majority of cases (90%) were susceptible to cephazolin and tobramycin. Out of 2 cases of S. pneumonae, both were sensitive to chloramphenicol, gatifloxacin and moxifloxacin. All cases of S. epidermidis were sensitive to moxifloxacin (Table 4).

In the present study, 76.20% of patients underwent surgical debridement of the corneal ulcer. 11.91% cases underwent dacrocystectomy. In 11.91% of cases the eye was eviscerated. In 3 cases (7.14%) therapeutic keratoplasty was done and in another 3 cases (7.14%) conjunctival hooding was done. In 4.76% of cases, conjunctival foreign body was removed (Table 5).

Table 1: Visual acuity of patients at the time of presentation and at the end of 4 weeks

Visual Acuity	Number (%) at the Time of Presentation	Number (%) at the end of 4 weeks	Chi square and p value
No perception of light	03 (7.14%)	06 (14.29%)	$X^2 = 5.266$
perception of light present	14 (33.34%)	05 (11.91%)	P = 0.01087
Hand movements only	12 (28.58%)	06 (14.29%)	
Counting fingers close to face	04 (09.52%)	05 (11.91%)	
Counting fingers up to 5 m	03 (07.14%)	10 (23.80%)	
Visual acuity 6/60	04 (09.52%)	04 (09.52%)	
Visual acuity 6/36	02 (04.76%)	03 (07.14%)	
Visual acuity 6/24	00	01 (02.38%)	
Visual acuity 6/18	00	02 (04.76%)	
Total	42 (100%)	42 (100%)	

Table 2: Bacteriological profile of corneal ulcers

Bacteria Causing Corneal Ulcer	Number	Percentage
Staphylococcus aureus	14	33.34
Pseudomonas	10	23.81
Klebsiella	06	14.29
Alpha hemolytic streptococci	03	07.14
Beta hemolytic streptococci	02	04.76
Streptococcus pneumonia	02	04.76
E. coli	01	02.38
Staphylococcus epidermidis	04	09.52
Total	42	100

Table 3: Incidence and amount of hypopyon

Amount of Hypopyon	Number	Percentage
No hypopyon	12	28.57
Minimal (< 2 mm)	08	19.05
Moderate (2-4 mm)	16	38.09
Marked (> 4 mm)	06	14.29
Total	42	100

Table 4: Antibiotic sensitivity and culture pattern of bacteria found in corneal ulcer

Bacteria	Sensitivity (S)/resistance (R)	CEF	CHL	GENT	CIPR	GATI	MOXI	NOR	OFLO	TOB
S. aureus	S	10	6	7	8	11	12	8	9	7
	R	4	8	7	6	3	2	6	5	7
Pseudomonas	S	6	5	8	4	3	4	4	7	9
	R	4	5	2	6	7	6	6	3	1
Klebsiella	S	5	4	4	2	4	4	3	3	5
	R	1	2	2	4	2	2	3	3	1
Alpha hemolytic streptococci	S	2	2	2	1	2	1	2	2	2
	R	1	1	1	2	1	2	1	1	1
Beta hemolytic streptococci	S	2	1	1	1	2	2	1	2	1
	R	0	1	1	1	0	0	1	0	1
S. pneumonae	S	1	2	0	1	2	2	2	2	1
	R	1	0	2	1	0	0	0	0	1
E. coli	S	0	1	1	0	1	1	1	1	1
	R	1	0	0	1	0	0	0	0	0
S. epidermidis	S	2	1	0	2	3	4	3	2	1
	R	2	3	4	2	0	0	1	2	3

Table 5: Surgical measures undertaken in the management of bacterial corneal ulcers

Surgical Measures Undertaken	Number	Percentage
Debridement	32	76.2
Conjunctival hooding	03	07.14
Sac excision	05	11.91
Keratoplasty	03	07.14
Evisceration	05	11.91
Foreign body removal	02	04.76

Discussion

A prospective clinical study was carried out. All patients attending ophthalmology out patient during the study period of November 2010 to May 2012 with definitive signs and symptoms of corneal ulcers were included in the study. Bacterial corneal ulcers were specifically studied in detail after microbiological evaluation.

In the present study, 19.05% of cases had already received antibiotics, 11.91% had received antibiotics with steroid, 2.38% had received native medications like cow's milk, rose water, breast milk etc. In 19.05% of cases, medications were received but its nature was unknown, 47.61% of patients had no history or prior medication. Though 19.05% of patients had used local antibiotics, bacteria were still recovered on culture indicating inadequate use of drugs, poor patient compliance or organisms being resistant to antibiotics. Topical steroid usage noted in 11.91% might have potentiated the infective process. The use of native medications might have been responsible for secondary bacterial infections in an otherwise epithelial abrasion due to trauma. 47.61% of patients did not use any local antibiotics suggest lack of awareness about seriousness of ocular ailments. Bourcier et al [8] found that 76% of patients in their study did not take prior medication at the time of presentation. Srinivasan M et al [9] reported that a significant proportion of patients (57.7%) had history or prior use of antibiotics at the time of presentation.

In the present study, only 8 patients presented early and they were found to have a better prognosis. At the time of presentation only 9 patients (21.4%) had visual status of counting fingers up to 5 meters and better which improved to 47.6% (20 cases) at the end of 4 weeks. At the time of presentation majority i.e. 33 patients (78.6%) had poor visual status like no perception of light or only perception of light or hand movement's only or counting fingers close to face and this decreased significantly to 52.4% at the end of 4 weeks of treatment. This difference was found to be statistically significant ($p < 0.05$).

We found that prevalence of bacterial corneal ulcer was 39.62% and that of fungal corneal ulcer was 45.28%. Thus the prevalence of fungal corneal ulcer was more than bacterial corneal ulcer. Similar findings were reported by Bharathi MJ et al [10], but Srinivasan M et al [9] found that the prevalence of bacterial corneal ulcers was slightly more than that of fungal corneal ulcers.

In the present study majority of the bacterial

corneal ulcer were caused by S. aureus (33.34%) followed by Pseudomonas in 23.81% of cases. But Bharathi MJ et al [10], Srinivasan M et al [9], and Schaefer et al [11] observed that Streptococcus pneumonae was the causative agent in majority of cases (37.51%) in their studies. The higher incidence of S. aureus ulcers in the present study may be due to increased prevalence of beta lactamase producing strains which are more resistant to antibiotics.

In the present study, we observed that cases due to Streptococcus pneumonae responded well to the treatment by showing a significant decrease in the number of corneal ulcers but cases caused due to Klebsiella did not respond well. This is due to more sensitivity of gram positive organisms in comparison to gram negative organisms.

We found that majority of the patients (54.76%) had central corneal involvement and among them majority were due to S. aureus. Similar findings were reported by Bourcier T et al [8] we found that majority of cases (45.23%) had deep stromal involvement followed by superficial stromal involvement in 30.96% cases. Bourcier T et al [8] in their study found that the depth of ulcer was less then one third in 77.2% of cases, between one third to two thirds in 13.1% cases and more than two third in 9.7% cases.

In the present study out of 14 cases of S. aureus, 12 cases (85.72%) were sensitive to moxifloxacin, 11 cases (78.47%) to gatifloxacin, 10 cases (71.4%) to cefazolin, and 7 cases (50%) to tobramycin. Out of 10 cases of pseudomonas, 9 cases (90%) were sensitive to tobramycin, 3 cases (30%) to gatifloxacin, and 4 cases (40%) to moxifloxacin. Out of 6 cases of Klebsiella, majority of cases (90%) were susceptible to cephazolin and tobramycin. Out of 2 cases of S. pneumonae, both were sensitive to chloramphenicol, gatifloxacin and moxifloxacin. All cases of S. epidermidis were sensitive to moxifloxacin. Study by Akter L et al [12] found that S. aureus was sensitive to tobramycin, and S. epidermidis was susceptible to chloramphenicol.

In the present study, the most common complication was leucomatous grade corneal opacity (35.71%). Macular grade corneal opacity was seen in 19.05% cases and nebular grade corneal opacity in 14.29% cases. Gopinathan U et al [13] found that 75.5% had healed scar (nebular, macular, leucomatous opacity), 1.1% had adherent leucoma and 4.9% had undergone evisceration.

Key Messages

Appropriate timely intervention reduces the morbidity. Patient compliance is equally important.

Conclusion

Staphylococcus aureus was the most common bacteria found responsible for bacterial corneal ulcers. It responded well to moxifloxacin/gatifloxacin therapy. Maximum cases of Pseudomonas responded to fortified tobramycin therapy. Majority of patients had improvement in the visual acuity. Microbiological evaluation is the most important step in the management of bacterial corneal ulcer. Appropriate timely intervention reduces the morbidity. Patient compliance is equally important.

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Original Article

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Visual Functional Assessment in Children and Young Adults with Refractive Errors

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Abstract

Background: Normal visual functioning depends not only on patient's visual acuity but also on many other parameters, such as the visual fields, perception of colour, contrast and visual skills. Clinically, objective measurements, such as those of acuity or the visual fields, provide an assessment of a patient's visual status but do not reflect the degree of visual impairment that the patient experiences in his or her daily activities sufficiently. Impairment of vision affects the quality of life which is related to health, and affects the daily activities of life, including social activities. The efficacy of interventions should be validated by patient's visual functions and by assessing visual or impact of visual impairment on daily activities. *Aim:* To evaluate visual functions and performance among children and young adults with refractive errors and to assess the effectiveness of ophthalmological interventions on visual functional improvement. *Materials and Methods:* The participants in this study comprised children and young adults with refractive errors, aged 5-30 years, attending the low Vision and paediatric ophthalmology department at Institute of Ophthalmology, Joseph Eye Hospital, Tiruchirappalli. Data relating to distant visual acuity, near visual acuity, ocular examination, refraction after cycloplegia, near vision, contrast sensitivity; colour vision, field of vision and functional visual assessment were collected and reviewed after refractive correction. *Results:* The comparison of visual functions and functional skills in children and young adults with refractive errors showed that individuals in low vision groups had reduced visual functions even with best corrected visual acuity than the individuals in normal vision group. There was a statistically significant difference in uncorrected visual acuity, best corrected visual acuity, colour vision, contrast sensitivity, stereopsis, near point of accommodation, near point of convergence etc. between Group 1(patients with vision $\geq 6/18$) and Group II(patients with vision<6/18). Functional skills like reading speed, writing speed and mobility were also reduced in low vision groups that shows statistically significant difference between Group 1 and II and also had significant difference among subgroups of Group 1 and II. None of the patients had age appropriate functional skills in Group 1 and Group II. After using interventions (like optical and non-optical aids) for 6 months, there was a statistically significant improvement in BCDV, functional skills between first visit and follow-up visit and had significant differences among subgroups. But none of the individuals in Group 1and II had age appropriate functional skills. *Conclusion:* The present study had shown that in spite of improved clinical and functional vision with interventions, at short term follow-up, the visual skills required, were not age appropriate, both at initial and at also follow-up visit. Hence, functional vision parameters should be monitored as a criterion to determine the quality of vision in those with refractive errors especially in the paediatric age group.

Keywords: Refractive Error; Visual Function; Paediatric and Young Adults.

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Introduction

The World Health Organisation (WHO) and VISION 2020 report states that uncorrected refractive errors (43%), unoperated cataract (33%), and glaucoma (2%), are the important causes of blindness and low vision globally. Of these, refractive errors has been identified as one of the main cause of visual impairment in children and young adults, leading to drastically reduced productivity, educational opportunities and quality of life. According to the WHO (2011), Low Vision is defined as the best corrected visual acuity (BCDV) less than 6/18 to light perception or visual field of less than 10 degree in the better eye after the best possible correction [1].

According to WHO (2012) estimates, approximately 285 million people across the world live with low vision and blindness. Out of this estimation, 39 million people are blind and 246 million live with moderate to severe visual impairment. Of the latter, 145 million of the visually impaired people suffer from uncorrected refractive errors, where restoration of normal vision can be done with the help of optical devices such as spectacles [2].

Normal visual functioning depends not only on patient's visual acuity but also on many other parameters, such as the visual fields, perception of colour, contrast and visual skills [3]. Clinically, objective measurements, such as those of acuity or the visual fields, provide an assessment of a patient's visual status but do not reflect the degree of visual impairment that the patient experiences in his or her daily activities sufficiently [4].

Low vision is characterised by changes in visual functions such as decreased visual acuity, stereo acuity, contrast sensitivity, brightness perception, abnormal contour interaction. These visual functions can be reduced even in people with normal vision and are highly compromised in low vision.These visual parameters determine the quality of vision that are used in daily tasks such as reading and writing, especially in the school and college years [5].

Amblyopia is one of the preventable causes of low vision. In amblyopia, the visual acuity is reduced. Interestingly, patients with amblyopia have improvement in the visual acuity by one or two lines when examined through a neutral density filter but patients with organic lesions have further worsening of visual acuity. Second, patients with amblyopia have reduced visual acuity when examined with multiple letters in the charts than by using single letter charts and this is named as crowding phenomenon [8].

It has been documented that there is no correlation between subjective complaints and objective measurements of difficulty in patients with visual impairment.There is a paucity of literature on how functional visual performance improves with correction of refractive errors. The improvement of visual functions after correction of refractive error has been inferred based on improvement in visual acuity only [7].

In general, visual impairment and low vision affects the visual functioning of a person in areas like orientation and mobility, in day-to-day communication skills, with the daily living activities and prolonged near tasks such as reading. The effect on these four areas depends on the type and degree of impairment [9]. Visual impairment also affects various aspects of life which include a person's educational status, occupation and leisure activities.

Impairment of vision affects the quality of life which is related to health, and affects the daily activities of life, including social activities. The efficacy of interventions should be validated by patient's visual functions and by assessing visual or impact of visual impairment on daily activities [9].

Children and young adults with low vision have different needs from that of their peers, necessitating residual vision enhancement. Residual vision can be enhanced by thorough clinical assessment and correction of refractive errors by glasses or contact lenses. These patients should also be trained to use optical and non-optical aids if needed, through adaptation of environment and teaching methods. This is very important especially in children, because any delay in development of visual skills will affect their education. Early referral and intervention have great potential to impact on visual outcome as well as on participation in family, school and community life [10].

As of today most of the studies done on refractive errors was on assessing the prevalence of the problem and its associated illness only very few studies had been done on assessing the visual function among the refractive error children so this study was done to identify the differences in visual funcions like visual acuity, contrast sensitivity, colour vision, stereopsis, visual fields etc in patients with refractive errors between individuals with normal best corrected visual acuity and individuals suffering from visual impairment.

Aim

To assess the visual functions among children and young adults with refractive errors and to evaluate the interventions made on them.

Materials and Methods

A prospective comparative study was conducted at the out-patient department of Institute of Ophthalmology, Joseph Eye Hospital, Tiruchirappallifor a period of one year after getting the clearance from the institutional ethical committee. All patients aged 5-30 years presenting with refractive error were included for the study. Patients with features of strabismus/anisometropic amblyopia; refractive errors <0.5 D (sphere/ cylinder); nystagmus; any previous ocular surgeries or pathology were excluded from the study. The patients were divided into two groups. Group 1, were those with best corrected visual acuity (BCVA) > 6/ 18 (in both eyes) (50 patients), Group1 subgroup A consisted of those presenting for the first time while subgroup B consisted of those already using interventions. Group 2, were those with (BCVA) <6/ 18(in both eyes) (50 patients); Group 2 subgroup A consisted of those presenting for the first time while Group 2 subgroup B consisted of those already using interventions. All eligible patients underwent a complete clinical and visual function assessment and were prescribed interventions. Clinical and visual function assessment include examination of the anterior segment by slit-lamp biomicroscopy and posterior segment by fundus examination, presenting and best corrected visual acuity testing by log MAR charts for both distance and near vision; refraction; contrast sensitivity testing by Lea's low contrast numbers; visual field testing by Bjerrums; colour vision by Farnsworth D 15; testing of visual skills such as reading and writing speed, stereopsis by TNO cards and binocular single vision parameters by synoptophore, near-point of accommodation and near-point of convergence by RAF ruler.

Interventions prescribed included; prescription of distance and near correction; optical and non-optical devices; and environmental modifications. All cases were reviewed after 6 months and their visual skills like reading and writing speed were evaluated at follow up. The data were entered and analysed by using SPSS version 21. Mean and standard deviation were derived for all the parametric variables. Chi-square test with Yates correction and Mann-Whitney U test and Wilcoxon sign rank test was applied for assessing the statistical significance between the groups.

Results

Table 1 shows the age wise distribution of the study population. The minimum age of the study subjects was 6 years and the maximum age was 30 years. Majority of the study subjects were in the age group between 10–20 years and the mean age ranges between 10–15 years. In the intra-group comparison there is a statistically significant difference between group 2A and 2B among the age group distribution. Females were found to be more in number than males in group I whereas males were more among group II and the difference was found to be statistically significant. Among the intra-group comparison there was almost equal distribution between males and females (Table 2).

Among the various refractive errors which were presented between the two groups, myopia was found to be more common among group I (52%) and compound myopic astigmatism (52%) was found to be more common in group II patients and the difference between the two groups was found to be statistically significant ($p<.05$) (Table 3). The mean spherical equivalent was found to be of high dioptres in group II when compared to group I and the difference was found to be statistically significant and among the intra-group comparison between group I, it was high in group IB when compared to group IA and the difference was statistically significant, whereas intra-group comparison among group II did not show a statistically significant difference (Table 4).

The various interventions prescribed to the patients enrolled in the study was tabulated in table 5. Prescription of new glasses was the most common intervention done for most of the patients in group I, whereas in group II few patients were prescribed magnifiers, lamp, telescope and bifocals. No statistical significant difference was observed in the type of intervention between inter-group and intra-group (Table 5). Table 6 shows the various clinical parameters related to refractive errors and colour vision measured among the two groups. All the parameters showed a statistically significant difference between the two groups, whereas between the intragroup comparisons there was no statistical significant difference among any of the parameters.

Table 7 shows the functional vision assessment among the study subjects. It is inferred from the table that mean reading speed and mean writing speed were better among group I patients when compared to group II and the difference was statistically significant ($p<.05$). The comparison of the clinical

and functional visual parameters between the initial and follow-up (after 6 months) visit among the intra and inter group shows that there is no statistically significant difference in the clinical parameters (p>.05), whereas among the functional parameters there is a statistically significant difference (p<.05) in the initial and follow-up visit among both inter and intra group (Table 8).

Table 1: Age wise distribution of the study population

Age Group	Group I A (n=25)	Group I B (n=25)	Group II A (n=25)	Group II B (n=25)
<10	6 (24%)	4 (16%)	13 (52%)	6 (24%)
10 – 20	14 (56%)	15 (60%)	10 (40%)	15 (60%)
21 – 30	5 (20%)	6 (24%)	2 (8%)	4 (16%)
Mean ± SD	15.8 ± 7.1	16.2 ± 5.8	10.0 ± 5.9	15.0 ± 6.7
P value (Mann-Whitney U test)	Group 1A vs 1B U=292, P=0.690		Group 2A vs 2B U=170, **P=0.006**	

Table 2: Gender wise distribution of the study population

Study group	Males	Females	P value (Chi-square test)	P value (between group I and group II)
Group I A (n = 25)	11 (44%)	14 (56%)	1.000	**<.01**
Group I B (n = 25)	11 (44%)	14 (56%)		
Group II A (n = 25)	19 (76%)	6 (24%)	0.538	
Group II B (n = 25)	17 (68%)	8 (32%)		

Table 3: Refractive errors presented between the two groups

Refractive Errors	Group I (n=50)	Group II (n=50)	P value (Chi-square test)
Myopia	26 (52%)	10 (20%)	**<.01**
Hypermetropia	1 (2%)	4 (8%)	**0.0318**
Myopic astigmatism	12 (24%)	8 (16%)	**0.0281**
Compound myopic astigmatism	9 (18%)	26 (52%)	**<.01**
Compound hypermetropic astigmatism	2 (4%)	1 (2%)	0.319
Mixed astigmatism	0	1 (2%)	0.182

Table 4: Mean spherical equivalent in both eyes of the individuals enrolled in the current study

Groups (no.of individuals)	Mean Spherical Equivalent (dioptres)	Statistical analysis (Mann-Whitney 'U' test)	Subgroups (no.of individuals)	Mean Spherical Equivalent(dioptres)	Statistical analysis (Mann-Whitney 'U' test)
Group 1 (50)	-1.85±1.94	U=679, **P<0.000**	1A(25)	-1.2±2.85	U=173.5, **P=0.007**
			1B(25)	-2.50±2.75	
Group 2 (50)	-5.9±7.85		2A(25)	-5.9±7.8	U=279.5, P=0.5.
			2B(25)	-5.9±8.5	

Table 5: Interventions prescribed to the individuals enrolled in the study

Interventions	Group 1		Statistical analysis	Group 2		Statistical analysis(Chi-square test)
	1A	1B		2A	2B	
Glasses	25	22	Yates'=1.42,P=0.23.	25	24	{x^2 [d.f=1]=1.020, P=0.312}
Same glasses	0	3		0	1	
			Low Vision Aids			
CCTV	0	0	No significant difference.	0	2	(x^2 (d.f=4)=7.754, P=0.2
Magnifiers	0	0		1	1	
Lamp	0	0		2	1	
Telescope	0	0		2	0	
Bifocals + Lamp	0	0		3	0	

Table 6: Evaluation of clinical parameters in both eyes of the individuals between the two groups

Clinical parameters (In both eyes)	Group I	Group II	P value
BCNV (logMAR units)	0.63±0.00	1.22 ±0.73	**<.0001**
BCDV (logMAR units)	0.03 ± 0.09	0.61 ± 0.13	**<.0001**
Confusion angle (degrees)	69.04± 7.30	21.13±60.16	**<.0001**
Contrast sensitivity	18.50±4.50	7.00±5.43	**<.0001**
Stereopsis (arc secs)	76.80±34.37	195.6±137.04	**<.0001**
Fusional range (degrees)	14.78±2.45	15.82±3.53	**<.0001**
NPC (cms)	11.18±2.00	9.82±2.33	**<.0001**
NPA (D)	11.18±2.00	9.52±2.53	**<.0001**

BCNV – Best corrected near vision
BCDV – Best corrected distant vision
NPC – Near point of convergence
NPA – Near point of accommodation

Table 7: Assessment of functional vision among the study subjects

Functional Parameter	Group I	Group II	P value	Intra Group Comparison		P value
No. of individuals with dependent mobility in unfamiliar places	0	26	<.0001	IA	0	0
				IB	0	
				II A	14	0.571
				II B	12	
Mean reading speed(words/min)	86.22±20.03	29.06±20.34	<.001	IA	83.40 ± 21.80	0.484
				IB	89.04 ± 18.10	
				II A	21.12 ± 16.05	**0.005**
				II B	37.00 ± 21.35	
Mean writing speed(words/min)	36.38±7.02	13.82±7.79	<.0001	IA	35.00 ± 8.11	0.321
				IB	37.76 ± 5.56	
				II A	9.92 ± 7.29	**<.0001**
				II B	17.72 ± 6.25	
Mean number of words omitted while reading	Nil	0.76±0.52	<.0001	IA	Nil	---
				IB	Nil	
				II A	0.67 ± 0.34	**0.034**
				II B	0.60 ± 0.32	

P value derived by using Mann-Whitney U test

Table 8: Comparison of visual parameters between the initial and follow-up visit among the study subjects

Visual Parameter	Study Groups	Initial	Follow-up	P value
BCDV (log MAR units)	Group I	0.026±.09	0.022±0.08	0.57
	Group II	0.614±0.13	0.608±0.13	0.180
	IA	0.05±0.12	0.04±0.10	0.157
	IB	0.00±0.0	0.00±0.0	1.000
	II A	0.65±0.15	0.65±0.14	0.317
	II B	0.57±0.09	0.56±0.09	0.317
BCNV (log MAR units)	Group I	0.63±0.0	0.63±0.0	1.000
	Group II	1.22±0.727	1.24±0.73	0.317
	IA	0.63±0.0	0.63±0.0	1.000
	IB	0.63±0.0	0.63±0.0	1.000
	II A	1.33±0.93	1.33±0.93	1.000
	II B	1.11±0.43	1.16±0.46	1.000
Mean reading speed (words/min)	Group I	86.22±20.03	96.14±21.27	<.0001
	Group II	29.06±20.34	33.84±20.44	<.0001
	IA	83.40±21.80	93.48±23.61	<.0001
	IB	89.04±18.10	98.8±18.7	<.0001
	II A	21.12±16.05	25.04±15.7	<.0001
	II B	37.00±21.35	42.68±20.97	<.0001
Mean writing speed (words/min)	Group I	36.38±7.02	42.10±8.90	<.0001
	Group II	13.82±7.79	16.02±8.24	<.0001
	IA	35.00±8.11	40.00±9.72	<.0001
	IB	37.76±5.56	44.2±7.63	<.0001
	II A	9.92±7.29	30.0±11.9	<.0001
	II B	17.72±6.25	20.12±6.71	<.0001

P value derived by using Wilcoxon sign rank test

Discussions

In the present study, the overall study population comprised 58% males and 42% females with refractive errors. In Group I, (50 patients with refractive errors) 44% were males and 56% were females (mean age of 15.96 years). In group II, 72% were males and 28% were females (mean age was 12.78 years). The prevalence of refractive errors in Group 1 individuals was myopia in 26(52%) and in Group II it was compound myopic astigmatism. A study done by Sethietal found that myopia to be the most common refractive error among 417 school children aged 12-17 years [11]. This is further affirmed by Karkietal, in their study on prevalence of amblyopia in ametropes, myopic astigmatism (55.36%) was found to the most common refractive error followed by hypermetropic astigmatism [9]. This underlines the importance of identifying and managing astigmatism effectively at the earliest in such a way to prevent amblyopia. Interestingly, 57.14% of amblyopic patients in the study done by Karki et al [9] were male, similar to the preponderance of male patients in group II noted in our study. Whether this reflects the gender predilection or health seeking behaviour of parents depending on the gender of the child has to be studied separately.

Colour vision was found to be affected in high axial myopia as studied by Rutar Tetal, with tritan defect being the most common anomaly noticed [12]. In our study, protan defect (42%) was the most commonly encountered colour vision abnormality among those with low vision due to ametropic amblyopia. Our study used a computerised version of a similar test used in the said study. The difference in the colour vision could be because patients with various refractive errors have been grouped together in group II.Whether this anomaly in the colour vision perception will affect their activities of daily living has to be studied.

Martin-Boglindetal, found that an error as little as 1D can significantly influence the visual fields [13]. Performance of visual field testing without spectacles resulted in reduced peripheral visual field as well as reduction in contrast sensitivity. Another study by Ohno-Matsui etal found that visual field defects were significantly higher in myopic eyes [14]. They conducted visual field examinations by Goldman kinetic perimetry for 492 eyes of 308 patients with high myopia (myopic refractive error >8D or axial length >26.5 mm). Significant visual field defects developed in 13.2% of highly myopic eye. In the current study, visual fields were examined by Bjerrum's screen, 97% of the patients with refractive errors had normal visual field except 3 patients in Group II had peripheral constriction of visual field.

Li S and Zou H conducted a study on stereoscopic visual acuity among ametropic amblyopia; it proved that children with astigmatism had the worst stereo-acuity in case of mild and moderate amblyopia [15]. In present study, the mean value of stereopsis in Group 1 was 76.80 arc secs and 195.6 arc secs in Group II and the difference was statistically significant. It could be because 52% of patients in low vision group had compound myopic astigmatism with ametropic amblyopia.

Manny etal conducted a study on changes in fusionalvergence, phoria and near point of convergence among myopic children aged 7-13 years and followed up annually for 10 years [16]. During follow-up, measurements like refractive error for distance and near, prism bar fusionalvergence range, near point of convergence were measured. After 10 years, the distance and near base out was decreased from 20 pd and 30 pd to 5.6 pd and 9.4 pd. This study concluded that for myopic children, the near point of convergence decreases for both distant and near vision viewing, as near phoria becomes more exophoric. In the current study, the mean near point of convergence was 11.18 cms in group 1 and 9.82 cms in group II as most of the patients in the study group were myopic.

A relationship between writing skills and visual-motor control was assessed in 42 students with low vision and 26 normal -sighted students by Atasavum Uysal et al [17]. Significant differences were found between the groups in writing speed, legibility, and visual motor control. Visual motor control was correlated with both writing speed and legibility. Students with low vision had poorer handwriting performance, with lower legibility and slower writing speed. Writing performance time was related to visual motor control in students with low vision. In the current study, the mean writing speed was 36.3 words/ min in group 1, 13.8 words/min in group II and16.02 words /min in group 2 during the follow-up visit. All the patients in group II had poorer writing speed when compared with patients in normal group.

In this study there were significant differences between clinical, orthoptic and functional vision parameters between low vision and normal vision groups. There were significant differences in functional visual skills within subgroups in low vision groups, but none of the patients in both groups had age appropriate functional skills, despite of improvement in visual acuity and functional skills

at follow-up. The comparison within subgroups proved that functional skills were better in patients, those who were already using interventions (Group 1B & 2B) than from the patients presenting for the first time (Group 1A &2A). The present study reports that regular follow-up with evaluation and correction of refractive error by glasses or contact lenses is necessary in children and young adults.

Conclusion

Refractive errors, with or without associated amblyopia, can lead to reduced visual functions like contrast sensitivity, stereopsis, colour vision, visual fields and reduced functional skills such as reading and writing.The present study had shown that in spite of improved clinical and functional vision with interventions, at short term follow-up, the visual skills required, were not age appropriate, both at initial and at also follow-up visit. Hence, functional vision parameters should be monitored as a criterion to determine the quality of vision in those with refractive errors especially in the paediatric age group.

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Original Article

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Bacteriological Profile and Drug Susceptibility Patterns in Chronic Dacryocystitis Patients: A Rural Hospital Study

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Abstract

Introduction: Dacryocystitis is the inflammation of lacrimal sac. It mostly results from blockage of nasolacrimal duct. *Aim:* The study was carried out for detection and identification of causative bacterial agents and their Sensitivity to different antibiotics. *Materials and Methods:* One year study was carried out from March 2015 to Feb. 2016. Samples were collected with the help of sterile swab and further processed in the department of Microbiology. *Results:* Out of 66 cases were studied, 64 (96.96%) were culture positive and only 2 (3.03%) were culture negative. Gram positive organisms were most commonly isolated than Gram negative organisms.The most common bacteria isolated were the Coagulase negative staphylococci 41 (64%), Staphylococcus aureus 12 (18.75%), Staphylococcus epidermis 3 (4.68%), Klebsiella pneumoniae 3 (4.68%), Pseudomonas aeruginosa 3 (4.68%) and Streptococcus pneumonia 2 (3.12%). *Conclusion:* Dacryocystitis is the most frequent disease of lacrimal system and one of the most important cause of ocular morbidity. As majority of our population live in rural areas, knowledge of causative organisms and the susceptibility of the bacteria towards antibiotics plays major role in the management of these disease.

Keywords: Dacryocystitis; Lacrimal Sac; Nasolacrimal Duct.

Introduction

Dacryocystitis is one of the common eye disease.It is the inflammation of lacrimal sac [1]. It is classified under two broad headings Acute and Chronic type. Chronic dacryocystitis is commoner, commonly associated with partial and total obstruction of nasolacrimal duct. The obstruction of canal leads to stagnation of tears and favors the pathological environment [2,3]. The healthy lacrymal passages are free from infective microorganisms partly due to resistance of mucosa itself and partly due to the bacteristatic influence of the tears [4,5,6]. The normal flora of the eye and the nose acts as an opportunistic pathogens and cause infection of lacrimal sac.Treatment of dacryocystiti is surgery, either external or endonasal dacryocystorihnostomy or occasionally silicon intubation [4]. Delay in management can lead blindness. Hence the study was carried out to find out the bacteria responsible to cause dacryocystitis and to study their antibiogram which guide in formulation of exclusive management protocols.

Aims and Objectives

Detection and identification of causative bacterial agents and their Sensitivity to different antibiotics.

Materials and Methods

One year study was carried out from March 2015 to Feb. 2016. The study was carried in outpatient

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department of Ophthalmology in collaboration with Microbiology department. Samples were collected with the help of sterile swab and further processed in the department of Microbiology.

Inclusion Criteria

1. Cases of chronic dacryocystitis which were clinically diagnosed.
2. Patient with previous episodes of acute dacryocystitis.

Exclusion Criteria

1. Congenital dacryocystitis.
2. Patient who had received either topical or systemic antibiotics in past one week.

The study carried out on 66 samples, collected from 63 patients by applying pressure over the lacrimal sac and purulent material was collected by two sterile cotton swab from conjunctiva and nose. Collected material were subjected to Gram staining and culture. For culture specimens were inoculated on Blood agar, MacConkey agar, incubated at 37^0C, overnight in incubater.

Bacteriological identification was done by seeing colony morphology and by standard protocols [8]. Antimicrobial susceptibility testing was done by Kirby-Bauer disc diffusion method as per Clinical Laboratory Standard Institute guidelines [5,7].

Results

A total of 63 patients with the clinical diagnosis of dacryocystitis were enrolled for the study. A maximum of patients were from the age group 61-70 years (6^{th} decade) i.s. 26 (41.26%) followed by patients in the age group 51-60 years (5^{th} decade) i.s. 20 (31.74%) given in Table 1.

There was female predominance i.s. 47 (74.60%) which is shown in the Table 2.

In our study maximum age was 85 and 81 years of male and female patient respectively. The minimum age was 40 and 42 years of male and female patient respectively as per Table 3.

The mean age as per our study was 60.76 years of total patients given in Table 4. In our study mean age of female patients was 64.19 years and that of male was 61.5 years shown in Table 4.

Bacterial etiology was seen in 64/66 (96.96%) patients presenting with chronic dacryocystitis. No organism was isolated in 2 (3.03%) patients as per Table 5.

The details of bacterial etiology are given in Table 6. Among the isolated bacteria, most of the organisms were Gram positive as compared to Gram negative organisms. Coagulase negative staphylococci was the most common GPC followed by Staphylococcus aureus.

Among GNB, the most common was Pseudomonas Aeruginosa, and Klebsiella Pneumoniae Antibiotic sensitivity patterns of Gram-positive cocci and Gram-negative bacilli are shown in Table 7.

Overall sensitivity testing against all bacteria shows most effective antibiotic against all organism is Moxifloxacin (92%) followed by Gatifloxacin (84.37%), Ofloxacin (84.37%), Ciprofloxacin (73.43%), Norfloxacin (60.93%), Cephalosporin (56.25%) Gentamicin (53.12%), Tobramycin (51.56%), Amoxicillin (50%), Cloxacillin (50%), Chloramphenicol (48.43%) and Tertracycline (48.43%).

Table 1: Age wise distribution

Age-Group	No. of Cases	Percent %
31-40	1	1.58
41-50	10	15.87
51-60	20	31.74
61-70	26	41.26
71-80	3	4.76
81-90	3	4.76
Total	63	100

Table 2: Distribution of gender among patients and number of positive samples

Gender	No. of Cases
Female	47(74.60%)
Male	16(25.39%)
Total	63(100%)

Table 3: Distribution of minimum and maximum age

	Female	Male
Minimum age	42 yrs	40 yrs
Maximum age	81 yrs	85 yrs

Table 4: Mean age of patients

Mean age of total patients	60.76 years
Mean age of females	64.19years
Mean age of males	61.5years

Table 5: Distribution of culture

Name of Organisms	Total
Coagulase negative staphylococci	41 (64.06%)
Staphylococcus aureus	12 (18.75%)
Staphylococcus epidermis	03 (4.68%)
Klebsiella pneumoniae	03 (4.68%)
Pseudomonas aeruginosa	03 (4.68%)
Streptococcus pneumoniae	02 (3.12%)
Total	64 (100%)

Table 6: Bacterial types isolated from patients with chronic dacryocystitis

Positive	64 (96.96%)
Negative	2 (3.03%)
Total	66 (100%)

Table 7: Antibiotic sensitivity pattern of organisms (isolates)

Name of organisms	G	Te	C	CF	AM	CLX	NX	OX	GATI	CHLOR	TB	MO
A	21	22	24	30	23	24	27	39	39	23	20	38
	51.21%	53.65%	58.53%	73.17%	56.09%	58.53%	65.85%	95.12%	95.12%	56.09%	48.78%	92.68%
B	8	4	7	8	4	5	6	7	7	3	6	11
	66.66%	33.33%	58.33%	66.66%	33.33%	41.66%	50 %	58.33%	58.33%	25%	50 %	91.66%
C	2	2	1	2	1	1	1	2	2	2	2	3
	66.66%	66.66%	33.33%	66.66%	33,33%	33.33%	33.33%	66.66%	66.66%	66.66%	66.66%	100%
D	1	1	2	2	2	1	1	1	2	2	2	2
	33.33%	33.33%	66.66%	66.66%	66.66%	33.33%	33.33%	33.33%	66.66%	66.66%	66.66%	66.66%
E	1	1	1	3	1	0	2	3	2	1	1	3
	33.33%	33.33%	33.33%	100%	33.33%	0%	66.66%	100%	66.66%	33.33%	33.33%	100%
F	1	1	1	2	1	1	2	2	2	0	2	2
	50%	50%	50%	100%	50%	50%	100%	100%	100%	0%	100%	100%

A-Coagulase negative staphylococci,B- Staphylococcus aureus,
C- Staphylococcus epidermis,
D- Klebsiella pneumonia,E- Pseudomonas aeruginosa,F- Streptococcus pneumonia
G-Gentamycin,Te-Teracyclin,C-Cephalosporin, Cf-Ciprofloxacin,
Am-Ampicillin,Clx-Cloxacillin,Nx-Norfloxacin,Ox-Ofloxacin,Gati-Gatifloxacin,Chlor-Chloramphenicol, Tb-Toramycin, Mo-Moxifloxacin

Discussion

In the present study of Chronic dacryocystitis the maximum number of patients were in the age group of 61-70 years (6th decade) i.e. 26 (41.26%) followed by patients in the age group 51-60 years (5th decade) i.s.20 (31.74%), Sergio Pinar-Sueiro et al showed similar results [20]. Arun Ghosh et al shows showed the highest number of dacyrocystitis among the people who belongs to 40 -49 years (53.33%) age group followed by those in age group of 30- 39 years (23.33%) [5]. In our study Females were affected more 47 (74.60%) than male 16 (25.39%). Arun Ghosh et al shows Females were more affected 19(66.33%) as compared to male 11(36.66%) [5]. These findings were correlated with the findings of different authors [4,7,9,10]. Females are more affected because they are having more oblique and narrow nasolacrimal [5]. In the present study, among the isolated bacteria,

most were Gram- positive organisms as compared to Gram –negative organisms. Arun Ghosh et al shows 22(75.86%) isolates were gram positive bacteria and 7(24.13%) isolates were gram negative bacteria [5]. Suharshi Gupta et al [4], Coden et al [11] and Bharati et al [10] reported that majority of the isolates were gram positive organisms. Coagulase negative staphylococci was the most common GPC 41 (64.06%) followed by Staphylococcus aureus 12 (18.75%). Yared Assefa et al showed similar findings [21]. Among GNB, the most common were Pseudomonas Aeruginosa 03 (4.68%), and Klebsiella Pneumoniae 03 (4.68%). Gram-negative bacilli were found to be less commonly occuring cause of adult dacryocystitis. Similar findings were reported by many others [2, 12,13,14,17,18,19]. In present study 2 (3.03%) showed sterile culture, Jyoti Bhuyan [2] Sood NN [12] Baleshwar Prasad[13] also reported sterile samples. While testing the sensitivity of various bacteria against commonly used antibiotics,shows most effective antibiotic against all organism is Moxifloxacin (92%) followed by Gatifloxacin (84.37%), Ofloxacin (84.37%), Ciprofloxacin (73.43%), Norfloxacin (60.93%), Cephalosporin (56.25%) Gentamicin (53.12%), Tobramycin (51.56%), Amoxicillin (50%), Cloxacillin (50%), Chloramphenicol (48.43%) and Tertracycline (48.43%) as observed by others [2,14,15,16].

Conclusion

In conclusion, this study of 66 cases carried out in Department of ophthalmology A.C.P.M. Medical college Dhule, Maharashtra, India, shows that most commonly affected patients were in the age group of 61-70 years (6^{th} decade) and female predominance was there. Coagulase negative staphylococci was the most common organism among Gram-positive isolates and the most effective antibiotics were Moxifloxacin, Gatifloxacin, Ofloxacin and Ciprofloxacin.

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Original Article

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Ocular Changes in Hypertensive Disorders of Pregnancy – A Clinical Study

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Abstract

Aim: To determine the prevalence of ocular changes in hypertensive disorders of pregnancy. *Materials and Methods:* This was a prospective observational study and it was conducted in period of 2years and it consisted of 100 subjects who fulfil the diagnostic criteria of hypertensive disorders of pregnancy. *Results*: Out of 100 patients, 61 patients had gestational hypertension, 23 had preeclampsia, 15 had eclampsia, 2 had chronic hypertension and 1 had preeclampsia superimposed on chronic hypertension. Most of the fundus changes were seen in the 22-25 age group. Fundus changes were observed in 21(21%) patients. Of these 21 patients with fundus changes, 19 patients had Grade I change, 1 patient had Grade II retinopathy change with retinal edema and macular edema and 1 patient had macular edema. Fundus changes were seen in 55.5% of preeclampsic and eclampsic patients. Out of 21 women who had preeclampsia, fundus changes were seen in 52.3% of them. Among 12 women who mild preeclampsia fundus changes were seen in 41.6%. Of 9 women with severe preeclampsia 66.6% had fundus changes. Out of 15 women who had eclampsia, fundus changes were seen 60% of them. Severe retinal changes like macular edema and Grade II retinopathy with retinal edema and macular edema were seen in eclampsic women. Visual disturbances were seen in 2 cases, out of these one patient had macular edema and the other had Grade II retinopathy change with retinal edema and macular edema. Most of the fundus changes (71.4%) were seen when the systolic blood pressure was ≥160 mm Hg. It was found that there was an increased incidence of retinal changes with an increase in systolic BP with a statically significant P value of 0.001. Fundus changes were seen only when the diastolic blood pressure was ≥ 100. It was found that there was an increased incidence of retinal changes with an increase in diastolic BP with a statistically significant P value of 0.0006. In this study out of 37 patients who had proteinuria, 19 patients had proteinuria of 1+ and retinal changes were seen in 5 (26.3%) of them, 14 patients had proteinuria of 2+ and retinal changes were seen in 11 (78.57%) of them and 4 patients had proteinuria of 3+ and retinal changes were seen in all (100%) of them. *Conclusion:* It can be concluded that fundus evaluation should be done in all patients with hypertensive disorders of pregnancy.

Keywords: Gestational Hypertension; Eclampsia; Macular Edema.

Introduction

Hypertensive disorders complicate 5 to 10 percent of all pregnancies, and together they are one member of the deadly triad - along with hemorrhage and infection - that contributes to maternal morbidity and mortality. Hypertensive disorders of pregnancy include gestational hypertension, preeclampsia and eclampsia syndrome, preeclampsia superimposed on chronic hypertension and chronic hypertension. The incidence of hypertensive disorders is 5-10% of all pregnancies [1]. The incidence of preeclampsia in hospital practice varies from 5% to 15% [2]. The

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incidence in primigravidae is about 10% and in multigravidae is 5%. The hospital incidence of eclampsia in India ranges from 1 in 500 to 1 in 30 [2]. It is more common in primigravidae (75%) [2]. Ocular involvement is common in PIH, occurring in as many as 30 to 100% of these patients [3]. Hypertensive disorders affects multiple organ systems that include cardiovascular changes, haematological abnormalities, neurological or cerebral manifestation, hepatic and renal impairment [4]. As the retinal, cerebral and renal vessels are closely related to each other, the eye serves as a window to study the state of vessels in the brain and parenchyma of the kidneys. Several studies have concluded that there is a close correlation between the blood pressure elevation and retinal arteriolar spasm [5]. The degree of vasospasm is considered a better guide to the severity of the hypertensive disorders than presence or even degree of hypertension. Thus, ocular examination of these patients not only helps in diagnosis of eye problems but repeated observations assist in assessing the severity and progression of disease, response to treatment and ultimate outcome or prognosis [6]. Fundoscopy is a simple, non-invasive and cost effective investigative procedure that can be performed in the outpatient department or at the bedside. This study was undertaken to study the ocular changes seen in hypertensive disorders of pregnancy.

Materials and Methods

This was a prospective observational study and it was conducted in department of ophthalmology and department of obstretrics and gynaecology, Mediciti Institute of Medical Sciences, Ghanpur, Medchal, Telangana during a period of December 2014 to July 2016 and it consisted of 100 patients.

Inclusion Criteria was subjects who fulfil the diagnostic criteria of hypertensive disorders of pregnancy attending the obstetrics department of Mediciti Institute of Medical Sciences.

Exclusion Criteria was subjects with the following conditions pre-existing diabetes mellitus, pre-existing renal disease, pre-existing ocular diseases like glaucoma, optic neuritis, uveitis, patients with hazy media which precludes fundus examination, patients who are not willing to give consent.

Age, gravida, gestational period, blood pressure and proteinuria of the patients were documented after taking an informed consent. History of ocular complaints were noted. Anterior segment examination was done using a slit lamp when even the patient was stable. Examination was done under a diffuse torch light in case of unstable patients. Visual acuity was recorded, any improvement with pinhole was noted and retinoscopy was done. Fundoscopy: Fundus examination was done under tropicamide mydriasis. Tropicamide 0.5% eye drops were instilled into the cul-de-sac. After instillation of eye drops patients were advised punctal occlusion for 3 minutes after closing their eyes to avoid systemic absorption. Fundoscopy was done after adequate mydriasis. Both direct and indirect ophthalmoscopy were done. Subjects with ocular changes were advised regular follow up and postpartum ocular examination. Ocular findings were documented and observations were analysed. Subjects with ocular changes were advised treatment was per physician's advice.

The results were analysed using EPI INFO 7.0 software. Chi-square test with Yate's correction was used to determine the association between the various parameters. P value of < 0.05 was taken as significant.

Results

Table 2 shows in the present study of 100 patients, 40% were between 18-21 years of age, 40% were between 22-25 years of age, 13% were between 26-29 years of age and 7% were between 30-33 years of age. The mean age was 22.98 years. 56% were primigravidas (maximum), 25% were gravida II, 13% were gravida III, 5% were gravida IV and 1% belonged to gravida V (minimum). 30% belonged to > 34 weeks of gestation (maximum), 27% were between 30-34 weeks of gestation, 23% were between 25-29 weeks of gestation, 20% were between 20-24 weeks of gestation (minimum). 83% had 6/6 vision, 15% improved to 6/6 with pinhole. 2% of the patients had blurred vision.

Table 1: Shows grading of hypertensive retinopathy (Keith Wagner)[22]

Grade I	Mild generalized retinal arteriolar narrowing, particularly of small branches.
Grade II	Focal arteriolar attenuation and arteriovenous nipping.
Grade III	Grade II + hemorrhages (dot, blot and flame), hard exudates, cotton wool spots.
Grade IV	Grade III + optic disc swelling (papilloedema)

In the present study of 100 patients, 61% had gestational hypertension (maximum), 21% were preeclampsic, 15% were eclampsic, 2% had chronic hypertension, 1% had preeclampsia on chronic hypertension (minimum). Fundus changes were observed in 21 patients, of which grade I retinopathy changes were seen in 19%, grade II with retinal edema and macular edema was seen in 1% and macular edema was seen in 1%.

Table 2: Demographic distribution study

Age Group (Years)	No. of Patients	Percentage
18-21	40	40%
22-25	40	40%
26-29	13	13%
30-33	7	7%
Total	100	100%
Gravida		
G1	56	56%
G2	25	25%
G3	13	13%
G4	5	5%
G5	1	1%
Total	100	100%
Period of Gestational Age		
20-24 weeks	20	20%
25-29 weeks	23	23%
30-34 weeks	27	27%
>34 weeks	30	30%
Total	100	100%
Visual Acuity		
6/6	83	83%
6/9	15	15%
6/18	1	1%
6/36	1	1%
Total	100	100%
Visual Acuity with pinhole improvement		
6/6	15	15%
6/12	1	1%
6/18	1	1%
Total	17	17%

Table 3: Hypertensive disorders of pregnancy in fundus changes

Hypertensive Disorder	No. of Patients	Percentage
Gestational Hypertension	61	61%
Preexclampsia	21	21%
Exclampsia	15	15%
Chronic hypertension	2	2%
Preexclampsia on Chronic hypertension	1	1%
Total	100	100%
Fundus Changes		
No change	79	79%
Grade I	19	19%
Grade II change with retinal & macular edema	1	1%
Macular edema	1	1%
Total	100	100%

In the present study maximum retinal changes (47.6 %) were seen between the 22-25 age group. The P value is 0.512, which is not statistically significant. Maximum changes were seen in gravida I (71.4%) followed by gravida II (19%). The P value is 0.0098, which is statistically significant. Most of the changes were seen in preeclampsic and eclampsic patients. Macular edema and grade II change with retinal edema and macular edema were seen in eclampsic patients. P value is 0.0001, which is statistically significant. 21 patients had preeclampsia and fundus changes (Grade I) were seen in 11 (52.38%) of them.

Mild preeclampsia was seen in 12 patients and fundus changes (Grade I) were seen in 5 (41.6%) of them. Severe preeclampsia was seen in 9 patients and fundus changes (Grade I) were seen in 6 (66.6%) of them.

In the present study, 21 patients had preeclampsia and fundus changes (Grade I) were seen in 11 (52.38%) of them. Mild preeclampsia was seen in 12 patients and fundus changes (Grade I) were seen in 5 (41.6%) of them. Severe preeclampsia was seen in 9 patients and fundus changes (Grade I) were seen in 6 (66.6%) of them.

Table 4: Relationship between age, gravid and fundus change in hypertensive disorders of pregnancy.

Age (Years)	None	Grade I	Grade II	Macular	Total
18-21	33	6	1	0	40
22-25	30	10	0	0	40
26-29	10	2	0	1	13
30-33	6	1	0	0	7
Gravida					
G1	41	13	1	1	56
G2	21	4	0	0	25
G3	12	1	0	0	13
G4	4	1	0	0	5
G5	1	0	0	0	1
Hypertensive changes in pregnancy					
Gestation Hypertension	60	1	0	0	61
Preexclampsia	10	11	0	0	21
Exclampsia	6	7	1	1	15
Chronic Hypertension	2	0	0	0	2
Preexclampsia on chronic hypertension	1	0	0	0	1

Table 5: Severity of hypertensive retinopathy in exclampsia group in relation to blood pressure and proteinuria

Variables	No change	Grade I	Grade II	Macular EDEMA	Total
Systolic blood pressure (mm Hg)					
140-149	66	0	0	0	66
150-159	9	6	0	0	15
160-169	4	10	0	1	15
≥170	0	3	1	0	4
Total	79	19	1	1	100
Diastolic blood pressure (mm Hg)					
90-99	64	0	0	0	64
100-109	13	13	1	0	27
≥110	2	6	0	1	9
Total	79	19	1	1	100
Total Blood pressure (mmHg)					
<160/100	76	5	0	0	81
>160/100	3	14	1	1	19
Total	79	19	1	1	100
Proteinuria					
+	14	5	0	0	19
++	3	11	0	0	14
+++	0	2	1	1	4
Total	17	18	1	1	37

In the present study, 15 patients had eclampsia and fundus changes were seen in 9 (60%) of them. Grade I changes were seen in 7(46.6%) patients, grade II with retinal and macular edema was seen in 1 patient and macular edema in 1 patient. Most of the fundus changes (71.4%) were seen when the systolic blood pressure was ≥ 160 mm Hg. Every patient with systolic blood pressure of ≥170 had fundus changes. The P value is 0.001, which is statistically significant. Fundus changes were seen only when the diastolic blood pressure was ≥100. The P value is 0.0006, which is statistically significant. Most of the fundus changes (73.68%) were seen when the blood pressure was > 160/100 mm Hg. The P value is 0.001, which is statistically significant.

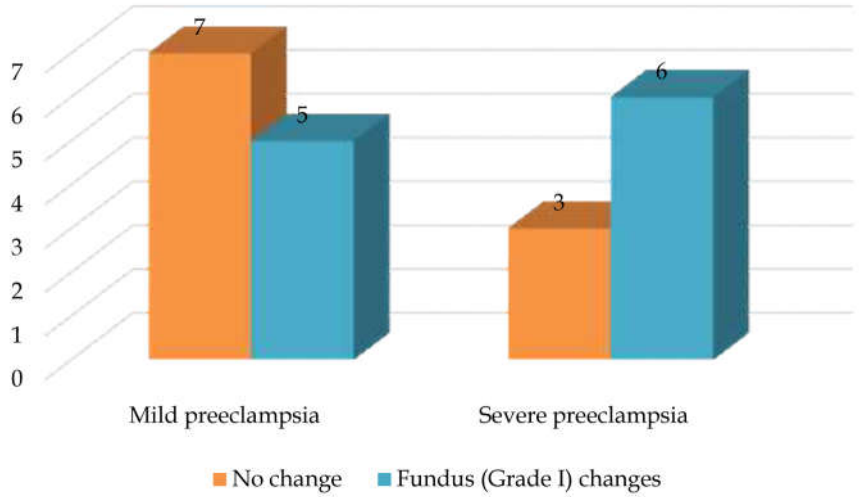

Fig. 1: Relationship between fundus changes and severity of preeclampsia group

In the present study, most of the fundus changes were seen when the proteinuria was ≥ 2+. The P value is 0.001, which is statistically significant. Visual acuity changes (< 6/6 with pin hole) and complaints of blurred vision (in women with no ocular complaints) were seen in 2 patients. In both cases macula was involved.

Discussion

This hospital based prospective observational study was done on 100 patients with hypertension disorders of pregnancy.

Hypertensive Disorders of Pregnancy

In the present study of 100 patients, majority had gestational hypertension (61%), followed by preeclampsia (23%) which was followed by eclampsia (15%). Chronic hypertension was seen in 2% whereas preeclampsia superimposed on chronic hypertension was seen in only 1%. This is comparable to the study by Shah et al [7] where gestational hypertension was seen in 61.33%, preeclampsia was seen in 32% and eclampsia was seen in 6%. This indicates that gestational hypertension is the most prevalent of hypertensive disorders of pregnancy, followed by preeclampsia which is followed by eclampsia.

Age

In the study by Tadin et al [9] of 40 women, the average age was 29.1 years. In another study by Jaffe and Schatz [8], the mean age was 28 years. The mean age was 25.1 years in the study by Shah et al [7] of 150 patients. In the present study the mean age was 22.98. In the present study of 100 patients, 47.6% (10 out of 21 changes) of fundus changes were seen in the 22-25 years age group. The P value was 0.512 indicating insignificant association between age and retinal changes. This is comparable to the studies by Sagili Chandrasekhara Reddy et al [10](P=0.41), Shah et al [7](P=0.865) which also indicate there is no significant association between age and retinal changes.

Gravida

Young and nulliparous women are particularly vulnerable to developing preeclampsia. In the present study of 100 patients with hypertensive disorders of pregnancy, 56% were primigravidas. In the study by Reddy et al [11], 55.3% were primigravidas. In the study by Shah et al 50.67% [7] were primigravidas. 65% were found to be primigravidas in a study by Rajalaxmi et al [12]. The present study is correlating with the other studies in indicating that primigravidas are more susceptible to hypertensive disorders. In the present study of 100 patients maximum fundus changes were seen in primigravidas (71.4%), followed by gravida II (19%). This indicates that the primigravidas are more susceptible to hypertensive retinopathy with a statistically significant P value of 0.0098.

Fundus Changes

In the present study fundus changes were seen in 21 (21%) patients. Of these Grade I retinopathy changes were seen in 19 patients (90.4%), Grade II

with retinal edema and macular edema was seen in 1 patient and macular edema was seen in 1 patient. Rasdi et al [13] found 32.5% fundus changes in their study on hypertensive disorders of pregnancy. In the present study, amongst 61 patients with gestation hypertension, fundus change was seen only in one patient. Rest of the 20 fundus changes were seen in preeclampsic and eclampsic patients. In the present study, 55.5% of preeclampsic and eclampsic patients had fundus changes. This correlates with the studies reported by Sagili Chandrasekhara Reddy et al [10] (59%), Rajalaxmi et al [12] (60%). Tadin et al [9] reported 45% changes. In the present study, 21 women had preeclampsia and fundus changes were seen in 52.3% of them. All the patients with fundus changes had grade I retinopathy changes. Among 12 women who had mild preeclampsia, fundus changes were seen in 41.6%. Of 9 women with severe preeclampsia, 66.6% had fundus changes. This correlates with the observations of the study by Tadin et al [9], which states that the degree of retinopathy was directly proportional to severity of preeclampsia. Landesman R et al [14] have also found a correlation between the degree of retinopathy and severity of preeclampsia. Jaffe et al [8] found a statistically significant correlation between reduction of A:V ratio and a diagnosis of severe preeclampsia. In the present study, 15 women had eclampsia and fundus changes were seen in 60% of them. Severe retinal changes like Grade II retinopathy with retinal edema and macular edema and another case with macular edema were seen in eclampsic women. In the present study the severity of retinal changes was significantly (P= 0.0001) associated with the severity of the hypertensive disorder as was seen in previous studies. In the present study, absence of hemorrhages, exudates, cotton wool spots or retinal detachment is supported by the studies of Jaffe et al [8], Sagili Chandrasekhara Reddy et al [10], Shah et al [7]. Exudative retinal detachment thought to be caused by choroidal ischemia is seen rarely in PIH patients. Retinal pigment epithelial lesions, called Elschnig spots, may also be found in preeclampsic patients with choroidal infarcts. The prognosis in these cases is good, with visual symptoms and retinal pigment epithelial changes resolve spontaneously within weeks of delivery. Retinal detachment is seen in 1-2% of all patients with PIH. In the present study, Grade II retinopathy change with retinal edema and macular edema was seen in 1 case and isolated macular edema without any grade of retinopathy was seen in another case. In both cases pregnancy was terminated. Bhandari et al [15] in their study found 5 cases with isolated ocular findings like retinal and macular edema, which were not associated with any grade of retinal vascular changes. Termination was carried out in those cases. According to Sagili Chandrasekhara Reddy et al [10] the presence of macular edema, papilledema or retinal detachment are the warning signs for termination of pregnancy to save the mother's vision. The patients with fundus changes were followed up and fundus examination repeated. All fundus changes reverted by 10th day postpartum. In the present study the prevalence of hypertensive retinopathy was higher that Shah et al [7] (12%) and Karki et al [16] (13.7%), but was lower than Sagili Chandrasekhara Reddy et al [10] (59%), Tadin et al [9] (45%), Rajalaxmi et al [12] (60%). Comparatively lower incidence of retinopathy with the absence of hemorrhages, exudates, cotton wool spots and retinal detachment can be attributed to good antenatal care and early detection and good management of hypertensive disorders of pregnancy.

Visual Disturbance

Visual symptoms are few in patients with PIH and often absent unless the macula is involved. In the present study of 100 patients , 83% had visual acuity of 6/6, 15% had visual acuity of 6/9 and all of them improved to 6/6 with pinhole and had previous history of refractive errors. Blurred vision was complained by 2 patients . Of these one patient had visual acuity of 6/36 with an improvement of 6/18 with pinhole. This patient had Grade II retinopathy with retinal edema and macular edema. Another patient had visual acuity of 6/18 with a pinhole improvement of 6/12. This patient had macular edema. This indicates the role of macular edema as a cause of visual disturbance in hypertensive disorders of pregnancy. Cortical blindness appearing late in pregnancy or shortly after delivery is an uncommon complication of severe preeclampsia and eclampsia. None of the patients in this study had cortical blindness which is similar to the studies by Shah et al [7], Karki et al [16], Reddy et al [11], Sagili Chandrasekhara Reddy et al [10]. In the present study visual disturbance was seen in 2% which is less than Smitha et al (11.9%) [17] and Mithila et all (14%) [18]. This low incidence of visual disturbance may be attributed to early detection and better management of cases.

Blood Pressure

In the present study , most of the fundus changes (71.4%) were seen when the systolic blood pressure was ≥ 160 mm Hg. Every patient with systolic blood pressure of ≥170 mm Hg had fundus changes. This indicates an increased incidence of retinal changes

with an increase in systolic BP with a statically significant P value of 0.001. In the present study, fundus changes were seen only when the diastolic blood pressure was ≥100. This indicates an increased incidence of retinal changes with an increase in diastolic BP with a statistically significant P value of 0.0006. Tadin et al [16] found a statistical correlation between blood pressure and hypertensive retinopathy. Mussey and Mundell found a correlation between frequency of retinal changes and level of blood pressure. In the study by Smitha et al, the mean systolic and diastolic BP of the subjects with hypertensive fundus changes were 178.07 mm of Hg. with standard deviation of 12.10 and 100.63 mm of Hg. with standard deviation of 12.86 respectively.

In the study by Sagili Chandrasekhara Reddy et al [10] of 78 patients, 49 (62.82%) cases had BP < 150/100 mm of Hg and 29 (37.18%) had BP > 150/100 mm of Hg. Retinal changes were seen in 21 (42.85%) cases when BP < 150/100 and 25 (86.21%) cases when BP > 150/100 mm of Hg. They found a statistically significant (P value =0.001) association between retinal changes and concluded that the higher the BP the more severe the retinal changes.

Bhandari et al [15] suggested that the higher the BP greater the retinal vascular changes with a statistically significant P value of < 0.05. In the study by Shah et al of 72 patients who had <160 mm Hg systolic BP and <100 mm Hg diastolic blood pressure, 4 (5.56%) patients had developed hypertensive retinopathy changes while out of 78 patients who had >160 mm Hg systolic and >100 mm Hg diastolic blood pressure, 14 (17.95%) patients developed hypertensive retinopathy.

They found a statistically significant (P value = 0.037) association between retinopathy changes and blood pressure readings. In the present study of 100 patients. Out of 81 patients who had <160 mm Hg systolic and <100 mm Hg diastolic BP, 5 (6.1%) patients developed retinal changes and out of 19 patients who had >160 mm Hg systolic and >100 mm Hg diastolic BP, 14 (73.68%) developed retinal changes. Macular edema and Grade II retinopathy change with retinal edema and macular edema were seen in patients who had BP >160/100 mm Hg.

There was a statistically significant (P value = 0.001) association between retinal changes and blood pressure readings in the present study which is similar to Sagili Chandrasekhara Reddy et al [10], Tadin et al [10], Karki et al [16].

Proteinuria

Proteinuria is an important sign of preeclampsia and eclampsia. Tadin et al found a statistical correlation between proteinuria and hypertensive retinopathy. In the study by Shah et al, out of 58 patients with proteinuria, 13 (22.41%) developed retinopathy compared to 5 (5.43%) patients from 92 who did not have proteinuria. Proteinuria was significantly associated with retinopathy (P value = 0.0005) in their study. In the study by Bhandari et al, it was found that 79% of women with urine albumin >2+ had retinal changes as compared to 33% of women with urine albumin ≤ 2+.They found the difference to be statistically significantly (P value <0.05).They also found a significant association between severity of proteinuria and grades of retinopathy. In the study by Sagili Chandrasekhara Reddy et al [10], of 40 patients with +1 proteinuria retinal changes were seen in 18 (40%) patients, of 14 with +2 proteinuria retinal changes were seen in 7 patients (50%) and all 12 patients with +3 proteinuria has retinal changes. They found a statically significant association between retinal changes and proteinuria. (P value = 0.018). In the present study of 37 patients who had proteinuria, 19 patients had proteinuria of 1+ and retinal changes were seen in 5(26.3%) of them, 14 patients had proteinuria of 2+ and retinal changes were seen in 11(78.57%) of them and of 4 patients with proteinuria of 3+ and retinal changes were seen in all (100%) of them. Macular edema and Grade II retinopathy changes with retinal edema and macular edema were seen in patients with 3+ proteinuria. This indicates a statistically significant association between retinal changes and proteinuria with a P value of 0.001. This correlates with the above studies.

Conclusion

It can be concluded that fundus evaluation should be done in all patients with hypertensive disorders of pregnancy. Observations such as "most patients having gestational hypertension (61%), fundus changes seen only in 21% and most changes being only Grade I retinopathy" indicate increased awareness regarding antenatal check-ups and improved standard of management of cases.

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Clinico-Epidemiological Study of Mycotic Keratitis at a Tertiary Care Hospital

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Abstract

Aims: To study the various clinical presentations of mycotic keratitis based upon the type of fungi and predisposing factor. To study, the epidemiological features of confirmed culture proven cases of mycotic keratitis and to identify the etiological agents. *Settings & Design:* A prospective hospital based cross sectional study at a tertiary care hospital for a period of 3 years from October 2013 to September 2016. *Material & Methods:* 800 culture confirmed cases of mycotic keratitis were enrolled in the study and followed regularly. The demographic, epidemiological characters and clinical examination findings by slit lamp examination were noted. Corneal scrapings and swabs were sent to laboratory for cultivation and identification of fungi. *Statistical Analysis:* The collected data was entered in Microsoft excel spread sheet, verified and entered in MEDCALC software and analyzed for statistical significance. *Results:* Males were more common in the study (66.25%), 21-30 years age group were more common(29.4%) and the incidence of mycotic keratitis was 38.28%. 78% were of rural background and 65.5% of cases were agricultural workers/farmers. Trauma was the common predisposing factor (78.75%) and traumatic agent was vegetative matter like husk, straw etc. Anterior chamber reaction was the commonest finding in slit lamp examination (91%).Fusarium sp was the common fungi (34.2%) followed by Aspergillus sp (32.5%). Candida sp accounted for 18.2% in the study. Pseudomonas aeruginosa was the commonest bacterial pathogen isolated (62.6%). *Conclusion:* our study highlights the demographic particulars of mycotic keratitis and epidemiological characters and clinical presentation in our geographic region. Early diagnosis of the condition is imperative for management either surgical or medical management. KOH wet mount is a simple microscopic diagnostic choice with more specificity which can be used in diagnosis of fungal keratitis.

Keywords: Mycotic Keratitis; Fusarium; Aspergillus SP; Pseudomonas Aeruginosa; KOH Wet Mount.

Introduction

Keratitis is one of the common preventable causes of blindness. This is more commonly seen in the tropical climates and rare in temperate areas. Based on the geographic location, its incidence is between 6% - 20% as reported by various studies [1]. Several studies have shown that etiological agents of this condition may be bacterial, viral, fungal and parasitic. The clinical features produced by these agents are protean and overlapping, hence diagnosis based upon clinical features alone is difficult task for the Ophthalmologist. Corneal infection of fungal etiology is very common in tropical countries like India and accounts to 30-40% of culture positive infectious keratitis [2]. Keratomycosis is caused by around 60 different species of Fungi. Clinical features produced by these fungi itself are variable and accurate identification requires the cultivation of

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Fungus. These fungi are placed under two categories, filamentous fungi and Non-filamentous fungi [3]. The frequency and spectrum of fungi involved in causation of mycotic keratitis varies from place to place, as it is influenced by multiple factors like climate, age, sex, socioeconomic and geographical conditions. While tropical climates show a preponderance of filamentous fungi, temperate climates show higher percentage of yeast infections. The predisposing factors in development of mycotic keratitis are also variable, trauma being a common factor in developing countries where cultivation is a major source of income. In developing countries, increased usage of contact lens is a significant risk factor for mycotic keratitis [4]. The spectrum of fungal pathogens is constantly changing based upon the changes in the climatic factors, geographical conditions and increased usage of contact lenses. Hence a thorough knowledge of the spectrum is essential in identification, prevention and management of cases of mycotic keratitis.

The present study was undertaken to study the various clinical presentations of mycotic keratitis based upon the type of fungi and predisposing factor. To study, the epidemiological features of confirmed culture proven cases of mycotic keratitis and to identify the etiological agents. Our study also compares the direct microscopy with LOH wet mount examination, gram staining and culture on Sabourad's Dextrose agar in cultivation of the fungi.

Materials & Methods

A hospital based prospective cross sectional study was conducted at Narayana medical college and General Hospital by Department of Ophthalmology for a period of 3 years from October 2013 to September 2016. All the patients attending the Outpatient department of Ophthalmology and Emergency department were selected in the study based on the inclusion criteria. Patients clinically suspected of Bacterial and fungal corneal ulcers were included in the study. Ulceration is defined as a loss of corneal epithelium with underlying stromal infiltration and suppuration associated with signs of inflammation with or without Hypopyon. Corneal ulcers with features suggestive of viral keratitis, healing ulcers and ulcers associated with autoimmune conditions were excluded from the study. The study was approved by the institutional ethical committee and all the procedures were performed as per the ethical guidelines of the institution. The patient's demographic data, occupational history, duration of symptoms, History of trauma and systemic illness were interviewed and entered in a predesigned questionnaire form. The study was explained to the cases in the study and written consent was obtained from the cases.

Clinical Examination

All the cases were examined by a slit lamp microscope and features of the ulcer, presence or absence of hypopyon, pigmentation, margins of the ulcer were noted.

Collection of Corneal Scrapings

Scrapings from the edges of the ulcer were collected by Ophthalmologist under aseptic conditions using sterile Bird-Parker blade (No 15). The collection was done by using operating microscope after installation of 4% lignocaine. The scrapings were transferred immediately to the laboratory for further processing. Swabs were also collected from the deep base and leading edges of the ulcer.

Laboratory Procedures

The scrapings received were transferred immediately onto sterile sheep Blood agar, Chocolate agar and two sets of Sabourad's Dextrose agar with and without actidione for growth of the fungi. The scrapings were inoculated in a pattern of "C" shaped streaks deeply into the solid media. The swabs were spread thinly on a new clean glass slides for wet mount examination with 10% KOH solution and Gram's staining. The inoculated media were incubated aerobically at 25^0c and 37^0c for four weeks and examined daily for 1st week and twice a week thereafter.

Identification of Isolates

Bacterial isolates were identified by standard biochemical tests and grams staining. Fungal isolate was considered significant if it was consistent with clinical signs, growth occurred on the C streaks and same organism was grown for second time also. Fungi were identified by colony morphology; features on LCB mount and slide culture as per standard mycological guidelines. Candida species were identified by germ tube formation, chlamydospore formation on corn meal agar and sugar assimilation tests.

Statistical Analysis

All the data was entered in Microsoft excel spread sheet and checked. Diagnostic parameters like

sensitivity, specificity and predictive values were calculated using MEDCALC software.

Results

In our study, a total of 2090 cases with clinical features suggestive of corneal ulceration were examined and evaluated. In 2090 cases, 800 of cases were fungal growth positive (38.28%), 684 cases were bacteriological culture positive (32.73%), 74 cases were both bacterial and fungal growth positive (3.54%) and 532 cases were sterile with no growth (25.45%). The incidence of mycotic keratitis in the study was 38.28%. 812 fungal isolates were recovered from 800 cases of fungal keratitis, pure growth was seen in 788 cases and mixture with two fungi and one bacterial were seen in 12 cases of the study. 684 bacterial isolates were isolated in the study.

800 confirmed cases of mycotic keratitis were included in the study and studied for various factors. In total 800 cases males were predominant (66.25%) almost equal to twice the females (33.75%) in the study. The male to female ratio in the study was 1.96:1 and mean age was 41.32 years. The common age group in the study was 21-30 years (29.4%) followed in order by 31-40 years (25.3%), 41-50 years (23.5%) and 12.1% in >50 years age group. 77.5% of cases were from rural locality and 65.5% were agricultural workers/ farmers. 155 were labourers, 5 were students and 5.75% professionals. Trauma was the commonest predisposing factor for mycotic keratitis (78.75%) followed by ocular conditions like surgical conditions, lagophthalmos, lid injury etc. Diabetes mellitus and topical steroid use was also observed in few cases in our study. 68.9% of cases had injury with vegetative matter like (paddy husk etc), other less common causes were insects, fingers, contact lens injuries etc. Some of the cases in the study were associated with systemic diseases like diabetes mellitus (3%) and topical corticosteroid usage (2.25%). Statistically significant association was found with male sex, trauma and vegetative matter as a causative agent (p valve<0.001) [Table 1].

Table 1: Demographic data of cases in the study.

Gender	No	%
Male	530	66.25
Female	270	33.75
Total	**800**	100
Age in years		
<21 years	78	9.8
21-30 years	235	29.4
31-40 years	202	25.3
41-50 Years	188	23.5
>50 years	97	12.1
Residence		
Rural	620	77.5
Urban	180	22.5
Occupation		
Agricultural worker	524	65.5
Labourer	120	15
Student	56	7
Household	32	4
Salaried	46	5.75
Others	22	2.75
Predisposing factors		
Trauma	630	78.75
Occular conditions:	128	16
Topical steroids	18	2.25
Diabetes mellitus	24	3
Traumatic agents		
Vegetative matter	434	68.9
Soil/Dirt/sand	98	15.6
insects	30	4.8
fingers	24	3.8
Miscellaneous	18	2.9
Conatct lens	26	4.1
Total	**630**	100

On slit lamp examination, features observed are presented in Table 2. Anterior chamber reaction was seen in 91% of cases; Conjunctival injection in 81.8%, Hypopyon in 86.3%, Suppuration in 40.4% and raised corneal surface in 33.4% of cases. Less commonly observed findings were satellite lesions (10.5%), feathery margins (15.8%), immune rings (5.8%) and perforation (3%) of cases.

The sensitivity of KOH examination in detection of fungal elements was higher (95.42%) than gram stained smear (93.145%). The specificity was better by KOH examination (99.185%) and gram staining (99.18%) than Slit lamp examination (92.43%) PPV was almost equal in KOH wet mount and gram staining than slit lamp examination, whereas the negative predictive value is less in gram stain examination than by slit lamp and KOH wet mount examination [Table 3].

Table 2: Slit lamp examination findings in Cases of Mycotic keratitis.

Sign	No of Patients	%
Conjunctival injection	654	81.8
Anterior chamber reaction	728	91.0
Suppuration	323	40.4
Hypopyon	690	86.3
Raised corneal surface	267	33.4
Satellite lesions	84	10.5
Stromal infiltrtae with feathery margins	126	15.8
immune rings	46	5.8
Perforartion	24	3.0

Table 3: Correlation between KOH and gram stained examination with slit lamp examination and culture growth of cases in the study

S. No	Name of the Investigation	Results	Number	Presence of Fungal growth		Sensitivity	Specificity	PPV	NPV
				Positive	Negative				
1	*10% KOH mount*	Positive	844	834 (TP)	10 (FP)	95.42%	99.18%	98.82%	96.79%
		Negative	1246	40 (FN)	1206 (TN)				
		Total	2090	874	1216				
2	*Detection of fungal elements in gram stain*	Positive	824	814 (TP)	10 (FP)	93.14%	99.18%	98.79%	95.26%
		Negative	1266	60 (FN)	1206 (TN)				
		Total	2090	874	1216				
3	*clinical examination by slit lamp*	Positive	924	832 (TP)	92 (FP)	95.19%	92.43%	90.04%	96.40%
		Negative	1166	42 (FN)	1124(TN)				
		Total	2090	874	1216				

Table 4: Bacterial and Fungal isolates from the cases in the study

Fungal isolates	No	%
Aspergillus Sp	264	32.5
A.niger	168	20.7
A.fumigatus	43	5.3
A.flavus	28	3.4
Other species of Aspergillus	25	3.1
Candida Sp	148	18.2
C.albicans	108	13.3
C.tropicalis	24	3.0
C.parapsiliosis	11	1.4
C.glabarata	5	0.6
Curvalaria Sp	43	5.3
Fusarium Sp	278	34.2
Pencillium sp	16	2.0
Alternaria Sp	11	1.4
Mucor Sp	18	2.2
Rhizopus	24	3.0
unidentified fungii	10	1.2
Total	812	100
Bacterial isolates		
Pseudomonas aeruginosa	428	62.6
Staphylococcus aureus	148	21.6
CONS	70	10.2
Streptococcus pneumoniae	38	5.6
Total	**684**	**100**

The predominant fungal species identified was Fusarium (34.2%), followed in order by Aspergillus sp (32.5%) and candida sp (18.2%). Less commonly observed fungi were Curvalaria (5.3%), Rhizopus (3%), Mucor (2.2%), Pencillium sp (2%), Alternaria (1.4%). 1.2% of fungi were unable to be identified. Aspergillus niger (20.7%) and candida albicans (13.3%) were commonest among the species. Among the bacterial isolates in the study Pseudomonas aeruginosa was the commonest (62.6%) followed by staphylococcus aureus (21.6%). Other isolates were CONS (10.2%) and streptococcus pneumoniae (5.6%). [Table 4].

Discussion

Presence of fungi is ubiquitous and their distribution widely across is responsible for different types of infections. Among many fungal diseases, mycotic keratitis is one of the several diseases, which is responsible for blindness if not timely diagnosed and managed. Fungi causing keratitis can be either yeasts or moulds or filamentous fungi. Fungi reproduce sexually or asexually and are grown in asexual phase when cultivated from the scrapings of the cornea.

The incidence of mycotic keratitis differs from place to place, country and country based upon geographical factors, climatic conditions and nature of occupation. The incidence of mycotic keratitis in our study was 38.28%, which is almost similar to findings in reports of various studies. As reported by Gopinathan U et al, Srinivasan M et al, the incidence from south India is 32-38%[1,2]. The incidence of mycotic keratitis was more in males, in the age group of 21-30 years. These findings suggest that males are more actively engaged in work with outdoor activities, and age group is most active period of work in the life making them vulnerable to injuries of the eye. Trauma was the most common predisposing factor and was most commonly observed in rural population in our study. In our study area, paddy cultivation is the most common source of economy and vegetative matter (paddy, Husk, straw etc) were the most common agents of injury for the cornea. Findings of our study were on par with the reports of Parmjeet Kaur Gill et al, Agrwal J et al and many other studies globally [5,6]. Higher incidence of fungal keratitis is observed in males of age group 21-40 years and rural areas and more common in farmers and Agricultural labourers as per the reports of many studies which coincides with the findings of our study [7].

Trauma was the most common predisposing factor of fungal keratitis in our study (78.75%) which is most common in labourers and agricultural workers, farmers. Similar findings were reported by Leck AK et al who reported the incidence of trauma as 76% in his study as predisposing factor for fungal keratitis [8]. Schafer et al have reported associate ocular co morbidities like lagophthalmos, lid injuries also have an important role as predisposing factor, in our study the incidence of ocular conditions was 16% (Surgical conditions etc) which is little less than the findings reported from developed countries. The factors associated with mycotic keratitis are variable from developing to developed countries. Contact lens as a traumatic agent has gained importance due to wide spread usage among developed countries, it is reported as important traumatic agent in studies of UK and Florida, but in our study its role as causative agent was restricted to only 4.1% whereas studies from developed countries have reported its as an important agent which ranges from 10-12% [9]. This represents a significant lower incidence of contact lens usage among our patient population or higher incidence of other risk factors in our study. Some of the studies have reported diabetes mellitus, topical corticosteroid usage as significant risk factors in development of fungal keratitis; however in our study the rate of association of DM and steroid usage was 3% and 2.5% which is lower than some of the studies. This is however explained by the fact that our study population mostly was agricultural farmers and laborers who are actively engaged in regular physical exertion and age group in our study was mostly between 21-40 years where the incidence of DM is usually low.

Clinical manifestations of fungal keratitis are protean and are multifactorial dependent. These are mainly dependent upon age of the case, type of fungus, severity of the pathogen etc. In our study, by slit lamp examination anterior chamber reaction was the most common entity followed by hypopyon and Conjunctival injection [10,11]. Other associated lesions were Suppuration (40.4%), raised corneal surface (33.4%), stromal infiltrate with feathery margins (15.8%) and immune rings (5.8%). These findings are always variable and sometimes may be misleading in diagnosis [12]. The sensitivity and specificity of slit lamp examination was 95.19% and 92.43% in our study and Positive predictive value was 90.04% and Negative predictive value was 96.4%.

In our study, good old traditional method of KOH wet mount examination of corneal scrapings has sensitivity of 95.42% and specificity was 99.18%

which was higher when compared with Grams staining with sensitivity of 93.14%. These findings were on par with the findings of Sharma S et al who reported similar findings in their study [13]. Hence grams' staining alone lacks good sensitivity in identification of cases and results in underreporting of cases of Keratomycosis. Isolation of fungal pathogen by cultivation on SDA still remains as the gold standard in the diagnosis, bur delay in the growth and errors in identification of fungi leads to underreporting in cases of fungal keratitis. Absence of growth in KOH positive cases could be due to administration of antifungal topical preparations.

The type of the fungal pathogen implicated in mycotic keratitis is variable from place to place and is dependable upon the type of occupation involved. In our study, Fusarium sp was the most common pathogen (34.2%) with very little variation with Aspergillus sp which accounted for 32.5% of cases in our study. As described in many studies, filamentous fungi were more common than the yeasts in our study also. The difference in the isolation rates of the pathogens could be due to difference in the traumatic agent and predisposing risk factors of the cases in the study. Higher incidence of fusarium in the study than Aspergillus could be due to the fact, fusarium is a plant pathogen and most of the cases in the study were farmers and agricultural labourers [14]. Aspergillus niger was the commonest species among Asergillus sp (20.7%) and Candida albicans was the commonest among Candida sp. (13.3%). Similar findings were reported by Saha et al from New Delhi [15].

Mixed infections with bacterial and fungal were reported in 74 cases (3.54%) in our study. Similar incidence was reported by Hagan M et al and Capriotti JA et al in their studies as 4% and 13% in their studies [16,17]. Pseudomonas aeruginosa was the most common bacterial pathogen (62.6%) in the study followed by Staphylococcus aureus. Other bacterial pathogens were Coagulase negative staphylococci and Streptococcus pneumoniae.

To conclude, our study highlights the demographic particulars of mycotic keratitis and epidemiological characters and clinical presentation in our geographic region. Fungal keratitis is still a concern for ophthalmologist. Early diagnosis of the condition is imperative for management either surgical or medical management. KOH wet mount is a simple microscopic diagnostic choice with more specificity which can be used in diagnosis of fungal keratitis. Trauma with a vegetative material appears to be most common cause of fungal keratitis in our study. Aspergillus sp and Fusarium sp were common causative fungi implicated in the condition.

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Nil.

Conflict of Interest

Nil.

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Original Article

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A Study of Outcome of Pterygium Dissection and Surface Conjunctival Autografting with Sparing of the Superior Conjunctiva for the Management of Primary Pterygium

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Abstract

Objective: To evaluate the success and outcome of pterygium dissection and surface conjunctival autografting with sparing of the superior conjunctiva for the management of primary pterygium. *Methods*: Prospective non comparative interventionalcase seriesinvolving 30 eyes with primary pterygium who underwent pterygium dissection with surface conjunctival autografting in the cornea clinic of a medical college. *Results*: There were 22 (73.33%) males and 8 (27%) females included in the study. Mean age of the patients was 43.88 years (range 19-66 years). Pterygium was Grade 1 in 9 (30%) eyes, grade 2 in 10 (33.3%) and Grade 3 in 11 (36,6%) eyes. No significant intra-operative complications were encountered. Average surgical time was 12.8mins. Mean follow-up period was 48 weeks (ranged 24 weeks to 72 weeks). Graft adherence by the end of 4 weeks post operative period was seen in 29 (99.218%) eyes. Pterygium recurrence occurred in 1 (3.3%) eye. No vision threatening complications were encountered either intra-operatively or post-operatively. *Conclusion*: pterygium dissection with surface conjunctival grafting is an excellent option for treating primary pterygia and helps in maintaining a virgin superior bulbar conjunctiva which may be required for future glaucoma surgeries.

Keywords: Pterygium; Pterygium Surgery; Conjunctival Limbal Autograft.

Introduction

Pterygium is a slow growing roliferation of wing shaped fibrovasculartissue. More common in warm and dry climates.sIndia being a part of 'Pterygium Belt of Cameron', an equatorial belt delimited by latitude 37°N and 37°S [1], is having higher prevalence of pterygium (9.5%) [2]. The accepted etiopathogenesis for pterygium is the ultraviolet radiation induced damage or mutation to the limbal stem cell barrier with subsequent conjunctivalisation resulting in the encroachment of a wing-shaped, fibrovascular growth on to the cornea [3,4]. The definitive management of pterygium is surgical excision. Recurrences being the main complication of simple surgical excision, various adjuvant procedures have been described in literature with the aim of reducing the recurrence rates. These are intra-operative and post-operative mitomycin C drops, post-operative Thiotepa drops, beta irradiation, various conjunctival grafting procedures, amniotic membrane transplantation. Reported recurrence rates with these procedures vary from 89% with simple surgical excision to 5% with pterygium excision with conjunctivalautografting [5]. Literature review shows that of all the available options for the management of pterygium, conjunctival-limbal autografting is proven to be associated with least recurrence rate hence this procedure has become the gold standard for the management of primary pterygium [6,7,8]. Superior bulbar conjunctiva is commonly used as an auto graft for pterygium surgery the method has good results with regards to less recurrence rate, good cosmesis and good patient compliance. Using superior conjunctiva may

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however have an adverse effect on the outcome of future filtration surgery and even a cataract wound healing. In cases of large pterygium harvesting thesuperior conjunctival alone would not suffice. Even in cases of double headed pterygiums only superior conjunctiva would not be suffice. This study is done to analyse the recurrence rate, complications, and cosmesis after using the surface conjunctiva remaining after dissection of the fibrovascular tissue of the pterygiumas an auto graft instead of the superior conjunctiva so that it is spared for future filtration surgeries .

Methods

A Prospective non comparative interventional case series involving 30 cases of primary pterygium who underwent a dissection of the pterygium and grafting of the surface conjunctiva . To ensure consistency, all surgeries were done by a single surgeon. Informed written consent from the patient was taken for the procedure as per the protocol of the Institute.

Inclusion Criteria

Patients above 18 years of age Primary pterygium. Patients who completed a minimum of 6 months post operative follow up.

Exclusion Criteria

Recurrent pterygium, history of previous ocular trauma or surgery, usage of contact lenses, presence of other ocular pathology. Patient data collected included gender, age, rural/urban/tribal domicile, history of previous ocular trauma or surgery, indication for pterygium surgery, grade of pterygium, pre-op & post-op BCVA, duration of surgery, intra-operative and post-operative complications, post-operative treatment, post-operative reviews and recurrence of pterygium. Pterygium Grading (T1-3) according to the extent (mm) on to the cornea Grade 1 = 0-2 mm from limbus, Grade 2 = 2-4mm from limbus, Grade 3 = > 4mm from limbus. Success is defined as graft adherence to the surgical site at the end of 4weeks post-operative period. Recurrence is defined as a corneal recurrence that is evidenced by growth of fibrovascular tissue across the limbus onto the cornea at the surgical site.

Surgical Technique

Under peribulbar anaesthesia, with 2% xylocaine, lids were separated by a wire speculum. Superior rectus bridle suture was inserted .The head of the pterygium was held with a collibri and peeled of the cornea with gentle anti clockwise pull.The head was thus separated from the cornea. With Westcott scissors,the subconjunctivalfibrovascular tissue was gently dissected from the surface conjunctiva. The dissection was extended medially just up to caruncle and towards upper and lower fornices in a triangular fashion. The dissected fibrovascular tissue was excised. Care was taken not to buttonhole the surface conjunctiva and not to injure the caruncle which is a very vascular structure. The pterygiumremnants on the cornea was scraped off using a crescent blade. Using blunt and sharp dissection, the fibrovascular tissue was dissected from the sclera. Care was taken to avoid damage to the underlying medial rectus. The detached head of the pterygiumfrom the corneal surface and the limbuswas excised saving the conjunctiva of the body of the pterygium.The limbal conjunctiva was not included in the graft. Blood was allowed to pool on the scleral surface and the surface conjunctiva is put back on the sclera. Using two iris repositors pressure is applied over the surface conjunctiva for about 2-3 mins Graft was smoothened on to the scleral surface for 2-3 minutes with iris repositors. Speculum was removed carefully taking care not to disturb the graft and eye was patched for 24 hours. Post-operatively, topical antibiotic drops were given 4 times a day for 2 weeks, and topical steroid drops were given 6 times a day to be tapered over 6 weeks. Post-operative follow-ups were done on 1st post op day, 1 week, 2 weeks, 4 weeks, 1 month, and once every 3 months subsequently.

Results

22 (73.33%) males and 8 (27%) females were included in the study. Mean age of the patients was 43.88 years (range 19-66 years). Pterygium was Grade

Table 1: Early operative findings

	No of Patients	Percentage
Watering and Lid Edema	14	47%
Graft Edema and Inflammation	12	40%
Dellen Formation	1	3.3%
Retraction of Limbal Edge	2	3.3%

1 in 9 (30%) eyes, grade 2 in 10 (33.3%) and Grade 3 in 11(36.6%) eyes. No significant intra-operative complications were encountered. Average surgical time was 12.8 minutes. Post-operative discomfort in the form of watering and lid edema was observed in 14 (47%) patients which resolved in 2 weeks' time. Recurrence of the graft was seen in 1 eye (3.3%). Graft

Table 2: Late operative findings

	No of Patients	Percentage
Recurrrence of Graft	1%	3.3%
Adherence of the Graft	29	99.21%

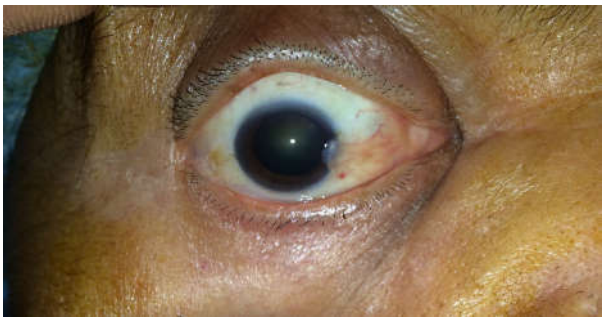

Photo 1: Pre operative

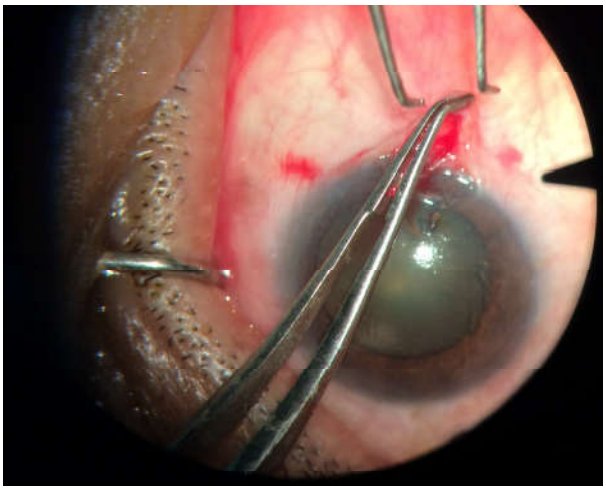

Photo 2: Pterygium head removal

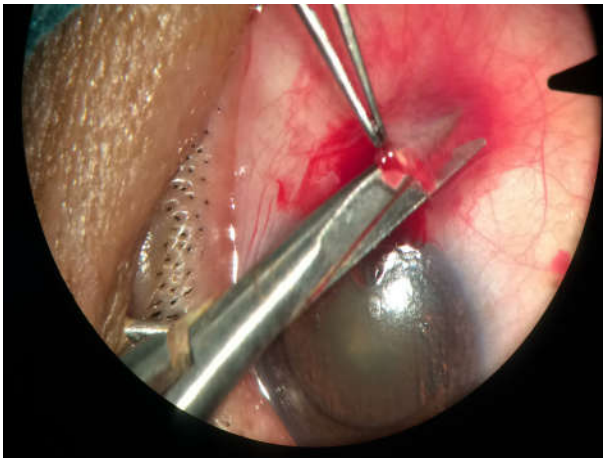

Photo 3: Pterygium dissection

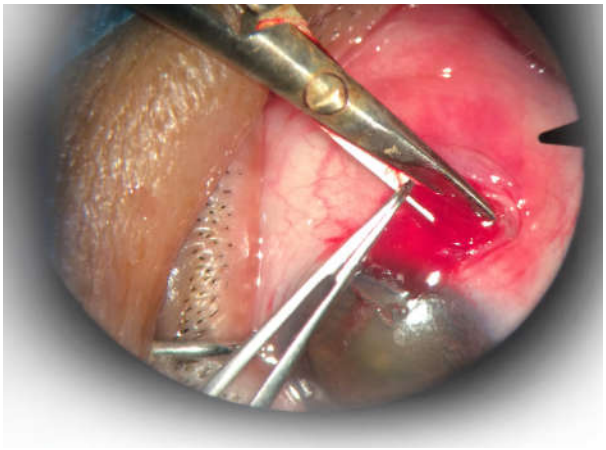

Photo 4: Removal of sub-conjunctival Fibro vascular tissue

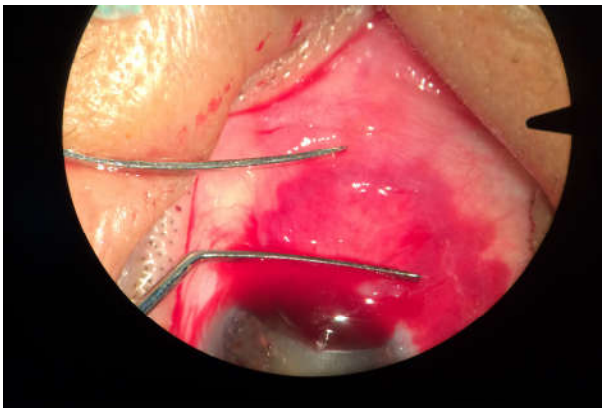

Photo 5: Reposition of surface conjunctiva

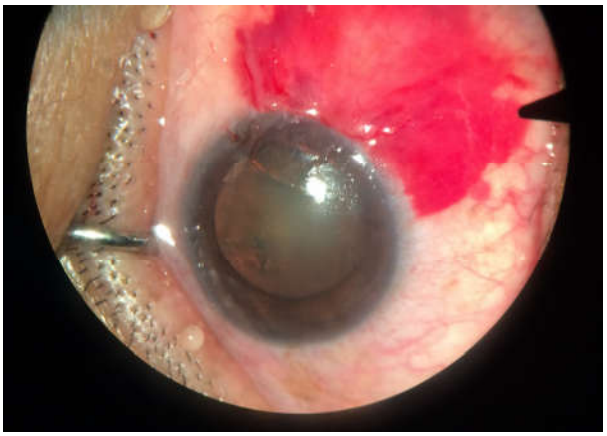

Photo 6: After repostion of surface conjunctiva

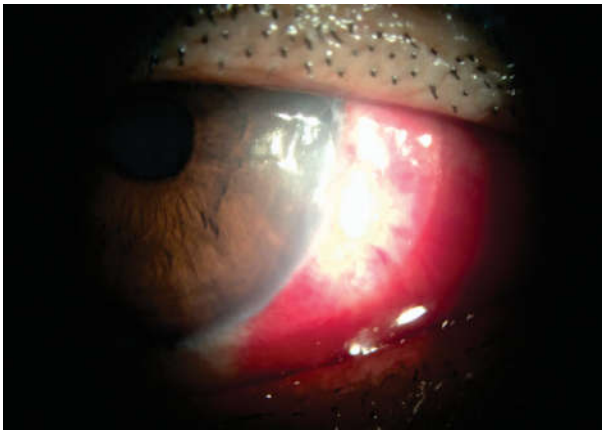

Photo 7: Post op day 1

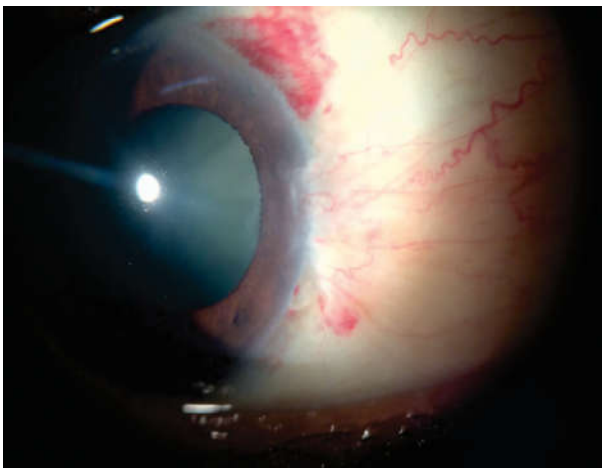

Photo 8:

edema and inflammation was seen in12 (40%) eyes, subsided in 3-4 weeks with routine post-op treatment. Dellen formation was seen in 1 (3.3%) eye at 2nd week post-operative review which resolved on treatment with intense lubrication along with routine post-operative regime. Retraction of the-limbal edge of the graft was seen in 2 (6.6%) eyes. All patients were happy regarding the cosmesis.

Discussion

Recurrence after successful removal of pterygium is undesirable. Despite the surgical options with their adjuvant procedures, that one satisfactory method of removing pterygium, which has minimal complications and a very low recurrence rate, that can deal with any form or grade of pterygium has not yet been identified. A recent detailed review on the treatment of pterygium revealed that, despite the variable success rates reported in literature, conjunctivallimbalautograft remains the safest technique and offers the lowest rate of recurrence in the management ofprimarypterygium [10,12]. Though technically more demanding, authors like Kenyon et al, Koch et al insisted on the inclusion of limbal tissue in the graft to reduce the recurrence [8,11]. Superior conjunctiva is preferred for the grafting due to reasons like more conjunctival graft is available, The upper lid protects the bare sclera area left behind and also due to cosmetic reasons. However, it has a disadvantage that the thin reepithelized area cannot be used for filtration site for future filtration surgeries. We have also found it difficult to make a superior incision during cataract surgery as the wound is exposed due to lack of superior conjunctiva. Also in cases of large pterygium or double headed pterygiumonly a superior conjunctival grafting would not suffice. In these cases both the surface conjunctiva of the pterygium and the superior conjunctiva may be used.In this study we used the same surface conjunctiva after thorough dissection of the underlying fibrovascular tissue .The results found were similar to a superior conjunctival grafting. The limbal tissue was not included in the graft . This surgery is also technically more easier and less time consuming the average time taken for the surgery was about 12.8mins. There is also no complications like graft loss which is present with pterygium excision and grafting. The graft is placed using blood autografting. Pterygium recurrence occurred in 1 (3.3%) patient in our study. Recurrence was observed in the fourth post-operative month, in a 32 year old male who was operated for Grade 2 pterygium. Recurrence rate of our study is consistent with the reported recurrence rate of conjunctival-limbal autografting which ranges from 0-15%. 13. Graft adherence at 4weeks postoperative period i.e. success of this procedure, was seen in 29 (99.218%) eyes. Graft retraction at the limbal edge occurred in 2 (5.468%) cases. These were sutured at the limbus with 1 or 2 sutures the next day. However the graft did not adhere in one case after 2 wks. Good adherence occurred in the rest of cases with good cosmesis. Our study suggests that surface conjunctivalautograft with pterygium dissection adheres to the surgical bed freely, without the aid of glue and sutures. It's recurrence rate is comparable with superior limbal autografting techniques.

Conclusion

Pterygium dissection with surface conjunctival grafting is an excellent option for treating primary pterygia. It is technically simple and helps in maintaining a virgin superior bulbar conjunctiva

which may be required for future glaucoma surgery.

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Original Article

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Assessing and Creating Awareness of Primary Glaucomas in Central India

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Abstract

Objective: The study was aimed at assessing & creating awareness of those attending eye department of our tertiary care hospital to save the precious sight and take a step forward in preventing this avoidable blindness. *Methods:* All the participants aged 40 yrs. or older, attending the eye department of this hospital of central India, included in this cross-sectional survey conducted from March 2013 to February 2014, were subjected to a pre-structured questionnaires. Data on demographics, and awareness collected and analyzed. Simultaneously a constant effort was made to create awareness among the selected group. *Result:* Randomly selected 924 patients attending the out-patient eye department, participated in this study. The mean age of participants was 52±24.yrs. No significant difference in male/female participation. All patients belonged to urban and semi-urban areas with almost similar ethnicity. Among the total participants, only 12.98% had heard of glaucoma and was found to have directly related to the level of literacy. Besides these, other disease groups like diabetes and hypertension also included in the study to find out the awareness of glaucoma in these high risk groups. *Conclusions:* Awareness of glaucoma in this part of country is very poor, more so the knowledge of the disease. Creating awareness through mass-media and community health education programmes will be very effective step in preventing this irreversible blindness.

Keywords: Awareness; Knowledge; Primary Glaucoma; Literacy.

Introduction

Glaucoma is a sneak thief of sight & is the 2nd leading cause of blindness in the world [1]. Glaucoma is a group of conditions defined by progressive optic neuropathy accompanied by visual field changes. Although raised intra ocular pressure is one of the most consistent risk factor but the concept that statistically raised IOP is a defining characteristic for glaucoma has been almost universally discarded. Besides, it has been found that some of those presented with glaucoma have IOP within the normal range [2].

Awareness regarding this potentially blinding disease has been found variable from poor in different population or clinic based studies ranging from 13.5% in population based studies in urban cohort in Chennai (India) [3] and 0.32% in rural Andhra Pradesh (India) [4] to high awareness of 60.6% in a clinic based population with high literacy rate at Eastern Nepal [5], it stands mandatory to assess the awareness level regarding glaucoma and screen the general outdoor patients specially from poorly educated background for early detection of the disease.

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Material and Methods

A cross-sectional study to assess awareness for glaucoma in the hospital attending population along with creating awareness for the disease was conducted for period of one year, from March 2013 to February 2014, as second week of March is designated as Glaucoma awareness week and is observed worldwide. All the patients aged 40 yrs. or older, attending eye O.P.D. with various complaints; were subjected to a prestructured questionnaire after taking written consent. Socio-demographic details including age, gender, literacy level, previous history of eye check-up, any family history of glaucoma, any previous eye surgery or treatment, availability of mass-media and access to health related information were noted. The patients were subjected to an extensive comprehensive eye check-up. Besides, inquiring about their knowledge about the disease and simultaneously creating awareness was also carried out. All the participants belonged to similar ethnicity. Special care was taken to include the patients having Diabetes, hypertension or both besides those having high myopia as these patients are labeled as high risk group for glaucoma. Those who had heard of the disease were considered aware and those who had some information regarding the cause or consequence of the disease were considered to have knowledge of the disease. All along the study, special attention was given to creating awareness by

Table 1: Age wise Distribution

S. No.	Age Group	No. Male	Percentage	No. Female	Percentage	Total No.	Percentage
01	<40	11	2.19	13	3.08%	24	2.59
02	40-50	277	54.27	273	64.68%	550	59.52
04	51-60	132	26.29	108	25.59%	240	25.92
05	61-70	63	12.54	26	6.10%	89	9.63
06	>70	19	3.78	2	0.47%	21	2.27
TOTAL-- (924)		**502**	**55.3**	**422**	**45.61%**	**924**	

Table 2: Disease wise distribution

S. No	Category	No. of Patients	Percentage
01	General	602	65.15
02	Hypertensive	190	20.56
03	Diabetic	50	5.41
04	Combined (H+D)	76	8.22
05	Myopic	6	0.64
	Total	**924**	

Table 3: Literacy vs awareness

S. No	Litteracy	No. of Patients	Awareness (+VE)	Percentage
01	Iilllitterate	246	0	0
02	Primary	112	14	12.5
03	Secondary	302	39	12.91
04	Graduate	228	53	23.24
05	Post Graduate	36	16	44.44
	Total	**924**	**120**	**12.98**

Table 4:

S. No.	State of Litracy	Literacy Vs Awareness- (Disease Wise Distribution) General		H.T.		Diabtic		Combined		Myopic	
		ve(+)	ve (-)	ve(+)	ve (-)	ve(+)	ve (-)	ve(+)	ve (-)	ve(+)	ve (-)
1.	Illlitrate	0	163	1	60	0	8	0	13	0	1
2.	Primary	5	65	0	20	2	2	6	10	1	1
3.	Secondary	25	182	6	51	3	11	5	17	0	2
4.	Gradute	31	108	10	35	4	17	8	14	0	1
5.	Post Gradute	8	15	2	5	3	0	0	3	0	0
	Total<<<<<<	69.00	533.00	19.00	171.00	12.00	38.00	19.00	57.00	1.00	5.00
	Percentage	11.46%	88.53%	10%	90%	24%	76%	25%	75%	16.60%	83.33%

making the patient to understand the cause of the disease in lay man's language and it's consequence if not treated early in the process that it may lead to irreversible blindness. Leaflets and C.Ds were also distributed to help them for better understanding of the disease.

Results

A total of 924 patients participated in this study. The mean age of the participants' was 52-±24. (Youngest being 28 & oldest 76)-Males were 54.3% Females—45.61%. Maximum patients belonged to 41 t0 60 yrs. age group i.e. 59.52% as evident from Table no. 1. Of the total 924 patients, 602 (65.15%) patients belonged to general category and the rest were from either systemic or ocular disease groups as mentioned for high risk groups (Table 2).

Overall awareness was found to be quite unsatisfactory; i.e. 12.98% ranging from 0% to 44.44%.in different literacy groups . Table no.3 shows the gradual increase in awareness related to the status of literacy. Among graduates/post-graduates, the awareness was found much better where as it was found 0% in illiterate group.

Disease wise distribution of literacy Vs awareness is depicted in Table 4 and was found that awareness varied in different groups, ranging from 11.46% in general category to 24% to 25% in diabetics and those suffering from combined disease respectively where as awareness was found lowest in those suffering from Hypertension alone (10.0%).

Discussion

Glaucoma is a leading cause of visual impairment and blindness worldwide [6]. Because of the insidious nature of the disease, patients often present late in the course of disease with irreversible damage. Early detection can prevent severe vision loss and socio-economic burden on society.

Awareness of glaucoma in the present study was found 12.98% which was comparable to 13.5% of population based studies in urban cohort in Chennai (India) [3], and was much higher than 0.32% in the rural cohort of population based study at Andhra Pradesh [4]. Higher awareness of 60.6% was noted in our previous hospital based study conducted at Eastern Nepal [5]. However, in another population based study conducted at rural north India, where it was 73% who had heard of glaucoma but the awareness of disease was found to be 8.3% and 1.89% had some knowledge about glaucoma, as in this study, having heard of the disease was not regarded as awareness of disease [7]. This is in contrast with rest of studies where the knowledge was regarded simply having heard about the disease [3,4,5]. Understanding of glaucoma in south eastern Ethiopia in a population based study was found to be only 2.4 [8]. Awareness of nature of disease in patients of Chronic open angle glaucoma was found to be 41% regarding the increased risk of COAG. in the family members [9].

As per knowledge of glaucoma in the present study, it was found in 5.08% of patients i.e. less than that found in study at urban Chennai, 8.7% of which only 0.5% had good knowledge [3]. Similar results were obtained in study done at rural cohort of Andhra Pradesh which shows that of those aware of disease, 55.6% did not know if visual loss due to glaucoma was permanent or reversible [4]. The most important determinant of awareness regarding glaucoma was found to be the literacy rate as it was found to increase gradually as per the educational background as shown in Table 3. Besides these, mass-media, printed or electronic media, family members with glaucoma and those belonging to family of medical personales also contributed in creating awareness of the disease. In our study, no correlation with gender, age, ethnicity was found as in another study done at Lagos Nigeria [10] in contrast to Chennai glaucoma study [3].

A definite correlation of awareness of glaucoma was observed in disease specific group where it was found high in diabetics and those having hypertension along with diabetes compared to those suffering from hypertension alone i.e. 24-25% in contrast to 10% respectively as is obvious from Table 4. This could be attributed to the fact that diabetics and those associated with hypertension needed frequent check-ups with ophthalmologists who could have been their source of information.

In a study of open angle glaucoma treated patients, it was found that 20% of those patients didn't know that they were being managed for a disease called glaucoma. Patients with family history of glaucoma, were nearly 4 times likely to be aware of disease and was found that over 1/3rd were unaware of the fact that glaucoma is heritable [10]. These studies therefore indicate the poor awareness and knowledge regarding the disease and emphasizes the need for proper screening of patients specially in the hospital based population as the population based screening programmes have been found to be difficult and

controversial [11,12]. In the present study 8 (28.57%) patients presented with blindness and were unaware of the term glaucoma. This level of high blindness reflects the high number of undiagnosed disease, lack of awareness and asymptomatic nature of disease.

Conclusion

Awareness of glaucoma in this study was found very low in urban/semi-urban population presented to hospital. The determinant was found to be literacy rate, availability of mass-media, relatives of patients with family history of glaucoma or of medical personales and those diabetics and combined diabetics and hypertensive who needed a frequent check-up with ophthalmologists. Glaucoma being an asymptomatic condition largely, causing blindness silently, is a major cause of concern for visual health. Creating awareness among general population through community education programmes and also a constant effort to educate the patients attending hospital for routine check-up can be a valuable tool in preventing this blinding disease.

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Assessment of the Awareness and Knowledge of Glaucoma among Households in Rural and Urban Field Practice Areas of Shimoga Institute of Medical Sciences, Shimoga, Karnataka

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Abstract

Background: Several challenges exists in rural areas, as most ophthalmologists are concentrated in urban areas, this leaves many people without access to regular eye exams or treatment, which is vital in preventing permanent vision loss in the setting of glaucoma. Therefore, the present study was undertaken to assess the Awareness and knowledge of Glaucoma among Households. *Materials And Methods:* This study included 200 households (100 rural;100 urban) aged above 20 years in rural and urban field practice areas. After the informed consent, every household was subjected to personal interview using a semi-structured and pre-tested questionnaire *Results:* The awareness on glaucoma was significantly higher in the literates (p= 0.000) in urban and among rural area (p= 0.015) as compared to illiterates. There was a statistical difference in the awareness of glaucoma between the males and females (p=0.014) in urban area and in rural area (p=0.005). *Conclusion:* Awareness and knowledge of glaucoma is poor both in urban as well as rural population. This study highlights the need for health education to effectively prevent blindness due to glaucoma.

Keywords: Glaucoma; Awareness; Urban area; Rural Area.

Introduction

The word "glaucoma" is from ancient Greek glaukos which means blue, green, or gray [1]. Glaucoma is a group of eye diseases which result in damage to the optic nerve and vision loss [2]. About sixty-seven million people have glaucoma globally [3]. Worldwide, glaucoma is the second-leading cause of blindness after cataracts [4]. Glaucoma is the third leading cause of blindness in India,12 million people are affected accounting for 12.8% of the country's blindness. Population based studies report a prevalence between 2.6% [5] to 4.1% [2-5]. Glaucoma has been called the "silent thief of sight" because the loss of vision usually occurs slowly over a long period of time [6]. Unlike cataracts, the vision loss associated with glaucoma is largely irreversible [7]. Glaucoma prevention and treatment has been a major focus of international directives including the World Health Organization's Vision 2020 campaign [8].

Lack of awareness and non-availability of appropriate screening procedures are among the major reasons for non-diagnosis or late diagnosis of glaucoma [9]. Several challenges exists in rural areas, as most ophthalmologists are concentrated in urban areas, this leaves many people without access to regular eye exams or treatment, which is vital in preventing permanent vision loss in the setting of glaucoma [10].

There is a need for health education in population to increase their level of awareness and knowledge

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of common eye diseases; such awareness and knowledge could lead to better understanding and acceptance of the importance of routine eye examinations for the early detection and treatment of eye diseases, thereby reducing visual impairment in the population [11]. Therefore, the present study was designed to Assess the Awareness and knowledge of Glaucoma among Households in Rural and Urban Field Practice Areas of Shimoga Institute of Medical Sciences, Shimoga and to associate the awareness of glaucoma with selected demographic variables.

Materials and Methods

This is a cross-sectional community-based study, conducted after obtaining the institution ethical committee clearance among 200 households (100 rural; 100 urban) aged above 20 years in rural and urban field practice areas of Shimoga Institute of Medical Sciences, Shivamogga. Multistage sampling was used; subcentre areas were primary sampling units and villages/wards that fall under the rural and urban field practice areas were secondary sampling units. The subcentre areas and villages/wards were selected by simple random sampling. All the households in the selected village were included in the study.

Data was collected by doing house-to-house visits till all the houses in that particular village is covered. Half of the selected households were randomly assigned to be 'male' households where only males from the target population (>20years of age) were interviewed, while the other half were randomly assigned as 'female' households where only females from the target population were interviewed. It was undertaken to ensure that an equal number of males and females were sampled. This process removes the introduction of selection bias into the design by arbitrarily deciding which gender to interview in each household. Locked houses and houses in which the households were temporarily absent were visited second time.

After taking informed consent, every household willing to be a part of the study was subjected to personal interview using a semi-structured and pre-tested questionnaire. It was initially developed in English and all the questions were translated into local language kannada for the target population. Questionnaire includes information on sociodemographic background and household information; knowledge and awareness of glaucoma will be assessed according to the definitions. Awareness was defined as "having heard of glaucoma". Knowledge was defined as "when the subject had some understanding of glaucoma". Only those individuals who had heard of glaucoma were enrolled to complete the questionnaire. Questions on knowledge were tested as per the questionnaire and if two out of seven questions were known, then considered to have knowledge about glaucoma.

Statistical Analysis

Microsoft Excel spreadsheet was used for data entry and SPSS version 21 for analysis of data. Data analysis was done by using proportions and Chi-square test.

Table 1: Sociodemographic characteristics and awareness on glaucoma in urban population

Characteristics	Urban Awareness	Number	P value
AGE in years			
20-30	0	16	
31-40	11	44	
41-50	1	16	p=0.011
51-60	0	22	
>60	0	2	
Gender			
Male	10	50	p=0.014
Female	2	50	
Education level			
Illiterate	0	16	
Primary	1	29	
Secondary	4	26	
Pre- University	1	18	P= 0.000
Graduation	4	8	
Post-Graduation	2	3	

Results

A total of 200 subjects participated in the study. The subjects who were older than 20 years responded to a structured questionnaire which was on the awareness of glaucoma. A total of 12 subjects among urban and 7 subjects among rural area were aware of glaucoma.

The awareness on glaucoma was significantly higher in the literates (DF-5, P= 0.000) in urban and among rural area (DF-3, P= 0.015). There was a statistical difference in the awareness of glaucoma between the males and females (p=0.014, degree of freedom =1) in urban area and in rural area (p=0.005, degree of freedom =1). There was also a statistically significant difference in the different age-groups regarding the awareness of glaucoma (p=0.011, degree of freedom=4) in urban area and in rural area (p=0.056, degree of freedom=4, (Table 1).

The awareness on glaucoma was statistically significant among rural and urban areas (p= 0.000, degree of freedom-1). In the urban population, out of 12 individuals who were aware of glaucoma, only 2 individuals knew about the risk of familial predisposition to glaucoma. Only 1 participant was aware of the asymptomatic course and irreversible nature of vision loss. 2 individuals knew that treatment of glaucoma is possible. In the rural population 7 individuals were aware of glaucoma, but only 1 individual knew that glaucoma can cause irreversible loss of vision (Table 2).

Table 2: Sociodemographic characteristics and awareness on glaucoma in rural population

Characteristics	Rural Awareness	Number	P value
AGE in years			
20-30	0%	16	
31-40	7%	45	
41-50	0%	15	p=0.056
51-60	0%	22	
>60	0%	2	
Gender			
Male	6%	50	
Female	1%	50	p=0.005
Education level			
Illiterate	0	57	
Primary	4	24	
Secondary	3	18	
Pre- University	0	1	
Degree	0	0	P= 0.015
Post-Graduation	0	0	

Table 3: Comparison of hearing of glaucoma between urban and rural population

Variable	Characteristics	Urban Awareness	Rural Awareness	P Value
Heard of Glaucoma	Yes	12	7	
	No	88	93	P=0.000

In the urban population only 10 persons had consulted ophthalmologist in last 1 year. Similarly, in the rural population 5 persons had consulted the ophthalmologist. In the urban population 5 individuals received information about glaucoma from family or friends, 4 from visiting hospital, medical personnel, eye camp, 3 individuals from mass media. In the rural population 3 individuals received information about glaucoma from eye camps, 2 individuals from mass media, 2 individuals from family or friends (Table 3).

Discussion

In a developing country like India, Glaucoma is the leading cause of preventable irreversible blindness. Blindness due to glaucoma can be curbed to a certain extent by educating the masses about the condition and thereby influencing at risk individuals to participate in regular ophthalmic care [12]. Hence this study was undertaken to assess the awareness and knowledge of glaucoma in this part of south Karnataka.

Awareness of glaucoma in our study population is poor both in urban and rural areas. This is in

contrast to the published data in many other countries (Table 2). In some of the developed countries awareness of glaucoma is as high as 72 to 93% [13,14].

The prevalence of glaucoma in India ranges from 2.6% [11] to 4.1%. Considering the prevalence of glaucoma, awareness of glaucoma is poor in urban population. It is still poor in the rural population. Limited access to medical and diagnostic care in the rural areas may have contributed to poor knowledge and awareness of glaucoma.

In our study males were more aware of glaucoma than females in both urban and rural areas. Awareness was more in the younger age group in both urban and rural areas. Relationship between glaucoma awareness and a particular age or gender has been noted previously [11,15,16,17]. Relationship between age, gender and 'health related literacy' is complex and affected by many social, economic and cultural factors [18].

Individuals with a higher elementary education were aware and had some knowledge of glaucoma. Similar observations were made in APEDS [15], Chennai glaucoma study [16], other studies [11,19,20]. This highlights the importance of education for awareness of the disease. Only 1% of the participants had knowledge of the asymptomatic course and irreversible loss of vision. In a study conducted in Hongkong only 10% of the participants were aware about glaucoma symptoms [21]. Hence if individuals are made aware about the asymptomatic course and irreversible loss of vision, it would favorably affect their attitude and behavior about glaucoma. Health promotion and communicating risk is a key public health strategy [12,22]. Health education about eye care will influence the behavior of individuals, towards regular eye check-up. Health education programme, targeting at risk individuals like individuals with family history of glaucoma would be more productive. Information brochure and pamphlets should be given to all out-patients visiting an eye clinic. Eye clinics can display posters of glaucoma. Information about glaucoma can be given through mass media like radio, TV, newspaper. Community level programmes and initiative taken as part of the world glaucoma day would help to increase awareness in the population [23].

Conclusion

In general awareness about glaucoma in the Indian population is poor, as seen in several population based studies [11,15,16,17]. In the present study also awareness and knowledge of glaucoma is poor both in urban as well as rural population. This study highlights the need for health education to effectively prevent blindness due to glaucoma.

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Original Article

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A Study of Surgical Induced Astigmatism

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Abstract

The present study included 200 cases. In this 6% in superior scleral incision showed up same level of astigmatism 82% patients showed astigmatism <1.00D in temporal group as compared to 48% in the superior sclearal group. In the temporal scleral group there was a Significant reduction of preoperative against the rule astigmatism from 71% to 65% pre operative with the rule astigmatism increased from 25% to 26% at 21st post operative day following. However decay of mean astigmatism in superior scleral incision showed a distinct increase in against the rule astigmatism from 55% to 86% at 21st postoperative day, and with the rule astigmatism decrased from 27% to 80% post operatively. Surgically induced astigmatism of<1.00D was found in 88% cases from temporal scleral group whereas 62% cases from superior scleral group had <1.00D SIA.

Keywords: Astigmatism; Temporal Scleral Group; Superior Scleral Incision.

Introduction

The sclera tunnel incision was introduced in the early 1980s in an attempt to better healing with less surgically induced astigmatism, and wider incision nuclear cataract extraction, this became the favored technique along with some modification for phacoemulsification. In 1990 the suture less incision was developed, utilized a longer sclera tunnel with linear grooves in the floor of the tunnel in the meridian of the incision.

This incision could be stretched to admit a foldable lens, and when unsutured still retains watertight characteristics. The corneal entry was described as a one way valve or corneal lip incision, which enabled the incision to self seal. Subsequently the temporal sutureless clear corneal incision for cataract surgery was described in1992, now it has become the favored technique for cataract surgery in conjunction with foldable or small incision IOL for many surgeons internationally [1].

Studies done by Gokhale N S . Sawhney S. in Mumbai where they compared superior superotemporal and temporal incisions in manual SICS on 45 eyes , have shown that mean astigmatism induced surgery was 1.28*2.9 degrees for superior incision.0.20*23.7 degress for superotemporal incision and 0.37*90 dedrees for temporal groups as compared to that in the superior group [2].

Another study done by Kimurra et al. have shown by vector analysis that surgically induced astigmatism is less with oblique incision(1.02*0.66D) than with a superior incision(1.41*0.72) [2].

Objectives

- To know how to minimize the postoperative astigmatism by changing the site of incision.

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Materails and Methods

This is a randomized prospective study conducted to compare astigmatic outcome in superior v/s temporal scleral incision in MSICS at our Basaveshwar Teaching and General Hospital (BTGH) at M.R. Medical College, Gulbarga between November 2007 to june 2009.

The variable was the site of scleral tunnel incision 100 cases underwent cataract extraction with superior scleral incision of 6-7mm and remaining 100 cases were operated with temporal scleral incision ranging from 6-7mm.

All the patient included in the study were examined preoperatively and were selected for cataract surgery following a standard protocol. A detailed history of thepatient was taken to rule out systemic diseases as well to exclude patients with diabetes mellitus and systemic hypertension. Patients with history of uveitis in the past high refractive errors and history of glaucoma and other retinal pathology were excluded from this study.

Observation Results

In group A superior incision Induced ATR in 97% of the patients and in group B temporal scleral incision induced WTR in 92% of the patients.

Final mean +/- Sd for superior scleral incision are 0.99+/- 0.58 Final mean +/-SD for temporal scleral incision are 0.66+/-0.43 Z (calculated value) 4.62>2.58 Z (tabulated value.) Therefore highly significant difference of surgically induced astigmatism is present between temporal and superior scleral incision for MSICS.

Table 1: Type of surgically induced astigmatism

Type	Superior	Temporal
ATR	97	3
WTR	3	92
Nil	0	5

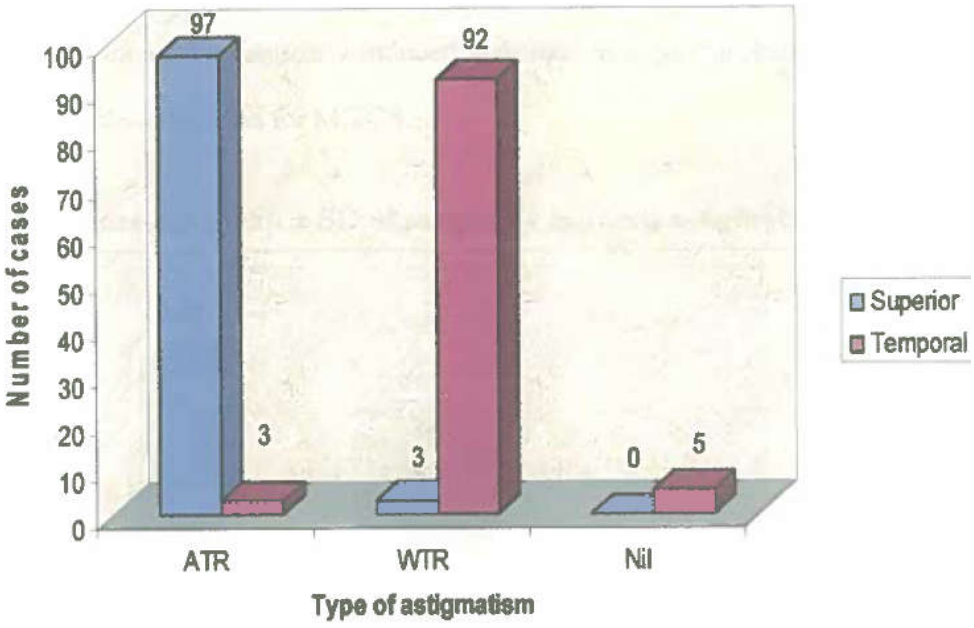

Fig. 1: Type of surgically induced astigmatism

Table 2: Mean +/- SD of surgically induced astigmatism

Type of incision	Mean +/- SD superior	Mean +/- SD Temporal
ATR	1.01+/-0.61	0.33+/-0.12
WTR	0.83+/-0.83	0.69+/-0.41
Nil	0	0
Total	0.99+/-0.58	0.66+/-0.43

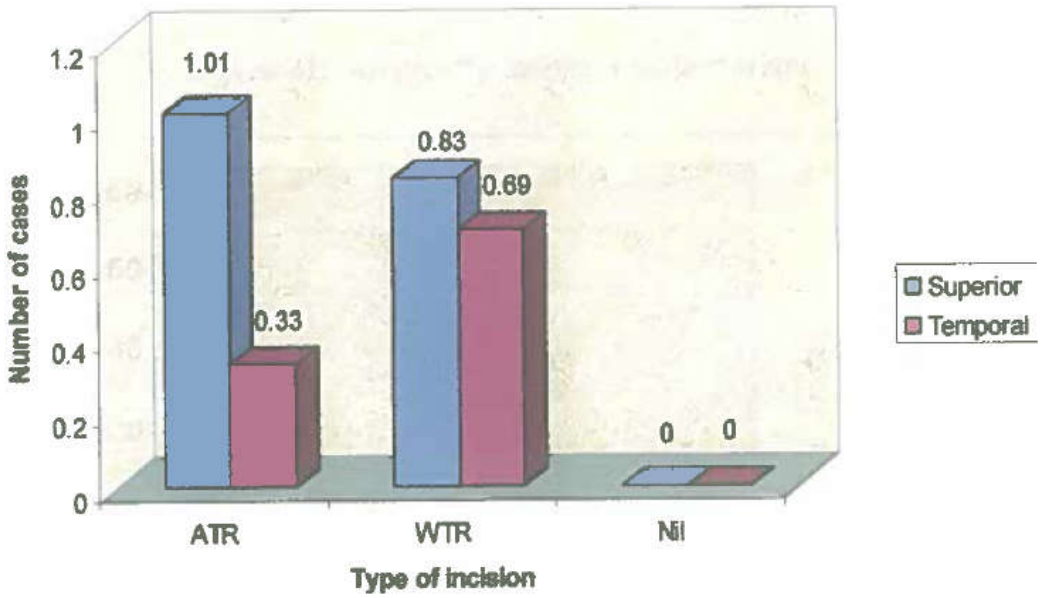

Fig. 2: Mean +/- SD of surgically induced astigmatism

Table 3: Surgically induced astigmatism

Astigmatism in diopters	Superior		Temporal	
	Numbers	%	Numbers	%
<0.50	29	29	55	55
0.51 to 1.0	33	33	33	33
1.01 to1.5	26	26	10	10
1.51 to 2.0	6	6	2	2
2.01 to 2.5	3	3	0	0
>2.5	3	3	0	0

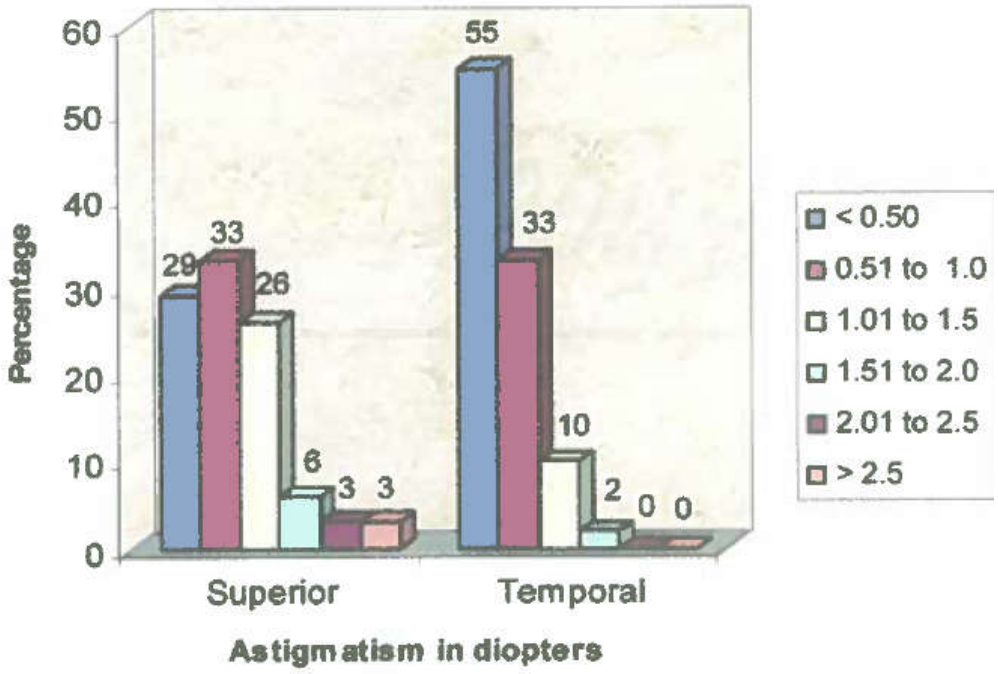

Fig. 3: Surgically induced astigmatism

In group (A) 62% of the patients had<1.00D of surgically induced astigmatism (29%) of the patients had <0.5 of astigmatism and 33% had between 0.50D to 1.00D astigmatism) 26% had between 1.00D to 1.50D of SIA.

In group (B) 88% of the patients had <1.00D of SIA and 10% had between 1.00D to 1.50D of SIA.

More than 2.50D SIA was found in 3% of patients with superior scleral incision and Nil temporal scleral incision.

Hence temporal scleral incision induces less surgically induced astigmatism compared to superior incision.

Discussion

Surgically induced astigmatism is surgeon depedent and varies from surgeon to surgeon although identical procedure were to be perfomed. This study showed that 88% cases of temporal scleral group had surgically induced astigmatism of<1.00Das compared to 62% of superior scleral group.

This study was similar to the study performed by Christopher Wirbeluer et al who studied that after 5 months of cataract surgery SIA was significantly higher in superior incision group(1.16=/-0.44SD) than in temporal scleral group(0.66+/-0.32)

The mechanism by which temporal approach is associated with reduced post operative decay in keratometric astigmatism is unproven . It is generally recognized that there is a tendency towards ATR shift in astigmatism associated with agimg in the absence of anterior segment surgery. The incessant stocking of superior limbus by the upper lid is probably responsible. Mechanicaly it is easy visualize the separational force of the upper lid as it croses nearly perpendicular to much of the traditional superior scleral incision, By comparison the upper lid courses generally parallel to the lateral incision and produces very little spreading effect upon the wound margin also the inter lamellar strength between the temporal and superior periphery of the cornea differs therefore early healing is seen temporal scleral incisions.

Uncorrected visual acuity is a little better in temporal (group B) incision in early post operative period compared to the superior (group A) incision. In both the groups there was slight variation uncorrected visual acuity at 21st day. Visual acuity was more than 6/18 in 91 cases in group B and 83 cases in group A. The amount of this study are constient with previous reports that MSICS induces a small amount of astigmatism and gave early rehabilitation to patients with in 3 weeks. For majority of patients with in 3 weeks. For majority of patients spectacle correction were given at 6 weeks.

Although the present study clearly shows the added advantages of the temporal scleral incision. It has to be concluded that the series is small and followup is inadequate to be statistically significant. A large series preferably a controlled random study would be required to make the study statistically comparable.

Conclusion

Superior scleral incision shows a significant post operative post operative against the rule astigmatic shift as compared to temporal scleral incision. Therefore superior scleral incision should not be done in patients with preexisting ATR astigmatism. Surgically induced astigmatism of<1.00D was seen in 88% in temporal scleral incision as compared to 62% in superior scleral incision. This implies that temporal scleral incision producer less astigmatism when compared to superior scleral incision. Temporal scleral incision gives a substantial improvement in surgical exposure especially in patients with deep eyes or prominent eye brows. Temporal scleral incision is more advantageous than superior scleral incision in Astigmatically neutral patients Patients with ATR astigmatism; Patients with WTR astigmatism up to <1.00D. Superior scleral incision is preferred only if with the rule astigmatism is>1.00D.

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Analysis of Changes in Retinal Nerve Fiber Layer before Vascular Changes in Patients with Diabetes Using Optical Coherence Tomography

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Abstract

Aim: To detect retinal changes in patients with type 2 Diabetes prior to vascular signs without diabetic retinopathy or with mild non proliferative diabetic retinopathy. *Methods:* A cross-sectional study was performed in three groups: 1. Patients without diabetes (Group A), 2. Patients with type 2 diabetes without diabetic retinopathy (Group B), 3. Patients with diabetes with mild diabetic retinopathy (Group C). Analysis of retinal layers was performed using Topcon 3D OCT. Macular scans were analyzed with regard to: retinal nerve fiber layer thickness, central subfoveal retinal thickness and average macular thickness. *Results:* In total, 60 patients were included in this study, of which 16 (26.67%) were classified into control group (Group A), 28 (46.67%) classified as diabetic patients with no diabetic retinopathy (Group B) and 16 (26.67%) classified as mild diabetic retinopathy (Group C). Quantitative analysis with using Topcon 3D OCT showed that the mean retinal nerve fiber layer was thinner in diabetics without diabetic retinopathy group when compared to controls. Statistically significant reduction in average retinal thickness in mild diabetic retinopathy group compared to control. Also indicated reduction in retinal nerve fiber layer in diabetic without diabetic retinopathy and eyes with mild diabetic retinopathy, compared to controls. Both the results were statistically significant. *Conclusions:* Our study found reduction in thickness of retinal nerve fiber layer in patients with diabetes without diabetic retinopathy, which suggests neuroretinal changes before vascular signs of diabetic retinopathy.

Keywords: Diabetes Mellitus; Diabetic Retinopathy; OCT; Optical Coherence Tomography; Macula; Retina; Neuronal; Neurodegeneration.

Introduction

Diabetic retinopathy (DR) is one of the major causes of blindness in patients from 30 to 60 years of age. Inspite of the recent advances, current treatment with pharmacological measures and laser may not be enough in some patients for complete visual recovery.

DR is primarily a vascular disease, but recent studies have shown some degenerative and neuronal changes that occur before the appearance of actual microvascular changes in patients with diabetes mellitus (DM) [1,2]. Laboratory studies support the occurrence of neuronal alterations like apoptosis in early stages itself in cases of diabetes [3-6].

Optical coherence tomography (OCT) makes it easier the deep understanding and study of a large number of eye diseases [7-8]. New generation Spectral Domain-OCT allows detailed examination of all retinal layers and vessels, thereby facilitating the study of pathogenesis of each disease.

Clinically, authors have reported diminution in average central retinal or single cellular layer thickness in diabetic eyes, including both with and without clinical signs of DR compared to control groups (subjects with no DM) [1,2]. Others studies have shown decrease in the inner retinal thickness

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at macula in diabetics with mild disease, which may be caused due to initial loss of ganglion cells in the pericentral areas followed by retinal nerve fiber layer (RNFL) thinning in the peripheral part of macula [5,6,9].

Aim

The goal of this study was to investigate neuroretinal changes prior to vascular signs in patients with type 2 diabetes without diabetic retinopathy or with mild non proliferative diabetic retinopathy.

Material and Method

A study was performed in three groups:

(Group A) - Patients without diabetes.

(Group B) - Patients with type 2 diabetes without diabetic retinopathy.

(Group C) - Patients with diabetes with mild diabetic retinopathy**.**

Patients were examined in the Department of Ophthalmology at DVVPF Medical College and Hospital.

Analysis of retinal layers was performed using Topcon 3D OCT.

Macular scans were analyzed with regard to:

- Retinal nerve fiber layer thickness,
- Central subfoveal retinal thickness
- Average macular thickness.

Control subjects did not have a diagnosis of diabetes, any ocular disease, or any other systemic disease. These subjects were randomly recruited from individuals accompanying patients visiting the Department of Ophthalmology.

The Inclusion Criteria

1. Individuals with type 2 DM and above the age of 40 years. (The choice of type 2 diabetes was due to its prevalence and importance of future projection)
2. Mild DR was considered as the presence of at least one micro aneurysm in the retina, but no other diabetic lesions.

The Exclusion Criteria

1. If they presented with a best corrected visual acuity less than 6/9.
2. When OCT images were of inadequate quality (signal strength below 7),
3. If DR equal or worse than moderate,
4. Lens opacity and other vision impairing diseases such as glaucoma, cataract, uveitis, or macular degeneration.

After informed consent was signed, all participants underwent the following examinations:

1. Visual Acuity (BCVA)

   Patients were evaluated with respect to best corrected visual acuity using the Snellen chart.

2. Slit Lamp Biomicroscopy

   To detect signs of Anterior segment complications include rubeosis iridis, neovascular, ghost cell, and hemolytic glaucoma, cataract, and corneal decompensation.

3. Ophthalmoscopy - Direct and 90D
4. Spectral - Domain Optical Coherence Tomography (SD-OCT) - The patients had pupil dilation by tropicamide and evaluation through spectral-domain optical coherence tomography (SD-OCT).

Only SD-OCT analysis was performed, centered on the fovea and repeated three times by the examiner. Only scans with signal strengths ≥7 and without artifact were included in the study.

- The results were reported as mean values with standard deviation. Data was statistically analyzed.
- An unpaired *t* -test was used to calculate the *p* value between the study and the control group.
- Values of *p* less than 0.05 were considered statistically significant.

Results

In total, 60 patients were included in this study, of which 16 (26.67%) were classified into control group (Group A), 28 (46.67%) classified as diabetic patients with no diabetic retinopathy (Group B) and 16 (26.67%) classified as mild diabetic retinopathy (Group C). Quantitative analysis using Topcon 3D OCT showed that the mean retinal nerve fiber layer was thinner in diabetics without diabetic retinopathy group when compared to controls.

Statistically significant reduction in average

retinal thickness in mild diabetic retinopathy group compared to control. Also indicated reduction in retinal nerve fiber layer in diabetics without diabetic retinopathy and eyes with mild diabetic retinopathy, compared to controls. Both the results were statistically significant.

Table 1: Demographic data of subjects included in the study

Parameters	Controls (16)	DM with no DR (28)	Mild DR (16)	p
Age (in years)	54 ± 10	59 ± 10	62 ± 11	0.01
Gender (m or f)	8:8	11:17	7:9	0.53
Glycaemia (mg/dl)	92.50 ± 9.19	167.33 ± 134.44	148.81 ± 70.72	0.01
HbA1c (in %)	-	7.55 ± 1.57	7.16 ± 1.22	0.10
Duration of DM (in years)	-	12 ± 7	12 ± 9	0.98

Table 2: Thickness measured by SD- OCT Mean thickness (μm)

Measure	Control (N = 16)	DM with no DR (N = 28)	Mild DR (N = 16)
RT	284.07 ± 13.40	279.02 ± 14.26	271.46 ± 26.23
CS	260.61 ± 24.15	245.46 ± 24.36	254.68 ± 46.90
RNFL	45.93 ± 24.60	30.41 ± 3.46	29.78 ± 5.57

Table 3: Standardized regression coefficients derived from multiple linear regression

Dependent variable:	Independent variable	Standartized coefficients	P
RT	Age	0.154	0.126
(R = 0.293, p = 0.012)	DR status	0.210	0.038
RNFL	Age	0.156	0.103
(R = 0.427, p < 0.001)	DR status	0.358	<0.001

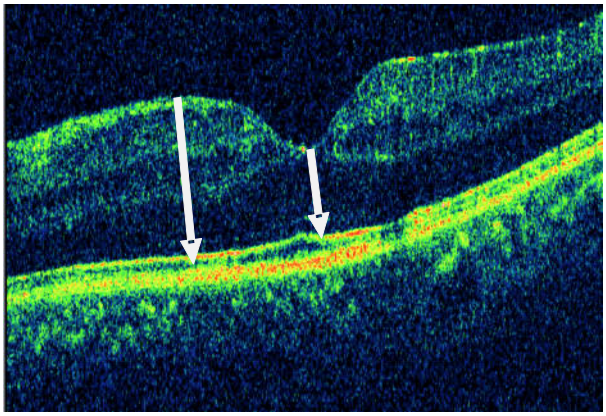

Fig. 1: Showing Central Subfoveal Thickness and Macular thickness on OCT

Analysis

In quantitative analysis the RT and RNFL were thinner in the group with DM with no DR when compared to controls ($p < 0.05$). Furthermore, RNFL was even thinner in patients with DR (Table 2). Test indicated a statistically significant reduction compared to controls ($p < 0.05$) in the following retinal layers: RT in mild DR group ($p = 0.032$); and RNFL in DM without DR or eyes with mild DR ($p < 0.001$).

The relationship between RNFL thickness and RT with variables with correlation (age and DR status). In Table 3, standardized coefficients of the explanatory variables are presented. These variables show that DR status is the most explanatory variable to thickness reduction.

Discussion

DR is the leading cause of mild to moderate visual impairment and blindness in the adult working population. It has been considered to be primarily a microvascular disorder [10]. However, recent publications proclaim that retinal neuronal degeneration can be detected before clinically detectable microvascular changes [1,2,4,11,12]. The hypothesis for the occurrence of neuronal degeneration before microvascular damage has been confirmed by electrophysiological studies [13,14]. Recent studies have proposed that diabetes also causes the loss of different types of retinal cells that include ganglion cells, bipolar cells, amacrine cells, horizontal cells and eventually affects photoreceptors [3,4,14,15]. Thus, clinically, various authors have reported a decrease in retinal thickness in diabetic eyes with or without clinical signs of DR when compared to normal subjects [1,2,12,16-18].

Vujosevic, Midena and Van Dijk et al. have shown a reduction in the inner retinal thickness in the region of macula in patients with mild DR. Van Dijk et al. postulated an initial GCL loss in the pericentral areas which was further followed by RNFL thinning in the peripheral part of macula [5]. In addition to this, Vujosevic and Midena found outer retina may not be affected at early stages of DM and concluded that automatic SD-OCT may be a useful tool to diagnose and monitor early changes in retina in DR patients.

The total macular thickness in diabetic eyes with no DR and mild DR was studied in our setting using CS and RT parameters and we found a significant decrease in the number of eyes with mild DR in RT ($P = 0.032$). These values matched the results of Biallosterski et al., who postulated that the mean RT in the pericentral area was decreased in patients with DR as compared to the healthy controls. Verma et al. also found that there was reduction in foveal thickness in patients with DM but there was no retinopathy when compared to healthy individuals [6].

RNFL thickness evaluation all quadrants with SD-OCT is considered to be a reliable parameter in patients of glaucoma. Herein, analysis disclosed reduction in RNFL both in patients with no DR and those with mild DR. Similar findings of decreased RNFL have been postulated by van Dijk et al. in patients with mild DR [1].

Strengths of our study included examination of both patients with DR or just DM and it also includes the objective analysis with the help of OCT software in addition to a subjective retinal measurement by two different experimented examiners.

A limitation of our investigation may be the poor intraclass correlation between examiners in some retinal layers. Apart from that, the difference in age between different groups was another limitation. Other drawback of our investigation was the uncertain onset of the DM, as type 2 DM patients may be affected by the disease for some time before the condition is diagnosed, but this fact would only underestimate the findings.

Conclusions

Our study found reduction in thickness of retinal nerve fiber layer in patients with diabetes without diabetic retinopathy, which suggests neuroretinal changes before vascular signs of diabetic retinopathy.

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Original Article

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Clinico-Microbiological Study of Acute and Chronic Dacrocystitis at a Tertiary Care Hospital

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Abstract

Aims: The present study was done to determine the clinical pattern and microbiological spectrum of pathogens implicated in causation of acute and chronic dacrocystitis, and their antibiotic susceptibility. *Settings & Design:* A prospective hospital based cross sectional study for a period of two years at a tertiary care hospital by the department of ophthalmology in association with department of Microbiology. *Material & Methods:* 350 patients above >20 years attending the OP of dept of ophthalmology with clinical signs and symptoms of dacrocystitis were enrolled. Demographic data, duration of illness, clinical signs and symptoms were noted. Specimens collected after lacrimal syringing or purulent material collected after applying pressure on the sac was transported to microbiology laboratory for processing and isolation of pathogens. The isolated pathogens were identified by standard biochemical tests and antibiogram interpreted by CLSI guidelines. *Results:* 350 cases were enrolled, with 196 acute and 154 chronic dacrocystitis. Females were predominant (54.3%) in the study and 31-40 years was the predominant age group, with 39.4% having illness <1 week duration. 49.4% belong to low socioeconomic group and majority are house wives (22.9%) and farmers (32.3%). Epiphora was present in all cases of chronic dacrocystitis and pain and swelling was major complaint in acute dacrocystitis. Unilateral involvement in 89.4% of cases, right eye was most commonly involved in acute cases and left eye in chronic cases. Culture positivity was observed in 82% of cases, 297 total bacterial isolates and 14 cases were co infected with fungus Candida albicans. Staphylococcus aureus was the most common pathogen in the total study, Pseudomonas aeruginosa was the most common gram negative pathogen. Gram positive pathogens were predominant in acute cases and gram negative in chronic cases. All the isolates were sensitive to higher generation antibiotics. *Conclusion:* To conclude, our study clearly highlights changing trends of bacterial pathogens in causation of acute and chronic dacrocystitis. Tobramycin, Amikacin, netilmycin, imipenems are therapeutic options of choice in medical management of cases of dacrocystitis. The present study may help the ophthalmologist to choose appropriate rationale antibiotic which provides broader coverage of common ocular pathogens.

Keywords: Acute Dacrocystitis; Chronic Dacrocystitis; Epiphora; Staphylococcus Aureus; Pseudomonas Aeruginosa.

Introduction

Mucosa of the lacrimal sac and nasolacrimal duct are highly resistant to infections under normal conditions. Any damage or anatomical alterations obstructing the nasolacrimal duct leads to increased susceptibility for microbial pathogens. Infection confined to the lacrimal sac is termed as dacrocystitis. [1] Dacrocystitis is one of the essential causes of ocular morbidity in children and adults. These are of two types; congenital and acquired. Primary congenital malformations like idiopathic stenosis of the duct or acquired conditions secondary to trauma,

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neoplasia, and infections may lead to stagnation of the tears in the sac. This stagnation acts as a reservoir of infection of the sac, leading to inflammation and further complications like stenosis of the duct, orbital cellulitis [2]. Acute dacrocystitis presents with pain, swelling of the lacrimal sac and 23% of the cases progress towards orbital abscess. Cases of chronic dacrocystitis presents with epiphora, conjunctivitis and mattering of the eye. These differing presentations may be due to wide differences in the etiology, microbial pathogens in cases of acute and chronic dacrocystitis and associated nasal pathologies in different conditions [3].

The bacterial etiology in cases of acute and chronic dacrocystitis is constantly changing and hence a constant vigilance over the pathogens and their antibiotic susceptibility is highly important. These may be gram positive, gram negative organisms, rare acid fast organisms and fungi. Review of literature suggests gram positive as the most common etiological agents and mixed isolates from cases of chronic dacrocystitis. However pathogens implicated in dacrocystitis are constantly changing over the periods and also variable from place to place depending upon the various cultural and climactic conditions [4]. The present study was aimed to determine the clinical presentations and microbial pathogens implicated in causing acute and chronic dacrocystitis. The antibiotic susceptibility was determined to guide the ophthalmologists in choosing appropriate antibiotic in management.

Materials & Methods

A hospital based prospective cross sectional study was conducted at Narayana Medical College and General hospital by Department of Ophthalmology for a period of two years from January 2015 to December 2016. The study was approved by the institutional ethical committee and all the procedures were followed as per the ethical committee guidelines. Patients of age >20 years attending the Outpatient department of Ophthalmology were evaluated for all the signs and symptoms of dacrocystitis. The patients demographic data including age, sex, social status and clinical history (duration of symptoms etc) clinical signs and symptoms were noted and examined by slit lamp microscope. Clinical examination included examination of lacrimal sac region, discharge from the lacrimal sac, patency of the nasolacrimalduct and nasal examination for any risk factors. The cases were categorized as Acute and Chronic dacrocystitis based on clinical findings and history of the patient [5]. Written consent was obtained from all the participants in the study.

Inclusion Criteria

Any case with history of pain, swelling in the medial canthal area, tearing or discharge in the conjunctiva was considered as Acute dacrocystitis. Persistent epiphora and regurgitation of purulent material from the sac on application of pressure or syringing was considered as chronic dacrocystitis.

Exclusion Criteria

All cases of Pseudoepiphora and Epiphora caused by causes other than nasolacrimalduct obstruction, cases with past history of infection, trauma, surgery and patients on topical application of antibiotic or steroid solutions for past 1 week were excluded.

Specimen Collection & Transport

Conjunctival swabs were collected from cases of acute dacrocystitis and purulent discharge on applying pressure over the lacrimal sac or refluxed material after syringing were collected and processed as per standard procedures at Microbiological laboratory. Gram staining and wet mount examination was done and examined microscopically. Swabs and material were inoculated onto sheep blood agar, Maconkey agar and chocolate agar. Cultured plates were incubated aerobically at 37^0C for 24-48 hours till 7 days. Colony characteristics were noted and isolates were identified by standard biochemical tests. Antibiotic susceptibility testing was performed on Muller Hinton agar by Kirby-Bauer disc diffusion method and interpreted as per CLSI guidelines [6]. ATCC strains were used as controls in interpretation of antibiotic sensitivity. In case of sensitivity on blood agar zone of hemolysis around each disc was measured.

Results

A total of 350 patients fulfilling the inclusion criteria were enrolled in the study. 196 cases (56%) were diagnosed as Acute dacrocystitis and 154 (44%) as chronic dacrocystitis. Dacrocystitis was more commonly observed among females (190/350, 54.3%) than males (160/350, 45.7%), mostly because of narrow nasolacrimal duct in females. 30.9% females diagnosed with acute dacrocystitis and 23.4% with

chronic dacrocystitis. In the total study, majority of the cases presented in the age group of 31-40 years (30%) followed by >50 years (27.1%). 49.4% of cases were of low socio economic status group and 32% of middle group. 39.4% of the cases were suffering with duration of <1 week and 32.9% between >1 week and < 2 week. Majority of the cases were farmers (32.3%) and females most of them were house wives (22.9%) [Table 1].

Unilateral involvement was observed in 314 cases (89.72%) whereas bilateral involvement is observed in 36 cases (10.28%). Right eye was more commonly involved (48.57%) than left eye (41.14%). In acute dacrocystitis right eye was more commonly involved, left eye was more in chronic dacrocystitis and bilateral involvement was more in cases of chronic dacrocystitis than acute cases. However these findings were not statistically significant in our study [Table 2].

Pain and swelling were the most common clinical signs in cases of acute dacrocystitis and epiphora (100%) and mucopurulent regurgitation (78%) was observed in cases of chronic dacrocystitis.85 cases in the study had nasal pathology with nasal polyps and deviated nasal septum.

Microbiological analysis of the cases were done and observed. A total of 350 specimens from all the cases were sent to microbiological laboratory for culture. A total of 310 isolates were isolated from the 287 culture positive (82%) cases from the study. Single isolate was grown from 272 cases (pure growth) whereas mixture (Two/Three) was recovered from 15 cases. In our study gram positive pathogens (198) were predominant than gram negative pathogens (99) and 14 cases were isolated with candida albicans, all were of chronic dacrocystitis. Analysis of our study has clearly shown staphylococcus aureus as the most common pathogen (97/198) both in cases of acute and chronic dacrocystitis, followed by staphylococcus epidermidis (77/198) and Streptococcus pneumoniae (24/198). Pseudomonas aeruginosa was the common gram negative isolate from our study (44/99) followed by Klebsiella pneumoniae (25/99). Other gram negative pathogens were Escherichia coli (22/99) and Hemophilus influenza (8/99). Gram negative pathogens were isolated mostly from cases of chronic dacrocystitis than acute dacrocystitis in our study. Candida albicans was the only fungus isolated from cases of both acute and chronic dacrocystitis (14/310) [Table 3].

Table 1: Demographic data of cases in the study

Age (Years)	Acute Dacrocystitis		Chronic Dacrocystitis		Total
	Male (No) (%)	Female (No) (%)	Male (No) (%)	Female (No) (%)	
20-30	18	24	14	16	72 (20.6%)
31-40	31	32	21	21	105 (30%)
41-50	21	22	16	19	78(22.3%)
>50	18	30	21	26	95(27.1%)
Total	88(25.1)	108 (30.9)	72 (20.6)	82 (23.4)	350
		Duration			
<1 week	62	76	0	0	138 (39.4)
>1- <2 week	26	32	21	36	115 (32.9)
>2 weeks	0	0	51	46	97 (27.7)
Total	88	108	72	82	350
		Social status			
Upper	18	16	15	16	65 (18.6)
Middle	28	32	24	28	112 (32)
Lower	42	60	33	38	173 (49.4)
		Occupation			
Worker	22	22	12	8	64 (18.3)
Farmer	38	16	39	20	113 (32.3)
salaried	18	8	7	16	49 (14)
House wife		50		30	80 (22.9)
Others	10	12	14	8	44 (12.6)

Table 2: Eye involvement in cases of study

Eye Involvement	Acute dacrocystitis (No) (%)	Chronic dacrocystitis (No) (%)	Total
Right Eye	116	54	170 (48.57)
Left Eye	68	76	144 (41.14)
Bilateral	12	24	36 (10.29)
Total	196	154	350

Table 3: Distribution of pathogens from Acute & Chronic Dacrocystitis

Isolate	Number (%)	Acute	Chronic
Gram positive Organisms	198	113	85
Staphylococcus aureus	97	54	43
Staphylococcus epidermidis	77	43	34
Streptococcus Pneumoniae	24	16	8
Gram Negative organisms	99	37	62
Esherichia coli	22	6	16
Pseudomonas aeruginosa	44	18	26
Hemophilus influenza	8	4	4
Klebsiella pneumoniae	25	9	16
Fungi	14	4	10
Candida albicans	14	4	10
TOTAL BACTERIAL ISOLATES	297	150	147
TOTAL FUNGAL ISOLATES	14	4	14

Table 4: Antibiotic Sensitivity pattern of Isolates in the study

Antibiotic	S.aureus	S.epidermidis	S.pneumoniae	E.Coli	P.aeruginosa	H.influenzae	K.pneumoniae
Chloramphenicol	65	76	66	77	71	70	68
Ciprofloxacin	79	84	76	82	88	86	77
Ofloxacin	88	88	77	88	82	85	87
Gentamycin	88	89	88	84	86	83	80
amikacin	92	96	89	91	90	89	88
Tobramycin	98	96	NT	98	94	96	92
Azithromycin	93	93	90	NT	NT	NT	NT
Cefoxitin	78	87	NT	88	89	89	88
Cefotaxime	89	89	NT	89	83	91	90
Imipenem	NT	NT	NT	100	100	100	100
Vancomycin	100	100	N	NT	NT	NT	NT
Linezolid	100	100	NT	NT	NT	NT	NT
Neomycin	NT	NT	NT	89	90	82	89

* NT = Not Tested.

Antibiotic sensitivity was performed for all the isolates as per standard guidelines and interpreted as per manufacturers instructions. Gram positive isolates exhibited maximum sensitivity to vancomycin, linezolid, azithromycin, tobramycin and amikacin. Gram negative isolates exhibited maximum sensitivity to imipenems, amikacin, Cefotaxime and netilmycin [Table 4].

Discussion

In our present study, female preponderance was observed totally and the most common age group was 31-40 years in cases of acute dacrocystitis and >50 years in cases of chronic dacrocystitis. These findings suggest that acquired nasolacrimal duct obstruction is most commonly seen in females of >50 years due to narrow lumen of nasolacrimal duct. Findings of our study concur with the findings of Bharathi MJ et al who reported the incidence as 58% in females and >50 years as the common age group in her study [7]. Female preponderance similar to our study were reported by Hartikainen et al (79%), Chaudhry et al (65.4%) in their studies which are significantly higher than the incidence in our study [8, 9]. Most of cases in our study were from low socio economic status due to relatively low hygienic habits and illiteracy. Most of the females were house wives and males were farmers stating that some kind of injury or trauma may act as a predisposing factor in development of dacrocystitis. Among nasal pathologies observed nasal polyp was seen in 37 cases, inferior turbinate hypertrophy in 12 cases and DNS in 36 cases. Nasal pathology which leads to nasolacrimal duct obstruction is an important risk factor in development of chronic dacrocystitis as mentioned in many studies globally [10]. Bilateral involvement was seen in 10.29% of total cases and more so in cases of chronic dacrocystitis. In our study, a significant finding observed was right eye involvement is more common in acute dacrocystitis and left eye involvement in chronic dacrocystitis. These findings were almost similar to findings of Brook et al, Ghose et al in their studies [10,11]. Nasolacrimal duct obstruction is more common on left side because of narrow bony canal and the lacrimal fossa formed a greater angle on right side than left side.

Epiphora was present in 100% of cases and purulent discharge was found in 75% of cases of chronic dacrocystitis which is similar to findings of Coden DJ et al [12]. Pain and swelling were the most common signs and symptoms in cases of acute dacrocystitis in our study which is similar to many studies [13].

In our study, culture positivity was 82% with 311 isolates from all the positive specimens. Pure growth was isolated from 272 cases and mixture from 15 cases. Similar percentage of culture positivity was identified from the findings of Patel K et al who reported the culture positivity of 83% in his study [14]. 14 cases of chronic dacrocystitis produced growth of candida albicans from the specimens. Gram positive organisms were more predominant than gram negative in our study, which is similar to many studies. Gram positive organisms were more common in acute dacrocystitis whereas gram negative were more common in cases of chronic dacrocystitis. This finding is contrary to many of the studies who reported gram negative pathogens in cases of acute and chronic dacrocystitis[15]. Staphylococcus aureus was the most common isolate in our study(198/297), this is similar to findings of Sainju et al who reported the same in his study, whereas differs from study of Sun X et al who reported Streptococcus pneumoniae as the most common pathogen in his study [16,17]. Pseudomonas aeruginosa was the common gram negative pathogen and isolated mostly from cases of chronic dacrocystitis in the study. Findings of our study concurs with the findings of shah CP et al but differs from majority of studies who reported Escherichia coli and Klebsiella pneumoniae as common pathogens in their study [18]. Escherichia coli and Klebsiella pneumoniae were also isolated from our study with predominant isolates from chronic dacrocystitis. Candida albicans was the only fungal isolate reported in the study, studies pertaining to fungal pathogens in dacrocystitis are limited and few of them have reported candida as the most common pathogen which is also observed in our study [19].

Antibiotic susceptibility of the pathogens in the study identified gram positive pathogens exhibited maximum sensitivity to vancomycin, Linezolid, Tobramycin, amikacin. Gram negative pathogens were susceptible to imipenems,amikacin, tobramycin and cefotaxime in our study. Findings of our study, parallels findings of Huber-Spitzy et al, and many other studies [20].

To conclude, our study clearly highlights changing trends of bacterial pathogens in causation of acute and chronic dacrocystitis. Staphylococcus aureus was the common gram positive pathogen and pseudomonas aeruginosa was the gram negative pathogen. Tobramycin, Amikacin, netilmycin, imipenems are therapeutic options of choice in medical management of cases of dacrocystitis. The present study may help the ophthalmologist to choose appropriate rationale antibiotic which provides broader coverage of common ocular pathogens.

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Nil.

Conflict of Interest

Nil.

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Treatment of Latent Hypermetropia in Adults Presenting with Chronic Headaches

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Abstract

Purpose: To evaluate the response ot the treatment of uncorrected latent hypermetropiain adults with chronic headaches. *Methods*: It's a prospective descriptive study. 50 subjects of age group 18-40 yrs with headache are evaluated using cycloplegic retinoscopy to estimate the latent hypermetropia .Other identifiable causes of headache are ruled out.With appropriate spectacle correction responses are evaluated at 1 month, 2 months,and 6 months on a 6 point patient satisfaction scale. *Results*: 55% were satisfied at 1 month, 75% at 2 month and 81% at 6 months. Among the age category 93.9% patients less than 30yrs were satisfied at the end of 6months and 74.6% were satisfied in more than 30 yrs age group. *Conclusion*: This study showed that age groups 18-40 yrs who presented with recurrent headache with no secondary cause were benefitted with latent hypermetropia correction.Thus this stidy emphasis on the importance of cycloplegicretinoscopy and latent hypermetropia correction for young adults complaning of headache.

Keywords: Latent Hypermetropia; Manifesthypermetropia; Accommodation.

Introduction

Significant hyperopia is defined as any degree of hyperopia sufficient to cause symptoms prompting clinical attention[1]. Hyperopiamay be classified by structure and/or function of the eye. Simple hyperopia is due to decreased axial length or decreased converging power of cornea, lens, and/or media (flattened cornea/decreased curvature, increased thickness of lens, etc. [1]. Pathologic hyperopia is due to atypical development, trauma, or disease of the eye (i.e. cataract, microphthalmia, nanophthalmia, aniridia, etc.)[1,2]. Functional hyperopia is due to paralysis of accommodation [1,3]. If affected, functional hyperopia is usually present at birth. Drugs, such as cycloplegics, can also cause a transient hyperopia [1].

Hyperopia may also be categorized by the degree of refractive error: Low hyperopia is +2.00D or less, Moderate hyperopia ranges from +2.25 to +5.00D, and High hyperopia is +5.25D or more [1].

Hyperopia may also be classified by the role of accommodation to visual functioning. Facultative hyperopia is hyperopia that can be overcome by accommodation whereas Absolute [9] hyperopia cannot be overcome by accommodation. Total hyperopia is the sum of Facultative and Absolute hyperopia [1].

Hyperopia may also be categorized based upon the outcome of noncycloplegic and cycloplegic refractions. Manifest hyperopia is determined with noncycloplegic refraction whereas Latent hyperopia is determined with cycloplegic refraction. The magnitude of hyperopia is the sum of Manifest and Latent hyperopia [1].

The Mutli-Ethnic Pediatric Eye Disease Study Group reports hyperopia prevalence of children in each ethnic group of the sample population as being 26.9% of Hispanics, 25% of non-Hispanic White Americans, 20.8% of African Americans, and 13% of

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Asian Americans [8,9]. Hyperopia is most common in the Hispanic population, next most common in Native Americans, African Americans, and Pacific Islanders, and least most common in Asians and Caucasians. Most commonly, the patient may experience decreased visual acuity orasthenopicsymptons. Active accommodation mitigates some or all of hyperopia's adverse effects on vision. The impact of accommodation is highly dependent upon age, the amount of hyperopia and astigmatism, the status of the accommodative and vergence systems, and the demands placed upon the visual system. Accommodation typically enables younger patients to overcome facultative and latent hyperopia [1,2].

When the level of hyperopia is too great or the accommodative reserves are insufficient, due to age or fatigue, accommodative dysfunction may result as the eye is no longer capable of accommodating to focus light onto the retina [2] causing blurred vision and asthenopia develops. Asthenopia (eye strain) and/or eye pain is commonly reported and is associated with headaches due to close work such as reading, writing, or computer work [1,2]. Presbyopia brings an increase in absolute hyperopia, causing blur, especially at near. Binocular dysfunction is also a symptom of hyperopia [1].

Many persons between the ages of 10 and 40 years who have low hyperopia require no correction of their latent hyperopia, because they have no symptoms. Ample accommodative reserves shelter them from visual problems related to their latent hyperopia. Under increased visual stress, such persons may develop symptoms that require correction, of their latent hyperopia as well under cycloplegic refraction.

Facultative hyperopia can no longer be sustainedcomfortably, due todecreasing accommodative amplitudes. Latent hyperopia should be suspected when symptoms occur in conjunction with a lower-than-expected amplitude of accommodation for the patient's age. Cycloplegicretinoscopy can help identify this latent component. When persons reach their mid-thirties, accommodation takes noticeably longer, while facility decreases, causing associated vision problems in many hyperopic persons previously free of symptoms.

A prescription for the distance manifest (noncycloplegic) refraction for the patient to wear as needed (i.e., part time) often suffices. With increasing age and visual demands at near, the patient may require additional correction. Before prescribing a permanent pair of spectacles, the optometrist may lend the patient a pair of spectacles (i.e., over-the-counter reading glasses) to demonstrate the potential benefits of optically correcting latent hyperopia. In addition, the optometrist should tell the patient that under certain circumstances, correcting near vision can adversely affect distance visual acuity. A good alternative for some patients is the prescription of contact lenses, which can relax accommodation more The standard, and safest, treatment for symptomatic hyperopia is wearing prescribed lenses with low amounts of plus power. Patients with moderate degrees of hyperopia are more likely to require at least part-time correction, especially those who have significant near demands or have accommodative or binocular anomalies. Many practitioners have long been frustrated with traditional treatments of symptomatic latent hyperopia (fogging techniques, bifocals, etc.). Cyclorefraction and treatment of latent hypermetropia [7] offers both practitioners and patients an efficient, rapid-acting, and satisfying alternative treatment for this vexing accommodative anomaly.

Purpose

To evaluate the response ot the treatment of uncorrected latent hypermetropiain adults with chronic headache.

Methods

This was a prospective descriptive study .The duration of the study was 6 months. 50 patients in the age group of 18-40yrs referred to the ophthalmology out patient department for evaluation of headache were included in the study.

In all the patients other causes of headache like medical, dental, ENT, neuroophthalmology were excluded. Clinical history like occupation, amount of near work, relation of headache to constant near work were taken.visual acuity measured. Cycloplegic retinoscopy with 1% cyclopentolate was done. correction was given after reduction for distance so that the latent hypermetropia was treated.

Patients who were doing constant near work and active in reading like students and computer users were given full retinoscopic reading others were given 1/2-3/4 theretinoscopic reading. After spectacle prescription the patients were followed up for 1 month,2 month and 6 months. Responses are evaluated based on a 6 point patient satisfaction score (very satisfied to very dissatisfied) score of 6 on 0-6-point Likert scale.

Results

50 subjects between age group of 18-40 yrs participated.14 were males and 36 were females. Mean age was 32±2 yrs. Patients who had scored as satisfied and very satisfied were considered treated. 55% were treated at 1 month, 75% were treated at 2 months and 81% were treated at 6 months. Patients who were less than 30 were benefitted 66.7%, 87.9%, 93.9% at 1 month, 2 month, and 6 month respectively. Patients aged over 30 benefitted 49.3%, 73.1%, 74.6% at 1 month, 2 month, 6 month, respectively. Table 1 showing patient satisfaction in different age groups.

Table 1: Patient satisfaction in different age groups

	Patient <30yrs	Patient >30yrs
1 month	66.7%	49.3%
2 month	87.9%	73.1%
6 month	93.9%	74.6%

Discussion

In day to day practice ophthalmologists come across many cases of headaches usuasllyreferred to by other specialitis.Generally the manifest [8]. Hypermetropia as determined by non cycloplegicretinoscopy is treated. Accommodation plays an important role in determining the prescription. young patients with good accommodation reserve do not need the total correction however constant near work in them fails the accommodation and they suffer from chronic headaches.

Similarly as the patient ages to 30 plus the accomodation again fails and they have near vision blur and constant headaches. Some patients with hyperopia do not initially tolerate full optical correction. Patients with latent hyperopia who prove intolerant to the use of full or partialhyperopic correction may benefit from initially wearing the correction only for near viewing;. To determine the final spectacle lens prescription, the clinician should carefully consider the patient's vision needs. Newer high-index lens materialsand aspheric lens designs have reduced the thickness and weight of highplus-power lenses, increasing their wearability and patient acceptance.

In this study patients coming with headache and in whom other causes of headache were ruled out underwent a cycloplegicretinoscopy . younger patients who did more near work accepted full correction and at the end of 6 months 93.9% were free of headaches.

Patients more than 30 yrs were given 1/2 - 3/4 correction depending on the acceptance and 74.6% were free of headaches.previous studies have also concluded that uncorrected latent hypermetropia among young adults is one of the important cause for chronic headaches .

Conclusion

Thisstudy showed that age groups 18-40 yrs who presented with recurrent headache with no secondary cause were benefitted with latent hypermetropiacorrection. Thus this study emphasis on the importance of cycloplegicretinoscopy and latent hypermetropia correction for young adults complaning of headache.

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Management of Cataract with Different Approach

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Abstract

Background and Objectives: Cataract surgery is the major cause of blindness in the world. For developing countries MSICShas come in as savior simple and effective. Surgical techniques are continually modified and improved upon to decrease postoperative astigmatism. Major factor responsible is site of the cataract incision. In old age majority of the patient will have against the rule astigmatism, which worsens if the incision is taken superiorly for MSICS. The same is reduced when incicion is taken temporally. *Objective:* of the present study is to (a) Compare the astigmatic outcome in superior V/s temporal incision in MSICS. (b) To know the visual outcome in MSICS with both superior and temporal incision. *Methods:* This study has been conducted on patients of senile mature and immarute cataract admitted to ophthalmology wards in Basaveshwar Teaching and General hospital attached to M.R Medical / College, Gulbarga from November 2007 toJune 2009. *Results:* Inthis study with temporal sclera incision had gross lower astigmatism when compared to the patients with superor incision. The final mean of astigmation in superior scleral was 0.99 +/- 0.58 SD and in temporal sclera group it was 0.66 +/- 0.43 SD. The difference in astigmatism was highly significant, z- calculated value 4.6>2.58 tabulated Z value. *Conclusion:* Superior incicsion shows ATR shift as compared to temporal sclera incision which induces WTR. SAI of <1.00 D was seen in 88% of patient with temporal incision as compared to 62% in superior incision group. Temporal incision procedure less as compared to 62% in superior incision group. Temporal incision procedure less astigmation and neutralizing the preexisting.

Keywords: Cantaract Surgery; Astigmatism; Superior Incision Group.

Introduction

Cataract is the major cause of blindness in the world. The right to sight is the common global agenda launched by WHO and aim is to reduce the present blindness ratio. There is technological explosion in the field of cataract surgery. For developing countries which can ill afford an expensive technology for masses, MSICS has come in as savior being simple and effective.

In infancy cornea is spherical. Throughout the childhood and adolescence, with the rule astigmatism develops. As the age advances cornea becomes more spherical and develops against the rule astigmatism with senescence. There is development of against the rule astigmatism after cataract surgery most of the times, which worsens the preexisting astigmatism when incision is taken superiorly.

The same is minimized and well controlled when incision is made temporally. Hence there is need of comparative study of superior versus temporal incision in manual small incision cataract surgery to reduce post operative astigmatism for good operative visual recovery.

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Cataract surgery incision has been known for more than a century to influence astigmatism. Only in the past decade, however cataract surgeons have mounted a serious investigation in minimizing astigmatism induced by cataract surgery.

Significant astigmatism may be visually disabling causing diminution of visual acuity, glare, monocular diplopia, asthenopia and image distortion.

Surgical techniques are continually modified and improved upon to decrease postoperative astigmatism. Preoperative factors such as location and type of incision, size, configuration of the wound, suture material, technique of wound closure etc influence the postoperative astigmatism > Out of these factors, one of the major factors responsible for postoperative astigmatism is the site of the cataract incision. It is known that flatting of the cornea occurs ultimately at a direction angles to the direction of that cataract incision.

Therefore placing the incision on the steep meridian of preexisting astigmatism can reduce post operative astigmatism. Also it has been seen that, farther the cataract incision from the visual axis, less likely is the effect on the corneal curvature at visual axis.

Temporal sclera location is farther from the visual axis, and flattering that is likely to affect the corneal curvature at visual axis is less, thus causing less post operative astigmatism.

In view of this we have endeavored to compare the astigmatism following superior scleral incision and temporal sclera incision with manual small incision cataract surgery with posterior chamber intraocular lens implantation.

Methods

Thhis is a randomized prospective study conducted to compare astigmatic outcome in superior v/s temporal scleral incision in MSICS at our Basaveshwar Teaching and General Hospital (BTGH) at M.R. Medical College, Gulbarga between November 2007 to june2009.

This study includes 200 cases of senile cataract. Out of 200 Patients, 100 pateints underwent surgery with superior scleral incision and remaining 100 patients underwent temporal scleral incision for MSICS with PCIOL, using the formula

All the cases were thoroughly examined and managed in our hospital.

A standard protocol was maintained. Patients were admitted as inpatients for cataract surgery and they had postoperative followup as outpatients at the same hospital.

It is a study of 200 cases of senile cataract who underwent MSICS with PCIOL under peribulbaranasethesia and stasticallyanalysed by unpaired t test.

Preoperative ophthalmic examination

1. The best corrected visual acuity was recorded.
2. Pupillary reaction was noted
3. Keratometry and retinoscopy readings were recorded and database estanlished.
4. IOP was recorded with Goldmann's applnanation tonometry.
5. Fundal evauation was done under full dilation of the pupil.

A Detailed Slit Lamp Examination was done Preoperatively

1. To know the type of cataract
2. To know the density of the cataract
3. To decide the size of the incision accordingly.

Intra ocular lens power was calculated by using standard SRK-2 formula, 100 cases were operated by using straight superior scleral incision while remaining 100 cases were operated by staright temporal scleral incision of 6 to 7mm.

The schedule for post operativeexamnination was post operative day 1 day 7 and day 21. In the post operative period.

1. Both unaided and best corrected visual acuity recorded.
2. Keratometry readings were recorded.

Table 1: Age Distribution

Age	Group A (superior) No. of patients	%	Grou B (Temporal) No. of patients	%
31-40	1	1.00	2	2.00
41-50	14	14.00	17	17.00
51-60	37	37.00	36	36.00
61-70	48	48.00	45	45.00
Total	100	100	100	100

Table 2: Sex Distribution

Sex	Group A (superior) No. of Patients	%	Group B (Temporal) No. of Patients	%	Total
Male	47	47.00	43	43.00	45%
Female	53	53.00	57	57.00	55%
Total	100	100	100	100	100%

Table 3: Type of incision

Type of Incision	Number of Patients	Percentage
Superior	100	50
Temporal	100	50

Table 4: Pre operative visual acuity

Visual Acuity	Superior Incisions	Temporal Incision
PL+PR+	16	15
HM+	12	10
CF-CF	12	12
CF1 mts	10	7
CF2 mts	7	7
CF3mts	10	10
CF4mts	10	12
CF5 mts	8	8
6/60	10	12
6/36	5	6

Table 5: Pre operative astigmatism

Type	Group A (superior) No, of patients	%	GroupB(temporal) No. of patients	%
ATR	55	55.00	71	71.00
WTR	27	27.00	25	25.00
NIL	18	18.00	04	04.00
Total	**100**	**100**	**100**	**100.00**

Table 6(a): 1st day post operative astigmatism

Type	Group A(superior) No. of patients	Groupb (temporal) %	No. of Patients	%
ATR	77	77.00	65	65.00
WTR	16	16.00	22	21.00
NIL	7	7.00	13	14.00
Total	100	100	100	100

Table 6(b): 7thPost operative day astigmatism

Type	Group A(Superior) No. of Patients	%	GroupB (Temporal) No. of Patients	%
ATR	85	85	59	59
WTR	10	10	28	28
NIL	5	5	13	13
Total	100	100.00	100	100.00

Tbale 6(c): 21stPost operative day astigmatism

Type	Group A(superior) No. of Patients	%	GroupB (temporal) No. of Patients	%
ATR	86	86	63	63
WTR	08	08	28	28
NIL	06	06	09	09
Total	**100**	**100.00**	**100**	**100.00**

Table 7(a): Post operative visual acuity in superior sceleral incision

Visual Acuity	1st day	7th day	21st day
>6/9	0	15	43
6/18-6/12	2	55	40
6/36-6/24	10	20	13
<6/60	88	10	4

Table 7(b): Post operative visual acuity in temporal scleral incision

Visual Acuity	1st day	7th day	21st day
>6/9	0	17	45
6/18-6/12	3	56	46
6/36-6/24	12	19	7
<6/60	85	8	2

Table 8(a): Follow up of astigmatism pattern at 21st postoperative day in superior scelaral incision

Astigmatism in Diopters	Superior No. of Patients	%
<0.5	26	26
0.6-1.0	22	22
1.1-1.5	20	20
1.6-2.0	17	17
2.1-2.5	9	9
>2.5	6	6
Total	**100**	**100.00**

Table 8(b): Follow up of astigmatism pattern at 21st postoperative day in temporal scleral incision

Astigmatism in dioptress	Temporal No. of patients	%
<0.5	55	55
0.6-1.0	27	27
1.1-1.5	11	11
1.6-2.0	4	4
2.1-2.5	3	3
>2.5	0	0
Total	**100**	**100.00**

Table 9(a): Decay of mean aastigmatism in superior scleral group

Period	Number	%	ATR Mean +/- SD	Number	%	WTR mean +/- SD
Pre-operative	55	55	0.84+/-0.26	27	27	0.95+/-0.65
1st day	77	77	1.28+/-0.26	16	16	0.88+/-0.64
7th day	85	85	1.15+/-0.73	10	10	0.85+/-0.50
21st day	86	86	1.39+/-0.85	08	08	0.94+/-0.75

Table 9(b): Decay of mean astigmatism in temporal scleral insicion

Period	Number	%	ATR Mean +/- SD	Number	%	WTR mean +/- SD
Pre-operative	71	71	1.34+/-0.75	25	25	1.03+/-0.51
1st day	65	65	1.03+/-0.58	22	22	1.11+/-0.63
7th day	59	59	0.85+/-0.21	28	28	1.04+/-0.64
21st day	65	65	0.69+/-0.44	26	26	1.09+/-0.71

Table 10: Decay of mean astigmatism in superior and temporal scleral incisions.

Post op days	Superior Scleral					
	ATR		WTR		NIL	
	NO	%	NO	%	NO	%
1st day	77	77	16	16	7	7
7th day	85	85	10	10	5	5
21ST DAY	86	86	08	08	6	6

Post Op Days	Temporal scleral					
	ATR		WTR		NIl	
	No	%	No	%	No	%
1st day	65	65	22	22	13	13
7th day	59	59	28	28	13	13
21ST DAY	65	65	65	65	9	9

At the end of 2 weeks final visual acuity and keratometry were recorded and for all patients a note of surgically induced astigmatism was made. Minor post operative complications were treated and finally appropriate spectacles to cataract residual SIA at the end of the month was given.

Inclusion Criteria

All patients of age 40-70 years of either sex with senile mature immature cataract were screened at ophthalmology OPD BTGH and admitted to Opthalmology Wards at BTGH.

Exclusion Criteria

1. Pateints with congenital and developmental cataract
2. Paeints with complicated and traumatic cataract
3. Patients with preexisting corneal opacity uveities glaucoma dacryocystits and macular degeneration which independently cause visual impairement.

Observation Results

Total numbers of 200 cases were included in this study.

Group A : 100 patientsswhi underwent superior scleral incision with posterior chamber intraocular lens implantation.

Group B: 100 patients who underwent temporal scleral incision with posterior chamber intraocular lens implantation.

Discussion

In this study an attempt has been made to analyze only one of the variable i.e incision site. The other variable have been kept constant and an attempt has been made to explain and compare changes in astigmatism following superior and temporal scleral incision.

It was found that the patients with the temporal scleral (group B) incisions had a fross astigmatism when compared to the superior incision(group A). The final mean of astigmatism in superior scleral was 0.9+/-0.58D and temporal scleral group it was 0.66+/-0.43 SD. The difference in astigmatism by superior scleral and temporal scleral group was highly significant. Z calculated (Zcat) value- 4.6>2.58- tabulated Z value.

This study was similar to Anders N et al [2] where he showed that temporal scleral had a gross astigmatism of 0.70D +/-0.35 SD in comparsion to 0.93+/- 0.42 in superior scleral incision.

The present study showed that mean astigmatism in superior scleral group was 1.28D on first post operative 1.15 D on7th post operative day and 1.139 D on 21st post operative day.

In temporal scleral group it was 1.03D on 1st post operative day 0.85D on 7th post operative day and 0.69D on 21st post operative day.

In temporal scleral group it was 1.03D on 1st post operative day 0.85D on 7th post operative day and 0.69D on 21st post operative day.

In this study at any particular time 82% of patients with temporal scleral incision had astigmatism <1.00D as compared to 48% of patients with superior scleral incision. Hence it may be stated that temporal scleral incision lesser astigmatism as compared to

the superior scleral incision.

The gross astigmatic decay for temporal scleral incision shows a significant decrease in post operative ATR astigmatism from 71% to 65%. In the study done by Joel C Axt [3] Showed that there was decrease in postoperative ATR astigmatism by temporal inciosn. His study consisted of pre operative ATR astigmatism of>2.00D. Superior scleral incision showed an increase in ATR astigmatism from 55% to 86%.

Summary

The present study included 200 cases.

Group (A): 100 cases underwent with auperior scleral incision for manual SICS

Group(B): 100 cases underwent with temporal scleral incision for manual SICS

1. In this study it was followed that majority of the patients were in the age group of 61-70 years.
2. In this study 45% were males and 55% females.
3. In this study 50% patients underwent superior scleral manual SICS and 50% underwent temporal scleral manual SICS
4. The eyes that underwent temporal scleral incision showed >2.5D astigmatism in only less than 1% cases at any particular followup time. In comparison to this 6% in superior scleral incision showed up same level of astigmatism 82% patients showed astigmatism <1.00D in temporal group as compared to 48% in the superior sclearal group.
5. In the temporal scleral group there was a constiuen reduction of preoperative against the rule astigmatism from 71% to 65% pre operative with the rule astigmatism increased from 25% to 26% at 21st post operative day following. However decay of mean astigmatism in superior scleral incision showed a distinct increase in against the rule astigmatism from 55%to86% at 21st postoperative day, and with the rule astigmatism decrased from 27% to 80% post operatively.

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Management of Complex Retrobulbar Orbital Tumours, Our Institutional Experience

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Abstract

The orbital tumours coming to neurosurgical team are often those, which are referred by ophthalmological units when they consider it to be complex in nature that is retrobulbar tumours complicated by extraorbital and intracranial extensions. *Methods*: clinical records of 23 patients operated for retrobulbar orbital pathologies in department of neurosurgery, Bangalore medical college and research institute from 2011 to June 2016 were reviewed and analysed. Patient's demographics, symptoms and signs at presentation, and histologic diagnosis were recorded. *Results*: Twenty three patients were operated, of which 12 were men and 11 women, and the age of patients ranged from 11 to 65 years and mean age was 43 years. Fourteen patients had primary intraorbital tumours, 8 patients had secondary orbital tumours extending from other adjacent contiguous bones or structures and 1 patient had metastatic tumour from ovarian neuroendocrine carcinoma. *Conclusions*: Orbit being a complex anatomical entity, management of complex tumours poses a challenging surgical problem. Although a significant percentage of these tumours are treated by the ophthalmologist alone, proficiency with a multitude of approaches and collaboration with a neurosurgeon is often required, especially for tumours that are located deep within the orbit, are large, or have an intracranial extension. Technical advances and modifications in surgical techniques along with involvement of plastic surgeons have decreased surgery-related morbidity and involvement of radiation oncologist to the team for adjuvant radiotherapy/chemotherapy would be beneficial for prolonged recurrence free and better quality of life.

Keywords: Orbital Tumours; Proptosis; Lateral Orbitotomies; Superior Orbitotomies; Craniofacial Excisions.

Introduction

The orbit is an anatomically complex structure housing the globe; extra ocular muscles; fat; and vascular, nerve, glandular, and connective tissues. This complex anatomical area was first described by Whitnall to resemble a pear, with its widest aperture anterior and narrowing posteriorly. The bony orbit embryologically develops from the mesenchymal cells surrounding the optic vesicle. Composed of 7 bones, a normal adult orbit holds a volume of 30 mL with a medial length of 45 mm, a width of 40 mm, and a height of 35 mm at its most anterior point.

Since the orbit is a relatively small anatomical area with little wasted space, space-occupying lesions that increase orbital volume may result in proptosis of the globe and may adversely affect visual and extraocular muscle function. However, Lin and colleagues reported that proptosis of less than 4 mm might go undetected, obscuring occult pathology [1].

A basic understanding of orbital anatomy is critical in evaluation of orbital neoplasms. Not only can site of involvement guide the differential diagnostic considerations, but accurate descriptions

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of lesion location, involved structures, and extent of dissemination can facilitate proper treatment planning. The orbit can be divided into the ocular compartment or globe, the muscle cone, and intraconal and extraconal spaces. Six extraocular muscles control ocular movements; all but the inferior oblique muscle constitute the muscle cone. The muscle cone converges at the orbital apex, forming a tendinous ring (annulus of Zinn). Through this ring enters the optic nerve, oculomotor nerve (superior and inferior divisions), abducens nerve, nasociliary branch of the ophthalmic nerve, and the ophthalmic artery. The muscle cone separates the intraconal and extraconal spaces.

Orbital tumours may be primary, meaning they originated from orbital structures, or secondary, meaning they extend into the orbit from adjacent structures and third group of tumours, involving the orbit are metastatic [2]. These tumours are variable in their biological nature and in their location [3,4]. Orbital tumours are also divided anatomically, into intraconal, extraconal, and intra-canalicular. This distinction is made on the basis of the tumour's relationship with the muscle cone, with the intra-canalicular group of tumours being those lesions that are at least partially within the optic canal [5]. Patients with primary or secondary orbital tumours usually present with exophthalmos, pain, diplopia, swelling, tearing, and blurred vision.

Imaging studies used in the diagnosis and management of orbital tumours have changed dramatically in the last few decades. Ultrasonographic examination of the orbit is still helpful in the evaluation of cystic lesions and also for vascular lesions. Magnetic resonance imaging gives high-resolution images of the normal components of the orbit and of nonosseous lesions in three dimensions. In cases of osseous lesions, CT is the modality of choice, either alone or in combination with an MR imaging. The drawback to using CT in examining the eye is that it uses ionizing radiation and may produce cataract.Angiography is still the imaging modality of choice for vascular lesions, such as ateriovenous malformations and low-flow ateriovenous fistulas. It is also useful in cases of the more vascular orbital tumours (such as meningiomas) for defining the extent of vascularity prior to surgery. Cerebral angiography should be undertaken in any patient with pulsatile exophthalmia.

Surgery

There are two major types of surgical approaches to orbital tumours: the transorbital approaches, which are usually performed by an ophthalmologist [6] and the extraorbital approaches, which are best performed by a team that includes a neurosurgeon or a head and neck surgeon as well as an ophthalmologist [7]. In most instances, anterior lesions are treated via transorbital approaches, whereas lesions of the posterior third are best managed via extraorbital approaches [7,8]. There may be some instances, however, where this rule, cannot be applied. In some cases, posterior lesions can be approached via extended or combined transorbital approaches, and lesions of the middle third of the orbit are easily accessible via extraorbital approaches.

In 1888, Krönlein first described the lateral orbitotomy approach. The Berke-Reese modification of this approach used an extended canthotomy. In place of the curved incision used by Krönlein, Stallard altered the approach taking it into the upper lateral brow area. Avoiding the lateral canthal region was at the core of the Wright modification of the Stallard approach. A hemicoronal (or bicoronal) approach, also referred to as the coronal approach, has been used by Kennerdal and others [9]. Goldberg et al have popularized the transconjunctival approach and the transcaruncular approach [10].

The transcranial approach in which the orbital rim is preserved was initially developed by Dandy [11] and has been subsequently modified. The transcranial approach with orbital osteotomy was initially described by Frazier in 1913 [12]. and has since been modified several times [13]. This approach is useful in cases of tumours involving the medial orbit and the anterior skull base. The subcranial approach can also be useful in midline lesions involving the orbit, the anterior skull base, and the paranasal sinuses.

Material and Methos

Twenty three patients with orbital tumours were operated in department of neurosurgery, Bangalore medical college and research institute from 2011 to June 2016, 12 were men and 11 women, the age of patients ranged from 11 to 65 years and mean age was 43 years. One patient had lacrimal adenoma (Figure 1), three patients had lacrimal adenoid cystic carcinomas (Figure 2), one patient had intraorbital abducent nerve schwanoma (Figure 3), one patient had NF-2 with intraorbital intraconal sensory nerve schwanoma (Figure 4), three patients had orbital apex meningiomas (Figure 13), two patients had post-

traumatic orbital ateriovenous malformations mainly involving upper eye lids following penetrating injury, one patient had lower eyelid solitary plasmacytoma, one patient had orbital lymphoma (Figure 5), one patient had plexiform neurofibrma with orbital extension with pthysis bulbi, one patient had sphenoid wing meningioma with intraorbital extension (Figure 6), one patient had recurrent maxillary adenocarcinoma with intraorbital extension, one patient had sinonasal carcinoma with intraorbital and intracranial extension (Figure 7), one patient had frontal mucocele with intraorbital and intracranial extension (Figure 8), one patient had frontoorbital solitary fibrous dysplasia, one patient had fronto orbital Ewing's sarcoma (Figure 9), one patient had fronto orbital angiosarcoma (Figure 10), one patient had ethmoido-orbito-cranial mucormycosis (Figure 11) and one patient had orbital metastasis secondary to ovarian neuroendocrine tumour (Figure 12). The clinical features (Table 1), headache was the commonest symptom which was bothering patients, and progressive proptosis though present, patients reached after diplopia and loss of vision compelled them to consult.

Results

Based on the clinical presentation and radiological findings surgical approaches were planned for individual cases (Table 2 and 3). Lateral orbitotomy was used in one patient (Figure 1) and complete excision of tumour involving the lacrimal gland was done. The orbit was reconstructed and patient did not have any deficits. The histopathological examination findings were suggestive of lacrimal gland adenoma.

Three patients, who had intraorbital superolateral quadrant lesions (Figure 2) extending upto orbital apex and into optic canal. All these patients had complete loss of vision and proptosis in the involved eye. Fronto-temporo-orbital craniotomy was done in 2 patients and fronto temporo-zygomatico-orbital approach was used in one along with enucleation of the involved eye in all three case. The histopathology was suggestive of adenoidcystic carcinoma of lacrimal gland in all three patients. All three patients are still alive and have not had recurrence on follow up of 3 years duration.

Three patients of optic nerve sheath tumour (Figure 13) were operatred by fronto-orbito-zygomatico- temporal craniotomy, only partial excision was possible in one patient and when complete excision was achieved in other two patients, both developed 3rd nerve palsy and complete loss of vision in involved eye. The histopathological examination was suggestive of meningioma of optic nerve.

One patient of sphenoid wing meningioma (Figure 6) with intraorbital and optic canal extension was approached by fronto-temporo-zygomatico-orbital craniotomy and Simpson's grade 1 excision was achieved and superior and inferior orbital wall were reconstructed with osteosynthetic bioreabsorbable mesh. Patient had complete functional preservation of eye and acceptable cosmetic result. The histopathological examination revealed meningioma.

One patient who had right intraorbital intraconal orbital apex lesion (Figure 4), was approached by fronto-temporo-zygomatico-orbitotomy and complete excision of sensory nerve sheath tumour was achieved. Histopathology was suggestive of schwanoma. Patient has complete functional preservation of the eye.

One patient with right intraorbital abducens nerve schwanoma (Figure 3)[14] and was approached by right frontotemporal craniotomy and superior orbitotomy with preservation of the orbital rim and total excision of the tumour was done and superior wall of the orbit was reconstructed with osteosynthetic bioreabsorbable mesh. Patient had complete functional preservation of eye and superior cosmetic result. Histopathological examination of the tumour revealed Antoni type 'A' schwanoma.

Weber-Fergusons facial degloving approach with maxillectomy with inferiormedial orbitotomy and complete excision was done in one patient of recurrent vercucous adenocarcinoma of maxillary sinus with intraorbital extension and this patient had complete functional preservation of involved eye.

One patient with left orbital plexiform neurofibrma with pthysis bulbi and was operated by superior transorbital approach through upper eye lid transverse incision extending from medial to lateral canthus. The eye lids were reconstructed by local flaps.

One patient with right frontoorbital bulge (Figure 9) and was approached by frontoorbital craniotomy and wide excision of superior orbital rim. Histopathology was suggestive of Ewing's sarcoma and patient was subjected for postoperative radiotherapy. Another patient with right frontal diffuse expansile bony swelling and was approached by frontoorbital craniotomy and wide excision. Histopathology was suggestive of monoostotic

fibrous dysplasia.

An immunocompromised patient secondary to HIV infection with CD4 count of 800, had left orbital proptosis (Figure 5) with pthysis bulbi and was approach by extended medial-orbitotomy and complete excision of lesion and enucleation. Histopathological examination was suggestive of non-hodgkin's lymphoma. Patient was referred to oncological unit for appropriate chemotherapy and this patient is lost to follow up.

One patient with right inferior eyelid swelling involving the conjunctiva and inferior transorbital approach through lower eyelid traverse incision was used and complete excision of lesion was done. Histopathology was suggestive of solitary plasmacytoma of the eye lid. Patient was referred to oncological unit for chemotherapy.

One patient with right orbital swelling and was approached by subfrontal craniotomy and complete excision of frontal sinus mucocele with duroplasty and exteriorization of frontal sinus done. This patient is fine and no postoperative complications.

One patient with huge tumour involving eye-nose-cranium (Figure 7) and was approached by frontoorbital craniotomy along with Weber-Fergusons approach and complete excision of the tumour with enucleation of eye with anterior cranial fossa base repair was done. Histopathology was suggestive of sinonasal-adenocarcinoma. Patient developed postoperative CSF rhinorrhoea which stopped with five days continuous lumbar CSF drain.

One patient who had long standing nonhealing ulcer over right fronto orbital region with complete destruction of eye (Figure 10) was approached by wide local excision of fronto-temporo-orbito-zygomatic bone along with enucleation of the eye and closure with local pedicle graft repair. Histopathology was suggestive of angiosarcoma. Unfortunately patient had prompt recurrence with in 1year.

One patient who presented with a huge mass involving the eye-nose-forehead (Figure 11) was approached by frontoorbital craniotomy along with Weber-Fergusons facial degloving with medial orbitotomy–ethmoidectomy along with enucleation of eye and duroplasty and anteriorcranial fossa base repair. Patient had immediate postoperative CSF leak, which stoped with lumbar CSF drain for 5 days. Histopathology and culture sensitivity was suggestive of mucormycosis. Patient was treated with intravenous liposomal Amphotericin-B for 14 days followed by oral Fluconazole for 14 days.

Two patients with posttraumatic orbital ateriovenous malformation following penetrating injuries involving the upper eyelids and both were operatred through superior transorbital approach and incision extended from medial to lateral canthus. First the feeding arterial supply were coagulated and the nidus was completely excised and venous were lastly coagulated. One patient required reconstruction of the eyelid with local pedicle graft.

One patient with orbitofrontal swelling (Figure 12) was operated by frontal craniotomy with excision of

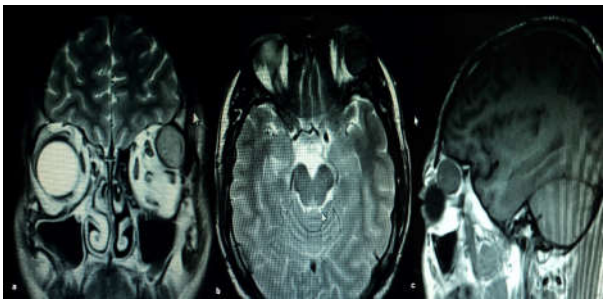


Fig. 1:

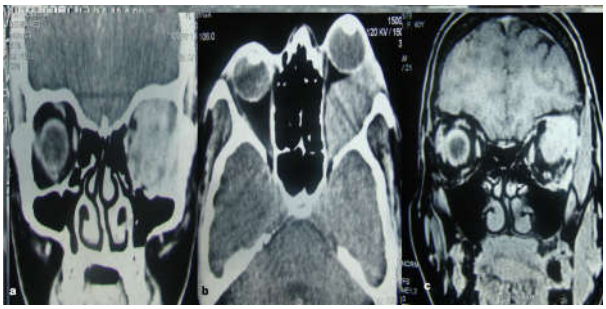
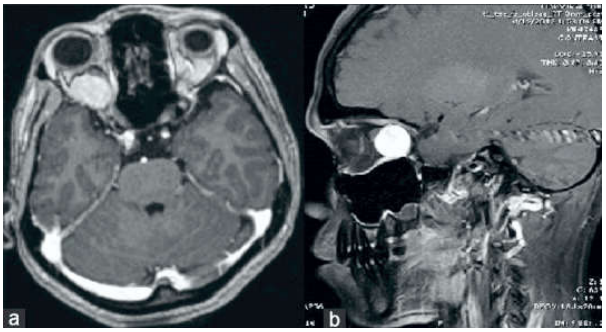


Fig. 2:

Fig. 3:



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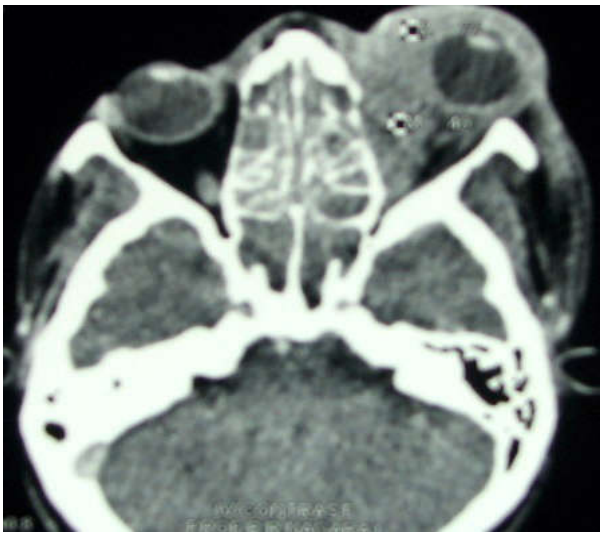

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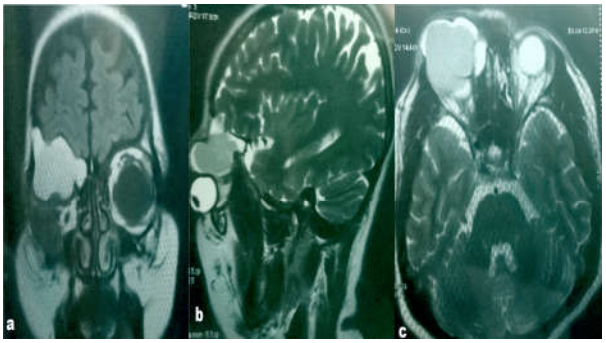

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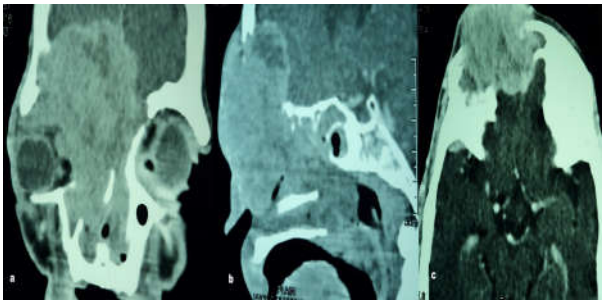

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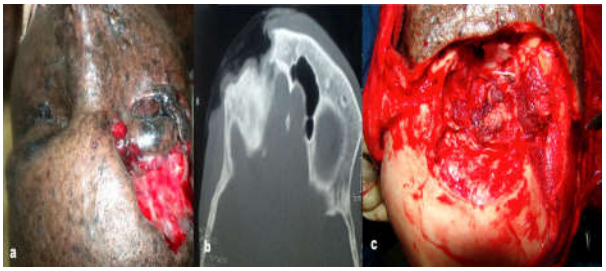

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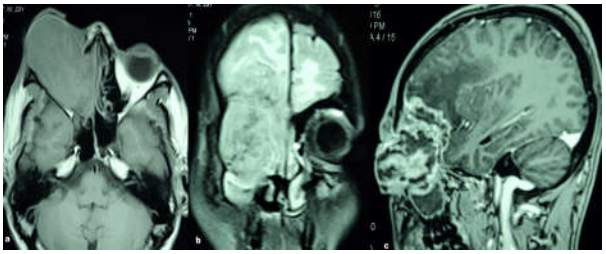

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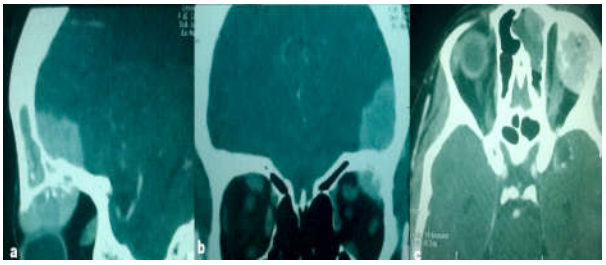

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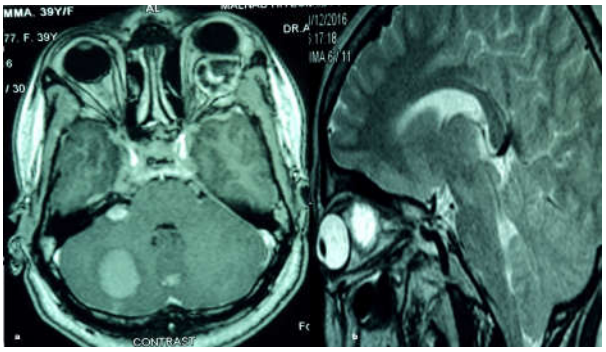

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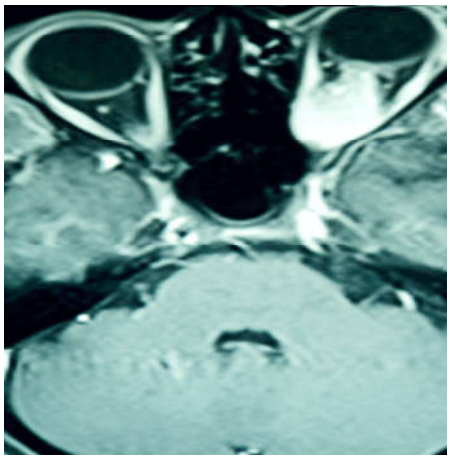

Fig. 13:

Table 1:

Diagnosis	No of Patients	Symptoms
Lacrimal gland adenoma	1	Proptosis & headache
Lacrimal adenoidcystic carcinoma	3	Pain, Proptosis & Visual loss
Recurrent maxillary adenocarcinoma with intraorbital extension	1	Facial numbness
Orbital apex meningioma	3	Proptosis &Diminution of vision
Sphenoid wing meningioma with intraorbital extension	1	Proptosis
Intraconal abducens nerve schwanoma	1	Pain
Intraorbital extraconal sensory nerve schwanoma	1	Pain & Proptosis
Plexiform neurofibrma with pthysis bulbi	1	Cosmetic disfiguration
Right frontoorbital Ewing's sarcoma	1	Proptosis
Right frontal solitary fibrous dysplasia	1	Proptosis
Left intraorbital lymphoma	1	Proptosis with loss of vision
Lower Eye lid solitary plasmacytoma	1	Painless Swelling
Frontal mucocele with intradural and orbital extension	1	Proptosis
Sinonasal carcinoma with intra orbital extension	1	Pain, Proptosis & Loss of vision
Fronto orbital angiosarcoma	1	Non healing ulcer & Pthysis bulbi
Sinoorbital mucormycosis with intracranial extension	1	Proptosis, pain & Pthysis bulbi Pain
Eyelid /orbital AVM	2	Pulsatile proptosis with conjunctival injection.
Metastases	1	Proptosis
Total patients	23	-

Table 2: Showing clinical profile of orbital tumors of series published by various authors.

Author and year	Patients (men/women)	Mean age year	Primary orbital tumors (%)	Secondary from contiguous structures (%)	Metastatic (%)	Proptosis (%)	diplopia	tightness/ pain/headache (%)	Decresed vision (blind eye)
Our series	23(12/11)	43	14(60.9%)	8(34.8)	1(4.3)	18	0	11	9(7)
Ohtsuka, K, 2005[2]	244(114/130)	48.7	213(89)	23(9)	8(2)	NA	NA	NA	NA
Nevo Margalit, 2007[6]	41(16/25)	42.2	5(12.2)	34(82.9)	2(4.9)	11(26.8)	2	7(17.1)	NA
Paluzzi A et al, 2015[17]	12(6/6)	39.5	11	-	1	4	2	4	5(NA)
Jian T et al, 2015[18]	21								
A. Chiriac et al, 2012[19]	57(28/29)	38.4	54	3	NA	39(68)	NA	15(26)	24(NA)

Table 3: Showing surgical approaches, extent of excision and complications

Authors, year	no	Approach	Extent of excision (%)	Enopthalmos	CSF leak	Follow up in months(mean)	Mortality related to surgery
Our series	23	Lateral orbitotomy- 1 Fronto-temporo-orbital craniotomy -2 Fronto-temporo-zygomatico-orbital -8 Weber-Fergusons -1 Superior transorbital -3 Fronto-orbital craniotomy - 3 Medial orbitotomy-1 Inferior transorbital -1 Subfrontal craniotomy-1 Fronto-orbital+Weber-Fergusons -2	GTR 21 STR-2		2	2year and 6 months	0
Nevo Margalit, 2007[6]	41	Lateral orbitotomy 13. Frontal craniotomy+obitotomy 23.	GTR30(73.2) STR 5(12.2) PR 2(4.9)	1	1	1 to 38 (20)	0

		Combined Craniotomy+ Weber-Ferguson 1. Weber-Ferguson alone 4.	Biopsy only 4(9.8)				
Paluzzi A et al, 2015[17]		Frontal craniotomy-orbitotomy 3 Lateral orbitotomy 1 Medial orbitotomy 1 EEA 3 Combined Craniotomy + EEA 2 Combined medial transconjunctival & EEA 2	GTR 11 PR 1	NA	NA	NA	0
Jian T et al, 2015[18]	21	Coronal scalp + lateral orbitotomy 3 Coronal scalp 4 Frontal craniotomy 6 Pterional					
A. Chiriac et al, 2012[19]		Superior orbitotomy 19(33) Fronto-pterional 12(21) Fronto-orbital 6(10) Bicoronal craniotomy 8(14) Fronto-orbitotemporal 10(18) Transfacial 1(2) Transpalatal & Weber orbitotomy 1(2)	NA	NA	NA	7 to 62(17)	0

GTR (gross total resection– complete excision)
STR (subtotal resection- upto 2% of lesion left behind)
PR (partial resection- more than 3% residual lesion)
EEA- endoscopy endonasal approach

lateral half of superior orbital rim. Histopathology and detailed post-operative work-up was suggestive of metastasis secondary to ovarian neuroendocrinal carcinoma.

Discussion

Literature search (Table 2) shows the percentage of primary orbital tumours in adult population to be 11-89% [15-18], secondary orbital tumours from adjacent contiguous structures 3-82.9% and metastasis 1-4.9%. In our series, we had 14 primary orbital tumours, 8 secondary orbital tumours and 1 metastasis.

In order to choose an effective surgical approach, not only tumour dimensions and localization alone, but also and as importantly the benign versus malignant character of the lesion need to be considered to plan effective acces to orbit all along the 360 degree around the optic nerve plane. While benign tumours may be observed and assessed conservatively as long as the (bin) ocular function remains unaffected [16], malignant entities require an immediate and more radical treatment, which apart from surgical tumour removal by means of an orbitotomy shallneed adjuvant chemo- or radiotherapeutical measures.

The optic nerve meningioma, though benign, poses challenges with high probability of worsening of vision owning to interruption of the central retinal artery at its point of medial penetration of the optic nerve sheath whenever gross total excision is tried and partial excision however, allows the tumor to infiltrate the intraconal compartment upon regrowth, and in this matter [19] radiation therapy then becomes an important. We had similar situation that only partial excision was possible in one patient and when complete excision of the meningioma was done in two patients, both had 3rd nerve palsy and complete diminution of vision.

The surgical excision of large and massive orbital tumours carries significant risks of surgical complications including visual loss, exophthalmos, strabismus, and third nerve palsy [20]. These complications may occur as consequence of excessive traction, reduced working room, blind dissection behind the increased bulk of the tumour or release of tight adhesions between the tumour and the surrounding orbital structures.

Also there is need for reconstruction of orbit, skull base and give acceptable aesthetic look. Hence it is desirable to deal with these challenges by multidisciplinary team approach, undertaken by

well-experienced neurosurgical team along with ophthalmic/orbital team and plastic surgeon,while operating tumours involving the orbit-cranial junction, the superior orbital compartment to facilitate optimal removal of the tumour along with skull base sealing without compromising the good cosmetic results.

Conclusions

Orbit being a complex anatomical entity and management of complex tumours poses a challenging surgical problem. Although a significant percentage of these tumours are treated by the ophthalmologist alone, proficiency with a multitude of approaches and collaboration with a neurosurgeon is often required, especially for tumours that are located deep within the orbit, are large, or have an intracranial extension. Technical advances and modifications in surgical techniques along with involvement of plastic surgeons have decreased surgery-related morbidity and involvement of radiation oncologist to the team for adjuvant radiotherapy/chemotherapy would be beneficial for prolonged recurrence free and better quality of life.

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Original Article

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Study on Morphological Lesions of Diabetic Retinopathy by Using Fundus Fluorescein Angiography

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Abstract

Background: The prevalence of diabetes among the population is varied and different in different parts of the world. In India it has been reported form 4-28%.There is prevalence of 6.7% of retinopathy in patients of NIDDM at the initial diagnosis of diabetes. *Methods:* The present study was conducted at Narayana Medical College Hospital, Nellore for a period of two years. The cases included in the study were 50 diabetic patients with retinopathy changes of both sexes with different age groups. Those included were selected from the patients attending the department of medicine for the treatment of diabetic mellitus, and referred to department of ophthalmology for evaluation, known diabetic patients who attended the ophthalmology outpatient department directly for the ophthalmic evaluation were also included in the study. *Result:* The mean age of the study subjects was 55.65 years with standard deviation (SD) of 11.3 years. 30 right eyes (60%) showed non proliferative diabetic retinopathy (NPDR) whereas in 29 left eyes (58%) showed NPDR. The lesions noticed on FFA of the right and left eyes in patients under study are almost same for Microaneurysm, Microaneurysm with haemorrhages, Ischemic maculopathy except hard exudates, intra retinal microvascular abnormalities ,venous beading and Neovascularization. *Conclusion:* From the present study, it was concluded that fundus fluorescein angiography is useful in differentiating the lesions and classifying the diabetic retinopathy. In addition this technique had a major contribution in establishing the cause of unexplained loss of visual acuity.

Keywords: Diabetic Retinopathy; Non Proliferative Diabetic Retinopathy; Proliferative Diabetic Retinopathy; Fundus Fluorescein Angiography.

Introduction

In both developed and developing countries, diabetic retinopathy is a leading cause of blindness and visual impairment [1].

The prevalence of diabetes among the population is varied and different in different parts of the world. In India it has been reported form 4-28% [2]. There is prevalence of 6.7% of retinopathy in patients of NIDDM at the initial diagnosis of diabetes.

In diabetic retinopathy, the angiogram is helpful in make out the extent of ischemia, location of micro aneurysms, presence of intra retinal microvascular abnormalities which can only be confirmed on angiogram; neovascularization and the extent of macular edema [3].

In India retinopathy was detected in 52% of patients with NIDDM of over 25 years duration [4]. Among this NPDR was seen in 41% & PDR in 10.3% patients.

Predisposing Factors

Duration of diabetes appears to be the most important factor in the precipitation of retinopathy, while diabetic retinopathy is also correlated with its severity, proteinuria, renal disease, insulin usage and

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decreased uric acid level. There is less evidence on the influence of age at onset, gender, associated hypertension, cardiovascular disease, serum cholesterol, serum triglycerides and high density lipoprotein. Adequate control of diabetes has been found to delay the retinopathy in many studies but not all.

Aggravating Factors

Humoral factors like onset of puberty and pregnancy can result in Progression of diabeticretinopathy [5].

Types of Diabetic Retinopathy

Non Proliferative Diabetic Retinopathy (NPDR)

This is the effect of ischemia on the retina and refers to the changes taking place within the retina. These consist of microaneurysms, superficial and deep haemorrhages, hard and soft exudates. The NPDR stage with macular edema is an important cause of impartment of vision.

Proliferative Diabetic Retinopathy (PDR)

This is the response of retina to ischemia and is seen in the form of new vassels, which can be seen on the disc as New Vessels at Disc (NVD) and New Vessels Elsewhere (NVE) in the retina.

The Proliferative phase can be complicated by vitreous hemorrhage, retinal detachment, which is important causes of visual impairment changes, and treatable maculopathies.

The NPDR needs no local treatment, only regular follow-ups are advised for early detection and treatment of proliferative changes, and treatable maculopathies.

Proliferative diabetic retinopathy needs treatment by means of photocoagulation in which the hypoxic areas, which stimulate the neovascularization, are thoroughly destroyed.

Fundus Fluorescien Angiography (FFA)

Fluorescein angiography provides a baseline on which subsequent changes can be easily projected and documented. Fluorescein angiography acts as a guide for further evaluation of the condition and it's management.

Fluorescein angiography is the technique of injecting a yellowish dye into a patient's antecubital vein, then photographically stimulating this dye with a blue green light at certain wavelengths to induce fluorescence, in the retinal vascular system of the human eye, and recording this fluorescence on photographic film using a fundus camera. Unlike, fundus photography, which is purely documentary, fluorescence angiography is a diagnostic test yielding information about the patient's ocular health otherwise unavailable to the ophthalmologist.

The absorption peak is 465-490 nm. The emission peak is 520-530 nm. To allow maximal absorption a filter corresponding to the absorption peak of fluorescein dye. i.e., blue filter is kept in the light pathway into the eye. This is the exciter filter. And to filter out other unwanted light a filter corresponding to the emission peak i.e., yellow green filter, is kept in the light pathway to the photographic film. This is the barrier filter. The transmission curves of the filters should be checked for any overlap. If there is overlap pseudofluorescense will result [6].

Fundus fluorescein angiography can be used for, as a screening means for detection of diabetic retinopathy, detection of presence and extent of retinal edema, to differentiate between aneurysm and hemorrhage, to detect maculopathies-Focal, diffuse, and ischemic, to assess the retinal blood flow (Arm retinal circulation) and arterio venous passage, retinal circulation time, to detect area of capillary non-perfusion, to detect presence of new vessels and their extent, and to assess the progression of diabetic retinopathy in a patient.

The detection of preproliferative and proliferative diabetic retinopathy can prevent the complications if these patients are appropriately treated by photocoagulation of the ischemic retina. This study is meant to determine the role of F.F.A. in detection of morphological lesions of diabetic retinopathy especially when subtle changes, which are otherwise difficult to appreciate by ophthalmoscopy or in doubtful causes and to explain the cause for unexplained loss of visual acuity.

Objectives

To determine the morphological lesions of diabetic retinopathy by using fundus fluorescein angiography.

Materials and Methods

The present study was conducted at Narayana Medical College Hospital, Nellore for a period of two years. The cases included in the study were 100 eyes of 50 diabetic patients of both sexes with different

age groups with ophthalmoscopically detectable diabetic retinopathy changes. Those included were selected from the patients attending the department of medicine for the treatment of diabetic mellitus, and referred to department of ophthalmology for evaluation, known diabetic patients who attended the ophthalmology outpatient department directly for the ophthalmic evaluation were also included in the study.

Selection Criteria

Inclusion Criteria

Al l the patients with the history of diabetes confirmed by investigations (RBSValues > 180mg/dl) and among those who have ophthalmoscopically detectable diabetic retinopathy changes.

Exclusion Criteria

Patients of diabetic retinopathy who have media opacities or hazy media due to cataract or other causes, Patients of diabetic retinopathy who have undergone treatment for Diabetic retinopathy by photo – coagulation or other surgeries, allergic to drugs, Porphyrias, end stage kidney disease are excluded from the study.

All these patients were examined and data were recorded in standardized proforma. Visual acuity was recorded and retinoscopy was done in all the cases. Blood glucose and blood urea & serum creatinine were done in all cases and recorded.

The initial examination was started with fundus examination with direct opthalmoscope after papillary dilation with a combination of phenylephrine and tropicamide eye drops (e.g. Itrop plus eye drops). Due care was taken to rule out hypertension in the patient before administration of this eye drops to avoid cardiovascular complications.

The study of diabetic changes in the fundus was performed by non- invasive techniques like direct ophthalmoscopy, slit lamp biomicroscopy using +78D lens, and indirect opthalmoscope with +20D Volk lens. After getting the opinion from the physician regarding the fitness for the fundus fluorescein angiography, the patient was taken up for the procedure.

The patient was explained about the purpose, the procedure, and the possible adverse reactions, which are likely to occur during or immediately after the procedure. He was explained about the management of the likely adverse effect also. Informed consent was taken from the patient. On the day of appointment, the patient was examined and his pupils were dilated with eye drops of a combination of tropicamide and phenylephrine (e.g. Itrop plus). Zeiss FF 450 plus fundus camera was used throughout the study.

The patient was seated comfortably in front of the fundus camera. The antecubital vein was secured and scalp vein set was fixed. On aiming and focusing the camera on the area of primary interest the patient was asked to fix the gaze by looking at the target. Color fundus picture and then red free photographs were taken using green filter. Then pre injection photographs were taken with exciter and barrier filters, if it was found necessary in the fundoscopic examination through fundus camera unit.

3ml of 20% fluorescein dye was injected into the antecubital vein and serial pictures were taken after 7 – 10 sec of post injection for every 10 sec. late films were taken 10 min after injection. All though the procedure, the patient's pulse and general condition was monitored and any reaction was attended to and noted.

After the procedure the patient was made to lie down and relax for 15to 30 minutes. He was also explained about the change in the color of urine and skin. The patient was asked to attend the out- patient department later on a specific date for the report.

The features, which were observed, were presence of microaneurysms, retinal edema , capillary dropouts, IRMA, new vessels, maculopathies – focal, diffuse or/ and exudative.

The microaneurysms were appreciated by the hyperflurescents acculardilatations at the terminal ends of the capillaries especially seen around the macula in the arterio venous phase of angiogram. The retinal edema is detected late and slow accumulation of the dye due to leak. Retinal capillary drop out is seen as hypoflurescence. IRMA is seen in the background and are the shunts between the arerioles and venules. The presence of new vessels was detected by the early anterio venous phase. The maculopathics are detected by low late leak pattern in the macular, paramacular area and enlargement of FAZ in the presence of hypoflurescence.

Results

Age and Sex Distribution

The mean age of the study subjects was 55.65 years with standard deviation (SD) of 11.3 years. The youngest was 21 years old and the oldest, 80 years old. There were almost three times as many males as

female patients.

The 51-60 years age group contained the majority of patients (48%). This was followed by the 61- 70 group that accounted for 22% of diabetics. On an average the female patient was 1 year younger than the male counterpart (Table 1).

Family History of Diabetes

11 patients (22%) gave the family history of diabetes; 8 of these were males and 3 females. About equal proportion of male and female patients gave the family history of diabetes.

History of Alcohol/Tobacco consumption

5 patients (10%) gave the history of alcohol consumption. All these, were males. 6 patients (12%) were abusing tobacco. All these, again were males.

Co-Morbodity

In 40 patients (80%), there was no associated systemic disease. In 10 patients (20%) diabetes was associated with hypertension.

Treatment Modality

45 patients (90%) were on oral hypoglycaemic agents. 4 patients(8%) were on insulin therapy. A 72 year old male diabetic was on both Insulin and oral hypoglycaemic therapy.

Treatment Regularity

Treatment in as many as 41 patients (82%) was regular. Therapy in the case of the rest 18% was irregular.

Visual Acuity

Right Eye

In the right eye of 16 diabetic patients (32%) the vision was 6/6 – 6/9. In 4 patients the right eye was economically blind (3/60 or worse). The remaining right eyes had loss of vision of various Intermediary degrees.

Left Eye

Vision in left eye was normal (6/6) in 16 patients. In 4patients the left eye was economically blind (3/60 or worse). The remaining left eyes had loss of vision of various intermediary degrees.

Ophthalmoscopic Findings

Right Eye

30 right eyes (60%) showed no – proliferative diabetic retinopathy (NPDR). Of these mild and moderate cases were 14(28%) and 10(20%) respectively, 6(12%) were severe NPDR. In 11 patients (22%), ophthalmoscopy revealed NPDR associated with clinically significant macular edema (CSME). Whereas in 9 cases (18%) proliferative diabetic retinopathy (PDR) was detected (Table 2).

Left Eye

The Table 2depicts, 29 eyes (58%) showed NPDR. Of these 14 (28%) were mild, 11 (22%) were moderate and 4 (8%) were severe NPDR. Ophthalmoscopy revealed NPDR with CSME in 12 patients (24%) whereas, in 9 patients (18%) PDR was detected (Table 2).

Systemic Hypertension with Diabetic Retinopathy

While 91% of the diabetics with hypertension showed severe retinopathy changes, only about 55% of non-hypertensive patients had such changes (Table 3).

Fundus Fluorescein Angiography Findings

The lesions noticed on FFA of the right and left eyes in patients under study are almost same for Microaneurysm, Microaneurysm with haemorrhages, Ischemic maculopathy except H/MA+IRMA+ venous beading and Neovascularisation (Table 4).

Table 1: Age and sex distribution of diabetic patients

Age group (years)	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
21-30	1	2.7	1	7.7	2	4
31-40	3	8.1	0	0	3	6
41-50	5	13.5	3	23.1	8	16
51-60	19	51.4	5	38.4	24	48
61-70	7	18.9	4	30.8	11	22
71 and above	2	5.4	0	0	2	4
TOTAL	37	-	13	-	50	-
MEAN	55.41	-	54.33	-	55.65	-
SD	11.26	-	10.97	-	11.63	-

Table 2: Ophthalmoscopic findings of right and left eye

Diagnosis	Right eye		Left eye	
	Number of cases	Percent	Number of cases	Percent
Mild NPDR	14	28	14	28
Moderate NPDR	10	20	11	22
Severe NPDR	6	12	4	8
NPDR with CSME	11	22	12	24
PDR	9	18	9	18
TOTAL	50	100	50	100

Table 3: Incidence of PDR & NPDR in patients with and without Glycemic control

Glycemic Control	PDR	NPDR	Total
Controlled	3	34	37
Uncontrolled	9	4	13
Total	12	38	50

Table 4: Fundus fluorescein angiography findings in right and left eyes

Lesions	Right eye		Left eye	
	No. of cases	Percentage	No. of cases	Percentage
Microaneurysms only	15	30	15	30
MA+ haemorrhages	10	20	10	20
H/MA+IRMA+venous beading	4	8	3	6
Macular edema				
Exudativemaculopathy	8	16	10	20
Ischemicmaculopathy	2	4	2	4
Neovascularisation	11	22	10	20

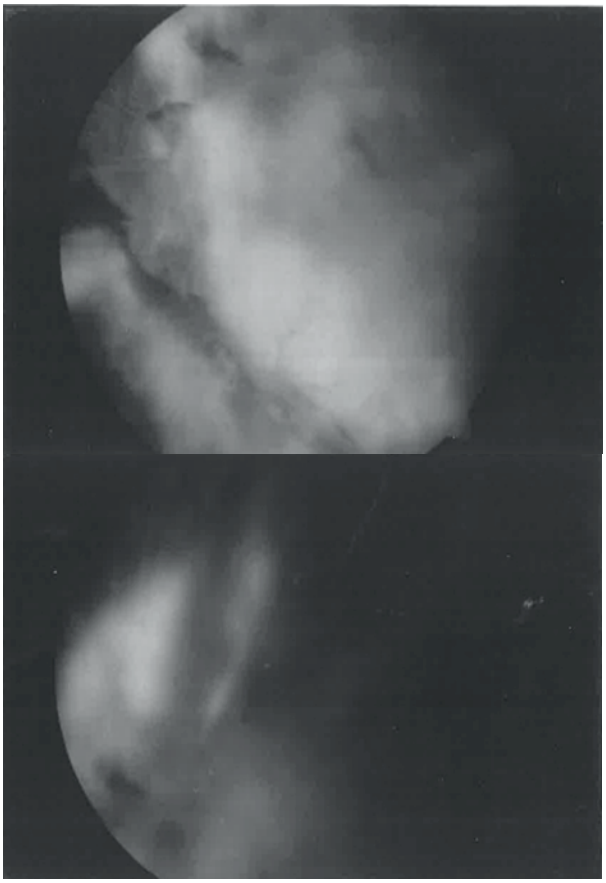

Fig. 1: Hyperfluorescent leaks over disc and hypofluorescent pre-retinal hemorrhages

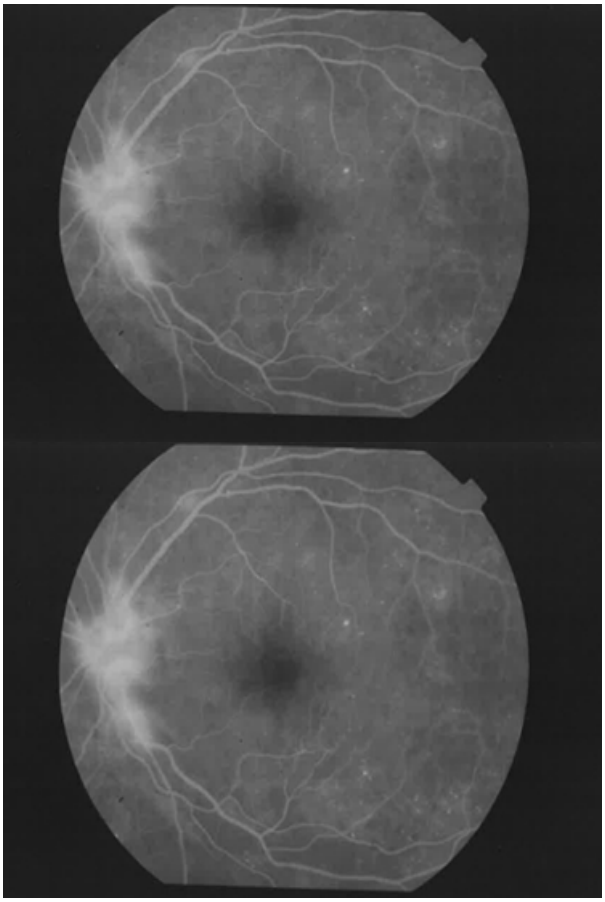

Fig. 2: Hyperfluorescent leaks over disc and elsewhere

Discussion

The mean age of the present study subjects was 55.65 years with a standard deviation of (SD) of 11.13 years. In a similar study conducted by Ramsevak V. et al [7] who have studied 775 cases, the mean age was 72.1 years. Another study conducted by Gonzalez Villalpando C. et al [8] where 231 patients were examined. The mean age was 62.4 years.

The mean age in the first study is more when compared to the remaining three studies due to the reason that the patients selected for the study are only of type 2 diabetes mellitus when compared to the patients of the other three studies where in the patients are of both type I and type 2diabetes mellitus.

Ophthalmoscopic Findings:

In our study we found more case of mild/moderate NPDR than other studies. This may be due to the fact that we had exclusion criteria of not including the patients having hazy media and the patients who had already undergone photocoagulation.

In the study conducted b Bertram et.al [9], 48 patients (9.8%) had already undergone laser photoco-agulation, 13 panretinal scatter, 18 with focal photocoagulation and 17 with both.

The NPDR category in the study conducted by Ramsevak V. et al [7] is 212.4% which is also less when compared to the present study. This is because they have screened the patients of diabetes mellitus patients who attended the ophthalmlic clinic for the first time for the evaluation.

Role of Irregular Treatment and Poor Glycemic Control:

In our study we had 13 patients who were irregular in their treatment. This can be considered a factor, which lead to poor glycemic control the grade of retinopathy of these patients are tabulated according to the duration of diabetes as follows.

In a study conducted by RM Voutilainen – Kaunisto, et. al [10] who studied progress of retinopathy with respect to poor glycemic control in 133 patients observed of retinopathy changes in 55% of patients after 5 years. They concluded, in the diabetic patients, poor glycemic control was the most important predictive factor for the development of retinopathy. It was directly associated with HbA1C values in their by their study.

Another study conducted by Kingsley LA et. al [11] showed significant differences in glycosilated hemoglobin values in patients with and without retinopathy changes. The number of microaneurysms was positively associated with individual mean glycosilated hemoglobin (HbA1C).

Detailed study of dilated ophthalmoscopy, biomicroscopy wherever needed, was followed by fluorescein angiography.

Fundus Fluorescein Angiography Findings

The microaneurysms were appreciated better both in the number, position and in relation to vasculature. This was is consensus with the study conducted by Friberg TR et. al [12], who studied 101 patients, about twice as many microaneurysms were detected on the FFA as on the colour photography. Also FFA showed microaneurysms in 57% of the eyes that had no detectable microaneurysms on colour photography.

However the study conducted by Niesel P. et al [13] states that the described method of quantitative evaluation of diabetic retinopathy quantifies the progression of retinopathy. Accurate quantitative analysis of the comparison between the ophthalmoscopic quantitative analysis of the comparison between the ophthalmoscopic quantification and angiographic quantification was difficult because of the cumbersome nature of counting especially by ophthalmoscopy, lack of accuracy and interpretation problems.

In a study conducted by Helstedt, et. al [14], it is concluded that although microaneurysms in fluorescein angiography and red spots in color or red free photographs all reflect the degree of retinopathy, about half of the red dots in photography don't represent open micro aneurysms in fluorescein angiography.

Ischaemicmaculopathy was better appreciated by fluoresce in angiography than by ophthalmoscopy. Widening of FAZ was also better delineated with fluorescein angiography than by ophthalmoscopy.

In a study conducted by Smith RT et. al [15] they studied 34 diabetic patients with clinically significant macular edema (CSME) by fundus photography, fluorescein angiography and vitreous fluorophotomertry observed that all the three investigations together best predicted visual acuity. They also concluded that by performing fluorescein angiography it is possible to quantitative macular ischaemia.

Clinically significant macular edema (CSME) was observed better by fluorescein angiography than by ophthalmoscopy. The study conducted by Kylstra JA et al [16] where 100 patients were studies by six retina specialists also concluded that the use of FA

improves the accuracy of treatment planning of CSME. Fluorescein angiography was also more accurate is exact localization and extent of neovascularization. This finding was in concurrence with the one observed by Jain BA, et al [17] who studies 25 patients of diabetic retinopathy by ophthalmoscopy and fundus fluorescein angiography.

Conclusion

From the present study, it was concluded that fundus fluorescein angiographyis useful in differentiating the lesions and classifying the diabetic retinopathy. It is useful in assessing the severity of characteristics like capillary loss and to explain the unexplained loss of visual acuity.

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Original Article

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A Study on Clinical Features of Pseudoexfoliation Syndrome

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Abstract

Introduction: Pseudoexfoliation cataract forms part of pseudoexfoliation syndrome. It is common in the older age group, with most cases occurring in late 60's and early 70's. The reported influence of sex is conflicting with one study showing a female preponderance and the other of males. No hereditary pattern has been established and studies have given conflicting results with regard to positive correlation with HLA typing. *Methodology:* Total numbers of 100 eyes with 100 patients were selected for the study who have presented with cataract and pseudo exfoliation. The present study was conducted in the Ophthalmology department and Patients attending ophthalmic OPD who had any evidence of any material deposit in the anterior segment during routine examination were further evaluated for PEX. *Results:* Majority of patients that is 88 of them had pseudo exfoliative material deposits on pupillary margin next to lens, 53 patients had deposits on iris surface, 42 had motheaten appearance, 12 had iris atrophy, and 15 had posterior synechiae and 5 had iridodonesis. *Conclusion:* The study included a total of 100 patients of cataract with PEX. The average age of the patients was 65.74 years with a slight male preponderance over females and with increased incidence of bilateral involvement.

Keywords: Senile Exfoliation; Capsularexfoliation; Fibrillopathia Epithelio Capsularis.

Introduction

Pseudoexfoliation syndrome (PXS) is a wide spread systemic disorder characterized by abnormal production and deposition of protein like fibrillar extracellular material in the anterior segment 'of an eye and extra ocular tissue [1].

White flaky material is deposited on the lens capsule, pupillary margin, iris stroma blood vessels, corneal endothelium, anterior vitreous face, zonules, trabecular meshwork and also in the conjunctiva and orbital structures [2]. The deposit is most prominent on anterior lens capsule and at the papillary margin[3]. Also found on the skin and connective tissue portions of various visceral organs, so it is suspected that pseudoexfoliation is a ocular manifestation of systemic disorder [4]. Pseudoexfoliation cataract forms part of pseudoexfoliation syndrome. It is common in the older age group, with most cases occurring in late 60's and early 70's [5]. The reported influence of sex is conflicting with one study showing a female preponderance and the other of males. No hereditary pattern has been established and studies have given conflicting results with regard to positive correlation with HLA typing. The condition may be unilateral or bilateral and some unilateral cases may become bilateral with time. Probability of development of exfoliation in fellow eye is 6.8% after 5 years and 16.8% after l0 years.

Signs suggestive of pseudoexfoliation syndrome [6,7].

1. Pseudoexfoliation deposition on lens anterior capsule in pupillary area.
2. Phacodonesis/lens subluxation.

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3. Intra stromal haemorrhage (post mydriasis without rubeosis),
4. Pigment dispersion post mydriasis without obvious cause.
5. Poor mydriasis and posterior synechiae without obvious cause.
6. Small AC depth without other reasons for a narrow drainage angle.
7. Pseudoexfoliation deposits on iris margin.

Patients with pseudoexfoliation have high incidence of developing glaucoma. It is frequently associated with open angle glaucoma [8].

There is increased incidence of phacodonesis and/or subluxation of the lens in eyes with PEX syndrome which is reported to be between 8.4% and 10.6% [9].

Pupils of patients with PEX show a diminished response to inydriatic agents, probably for two reasons: the iris becomes fibrotic due to infiltration by the exfoliative material and pupillary movements are mechanically restricted because the exfoliative material adheres to their is pigment epithelium and anterior lens capsule.

Cataract surgery on eyes with pseudo-exfoliation has higher potential to become complicated and extensive clue to inherent structural weakness like, small pupil, weak zonular support, shallow AC.

Complications will be more Intra-operatively, postoperative, or even in the long term postoperative period.

Intraoperatively Zonular dialysis, posterior capsular rupture, vitreous loss, difficulty in nucleus delivery are more common. Poor pupillary dilatation and zonular fragility have been suggested as most important risk factors for capsular rent and vitreous loss [9]. Phacodonesis, iridodonesis are common and most likely related to zonular degeneration and disintegration.

Spontaneous lens Subluxation tends to occur in patients with PXF [10].

Methodology

The present study was conducted in the Ophthalmology department and Patients attending ophthalmic OPD who had any evidence of any material deposit in the anterior segment during routine examination were further evaluated for PEX.

Sample Size

Total numbers of 100 eyes with 100 patients were selected for the study who have presented with cataract and pseudo exfoliation.

Statistical Method Applied

Simple random sampling method. The data collected was entered on excel spread sheet and analysed using SPSS software version 11.5. Proportion and mean were calculated and the test of significance was used. In the Chi-square test 'p' value of less than 0.05 was considered as significant and less than 0.01 as highly significant.

Inclusion Criteria

All the patients diagnosed with cataract and pseudoexfoliation on the basis of slit lamp examination before and after pupillary dilatation.

Patients presenting with all types of cataract that is cortical, nuclear, subcapsular and capsular cataract.

Exclusion Criteria

- Patient with traumatic cataract
- Subluxation of the cataractous lens without PXF
- Previous intra ocular surgery.
- Previous intra ocular laser treatment.
- Patients with secondary cataract, complicated cataract, anterior uveitis.
- Patients with uncontrolled hypertension and uncontrolled diabetes mellitus.

Pre-Operative Evaluation

Written informed consent was taken from patient,

- Xylocaine sensitivity test was done.
- Keratometry was done.
- A-scan was done to measure axial length and anterior chamber depth.
- Intraocular lens (IOL) power was calculated using SRK-T formula.
- Pupils were dilated adequately by instillation of 1% tropicamide and 5% phenylephrine eye drops every 10 minutes, repeated 3 times, one hour before surgery.
- To sustain the pupil dilatation the anti prostaglandin eye drops such as flurbiprofen was instilled half hourly for two hours before surgery.

Results

Table 1 shows l00 patients of PEX out of which, 14

Table 1: Age distribution in patients with pseudo exfoliation

Age	Number of patients	Percentage
50-59	14	14
60-69	54	54
70-79	27	27
>80	5	5
Total	100	100%

Table 2: Anterior chamber depth in patients with pseudo exfoliation

AC depth(mm)	Number of patients	Percentage
<2.5	51	51%
>2.5	49	49%
Total	100	100%

100 patients out of which,
51 patients had anterior chamber depth less than 2.5mm.
49 patients had anterior chamber depth more than or equal to 2.5

Table 3: Iris Characteristics in Pseudo exfoliation

Iris characteristics	Number of patients	Percentage (%)
PXF deposits on pupillary margin	88	88%
PXF deposits on iris surface	53	53%
Moth Eaten Appearance	42	42%
Posterior synechiae	15	15%
Iris Atrophy	12	12%
iridodonesis	5	5%

PXF deposits on iris surface in 53 patients.
PXF deposits on pupillary margin in 88 patients.
Moth eaten appearance seen in 42 patients.
Iris atrophy seen in 12 patients.
Posterior synechiae seen in 15 patients
Iridodonesis seen in -5patients

Table 4: Angle Configuration in Pseudo exfoliation

Angle configuration	Number of patients	Percentage (%)
Open angle	92	92
Narrow angle	8	8
Total	100	100%

Out of 100 patients with PXF,
92 patients had open angle of anterior chamber.
8 patients had narrow angle.

Table 5: Angle characteristics in pseudo exfoliation

Angle Characteristics	Number of Patients	Percentage
Trabecular meshwork hyperpigmentation	63	63%
Trabecular meshwork PEX deposits.	44	44%
Peripheral anterior synechiae	2	2%

Out of 100 patients of PEX,
63 patients had hyperpigmentation of trabecular meshwork.
44 patients had PEX material deposits on trabecular meshwork
2 patients had peripheral anterior synechiae

Table 6: IOP in pseudo exfoliation

IOP(In mm of hg)	Number of patients	Percentage
X21	78	78%
22-29	19	19%
>_30	3	3%
Total	100	100%

100 patients with PEX out of which,
78 patients had IOP less than 21 mmHg.
19 patients had IOP between 22-29 mmHg.
3 patients had IOP of 30 mmHg or more.

Table 7: Type of Cataract in Pseudo exfoliation

Type of cataract	Number of patients	Percentage
SMC	24	24%
SHMC	6	6%
Nuclear Cataract Grade 1	5	5%
Nuclear Cataract Grade 2	27	27%
Nuclear Cataract Grade 3	38	38%
Total	100	100%

Out of 100 patients with PEX,
24 patients had cortical cataract (senile mature cataract).
6 patients had senile hypermature cataract
70 patients had nuclear cataract out of which, 5 patients had nuclear cataract grade 1. 27 patients had nuclear cataract grade 2. 38 patients had nuclear cataract grade 3.

patients were in age group between 50-59 years. 54 patients were in age group between 60-69 years. 27 patients were in age group 70-79 years. 5 patients were in age 80 and above. Average age group was 65.74 years.

Discussion

In this study, 14% patients were in the age group of 50 -59 years, 54% patients were in the age group of 60-69 years, 27% patients were in the age group of 70-79 years, 5% patients were in the age group of 80 years and above In this study the average age of patients was 65.74 years, which is in concurrence with the following studies, The prevalence of pseudoexfoliation increases with age which occurs between late 60 and early70 years.

Lumme P, Lattikainen L (1993) had studied 351 eyes with pseudoexfhliation undergoing cataract surgery which showed that the prevalence of pseudoexfoliation was more in patients above 70 years [11].

Pseudoexfoliation occurs most commonly in the age group of 60-70years (Duke Elders, 1976).

In the present study, 51 patients had an AC depth of more than or equal to 2.5mm and 49 patients had an AC depth of less than 2.5mm. Similar results were found in the following study, Dr. Amjad Salman et at (2007) found anterior chamber depth to be significantly shallower in eyes with PEX when compared to eyes without PEX [12].

In this study, 88%patients had PXF material on pupillary margin, 53% had on iris surface, 42% patients showed moth eaten appearance, l0% had iris atrophy, 3% had iridodonesis, 14% patients showed posterior synechiae. Similar results were reported in study done by, Ritchschlotzer, Scherhardt (2001) in which deposits of PXF material on the iris sphincter and pupilary margin were seen in 84% of patients [13].

Thus next to the lens pseudoexfoliation material, the most prominent and consistent clinical finding is the pseudoexfoliation material at the pupillary margin.

In the present study, 92% patient had open angle, 8% patient had narrow angle. This is in concurrence with, Ritz, Schlotzer-Scherhardt (2001) noted 23% patient with pseudoexfoliation syndrome and glaucoma to have grade 2 or narrow angle.Wishart et al (1985) noted 32 patients in their study to have narrow angle.

In this study, 37 patients had average pigmentation of trabecular meshwork, 51 patients had moderate pigmentation, 12 had heavy pigmentation and none had absent pigmentation (hyperpignientation is seen in 63 patients). Extent of the trabecular meshwork pigmentation has been correlated to the degree of intraocular pressure.

This study also showed 44 patients had PEX material in angle and 2 patients had peripheral anterior synechiae. Similar results were reported in the following study, Sunde (1956) found the flakes of pseudoexfoliation material in the angle in 18.75% of patient with pseudo exfoliative glaucoma. But Tarkkhanen (1962) found pseudo exfoliative material in the angle on gonioscopic examination in 46% of glaucomatous eyes and 50% of non glaucomatous eyes. Thus the two conditions can occur simultaneously or separately and the relation between them is not clear.

Schlotzer-scherhardt et al (1992) reported a correlation between the extent of PEX material in angle and PEX syndrome.

In the present study 78% patients had an IOP of 21 mmHg, 19% had an IOP of 22-29mmHg, 3% patients had >30mmHg. Among these 22 patients with high pressure 19 had open angle glaucoma and 3 had secondary angle closure glaucoma.

This finding is in concurrence with the following study, Yanoff and Duker (3rd edition 2008) according to which patients with PEX 20% had increased IOP and glaucoma at the time of diagnosis. Patients with PEX without glaucoma can develop glaucoma because 15% of such patients develop increased IOP in 10 years.

Conclusion

The patient with pseudoexfoliation syndrome and cataract posted for manual small incision cataract surgery, have to he carefully looked for zonular weakness, insufficient mydriasis, raised IOP, subluxation and dislocation of cataractous lens because these pre operative factors have bearing on the intra operative complications in turn post operative complications also.

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A Study of Prevalence and Distribution of Elevated Intraocular Pressure and Glaucoma in Individuals with Thyroid Related Orbitopathy

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Abstract

Introduction: Patients with thyroid eye disease may have an elevated intra ocular pressure in primary position or on attempted upgaze, which is related to the restrictive myopathy and / or orbital congestion. Increased intra ocular pressure results from pressure of the in-elastic muscle pulling the eye and is most commonly appreciated on attempted upgaze with a tethered inferior rectus muscle. *Methodology:* This prospective, observational study enrolled 30 consecutive patients, visiting to GRH Ophthalmology OPD with proven diagnosis of thyroid related orbitop. Thyroid related orbitopathy was diagnosed on the basis of clinical history of thyroid dysfunction, eye symptoms and signs. Laboratory investigations – serum T3, T4 and TSH, which confirmed the thyroid status to be hyper, hypo or euthyroid and all patients underwent ultra-sonography and few computed tomography as required. *Results:* The Paired sample test and statistics, revealed a significant increase in intraocular pressure, when the gaze is shifted from primary to up gaze (p-value 0.0001). There was a mean difference of 4.57mm in intraocular pressure from primary to up gaze. *Conclusion:* The incidence of glaucoma was not higher than that in the normal general population, as only two patients had glaucoma.

Keywords: Intraocular Pressure; Glaucoma; Thyroid Related Orbitopathy.

Introduction

The intra ocular pressure variation with ocular movements in endocrine exophthalmos was first reported by Weasley in 1918. In 1901, a case series was published by Brailey & Eyre describing the presence of glaucoma in 5 young women suffering from thyrotoxicosis.

In 1920, Friendenberg postulated, endocrine imbalance as the cause of glaucoma. Magitot (1947) postulated hypothalamic disturbance as the cause. In 1958, Braley noted the increase of IOP in upgaze & decrease in downgaze, which he postulated to be helpful in differentiating thyrotoxic from thyrotropic exophthalmos [1].

In 1964, Rogova postulated an observational study which included a sample size of 105 patients with simple goitre and described that 13% has raised IOP which was in proportion to the degree of hypothyroidism. In 1965, Vasilieva described 53 cases of hyperthyroidism with raised IOP.

In 1965, McLenachan and Dawes reported presence of some thyroid dysfunction in 45 out of 100 cases of open angle glaucoma they observed. They postulated that trabecular obstruction by mucopolysaccharides was the cause of open angle glaucoma.

Howard & English (1965) reported 10% incidence of glaucoma in their case series which consisted of 74 cases of acromegaly. This led them to believe thatpituitary dysfunction as an aetiological factor. Vanni and Vozza postulated the aetiological role of venous obstruction in ocular hypertension.

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In 1967, Cheng and Perkins published an observational study comprising 155 cases of thyroid dysfunction. 17 cases had exophthalmos. 56% of them had 4mm Hg IOP raise in upgaze. 25% had 10 mm Hg raise in upgaze. Only 2 cases had features of glaucoma. They observed that IOP distribution did not differ much from the normal population. Also, the IOP distribution did not differ significantly between hypo and hyperthyroid group [2].

McLenachan and Daves did a comparative study between 100 cases each of open angle glaucoma and narrow angle glaucoma. They described the increased incidence of thyroid dysfunction in open angle glaucoma group.

Cartwright and associates reported 30% prevalence of immune disorders in normal tension glaucoma group in their study. Smith et al reported a case of primary open angle glaucoma which reverted to normal on treatment of hypothyroidism. He also found poor outflow facility using tonometry and tonography [3].

Gillow P Shah did a study on 100 cases of primary open angle glaucoma and did not find any association of thyroid dysfunction and glaucoma [4].

PanagiotisKaradinsas et al did an interventional case series comprising 100 hypothyroid patients. They did not find any correlation between intraocularpressure and thyroid stimulating hormone & tri-iodine thyronine levels. No significant difference was found in intra ocular pressure levels before and after the treatment of hypothyroidism. Thus refuting the association between glaucoma and thyroid dysfunction.

Thus there exists a lot of confusion and controversy regarding the association between thyroid dysfunction and glaucoma.

Methodology

This prospective, observational study enrolled 30 consecutive patients, visiting to GRH Ophthalmology OPD with proven diagnosis of thyroid related orbitop.

Thyroid related orbitopathy was diagnosed on the basis of clinical history of thyroid dysfunction, eye symptoms and signs.

Laboratory investigations – serum T3, T4 and TSH, which confirmed the thyroid status to be hyper, hypo or euthyroid and all patients underwent ultra-sonography and few computed tomography as required.

Definition of Thyroid – Related Orbitopathy

A combination of any of thefollowing eyelid retraction, with lagophthalmos, lid lag, conjunctival injection, chemosis, eyelid swelling, unexplained proptosis or myopathy (enlarged extra ocular muscle) as a sequelae of thyroid gland dysfunction.

Diagnostic Criteria for Thyroid Associated Orbitopathy

Eyelid retraction withor without other clinical signs of inflammation and with or without evidence of thyroid dysfunction (or) proptosis, extra ocular muscle enlargement, orbital congestion or inflammation accompanied by either eyelid retraction with lagophthalmos or evidence of thyroid dysfunction.

Serum T3,T4,TSH levels used to determine the thyroid status and patients who had significant thyroid disease were examined in detail and treated accordingly by endocrinologist.

All patients were examined by two observers one of whom is a senior consultant, who confirmed the diagnosis of thyroid related orbitopathy and other was me; and all patients were personally seen by both of us.

Ocular examination included assessment of best corrected visual acuity (BSVA) for distance by Snellen's chart. Colour vision was evaluated by Ishihara's pseudo isochromatic chart. Afferent papillary function was assessed by pen torch and swinging flash light test of levatin and slit lamp. Central 30 degreefield was charted in each eye with best corrected vision , using Octopus automated perimetry.

Detailed ocular motility was checked with pen torch and graded between – 4 to 0 to +4 based on degree of under action to normal to grades of over action respectively.

Fundus was examined initially by direct ophthalmoscopy and subsequently dilated with tropicamide. Stereo bio-microscopic evaluation was done with 90D condensing lens and slit lamp for assessing optic disc parameters, nerve fibre layer and other abnormalities.

Proptosis evaluation and documentation was done using Hertel'sexophthalmometer. Myopathy was evaluated using motility parameter's as described earlier with additional confirmation by imaging studies. Ultrasonography or computed tomography, to document the characteristic spindle shaped thickening of extra-ocular muscle bellies

with sparing of tendons. The intra ocular pressure was measured first by Goldmannapplanation tonometer and then by Schiotz's indentation tonometer.

Results

There is no influence of thyroid status on the variation of IOP between gazes.

Table 1: Thyroid status and differential intraocular pressure

	Thyroid status	Mean	N	Std. Deviation	Minimum	Maximum
Difference from	Hyperthyroidism	5.02	41	2.90	4.17	5.87
primary to up gaze	Hypothyroidism	3.27	11	1.85	1.45	5.09
(absolute increase)	Euthyroidism	4	8	2.39	1.74	6.26
p: 0.265	Total	4.57	60	2.73	3.87	5.27
Difference from	Hyperthyroidism	2.49	41	1.91	1.92	3.06
primary to down gaze	Hypothyroidisim	1.82	11	1.40	0.61	3.03
(absolute decrease)	Euthyroidism	1.5	8	1.41	-0.01	3.01
p: 0.441	Total	2.23	60	1.84	1.76	2.70

Table 2: Proptosis and Differential Intraocular Pressure

	Proptosis	Mean	N	Std. Deviation	Minimum	Maximum
Difference from prime	Present	5.38	48	2.41	4.66	6.10
to up increase) p<0.0001	Absent	1.33	12	0.99	- 0.25	2.91
	Total	4.57	60	2.73	3.93	5.21
Difference from prime	Present	2.38	48	1.92	1.85	2.91
To down (absolute	Absent	1.67	12	1.44	0.50	2.84
decrease) p: 0.49	Total	2.23	60	1.84	1.75	2.71

Proptosis has a significant influence on the variation of IOP between primary to up gazes.

Table 3: Elevation and Differential Intraocular Pressure

	Elevation	Mean	N	Std. Deviation	Minimum	Maximum
Difference from primary	Normal	3.4	40	1.77	2.67	4.19
to up gaze P<0.0001	Abnormal	6.9	20	2.86	5.75	8.06
	Total	4.57	60	2.73	3.93	5.21
Difference from primary	Normal	1.95	40	1.54	1.34	2.54
to down gaze. P:0.24	Abnormal	2.8	20	2.29	1.94	3.66
	Total	2.23	60	1.84	1.76	3.70

There is significant influence of elevation status on the variation of intraocular pressure between gazes. This is of lesser significance in down to primary gaze.

Table 4: Depression and Differential Intraocular Pressure

	Depression	Mean	N	Std. Deviation	Minimum	Maximum
Difference from primary	Normal	4.61	56	2.81	3.87	5.35
to up gaze. P:0.91	Abnormal	4	4	1.63	- 0.37	8.37
	Total	4.57	60	2.73	3.86	5.28
Difference from primary	Normal	2.25	56	1.87	1.76	2.74
to down gaze. P:0.97	Abnormal	2	4	0.63	-0.92	4.92
	Total	2.23	60	1.84	1.76	2.70

Table 5: Ultrasonography and Differential Intraocular Pressure

	USG	Mean	N	Std. Deviation	Minimum	Maximum
Difference from primary	Normal	3.55	44	1.77	2.80	4.30
to up gaze. P<0.0001	Abnormal	7.38	16	2.99	6.07	8.69
	Total	4.57	60	2.73	3.93	5.21
Difference from down	Normal	1.91	44	1.49	1.36	2.46
To primary gaze. P:0.07	Abnormal	3.13	16	2.42	2.17	4.09
	Total	2.23	60	1.84	1.76	2.70

Table 6: Ocular Hypertension (OHT)status between gaze shifts

	OHT status in primary gaze		OHT status in UP gaze		OHT status in down gaze	
	Count	%	Count	%	Count	%
No	55	91.67	28	46.67	57	95
OHT	5	8.33	32	53.33	3	5
Total	60	100	60	100	60	100

Table 7: OHT status in primary gaze (Up)

		OHT	Normal	Total
OHT	OHT	3	29	32
status in	Normal	2	26	28
up gaze	Total	5	55	60

Proportions of OHT
Upgaze 32/60 = 0.533
Primary gaze 5/60 = 0.083
P <0.0001
There is significant shift from normal to OHT, when there is a shift of gaze from primary to up gaze.

Table 8: OHT status in primary gaze (down)

		OHT	Normal	Total
OHT	OHT	0	3	3
Status in down gaze	Normal	5	52	57
	Total	5	55	60

Proportions:
Down gaze 3/60 = 0.05
Primary gaze 5/60 = 0.083
P: 0.727

There is no significant change normal to OHT when there is shift of gaze from primary to down gaze. In fact eyes became normal when the gaze is shifted downwards.

Discussion

7 eyes (11.66%)had rise of intraocular pressure >6mm of mercury, while 14 eyes (23.33%) had rise in intraocular pressure between 4mm and 6mm of mercury and (65%) i.e., 39 eyes had a variation between 0mm and 4mm of mercury.

It is believed widely that a greater than 6mm of mercury rise is significant, while some consider a rise of greater than 4mm to be significant.

The Paired sample test and statistics , revealed a significant increase in intraocular pressure, when the gaze is shifted from primary to up gaze (p-value 0.0001). There was a mean difference of 4.57mm in intraocular pressure from primary to up gaze. Which correlates with study by Khurana AK, which observed a significant increase of IOP on upgaze in 53% and 87% of cases with early and late GO, respectively. The positional IOP changes may have significant role to play under circumstances like; in diagnosis of early GO when either eye has no exophthalmos, establishing bilateral involvement in patients with unilateral exophthalmos and monitoring the progression or response to therapy [5].

Down gaze to primary gaze 3 eyes had a rise in intraocular pressure greater than 6mm of mercury and in two eye the rise was between 4mm and 6mm of mercury. Remaining 55 patients had intraocular pressure difference between 0mm and 4mm ofmercury.

Paired sample test and statistics, revealed no significant increase in intraocular pressure, when gaze is shifted from down to up gaze. P = 0.06, mean elevation was only 2.23, which is not clinically significant.

Thyroid Status and Its Influence on Intraocular Pressure

There is no influence of thyroid status (hyperthyroid, hypothyroid or euthyroid) on differential intraocular pressure as evidenced below. This correlates with the study done by Khurana which concludes that, there is no correlation between positional IOP changes and biochemical thyroid status of patients [5].

- Hyperthyroid patients, showed a mean rise of 5.02mm and 2.49 for primary to up and down gaze

to primary gaze respectively.

- The hypothyroid group, revealed a 3.27mm and 1.82mm mean rise respectively for gaze variation.
- The euthyroidgroup, reveals a 4mm and 1.5mm variation respectively. However these are not statistically significant with the p-value:0.265 and p-value :0.441 respectively.

Proptosis and its Influence on Intraocular Pressure

A significant influence of proptosis on the differential intraocular pressure was noted.

- The variation is high (mean 5.38±2.41mm) among those with proptosis, from primary to up gaze.
- Difference from primary to up gaze, was only 1.33mm in those without proptosis which is statistically significant (p-value<0.0001), whereas the difference from down to primary gaze was 2.38mm and 1.67mm in those with and without proptosis respectively, which is statistically not significant with p-value: 0.49

Elevation Restriction Versus Differential Intraocular Pressure

We found significant influence of elevation restriction, on variation of intraocular pressure between gazes. There was a 6.9±2.86mm increase in intraocular pressure in eyes with restricted elevation as compared to a 3.4±1.77mm in eyes with no restriction of elevation.

- We also found that restricted depression does not influence significantly intraocular pressure changes between gazes.

Ultrasonography

There was a significant influence of muscle thickening as determined by ultrasonography on intraocular pressure variation with different gazes. The thickened group by imaging showed an elevation in intraocular pressure of 7.38 mm of mercury, as compared to the 3.55mm of mercury in normal group, on shifting from primary to up gaze and 3.13mm of mercury and 1.91mm of mercury, respectively from down to primary gaze. which correlates with study by Khurana AK which states ultrasonography is useful in diagnosing early cases without manifest clinical proptosis and in picking up bilateral changes in apparently unilateral cases is unequivocal [5].

Ocular Hypertension Status between Gaze Shifts

Only 8.33% patients were ocular hypertensives in primary gaze. This number increased to 53.33% on up gaze. McNemar's chi square test test (p-value<0.0001) revealed a significant shift from normal to ocular hypertensive status, when there is shift from primary to up gaze.

However no significant change in ocular hypertensive status was found on shifting gaze from down to primary. This correlates with the study done by Peele Cockerhan K which inferred the increased prevalence of ocular hypertension in thyroid related orbitopathy [6].

Conclusion

- The measurement of intraocular pressure on up gaze, does serve as an index of muscle restriction and it correlates well with the muscle involvement as evidenced by imaging.
- We found no correlation between the systemic thyroid status (hyperthyroid, hypothyroid and euthyroid) and the ocular hypertension or intraocular pressure variation.

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A Study of Ocular Trauma Attending a Tertiarycare Hospital in a Semi Urban Population

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Abstract

Purpose: The aim of this study is to find out the type of ocular trauma attending a tertiary care hospital in a semi-urban population so that the patient can have the best visual outcome after treatment. *Methods:* This is a hospital based prospective study and sample size is of 100 consecutive patients attending emergency services from June 2015 to June 2017. *Result:* Majority of the ocular trauma attending the hospital were of closed globe injuries followed by chemical trauma. Injuries were more common in males. *Conclusion:* The visual outcome of the injured eye depends on the severity of the injury and the time lapse between injury and onset of treatment.

Keywords: Ocular Trauma; Semi Urban Population; Visual Outcome.

Introduction

"VISION" is the most prestigious of all senses and is the most cared for function in humans. Impairment of vision in any form can affect the quality of life of a person significantly.

Binocular vision, one of the most advanced functions present solely in human, imparting the quality of stereopsis in vision. It requires optimal functioning of both the eyes, and hence damage to one eye due to ocular trauma affects the quality of vision significantly.

Naturally, the eyeball is a fairly well protected structure in our body but if injured, the damage is much more than any other organ. There are anatomical as well as physiological factors for its protection. The bony orbit and elastic periorbital fatty tissue are the anatomical factors protecting it. Physiologically it is protected by blink reflex, head turning reflex, tear film, eye turn and copious lacrimation following intrusion by any irritant material.

The effects of such injuries are much more severe because of the delicate nature of the ocular tissue resulting in permanent blindness. Therefore they assume unusual social and economic importance, involving a huge cost in personal unhappiness and economic inefficiency. Injuries to uveal tissue (iris, ciliary body and choroid) induce an inflammatory reaction (uveitis) which excites a similar destructive inflammation (sympathetic ophthalmitis) in the fellow eye. Thus a penetrating injury to one eye can result in total blindness.

Aims and Objectives

This study aims at studying the visual outcome of ocular trauma.

Aims and objectives are as follows

1. To find out the commonest form of ocular trauma presenting to emergency ward or trauma centre of the out- patient department of our hospital
2. To study the various factors influencing visual outcome of trauma

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3. To find out the form of ocular trauma having the best and the worst visual outcome
4. Factors for maximising the visual outcome after ocular trauma.
5. To study the primary treatment given for ocular trauma and assess the delayed complications.

Material and Methods

One hundred consecutive patients with ocular injuries were studied, from June 2015 to June 2017 after the date of approval by Institutional Ethics committee.

1. This is a hospital based prospective study
2. All patients reporting to the casualty or out – patient department with ocular trauma, falling into the inclusion criteria mentioned below, were included in the study.
3. Patients were followed up for a period of three months to study the visual outcome of the injury after treatment, following the treatment protocol mentioned later.

Sample Size

100 consecutive patients suffering from ocular trauma were included in the study.

Sample

From June 2015 to June 2017.

Patients who required admission for specific investigations and management were admitted and the rest were followed up on OPD basis.

Patients were followed up to three months after injury for visual outcome after treatment protocol mentioned below.

Inclusion Criteria

1. Anterior segment trauma
2. Posterior segment trauma
3. Anterior plus posterior segment trauma
4. Chemical Injuries
5. Thermal injuries
6. Radiation injuries
7. Firecracker injuries

Exclusion Criteria

1. Ocular adnexal trauma including lid, lacrimal apparatus injuries.
2. Orbital fractures.
3. Retained Intraocular foreign body.

Methods

A detailed history of each patient was obtained from patient or relatives, and following details were noted which included.

- Date and time of injury
- Object causing injury
- Nature of injury (eg. closed globe/ penetrating / perforating / chemical / thermal etc.)All terminology used is according to the Birmingham Eye Trauma terminology System (BETT) [17].
- Grade of Injury Grading for Mechanical jnjuries is done according to the Ocular Trauma Classification System [17]. Chemical Injuries have been graded according to Roper- Hall Classification of Chemical Injuries.
- Time interval after injury to presentation.
- Visual Acuity at presentation.
- Clinical findings, including Adnexa, anterior segment finding and posterior segment findings.
- Special Investigations to aid in diagnosis and treatment.
- Diagnosis.
- Treatment given. Appropriate surgical or medical management was done.
- Best corrected visual acuity after completion of treatment.
- Best corrected visual acuity after three months after injury.
- The visual outcome according to WHO grading of visual disability.

Specific history of contact lens use or spectacle wear, history of any pre – existing ophthalmic disease or surgery is also important as procedures like Radial Keratotomy or LASIK make the eyes highly vulnerable to trivial trauma. An enquiry regarding pre-injury visual acuity was done.

In blunt trauma, assessment of the force of impact and physical characteristics of the object, including

density and presence of sharp or cutting edges, was done, as these characteristics are the major determinants of the degree of trauma.

If a penetrating injury was suspected, possibility of an intraocular foreign body was considered. Nature of its origin, size, shape, trajectory and risk of microbial infections were assessed as they have long term influence on visual prognosis.

Chemical injuries are true ophthalmic emergencies. Treatment and history taking were started simultaneously. As alkali injuries are potentially devastating, especially due to their rapid penetrance, all chemical injuries are taken as alkali injuries, unless proven otherwise, and treated rigorously. History was directed to the nature (acid/alkali), State (solid/liquid) of chemical, duration of exposure (time elapsed since injury) and whether any primary treatment was instituted.

After detailed history, the injuries were classified as Penetrating injury, Perforating injury, closed globe injury, globe rupture, chemical injury , thermal injury or firecracker injury, and further graded as per the grading systems mentioned above.

A detailed examination of eyes was done using a torch light, slit lamp, direct ophthalmoscope and indirect ophthalmoscope (where required). In every case visual acuity and IOP (where possible) was carefully recorded.

Treatment

- Medical
- Surgical

Follow UP

Visual Acuity and detailed examination was done on every follow up. Best corrected visual acuity at the end of three months was recorded as the final vision, and visual disability graded according to the WHO definition mentioned earlier.

Observations and Results

Three patients had bilateral injuries which are represented as "III – II ", "III – I " " III –IV". In "III-II", "III" represents Grade three injury in right eye and grade two injury in left eye. The other two cases have also been represented similarly.

Table 1: Gender Distribution

Sex	Frequency	Percent
Female	13	13.0
Male	87	87.0
Total	100	100.0

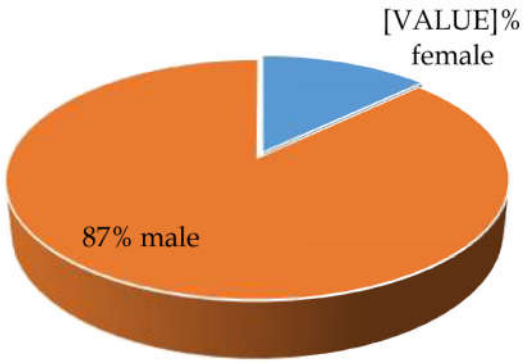

Fig. 1:

Table 2: Age distribution

Age in years	Frequency	Percent
<=2	1	1.0
3 - 23	33	33.0
24 – 44	49	49.0
>=45	17	17.0
Total	100	100.0

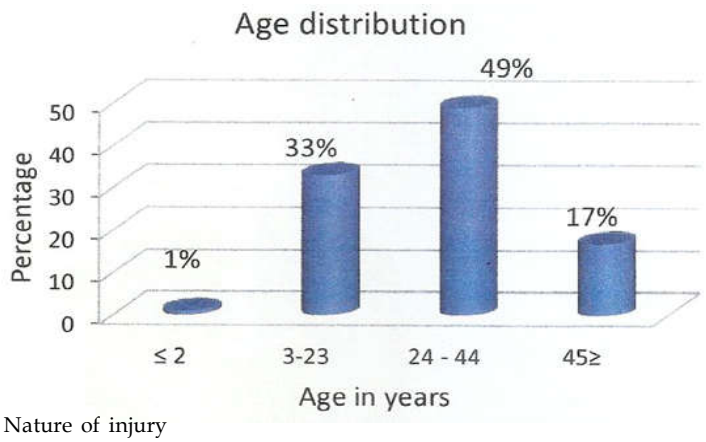

Fig. 2:

Table 3: Nature of injury

Nature of Injury	Frequency	Percent
Chemical injury	16	16.0
Closed globe injury	67	67.0
Fire cracker injury	1	1.0
Globe rupture	1	1.0
Penetrating injury	15	15.0
Total	100	100.0

Table 4: Grade of injury using the WHO grading system

Grade	Frequency	Percent
I	48	48.0
II	14	14.0
III	7	7.0
III –II	1	1.0
III – I	1	1.0
III – IV	1	1.0
IV	26	26.0
V	2	2.0
Total	100	100.0

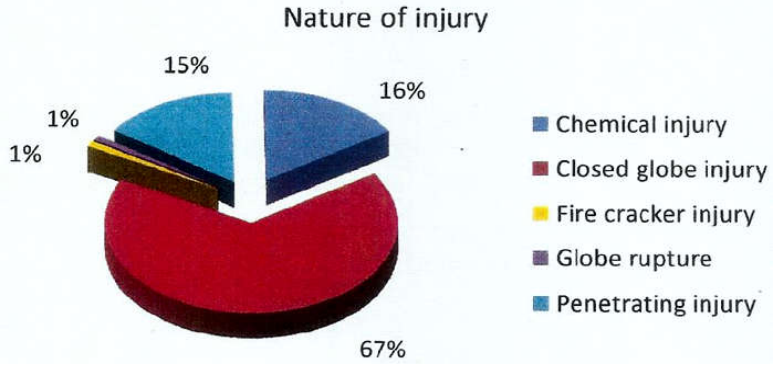

Fig. 3:

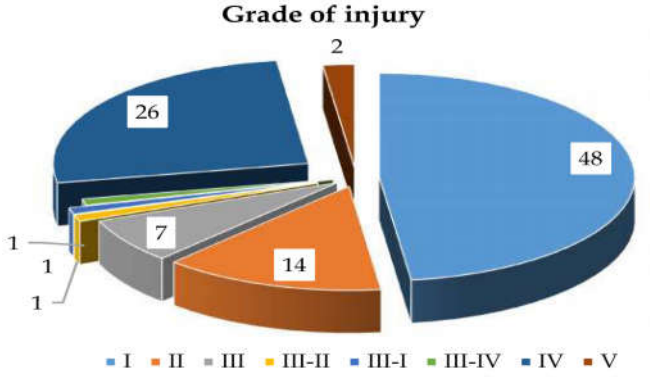

Fig. 4:

Table 5: Time of presentation to the hospital

Time of Presentation	Percent
<2 hr	43
2-6 hr	23
7 -24 hr	14
25 hr-4days	14
Above 4 days	6

Table 6: Object causing injury

Object Causing Injury	Frequency	Percent
Acid burn	4	4.0
Alkali burn	8	8.0
Ball	5	5.0
Fall	3	3.0
Fevi Kwik	3	3.0
Fist blow (Assault)	18	18.0
Glass piece	3	3.0
Hand (Acciental)	9	9.0
Iron Particle	17	17.0
RTA (Road Traffic Accident)	15	15.0
Stone	2	2.0
Others	10	10.0
Wooden stick	3	3.0
Total	100	100

Table 7: Final visual outcome

Visual outcome	Frequency	Percent
Mild Visual impairment	76	76.0
Moderate visual impairment	11	11.0
Severe visual impairment	3	3.0
Blindness (Category 3)	2	2.0
Blindness (Category 4)	5	5.0
Blindness (Category 5)	1	1.0
Normal to mild visual impairment, blindness (Category 4) (Bilateral)	2	2.0
Total	100	100.0

Table 8: Visual outcome in individual nature of injury

Nature of injury	Visual outcome					
	Mild visual impairment	Moderate visual impairment	Severe visual impairment	Blindness (Category 3)	Blindness (Category 4)	Blindness (Category 5)
Closed globe injury	57	6	2	1	1	-
Chemical injury	13	-	-	-	3	-
Fire cracker injury	1	-	-	-	-	-
Penetrating injury	5	4	1	1	3	1
Globe rupture	-	1	-	-	-	-

Table 9: Cross tabulation of anterior segment findings and posterior segment findings with visual outcome

Visual outcome	Anterior segment findings	Posterior segment findings	Anterior and posterior segment findings
Normal to mild visual impairment Category	64	3	9
Moderate Visual impairment	5	1	5
Severe visual impairment	1	-	2
Blindness (category3)	1	1	-
Blindness (category4)	4	-	3
Blindness (category5)	1	-	-

Discussion

The importance of ocular trauma as a major cause of blindness worldwide has been widely documented[2], though reliable population-based data are difficult to obtain., especially in developing countries. As per study by Negrel and Thylefors [3] a review undertaken for planning purposes in the WHO programme for the Prevention of Blindness, suggests that around 55 million eye injuries responsible for restricting activities for more than one day occur annually; they account for 750,000 hospitalized cases each year. These include approximately 200,000 open-globe injuries; with around 1.6 million people blind from such injuries, 2.3 million people with bilateral low vision from this cause, and almost 19 million people with unilateral blindness or low vision [5].

Our study showed male preponderance, with 87% patients being males and 13% being females [Table 1]. Hence the Male: Female ratio was found to be 6.69:1. This correlates with the recent studies by Sana Nadeem et al (Pakistan, 2013) [5], Vats et al (Delhi, 2008) [6], Agarwal et al (2011) [8], Singh et al (2005) [8], Narang et al (2004) [9], in India, Thompson et al (Australia, 2002) [10], Guly et al (UK, 2006) [11], Khatry et al (Nepal, 2004) [12] and Babar et al (Egypt, 2007) [13], where male preponderance was seen as well. This may be attributed to the outdoor and high risk nature of work of males in our country.

In our study majority of the patients were in the age group of 24-44 years (49%), followed by 3-23 years (33%) and finally >45 years (17%) and <2 years (1%) [Table 2]. In the study by Vats et al [6] in Delhi, the mean age at which trauma occurred was 24.2 (±13.5). In China, a study done by He Cao et al (2012), showed majority of patients with ocular trauma, to be in 15-44 year age group (56.2%). The preponderance in 24-44 year age group may be attributed to the fact that this is the main working age group, which is exposed to maximum risk of ocular trauma, especially at work place. The increased frequency among 3-23 year age group may be play and sport – related injuries.

In our study closed globe injuries were found to have the highest frequency, accounting for 67% of our cases. While chemical injuries accounted for 16%, penetrating injuries accounted for 15% of the injuries. Firecracker and globe rupture, each were seen only in 1% of injuries[Table 3]. This was in contrast to the study by Singh et al [8], where closed injuries were present only in 44.2% injuries, and penetrating injuries were present in 55.8% of the eyes. This contrast may be due to the fact that their study was conducted in a tertiary eye trauma centre, where patients were referred from various hospitals from the country.

Majority of the patients in our study presented to the hospital Emergency Department or Out-Patient Department within 2 hours of the injury (43%). 23% patients presented between 2-6 hours, 14% between 7-24 hours and 1-4 days each, while 6% patients presented after 4 days [Table 5]. Out of these majority of the patients with serious injuries presented within 24 hours. Patients with serious injury who presented late included one case of traumatic cataract (8days) and one of Sub hyaloids haemorrhage with Berlin's oedema (8days). All these patients were referred from primary health care centers In villages. This highlights the issue of illiteracy, ignorance on part of the patient who presented late were cases of minor ocular injuries like paracentral or peripheral corneal foreign bodies and subconjunctival haemorrhage. This is probably why on Fisher's exact test, the time of presentation does not show a significant correlation with the final visual outcome in our study (p – value 0.450) [Table 10].

The commonest cause of injury in our study was Fist blow injury due to assault (18%) leading to contusion injury. This was followed by iron particle due to hammering of metal (17%) leading to superficial conjunctival and corneal foreign body. This high incidence in this study may be due to the population of lower socio – economic class, and daily wage workers that the hospital caters to. 15% injuries were due to Road Traffic Accident (RTA), while 9% were due to accidental injuries with hand. Other causes were Alkali burns (8%), Acid burns (4%), Ball (5%), Fevi Kwik glue, glass piece, wooden stick and fall from height, each accounting for 3% injuries. Injury with stone accounted for 2% injuries, while single cases of injury were seen with coconut shell, Drainex powder, firecracker, iron piece, iron rod, nail, needle, horn of bull, tap and wooden piece [Table 6].

The final vision outcome of our study after three months was evaluated. Majority of the patients had only mild visual impairment (6/18 or better) (76%). 11% patients had moderate visual impairment (6/18 P to 6/60), 3% severe visual impairment (6/60 P to 3/60), 2% Blindness (Category 4) (1/60 to Perception of light) and 1% had Blindness (Category 5) (No Perception of light). 2% patients had bilateral injuries, in which one eye had normal vision to mild visual impairment while the other had blindness (Category 4) [Table 7]. As mentioned earlier, there is significant correlation between Grade of injury and Final visual outcome. Hence we can conclude that,

as a vast majority of patients in our study had only Grade I injury, their final visual outcome after successful treatment was normal to mild visual impairment. Out of the total 7 patients with Final visual outcome as Blindness Category 4, three were due to chemical injury, three due to severe penetrating trauma and one due to Traumatic optic neuritis [Table 8].

Out of 67% of Closed globe injuries, a majority 57 patients (85%) attained only mild visual impairment, 6 moderate visual impairment (8.95%) and only 2 attained severe impairment (2.98%), 1 Blindness (Category 4). In Chemical injuries, out of total 16%, 13 patients (81.25%) attained only mild visual impairment, and 3 patients (18.75%) had Blindness (Category 4). Penetrating injuries (total 15%) had slightly worse results. Only 5 patients (33.33%) had mild visual impairment, 4 patients (26.66%) had moderate impairment and 3 patients (20%) had Blindness (Category 4), while 1 patient had severe impairment, blindness (Category 3) and Blindness (Category 5) (6.67%) each [Table 8].

This implies that penetrating injuries had the worst visual outcome, closely followed by Chemical injuries. Closed globe injuries had much better outcome as compared to the other two types. Globe rupture and firecracker injuries were seen in only one patient each, hence their outcome could not be commented upon.

As seen in Table 9, majority of the patients in our study had only Anterior segment findings (76%), 5% had only Posterior segment findings while 19% had anterior and posterior segment findings. Out of the 76% patients, 84.2% patients had normal to mild visual impairment, 6.57% had moderate impairment and 5.2% patients had Blindness (category 4). Among patients who had anterior and posterior involvement 47.36% patients had only mild visual impairment, 26% had moderate impairment, 10.52% had severe impairment and 15.78% had Blindness (Category 4). Among the 5% patients with only posterior segment involvement, 60% patients had mild impairment, 5% moderate impairment and Blindness (Category 3) each. This implies that wherever there is posterior segment involvement, the visual outcome is somewhat worse. Corroborating these findings, are studies by Singh et al [8], Entezari et al [16], Pieramici et al [14] and Rao et al [15].

As we have seen in our study, a large number of young males were affected, most of them at their work place, followed by cases of assault. These patients form the main bulk of earning members of the society, and hence visual impairment leads to a significant loss of economy to the society as a whole. More importantly, this issue needs to be addressed as impairment due to ocular trauma is completely preventable. High risk occupations such as grinders, blacksmiths, carpenters, welders, etc., need to be educated and compelled to use protective gear.

Another group where ocular trauma is seen commonly is the age group of 3 years to 23 years. The trauma in these children is mainly during play and at school. This emphasizes the importance of adult supervision at all times.

The tremendous impact of ocular trauma, on the need of medical care, loss of income and cost of rehabilitation, significantly enhances the need for the strengthening of preventive measures. A clear understanding of the mechanism of ocular injuries ensures prompt detection, treatment and prevention.

Conclusion

According to our study, we may conclude young males were affected the most, either at workplace or at play.

Closed globe injury was the commonest form of injury, but had the best visual outcome amongst all forms of ocular trauma.

Chemical injuries and penetrating injuries followed closed globe injuries in frequency, but had much worse outcome as compared to closed globe injuries.

Grade I injuries were the commonest, followed by grade IV and then grade II injuries.

Nature of injury and grade of injury had significant correlation with visual outcome.

Majority of the patients presented to the hospital within one day of injury, but time of presentation did not have significant correlation with visual outcome.

Assault, road traffic accident and occupational objects were the commonest causes of injury, followed by domestic objects such as needle, toilet cleaner, etc.

Full thickness Corneal tear involving, and not involving visual axis without iris prolapse, Corneo scleral tear involving visual axis, Relative Afferent Pupillary Defect (RAPD), Hyphema Traumatic Cataract, Vitreous haemorrhage and sub hyaloids haemorrhage in mechanical injuries, and Corneal melting and limbal ischemia in chemical injuries had significant correlation with visual outcome.

Corneal tear suturing, cataract extraction with IOL implantation and Amniotic membrane transplantation had significant correlation with visual outcome.

Majority of the patients were left with only mild impairment of vision, followed by moderate impairment.

Even though the overall results in this study pointed towards good visual outcome, a sizable number of patients were left blind as per WHO criteria, which forms a large burden on the society as a whole. This emphasizes on the fact that even with advanced technology and modalities of treatment, the role of prevention is irreplaceable.

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Original Article

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Prevalence of Ocular Morbidity among School Children

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Abstract

Introduction: No one can deny the fact that the eyes are the most important of our sense organs. Good eye-sight plays a vital constructive role in the development of the faculties of the child. Most of our knowledge and skills are acquired by (Nit eyes which are said to be the windows to the world. Bad eye-sight not only affects academic improvement, but in the long run causes untold damage to the psyche and self-confidence of the child. *Methodology:* Screening was undertaken with the help and active cooperation of the school management. In each of these institutions the assistance of that particular class-teacher and the physical instructor was made available. The class teacher was given the proformas and general aspects, like name, age, sex, class, address were filled up. *Results:* The majority of ocular disorders fall in the category of refractive errors (54.9'3%), conjunctival lesions (23.94%) and lesions of the Lids 414 (12.68%). These three put together account for 91.5%. *Conclusion:* The schools should condone the absence of the students for treatment - especially surgical Procedures, where the child will have a short hospital stay and a longer recovery period.

Keywords: Screening; Ocular Morbidity; Refractive Errors.

Introduction

The World Health Organization(WHO),the highest international organisation which protects human rights for a healthy-life defines health in its constitution as "a state of complete physical, mental and social well being and not merely an absence of disease or infirmity". The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being, irrespective of race; religion, political belief, economical or social condition [1].

To achieve this aim, the WHO has coined the motto as "Health for all by 2000 AD". Good vision is certainly an impoftant part of this state of well being. How far the developing countries havee been able to achieve this state is questionable, even though the possibility to achieve this state is not beyond our reach or means, needing only effort by Government. Voluntary social organizations and last but not the least, by one and all in society [2].

The ophthalmology authorities have modified the motto of WHO as "Sight for all by 2000 AD".

Healthy eyes and good vision are natures gift and these are to be protected and preserved if a healthy human society is to be developed. Good habits develop easily in the minds of the young and so efforts must be made to catch them young. To achieve this school health programmes must be implemented, and these must incorporate eye health too. Visual hygiene must be taught to students. Parents and teachers must also be aware of the importance of visual hygiene so that they can implement them and correct the children [3].

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Children are the wealth of, a nation because tomorrow they will become its citizens and leaders. The nation's economy and progress depends mainly on the younger generation. Hence they are to be nurtured to be the future pillars of the nation No one can deny the fact that the eyes are the most important of our sense organs. Good eye-sight plays a vital constructive role in the development of the faculties of the child. Most of our knowledge and skills are acquired by (Nit eyes which are said to be the windows to the world. Bad eye-sight not only affects academic improvement, but in the long run causes untold damage to the psyche and self-confidence of the child [4,5].

A child's school life is a crucial period of his development when good or bad habits become established. Habits die hard, and hence is vital to teach them young to provide a better and healthier future generation.

Health care centers must be available at every school and are more important in the rural areas. It is here that ignorance and superstition can ruin and damage a child's life. Periodic checkup is of utmost importance. Proper eye care and visual hygiene must be taught early to make it habit forming, and a part of every young child.

The detection and correction of defective vision, squint, and other eve diseases are very important in the school going age. Most children are unaware of their defects and so are their parents and teachers. These undete6te.d defects result in immense emotional stress and strain for the child. It must be emphasized that if, an eye with gross refractive error and/or squint is not cared for or corrected at an early stage, the eye would become amblyopic and useless for fine work at a later age [6].

Undetected eye problems can affect, a child's academic and professional career. Unless the child can see the blackboard clearly and read print clearly, he would be branded as below average and will be under constant strain resulting .in disinterest in this studies. This would definitely interfere with his academic career and progress, causing irreparable damage to his abilities psychologically.

Methodology

The screening included both boys, and girls in the age group Of 5 to 15 years. Students from the 1st Standard to the Xth Standard were screened for any ocular disorders. Screening was undertaken with the help and active cooperation of the school management. In each of these institutions the assistance of that particular class-teacher and the physical instructor was made available. The class teacher was given the performs and general aspects, like name, age, sex, class, address were filled up. The physical instructor was helpful in organizing the students into batches and in their general discipline. He was also briefed before the screening about what the study exactly aimed-at. He was given adequate training in the use of the "Snellens" chart for assisting in the recording of the distant visual acuity. Also with the help of pictures and charts, certain gross visual defects commonly encountered in children like for example: bitot spots, pterygiurn, conjunctivitis etc. were 'made familiar to him.

Finally ophthalmologist carried out clinical examination and made note on morbidities

Results

In the present study a total of 1012 school children between the ages 5-15 were screened from various schools. Of them 542 (53.56%) were boys and 470 (46.44%) were girls. Thus the numbers of boys screened were more than the number of girls.

Out of the total number (1012) of Children screened, 71 students (7.02%)were discov-ered to have some or the other ocular defect. Among the 542 boys screened, 42 i.e, 7.75% had ocular defects while

Table 1: Distribution of students

Students	Number	Percentage
Boys	542	53.5%
Girls	470	46.5%
Total	1012	100%

Table 2: Distribution based on students affected

Students	Number screened	Number affected	Incidence
Boys	542	42	7.75%
Girls	470	29	6.17%
Total	1012	71	7.0%

Table 3: Distribution of various ocular disorders

Disorders	Number	Percentage
Refractive errors	39	54.9%
Conjunctival lesions	17	23.9%
Lesions of lids	09	12.6%
Others	06	8.4%
Total	71	100%

amongst the girls, 29 i.e,.6.17% had ocular defects.

Thus a higher incidence of Ocular disorders were seen in boys as compared to the girls

The majority of ocular disorders fall in the category of refractive errors (54.9'3%), conjunctival lesions (23.94%) and lesions of the Lids 414 (12.68%). These three put together account for 91.5%

Discussion

In order to ascertain .the prevalence of ocular defects in school children, a total number of 1012 children from different schools were screened. Their visual acuity and colour vision were tested, in addition to ocular motor balance. Their eyes were carefully examiined, refraction performed with mydriasis and a detailed fundus examination was done. In select cases additional investigations like slit-lamp biomicroscopy, indirect ophthalmoscopy etc were done. In those children in whom the common ocular disorders were discovered, the conditions were treated with medicines, glasses or simple surgical procedures.

Of the total 1012 students screened, boys were 542 in number and 470 were girls. 71 students (7.02%) were found to have some eye defect. The disease pattern in these children was studied by grouping them as belonging to

I. Refractive errors

II. Lesions of the conjunctiva

III. Lesions of the lids

IV. Other ocular lesions

This study has shown that most of the ocular disorders in these children are attributable to xerosis, refractive errors, infective lid conditions and a few other ocular conditions. More boys had myopia than girls and was seen to be more in the higher classes (VI th to Xth standard). Most of the cases of conjunctivalxerosis were seen in girls and in lower classes (1st to the Vlth standard).

Majority of the lid disorders were belpharitis and chalazion, probably because of their poor nutritional status and lack of hygiene

The above facts have to be taken into consideration while interpreting the results of the present study. A comparative study with a few other Standard school surveys has been done in this work.[7,8,9] Although the results are not numerically, comparable (nor do they tally among them-selves), they are helpful in arriving at certain common inferences. Thus, the principle causes of preventable visual impairment vary from one region to another and are ultimately related to ecological, environmental, socio-economical, seasonal and cultural factors, not to mention about the dietary habits and personal hygiene. In developing countries, in children, visual impairment associated with infections, nutritional deficiencies and trauma is much more common than it is in developed countries and affects the lower age groups. The burden on society is thus proportionally higher. Hence, it becomes all the more important and imperative that ocular disorders are identified, treated and prevented at the earliest opportunity lest blindness overtakes. It should be noted that blindness is the most expensive and the most undesireable of all causes of serious physical disablement.

Conclusion

The children found to be defective in theses screening programmes should receive prompt treatment ether on the spot or should be referred to institutions where they can be tackled. The teacher should be made aware of the condition and is his responsibility to follow up and see that the child attends the hospital with his parents.

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Pterygium Excision with ConjunctivalAutograft Using Autologous Blood, ARevoloutionary Advancement for Effective Pterygium Management

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Abstract

Introduction: Conjunctivalautograft has become the most preferred standard for management of primary pterygium and double pterygium. Securing the autograft over the bed is an important part of surgery and eventually determines the outcome of surgery. *Methodology:* We reviewed the case records of 100 patients from January 2016 to 2017 who underwent pterygium excision with conjunctivalautograft at our institute. Surgery was performed by a single surgeon for primary or double-headed pterygium. *Results:* All cases were properly assessed and followed up at every visit. The average age of study population was 45 years (18 to 65). 75% of patients were less than 40 years of age. Male to female ratio was 1:1. All the patients had an uneventful surgery. The patients were followed up on 5th day, 15th day, 1-month, 3-months, 6-months. *Conclusion:* We strongly recommend the conjunctivallimbalautograft with autologous blood for ensuring low recurrence and safety.

Keywords: Pterygium; Conjunctivalautograft; Pterygium Excision.

Introduction

Pterygium is a triangular, fibrovascular connective tissue over growth of the bulbar conjunctiva onto the cornea. it is usually found in the interpalpebral fissure commonly on the nasal, sometimes on the temporal side of cornea. Etiology is ultraviolet light induced damage to limbal stem cell barrier. India being a tropical country with lot of sunlight exposure, dust, wind, pterygium is very common in India. The definitive treatment is surgery if it is causing visual disturbance or for cosmetic purpose. Simple exision has a risk of recurrence as high as 40%-80%.

Various improvement in surgical techniques and antimitotic drugs have been reported to reduce the recurrence rate. The recurrence rate ofpterygium excision with conjunctivalautograft is just 4% TO 6%, for mitomycin-C.6% TO 8% [1]. Conjunctivalauto graft has become the most preferred standard for management of primary pterygium and double pterygium. Securing the autograft over the bed is an important part of surgery and eventually determines the outcome of surgery [2].

Various surgeons have used sutures, Fibrin glue, autologous blood to secure the graft.

Suturing can be time consuming, can cause postoperative irritation, inflammation and suture granuloma. Fibrin glue is very expensive, has the potential to cause anaphylaxis and rarely can transmit viral disease. Autologous blood as a tissue adhesive is a simple, safe, cheap and effective alternative to fibrin glue, but has the rare disadvantage of graft dehiscence, graft edema, graft retraction, graft antiflexion, pyogenic granuloma and lost graft [3,4].

Aim

Aim of this study is to assess the safety and efficacy of autologous blood to secure the conjunctival-autograft after pterygium excision and to know the recurrence rate.

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Materials and Methods

We reviewed the case records of 100 patients from January 2016 to 2017 who underwent pterygium excision with conjunctivalautograft at our institute. Surgery was performed by a single surgeon for primary or double-headed pterygium. All patients' data are depicted in Table 1. All surgeries were done under peribulbar anaesthesia.

Surgical Technique

Lid speculum was inserted. A small nick was made at the limbal conjunctiva. The conjunctiva over the body of pterygium was undermined, and the body of pterygium with involved tenons capsule were excised. The head of pterygium was stripped off from the surface of cornea. With tookes knife the limbal area was polished. The size of conjunctival graft required to resurface, the exposed scleral bed is determined using calipers. The equivalent area in upper temporal conjunctiva was marked. BSS was injected under the conjunctiva. Dissection began from fornix to limbus. The graft was oversized by 1mm. Thin graft was flipped over the cornea. The flap was excised taking care to include the limbal tissue.

Small Conjunctival capillaries were ruptured using 26G needle to induce fresh oozing of autoblood, taking care not to damage the sclera. The graft was then rotated immediately and moved onto the scleral bed maintaining limbus to limbus orientation.

The graft and the original conjunctiva at the inferior limbus were held with colibre forceps and with a Macphersons forceps or iris repositor the graft was anchored to the bed using a simultaneous sweeping and pressing movements towards the fornix and caruncle. The slightly oversized graft was pushed beneath the normal conjunctiva. The eye was patched for 12 hours. Post-Operatively, the patients were given topical antibiotic and topical steroid eye drops every 2 hourly and tapered over 5-6 weeks.

Results

All cases were properly assessed and followed up at every visit. The average age of study population was 45 years (18 to 65). 75% of patients were less than 40 years of age. Male to female ratio was 1:1. All the patients had an uneventful surgery. The patients were followed up on 5th day, 15th day, 1-month, 3-months, 6-months. 90% eyes had a follow-up of more than 6 months. In 5-eye having had double head pterygium, the graft was adequately divided between the two sides. 70 eyes had sub-conjunctiva hemorrhage under graft, which subsided after 2-weeks, graft edema was seen in 90 eyes which subsided on its own. Graft dehiscence on the non-limbus aspect seen in 5-cases, 1 case had small anti-flexion of graft at the superior limbus, 3-eyes had granuloma at the superior bulbar area after one and half months which subsided with topical flurometholone. None of the eyes had loss of graft. 2-eyes had graft encroachment by 0.5 mm over the cornea at nasal limbus. None of the eyes had recurrence at 6-months follow-up. Other pre-operative and post-operative data of all cases are in Table 1 and 2.

Table 1: Clinical data of patient

Age	**<40 years (75% eyes)**
Gender	
Male	50
Female	50
Eye involved	
Right eye	60
Left eye	40
Site:	
Nasal	95
Temporal	0
Both	5
Size of pterygium	
Crossing limbus	60
Midway between limbus and pupil	20
Reaching pupil	15
Crossing pupil	5
Fleshiness	
Mild	20
Moderate	20
Severe	60
Indications for surgery	
DOV	60
Cosmesis	20
Inflammation	20

Table 2: Postoperative outcome on vision and astigmatism and cosmesis

Visual acuity	
Same	60
Increased by 2-lines	20
Increased by > 2-lines	20
Decrease in astigmatism (with the rule)	50 eyes (0.5 D – 4.5 D)Avg. 2D
Cosmesis	
Satisfactory patient	90%
Unsatisfactory patients	5% because of irritation and pricking
Nebulo-macular corneal opacity	5%

Discussion

Pterygium excision with conjunctivalautograft has become a standard procedure as it has least recurrence rate. Traditional sutures and fibrin glue have major disadvantages. Trend is towards making the surgery safer, quicker and effective. Autologous blood is naturally available during surgery and there is no associated risk of disease transmission and anaphylaxis [5,6].

It is a very good alternative. Few important modifications that helped in preventing recurrence of pterygium and to hold the graft in place are:

1. Inclusion of limbal tissue in graft.
2. Removal of all sub-conjunctivalpterygium tissue
3. slightly oversized, thin, graft without button holeing
4. Inducing fresh bleeding, over the bed by puncturing the small conjunctival capillaries.
5. Sweeping and pressing movements immediately over the graft to anchor it to bed.

Conclusion

Autoblood technique is very simple, safe and effective procedure for graft fixation. The procedure is very easy to learn and does not require extra surgical skill or equipment. It is non time consuming. We strongly recommend the conjunctival limbal autograft with autologous blood for ensuring low recurrence and safety.

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Clinical Profile of Patients with Thyroid Related Orbitopathy

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Abstract

Introduction: An association between various systemic conditions like diabetes mellitus, hypertension and glaucoma have been demonstrated. Likewise an association between thyroid orbitopathy and glaucoma have been described in various literatures. *Methodology:* Thyroid related orbitopathy was diagnosed on the basis of clinical history of thyroid dysfunction, eye symptoms and signs. Laboratory investigations – serum T3, T4 and TSH, which confirmed the thyroid status to be hyper, hypo or euthyroid and all patients, underwent ultra-sonography and few computed tomography as required. *Results:* In our study minimum age was 18 years and the maximum was 69 years. The mean age was 46.17±10.06. One patient had family history of glaucoma and had normal intra ocular pressure, disc and fields.Family history of thyroid dysfunction was present in 7 patients (11.67%) and 8 patients (13.33%) were on medication for thyroid dysfunction. *Conclusion:* The labelling of thyroid related orbitopathy patients as ocular hypertensives should hence be made with care and these patients need careful follow up.

Keywords: Thyroid Related Orbitopathy; Glaucoma; Ophthalmopathy.

Introduction

Thyroid orbitopathy was first described by Caleb Hillier Parry in 1786. Since then there has been a myriad descriptions of its complex manifestations and clinical course. Its multisystem involvement has seeked interest of doctors from all the fields. Since its initial descriptions many nomenclature, classification, diagnostic criteria have been proposed.The term thyroid orbitopathy is used rather than thyroid ophthalmopathy as the orbital tissue is mainly affected.

McKenzie in 1968 defined Graves disease as a syndrome characterised by one or more of following features [1-3].

1. Diffuse hyperplasia of thyroid(with or without nodularity)
2. Ophthalmopathy
3. Infiltrative dermopathy(pre-tibialmyxoedema)

An association between various systemic conditions like diabetes mellitus, hypertension and glaucoma have been demonstrated. Likewise an association between thyroid orbitopathy and glaucoma have been described in various literatures.

Wessley first described raised intra ocular pressure in thyroid orbitopathy patients in 1918. Since then various studies have been done to prove the same [4].

The association of exophthalmos in Goitre cases dates back to as early as 12th century as described by Persian manuscripts of Sayrid Ismail Al-Juryani. In 1786 parry described Goitre, tachycardia and exophthalmos as Parry's disease. In 1835, Graves described an association of thyroid gland enlargement with palpitation and exophthalmos.

Karl A von Basedow (1799-1854) also described orbitopathy in Graves disease. He coined the

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synonym of 'merseburg triad' for the association of Goitre, orbitopathy and dermatological changes.

In 1984, Waller and Jacobsen proposed a diagnostic 'pie diagram'. They considered lid retraction as the primary criteria and the pie was divided into 4 quadrants each representing a secondary criteria viz EOM involvement, optic neuropathy, proptosis and thyroid dysfunction. When both primary & secondary criteria are present together, the diagnosis of thyroid orbitopathy was confirmed [5].

The multiplicity of diagnostic criteria and nomenclature is due to the ignorance of etiology .the autoimmune etiology concept which has been proved now has simplified the term Graves disease. There are many aspects of this fascinating condition which are yet to be discovered.

Methodology

Thyroid related orbitopathy was diagnosed on the basis of clinical history of thyroid dysfunction, eye symptoms and signs. Laboratory investigations – serum T3, T4 and TSH, which confirmed the thyroid status to be hyper, hypo or euthyroid and all patients underwent ultra-sonography and few computed tomography as required.

Inclusion Criteria

1. All patients clinically diagnosed to have thyroid related orbitopathy.
2. Patients with open angles on gonioscopy.

Exclusion Criteria

In patients with thyroid related orbitopathy:

1. Patients on systemic or topical steroids – systemic B-blockers.
2. Patients with corneal pathology, where intra ocular pressure cannot be measured.
3. Un co-operative patients
4. Other intraocular pathology (which my influence intra ocular pressure) PXF, trauma, retinal detachment, severe diabetic retinopathy.
5. patients with closed angles on gonioscopy.

The patients were examined elaborately in a proforma, which encompassed basic demographic data such as name, age, sex. Detailed systemic and ocularhistory, which reviewed the duration of thyroid related orbitopathy, symptoms and signs, as well as systemic symptoms of thyroid dysfunction. Family history of glaucoma and thyroid disease.

History of prior treatment with anti-glaucoma medication and treatment of thyroid dysfunction. History of diabetes and treatment of the same. Since these would influence the intra ocular pressure and occurrence of glaucoma.

Results

There is significant increase in IOP when gaze is shifted from primary to up gaze.

Table 1: Difference in IOP from primary to upgaze

0 – 4	65%
4 – 6	23.33%
>6	11.66%

Table 2: Difference of IOP from down to primary gaze

0 – 4	91.67%
4 – 6	3.33%
>6	5%

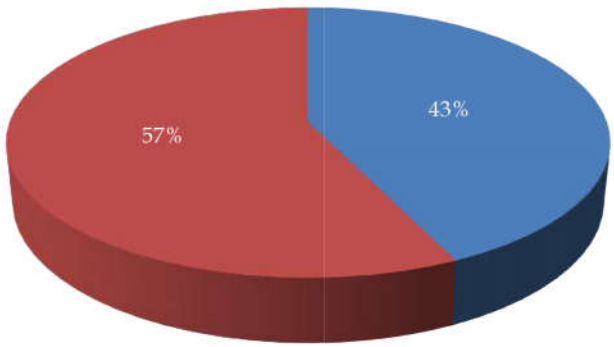

Fig. 1: Gender didtribution

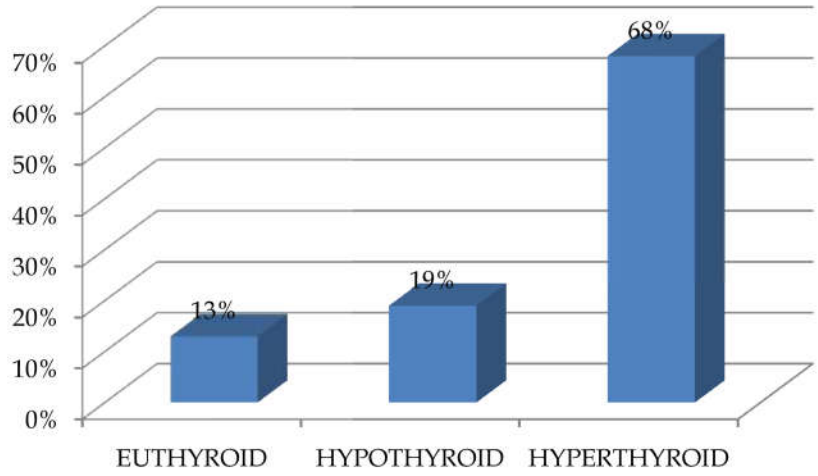

Fig. 2: Thyroid status

Table 3: Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error mean
Pair 1	Upgaze	21.53	60	3.48	0.449
	Primary gaze	17.37	60	2.64	0.341
Pair 2	Primary gaze	17.37	60	2.64	0.341
	Down gaze	16.40	60	3.01	0.388
Pair 3	Up gaze	21.53	60	3.48	0.449
	Down gaze	16.40	60	3.01	0.388

Table 4: Paired Sample Test

		Paired differences			P– Value
		Mean	95% confidence interval of the difference		
			lower	upper	
Pair 1	Up gaze – primary gaze	4.57	3.04	5.27	<0.0001
Pair 2	Down gaze – primary gaze	2.23	-0.05	1.99	0.06
Pair 3	Down gaze – up gaze	5.2	3.95	6.3	<0.0001

Discussion

Age: In our study minimum age was 18 years and the maximum was 69 years. The mean age was 46.17 ±10.06

Sex: Our study had female preponderance. Female patients were 56.67% and male were 43.33%. this correlates with the study done by Khurana AK [6]. which showed ratio of female to male of 1.5:1.

Thyroid Status: Our study had predominance of hyperthyroidism (70%) and an almost equal representation of both hypothyroidism and euthyroidism 16.66% and 13.34% respectively. This correlates with study done by Khurana AK which showed the thyroid status as 63.3% of patients with hyperthyroidand 36.7% euthyroid. None of the patients had hypothyroidism [6].

The ocular symptoms and signs based on the history ranged from 2 months to 10 years, with mean duration of 18 months.

- One patient had family history of glaucoma and had normal intra ocular pressure, disc and fields.
- Family history of thyroid dysfunction was present in 7 patients(11.67%) and 8 patients (13.33%) were on medication for thyroid dysfunction.
- Two patients were non-insulin dependent diabetes mellitus diabetics on oral hypoglycaemic.

Best corrected visual acuity

81.67% of patients, had the best corrected visual acuity of 6/6. The remainder had visual acuity ranging between 6/6 and 1/60 due to lens changes and optic neuropathy.

Colour Vision

The colour vision was normal in most of the patients. Two patients could not be tested due to very poor vision.

Afferent Papillary Reaction

2 patients had relative afferent papillary defect by Levatin's swinging flash light test.

Central Fields

46 patients had normal fields. 2 eyes one in each patient fields could not be tested due to very poor vision, fields in other eye was normal. Two patients had glaucomatous field defect.

Proptosis

Total of 48 eyes(80%) were found to have proptosis. 19 patients had bilateral proptosis, 10 patients had unilateral proptosis and 12 eyes(20%) had no proptosis. Which correlates with study by Khurana AK, which concludes that exophthalmometric readings were significantly high in GO(Graves' orbitopathy) patients as compared to controls [6].

The *Hertel'sexophthalmometry* reading varied between 18mm and 30mm, with a mean of 22.15±2.54.It showed asymmetry in involvement of eyes.

Fundus

In 86.67% (46 eyes) optic nerve head and nerve fibre layer were found to be normal. 2eyes in 2 patients had disc pallor. 2 eyes had glaucomatous disc damage.

Extra-ocular motility

a. *Elevation:* One patient had very gross restriction of elevation corresponding to (-4) of grading. 4 patients had severe restriction (-3), 4 patients had moderate restriction (-2) and 6 patients had mild restriction (-1). 56.67% had restriction of elevation and were graded as abnormal.

b. *Depression:* Depression was restricted in only 13.33% of our patients.

c. *Adduction:* Adduction was minimally restricted (-1) in 10% of patients.

d. *Abduction*: Abduction was severely restricted (-4) in 2 patients, moderately restricted in (-2,-3) in 2 patients and very minimal restriction (-1) in 9 patients.

Elevation and abduction were the movement most restricted, showing that the inferior rectus and medial rectus are most affected. The findings were confirmed by ultrasonography.

Ultrasonography

Imaging revealed thickening of bellies and sparing of tendons of the extraocular muscle in 16 eyes (26.67%) by ultrasonography. 44 eyes were normal by ultrasonography . which correlates with the study by Khurana AK which states as, marked thickening of extra ocular muscles was noted, maximum for medial rectus, followed by inferior rectus in early as well as late cases with GO (Graves' orbitopathy) [6].

Conclusion

Only 8.33% of our patients had ocular hypertension in primary gaze, which corresponds with that existing in general population. The number of hypertensives increased to 53.33% on up gaze.

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A Study on Prevalence of Refractive Errors among School Children in School Health Survey

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Abstract

Introduction: Children are particularly vulnerable to infections, injuries, and deficiency disorders due to their poor nutritional status, lack of proper hygiene, and care. Majority of the cases of ophthalmianeonatorum and keratomalacia are seen in this class of people even though they are easily preventable by early intervention timely institution of proper remedial measures and effective methods of prophylaxis and treatment. *Methodology:* This was a cross sectional study carried out in schools for children aged 5 – 15 years to know the prevalence of refractive errors. The sample size was 1012 which included both boys and girls. Predesigned semi structured questionnaire was prepared as study tool *Results:* Out of 1012 students, 39 had refractive errors and among them 71.8% of students had myopia, 20.5% students had hypermetropia and 7.69% of students had astigmatism *Conclusion:* The type of refractive errors seen in both boys and girls in the decreasing order was found to be myopia, hypermetropia and astigmatism.

Keywords: Refractive Errors; School Screening; Myopia.

Introduction

The concept of Preventable blindnesshas gained increasing recognition lately. The term 'prevention' may have one meaning in developed countries and an entirely different one in the developing countries.

The first meaning may relate to preventing the disease from appearing, or if it has occurred, preventing the onset of functional loss. The second meaning implies limiting functional loss to the minimum by active treatment [1]. The first group would include genetic counselling, prenatal care, adequate nutrition especially in children, eradication of vectors of infectious diseases, systemic health examinations and health care from birth onwards, preventive vaccination, active immunization, general education in hygiene and to reduce the 'risk of accidents to the eye by dangerous toys. For many ofthese measures the ophthalmologist serves as an advisor, mainly. The second group includes curative measures through expansion of eye services of all kinds and at all levels.

The main factors governing the health problems of the citizens of the underdevelopedcountries are poverty, ignorance, illiteracy, negligence, superstition, home medication, apathy for good advice, want of medical facilities; lack of personal hygiene, malnutrition, environmental pollution, and hazardous occupations [2].

Children are particularly vulnerable to infections, injuries, and deficiency disorders due to their poor nutritional status, lack of proper hygiene, and care. Majority of the cases of ophthalmianeonatorum and keratomalacia are seen in this class of people even though they are easily preventable by early intervention timely institution of proper remedial measures and effective methods of prophylaxis and treatment [3].

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The components for action in "National P'rogramme for Control ofBlindness in India"are [4]:

Initial Assessment

The magnitude, geographical distribution, and causes of blindness within the country or a region are estimated by surveys. This forms the basis and helps in setting priorities and in the development of appropriate intervention programmes.

Methods of Intervention

a. Primary Eye Care

Many ocular defects such as conjunctivitis, early trachoma, superficial foreign bodies, minor trauma and xeropthalmia can be treated/ prevented by adequately trained primary health workers at the grass root level. They serve as a link between the population and eye health services. They are trained to carry put specific eye care activities and refer difficult cases to the doctor. Currently there is one village guide for every 1000 population and two Multipurpose workers for every 5000 population in our country.

b. Secondary Eye Care

This is provided by Eye Departments or established Eye Clinics in P.H.C's, or District Hospitals. They operate by using mobile eve services. In India, the approach by mobile camps have gained popularity with good results. Apart from surgery these camps also undertake general health surveys, early detection of diseases, immunization, screening for ocular defects and education of the masses. They also serve in following up and evaluating these cases at regular intervals. The advantages of this 'system is that inexpensive and specialist facilities are taken to the masses at the peripheral levels. They also, undertake school screening, identification of con-genital, traumatic, cataract, and vision impairing deficiency diseases.

c. Tertiary Eye Care

These are usually established in regional or national capitals and are associated with medical colleges or institutions. These provide sophisticated eye can services, not available at secondary centers. Most states possess their own Eye Banks, Blind Rehabilitation centers, Braille schools, and Organizations where the blind are employed. These centers also help in arranging outlets for the products produced and manufacturedby the blind.

d. Specific Programs

Various programs have been undertaken under the national scheme for the prevention of blindness.

A few are mentioned below: I) Trachoma Control Programme

II. Vitamin A Prophylaxis Programme

III. School Eye Health Services

IV. Occupational Eye Health Services

Long Term Measures

These efforts are aimed at improving the quality of life and modifying or tackling the factors responsible for the persistence of eye health problems for e.g. poor hygiene and sanitation, bad dietary habits, and in changing certain social and behavioral patterns.

Evaluation

Evaluation must be an integral part of intervention programs, to measure .the extent of alleviation of ocular disease and blindness. The manner and degree to which these programs have been implemented should also be assessed to determine the nature of changes for further future improvements.

School health services are an important branch of community health services. Thepresent concept is that school health services are an economical and powerful means of raising the community health level.

Methodology

This was a cross sectional study carried out in schools for children aged 5–15 years to know the prevalence of refractive errors. The sample size was 1012 which included both boys and girls. Predesigned semi structured questionnaire was prepared as study tool The screening included both boys, and girls in the age group of 5 to 15 years. Students from the 1st Standard to the Xth Standard were screened for any ocular disorders. Screening was undertaken with the help and active cooperation of the school management. In each of these institutions the assistance of that particular class-teacher and the physical instructor was made available. The class teacher was given the proformas and general aspects, like name, age, sex, class, address were filled up. The physical instructor was helpful in organizing the students into batches and in their general discipline. He was also briefed before

the screening about what the study exactly aimed-at. He was given adequate training in the use of the "Snellens" chart for assisting in the recording of the distant visual acuity. Also with the help of pictures and charts, certain gross visual defects commonly encountered in children like for example: bitot spots, pterygiurn, conjunctivitis etc. were 'made familiar to him.

The data was entered in Microsoft excel and was analyzed.

Results

It was observed that higher percentages of children were affected in 6th, 7th and 8th classes.Their percentage being 9.35%, 10.53% and 9.18% respectively.

Out of 1012 students, 39 had refractive errors.

The Prevalence of refractive errors was-

Table 1: Refractive errors

Refractive Errors	Number of Students Affected	Percentage
Myopia	28	71.80%
Hypermetropia	08	20.51%
Astigmatism	03	7.69%
Total	39	100%

Table 2: Gender wise distribution of Refractive errors

Refractive Errors	Boys	Girls	Total
Myopia	18 (64.2%)	10(35.7%)	28
Hypermetropia	05 (62.5%)	03 (37.5%)	08
Astigmatism	02 (66.6%)	01 (33.3%)	03
Total	25 (64.1%)	14 (35.8%)	39

Out of 1012 students, 39 had refractive errors and among them 71.8% of students had myopia, 20.5% students had hypermetropia and 7.69% of students had astigmatism

The above table indicates that the type of refractive errors seen in both boys and girls in the decreasing order was found to be myopia, hypermetropia and astigmatism

Discussion

Childhood is the period of growth and development and is subjected to factors of stress and strain. The defence mechanism is not fully geared to combat external infections, and cannot sustain for long internal deficiencies, Hence, childhood is a very vulnerable period. Children ofschool going age are exposed to communicable eye diseases, nutritional deficiencies and many may be suffering from refractive errors needing only simple corrections. Any negligence, how ever slight might at times cost the child his vision or even the loss of his eye. Hence many Indian ophthalmologists of repute have, taken particular interest in screening school children for causes of visual impairment and blindness. The following are few such studies:

In 1977, Sharma et al, examined 4900 primary school children in urban areas of Jodh-pur city of Rajasthan found that nearly 4550 i.e, 92.86% were visually defective. In another study in 1974 by Surinder Siligh et al on 11,813 school children in Patiala city, 7590 i.e, 64.25% were found to be harbouring some or the other eye disease [5].

When the present study is compared to the above figures, it is observed that the present study has higher percentage of refractive errors (54.93%) whereas lower percentage of conjunctivitis (5.63%) and no case oftrachoma was detected.

James Kuruvilla et al examined 8,496 school children aged between 5-12 years in UdipiTaluk of South Karnataka district. 1061 (i.e, 12,5%) students were visually defective out of total 8496 students [6].

K. Indirabai et al conducted a study of school children at Tirupati in AdhraPradesh,while evaluating school Health Service Programme. Nearly 5900 primary school children within the age group 5-14 years were examined: they noted Vit. A deficiency in 17.5% of the children screened.

Pal et al found 42.20% incidence of eye problems in school screening study in New Delhi Mukerjee and Sengupta showed that in urban West Bengal 83% of school had some visual defect.

Sri HariRao et al found that 71.3% of children had some or other ocular defect in a school in New Delhi.

To conclude, in every city and every Village of our country, there are many school going children who

have defective eye sight due to nutritional deficiencies, inflections, injury or refractive error. These children need special attention. Unfortunately such visually defective children are not easily recognized by their teachers or by the poor and ignorant parents. Even when they are aware of the defect, they do not know that with the adoption of simple remedial measures, most of their disability could be over come and blindness prevented. As a result these children are the victims in the hands of their own parents and teachers. Both parents and teachers are equally responsible for the wellbeing and Welfare of school children.

Conclusion

In schools, training teachers in vision tests and identification of the common eye disorders can help the opthalmologist to identify ocular disorders in less time and with more efficiency. For this, a close working relationship between the teacher, parent and eye specialist is necessary especially for follow-up studies. It is only then that such screening programmes will become more meaningful and fruitful.

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[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

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Article in supplement or special issue

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Corporate (collective) author

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Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

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Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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