ORIGINAL RESEARCH

Clinical profile of keratoconus in central India

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ABSTRACT

Aim: The aim this study to describe the demography and clinical profile of keratoconus in central India. **Methods:** This is single centre, cross-sectional hospital-based study conducted on68 patients presenting between April 2023 to September 2023. All Patients of Keratoconus without any previous interventions were included in this study. **Results:** 129 eyes of 68 patients diagnosed with Keratoconusare used for the analysis. The mean age of patients was 19.01 +/- 6.64years.The majority of patients were male (58.82%) Out of 68patients 61 had bilateral keratoconus (89.7%) and 7 patients had unilateral presentation (10.29%). Common signs noted were prominent corneal nerves (58.13%), Fleischer ring (50.38%), corneal thinning(45.73%), Vogt's striae (24.80%), and corneal hydrops (2.32%). Allergic eye disease like Vernal kerato conjunctivitis(VKC) was most common association noted. **Conclusion:** Study concludes that bilateral nature of disease was more preponderant. Gender dominance was seen in males with commonest presentation in second and third decades. Common Mode treatment included corneal collagen cross linking, Scleral contact lenses and keratoplasty.

Key word: Keratoconus, Corneal Ectasia, Collagen Cross Linking

INTRODUCTION

Keratoconus isa non-inflammatory, progressive ectasia affecting the cornea.[1] It is commonly a bilateral but asymmetric[2,3] disease. It is characterized by the protrusion of the cornea caused by localized and central corneal thinning.[4] Keratoconus causes irregular astigmatism, leading to various degree of visual impairment.[5] Existing literature indicates that keratoconus tends to occur in adolescence and most likely the course of progression extends to the age of 30 or 40 years.[3] Many risk factors of keratoconus have been described previously, including rubbing one's eyes, family history of keratoconus, atopy, allergy, asthma, and eczema.[6] Clinically, the disease ranges from subclinical "formefruste" keratoconus (ffKC) to the more severe progressive form, resulting in corneal scarring, hydrops, and blindness. The prevalence of keratoconus is highly variable, ranging from 0.2/100,000 in Russia[7] to 3,300/100,000 in Iran.[8]The aim of this study is to describe the prevalence and clinical profile of keratoconus in central India.

METHOD

This is single centre, cross-sectional hospital-based study conducted on 68 patients presented between April 2023 to September 2023. All the patients of Keratoconus without any previous interventions were included in this study. Any patient with a history of ophthalmic surgery was excluded. Informed consent was obtained from the patient or the parents/guardians of the patient. Clinical records from the Cornea Clinic of School of Excellence for Eye, MGM Medical College Indore were reviewed. The parameters noted were patient's demographics, associated conditions, presenting visual acuity (uncorrected or best corrected with spectacle), Slit lamp biomicroscopic findings(Clinical Finding), keratometric reading on auto keratometer and topography . Based on presenting visual acuity (logMar) patients were classified as no visual impairment (0.00-0.18), mild visual impairment (0.30-0.48), moderate visual impairment (0.60-1.00)and severe visual impairment (< 1.00). Keratoconus was categorized according to the Amsler Krumeich (AK) classification with corneal topography data[9]

RESULT

Diagnosis was made clinically and confirmed by topography. 129 eyes of 68 patients were diagnosed with keratoconus. The mean age of keratoconus is 19.01 +/- 6.64 (9-45) years. Male were affected more commonly with male to female ratio1.42. Out of 68 patients 61 had bilateral keratoconus (89.7%) and 7 patients had unilateral presentation (10.29%). (Table 1)

Table 1: Demography

SN	Parameters	No	%
1	Total patients	68	
2	Bilateral cases	61	89.70
3	Unilateral cases	7	10.29
4	Mean age +/- SD(range)	19.01+/- 6.64(9-45)	
5	Male female Ratio	1.42	

Common clinical findings included prominent nerves, Fleischer ring, central thinning, Vogt's striae, corneal scarring and hydrops.(Table 2)

Table 2: Clinical findings

SN	Findings	No of eyes	%
1	Prominent corneal nerves	75	58.13
2	Fleischer ring	65	50.38
3	Central thinning	59	45.73
4	Vogtsstriae	32	24.80
5	Corneal scarring	14	10.85
6	Hydrops	3	2.32

Among the 68 patients, history of eye rubbing and allergic eye disease like vernal keratoconjunctivitis(VKC) were the most common association noted in this study. Family history of keratoconus were noted in 3 (4.41%) patients. (Table-3)

Table 3: Associated Conditions

SN	Associated conditions	No of patients	%
4	Eye rubbing history	12	17.6
1	Allergic eye disease like Vernal keratoconjuctivitis	11	16.17
2	Allergic Rhinitis/Asthma	4	5.88
3	Family history	3	4.41
5	Marfan's syndrome	1	1.47

At the time of diagnosis most of the eyes; 58 (44.96%)had moderate visual impairment (0.60-1.00). Nil visual impairment (0.00-0.18), mild visual impairment (0.30-0.48)and severe visual impairment (Worse than 1.00) were seen in 33 (25.58%), 26 (20.15%), and 12 (18.38%)eyes, respectively.(Table-4)

Table 4: Presenting Visual Acuity

SN	Grade of visual impairment	Visual acuity (Log Mar)	No of eyes	%
1	No impairment	0.00-0.18	33	25.58
2	Mild	0.30-0.48	26	20.15
3	Moderate	0.60-1.00	58	44.96
4	Severe	< 1.00	12	9.30
	Total eyes		129	

Corneal topography was done in all the patients. Severity of all the eyes were graded according to the Amsler-Krumeich(AK) criteria. Stage 2 keratoconus was seen in nearly 66 (51.16%) eyes followed by stage 3(24.03%), stage 1(17.82%) and stage 4(6.6%).(Table-5)

Table 5: Staging of Keratoconus-According to the Amsler-Krumeich(AK) criteria

SN	Stage	No. of eyes	%
1	Stage 1	23	17.82
2	Stage 2	66	51.16
3	Stage 3	31	24.03
4	Stage 4	9	6.60

In our study corneal collagen cross linking(37.20%) was the most commonly performed procedure in the management of keratoconus. Scleral lens with or without prior corneal collagen cross linking was used

in 30 eyes (23.25%). Keratoplasty (Full thickness/DALK) was done in 11 eyes (8.52%).

DISCUSSION

In our study mean age of presentation was 19.01 +/- 6.64 (9-45) years, which is more and less similar to mean age reported in others studies from Asia.[12,14] A study in United Kingdom has shown that Asians develop Keratoconus at a significantly younger age compared to the Caucasian population.[13] A study from Saudi Arabia reported the mean age (17.7 y) of presentation is nearly similar to our study.[15] . The correlation between Keratoconusand gender is unclear. In our study male were affected more commonly than female with male to female ratio 1.42. Many studies have shown Keratoconus to be more prevalent in males.[5,16,17] Others have found females to be more commonly affected.[10,11] Ziaei et al. [18] found a male-to-female ratio of 1.02 among the Iranian population. A multicentric study from India showed significantly higher prevalence in male patients.[21]In our study most of the cases were bilateral (89.70%) and similar results werenoted in other studies also (19, 20). We have noted that patients presented with severe visual impairment had unilateral presentation. In our study most common clinical findings noted were prominent corneal nerves (58.13%) followed by Fleischer's ring (50.38%), CLEK study [22] showed fleischer's ring as the most common finding followed by prominent corneal nerves. Other finding noted in our study were central thinning (45.73%), Vogt's striae (24.80%), and hydrops (2.32%).Eye rubbing (17.6%) and allergic eye disease like vernal keratoconjunctivitis (VKC)(16.17%) were the most common association noted in this study . Allergic rhinitis, asthma and marfan's syndrome were the other associations observed in the study. Family history of keratoconus were noted in 4.41% patients. Similar associations were noted in other studies[6, 23-25] In present study most patients (65.11%) presented with mild to moderate visual impairment in the affected eye. This is contrary to another study of India[21],where most of the patients(61.42%) had nil to mild visual impairment. Most of the patients in this study were diagnosed in stage 2- 3, might be a reason for mild to moderate visual impairment. According to Amsler-Krumeich staging Stage 2 keratoconus was seen in nearly 66 (51.16%) eyes followed by stage 3(24.03%), stage 1(17.82%) and stage 4(6.6%). Previous studies[26,27] have reported a high percentage of patients presenting with severe Keratoconus based on the CLEK classification. Mahadevan et al (2009) revealed that most Keratoconus patients presenting to a tertiary eye care hospital had advanced KC with corneal curvatures of greater than 52D (27). We have noted that spectacle intolerance was the commonest reason for seeking medical intervention in the in the later stages of Keratoconus. A study from Iran reported that over 50% of patients presented with moderate Keratoconus[17] Most patients in the Collaborative Longitudinal Evaluation of Keratoconus (CLEK) study presented with moderate to advanced stages.[26]Another study from India showed half of the patients presented with stage 1 disease and over a quarter presented in stage 2.[21] In our study corneal collagen cross linking (37.20%) was the most commonly performed procedure to manage keratoconus which is more than other studies.[17] The probable reasons beingadvancement in technology that offers treatment for wide range of patientsand more number of stage 2 - 3 patients with progressive keratoconus. Scleral lens with or with prior corneal collagen cross linking was used in 30 eyes (23.25%). A reasonable contact lens service, noninvasive and better visual outcome are the reason for such number of scleral contact lens. Keratoplasty (Fullthickness/DALK) was done in 11 eyes (8.52%). Earlier studies have reported that approximately 12–20% of patients with Keratoconusrequire keratoplasty.[3,28-29] S Rafati et al. [17] also reported that 10% of their patients needed keratoplasty.

CONCLUSION

Keratoconus is usually bilateral and predominantly affects males. Keratoconus commonly presents in the second and third decade of life with majority diagnosed in stage 2/3 with mild to moderate visual impairment. Presently Collagen cross linking and sclera lenses are the commonly used modalities to treat keratoconus.

Financial Interest - Nil
Conflicts of Interest – Nil

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