ORIGINAL ARTICLE

A two year study of keratoconus at eye hospital

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ABSTRACT

BACKGROUND: keratoconus is ectating corneal disorder of progressive form which involves thinning of cornea and causes significant visual disturbances. **OBJECTIVE:** this study was conducted to found incidence of keratoconus and to classify it according to severity and treat them accordingly. **MATERIAL AND METHODS:** study was conducted at eye hospital for a period of twenty four months. Total 40 eyes of 26 patients were included in the study. Cases were divided into mild, moderate, advance and severe according to topographic data. **OBSERVATION AND RESULTS:** we found out of 40 eyes 7 cases were mild, 20 cases were moderate, 11 cases were advanced and 2 cases were of severe stage. In 3 patients there was significant improvement in vision with spectacles, 23 cases preferred RGP lenses and 12 case preferred ROSE K lenses. In 2 cases Corneal cross linking surgery was done. **CONCLUSION:** keratoconus should be properly diagnosed and categorization of disease helps us to manage the patients.

Key words: keratoconus, cornea, contact lens.

INTRODUCTION

Keratoconus is a non-inflammatory disorder of cornea. It occurs due to progressive thinning of the cornea which is usually bilateral and involves the central two-thirds of the cornea. Etiology of Keratoconus is unknown and most likely it includes many factors. Although hereditary pattern is not predictable but there is strong evidence of genetic involvement and high concordance rate in monozygotic twins[1]. Positive family history has been reported in 6-8% of the cases and its prevalence in first-degree relatives is 15-67 times higher than the general population[2]. It is written that the incidence and severity of keratoconus may be high in Asian eyes. An early onset and more rapid progress to the severe disease stage at a young age and frequently by the second decade[3] Manifestations of keratoconus are limited to the cornea. They include steepening of the cornea,

especially inferiorly, thinning of the corneal apex, clearing zones in the region of Bowman's layer, scarring at the level of Bowman's layer. Diagnosis of the early stages of keratoconus is difficult. Popular corneal topographical criteria to define keratoconus include average simulated keratometry exceeding 45.7 dioptres or central corneal power greater than 47.2 dioptres or infero-superior asymmetry of more than 1.4 dioptres.[4] Published studies have documented geographical and ethnic variations in the profile and treatment modalities of keratoconus.[5,6,7] there appears to be a higher prevalence of the disease in dry climates and in the presence of atopy.[8,9] in this study our main objective is to explore current scenario of keratoconus cases.

MATERIAL AND METHODS

A longitudinal interventional study was done over a period of 24 months (November 2011 to October 2013) in 40 eyes of 26 patients of keratoconus those who presented in OPD at our eye hospital. Permission from institutional ethics committee was taken. Informed consent was taken in each case. Any history of Ocular allergies, ocular surgical history, history of glare, distortion of images, eye rubbing, any associated ocular or systemic disease and family history of keratoconus

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if present was noted. To report their eye rubbing habits the patients answered 'yes' or 'no' for each eye separately and to report contact lens comfort, contact lens wearing patients answered 'can tolerate' or 'cannot tolerate' separately for each eye. Thorough systemic examination, visual acuity was assessed using Log MAR visual acuity chart for distance and near. Objective and subjective refraction was done in each case. Evaluation of adenexa, anterior segment with slit lamp examination, fundus examination and schirmer's test were done in each case. Objective findings necessary for enrollment were corneal distortion in either eye (as seen with keratometry or retinoscopy) or the presence of either Fleischer's ring, Vogt's striae, scarring consistent with keratoconus or the presence of topographic evidence suggestive of keratoconus. Values of keratometry, corneal topography with ORBScan were noted. The grading of keratoconus based on keratometry was done for every patient. The keratoconus was sub grouped based on the keratometry value as mild (average Sim K: <45 diopter [D]), moderate (average Sim K: 45–52 D), advanced (average Sim K: 52–62 D), and severe (average Sim K: >62 D) based on the keratometry value[10]. Contact lens base curve was selected according to the flat k value. Lenses were fitted on the basis of flat K. A drop of Proparacaine 0.5% was put as a topical anesthesia and the lens was allowed to settle for about 5 -10 minutes before evaluating the fluorescein pattern. According to fluorescein staining fitting assessment was done. The dynamic and static fit was assessed. In dynamic fit assessment, the lens it was considered to be acceptable when the lens was centered adequately on the cornea with good post blink movement.

OBSERVATION AND RESULTS

study includes 40 eyes of 26 patients. 20 patients are male and 6 patients are female.

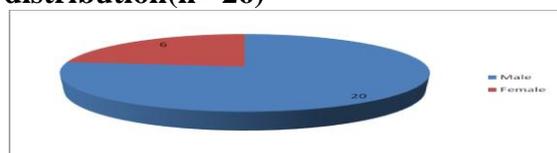**Figure1: legend shows gender distribution(n= 26)**

Table1: Age and sex distribution (n = 26)

S.No	Age group (in years)	Number of cases	Number of cases Male	Female	percentage
1	16-25 yrs	11	8	3	42.3
2	26-35 yrs	10	9	1	38.5
3	>35 yrs	5	3	2	19.2
Total number of Patients		26	20	6	100

Table 2: Study eye distribution

Laterality	Number of cases	Percentage
A) bilateral	28 (14 x 2)	53.8
B) unilateral		
1) Right	7	26.9
2) Left	5	19.2 } 46.2
Total	40	100

Table4: Symptoms at presentation in various stages of keratoconus.

Symptoms	Total eyes (n=40)	Mild (n=7)	Moderate (n=20)	Advanced (n=11)	Severe (n=2)
Frequent change of glasses	26	5	15	5	1
Image distortion	15	-	8	6	1
Eye rubbing	13	1	4	6	2
Glare	10	-	2	6	2
Monocular diplopia	3	-	-	2	1

Table5: Biomicroscopic signs based on severity of keratoconus.

Keratometry	Vogt's stria	Fleischer ring	Corneal scarring	Hydrops	No signs
Mild <45 D	-	-	-	-	7
Moderate 45-52 D	7	6	2	-	7
Advanced 52-62 D	6	7	2	-	1
Severe>62 D	-	-	1	1	-

Treatment: in all patients we tried spectacles but only in 3 mild cases there was significant improvement. After that we tried both RGP lenses and ROSE K lenses in those patients. In all cases (except two) there was significant vision improvement with lenses and it was better with ROSE K lenses. ROSE K lenses are not affordable to all because of their high cost. In our study total 23 eyes we prescribed RGP lenses and in 12 eyes (those patients who were willing to afford high cost) we prescribed ROSE K lenses. In two cases there was no improvement in vision with lenses so we proceeded for collagen cross linking surgery in those cases.

DISCUSSION

Keratoconus is a condition in which the cornea assumes a complex irregular

curvature caused by central corneal thinning. keratoconus is bilateral but usually asymmetric disease, reported incidence of unilateral disease vary from zero to forty one percent.[7,11,12] there is data that say that there is presence of both male[13] and female[14] preponderance in our study we found male preponderance. Approximate half patients presented below 25 years and more than 3/4th patients are below 35 year of age. Other studies also found increased number of cases in younger age group in Asian population[14,15]. The majority of patients reported a decrease in vision, frequent change of glasses and image distortion. Reduced visual acuity due to keratoconus is initially managed with spectacles. When spectacles fail to adequately correct visual acuity, contact lenses are the next option. Contact lenses often provide better vision than spectacles by masking irregular astigmatism (higher-order aberrations). Rigid gas permeable (RGP) lenses are required in order to mask the irregular astigmatism. Various specialized RGP lenses, such as Super Cone, and Rose K, have been developed for keratoconus, with a steep central posterior curve to vault over the cone and flatter peripheral curves to approximate the more normal peripheral curvature. Many researchers found that results are better in cases of ROSE K lenses[15,16] in comparison of RGP lenses but they are much costlier than RGP lenses. We also found the same results. Other treatment modalities are collagen cross-linking (C3R) by UV A rays and keratoplasty (Penetrating or lamellar keratoplasty). Surgery might be considered when patient are not able to tolerate lenses or there is no possibility of successful contact lens fitting due to un-resolving corneal hydrops. Penetrating keratoplasty (PK) or full-thickness corneal transplant historically has been the most common surgical correction for irregular astigmatism resulting from keratoconus. Corneal Collagen Cross-linking is an emerging modality in the treatment of keratoconus and we are doing this in our institute. Study on the prevalence of biomicroscopic signs in keratoconus found that more advanced disease was associated with a greater proportion of at least one positive, slit lamp finding.[17]In our study, 12 of 13 eyes (92.3 per cent) with advance and severe keratoconus elicited one or more slit lamp signs compared to 13 of 20 eyes (65 per cent) with moderate keratoconus ($p > 0.05$). The prevalence of individual signs was also higher in the severely keratoconus eyes. The data also supports the categorization of severity of keratoconus based on central keratometry. Our findings suggest that majority of cases of keratoconus were presented up to third decade early age so diagnosis is to be done early by the use of recent modalities of diagnosis. Treatment option may be selected according to patient tolerance and maintaining best visual acuity. Surgery is considered in special cases not responding to other modalities of treatment.

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