

Original Article**Profile and Visual Outcome of Patients having Keratoconus Attending Tertiary Eye Hospital, Nepal****Pankaj Ray Adhikari*^{1,2}, Nirmala Chaudhary¹, Rajiv Ranjan Karn³**¹Department of Contact lens, Biranagar Eye Hospital, Biratnagar, Nepal, ²National Academy of Medical Sciences, Nepal, ³Department of Research, Eastern Regional Eye Care ProgramArticle Received: 8th February, 2024; Accepted: 14th April, 2024; Published: 30th June, 2024DOI: <https://doi.org/10.3126/jonmc.v13i1.68100>**Abstract****Background**

Keratoconus is a bilateral, asymmetric, chronic, progressive ectasia of the cornea in which patients experience distorted vision that is usually treated with rigid contact lenses when spectacles no longer provide adequate vision. The aim of the study was to find out the clinical profile and visual outcome of the patient having Keratoconus.

Materials and Methods

The hospital based cross sectional study was done at Biratnagar Eye Hospital, Biratnagar. All the diagnosed Keratoconus patients referred from cornea clinic to contact lens clinic for contact lens trial were included in this study between 1st January 2017 to 31st December 2019. Diagnosis was done by using keratometry and pachymetry findings or by using corneal topography findings and slit lamp examination.


Results

Total 133 patients were enrolled in the study among them the mean (\pm SD) age was 20.2 (\pm 6.9) with a minimum of 9 and a maximum of 50 years of age. Most of them were male 89 (67%) and 78 (58.7%) patients were between 16 to 25 years of age group. Most of the eyes had moderate 161 (63.4%) type in which the amount of refractive was high 201 (79%) and RGP contact lens 245 (96.4%) was tried for vision correction. Normal vision (0.0 to 0.5 Log MAR) was found in 255 (96%) of eyes among them 194 (73%) of eyes got better than 0.2 log MAR visual acuity after the contact lens trial.

Conclusion

Keratoconus was found mostly in younger male patients and gas permeable contact lenses were most commonly used treatment modality.

Keywords: *Contact lens, Keratoconus, Patients, Nepal, Visual outcome*

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Introduction

Keratoconus (KCN) is a bilateral, asymmetric, chronic, progressive ectasia of the cornea characterized by steepening, apical thinning and sometimes corneal scarring [1].

It has been classified as mild, moderate, advanced and severe [2]. It affects mostly younger patients [3] and hampers the quality of life [4]. It is treated optically by spectacle and Contact lenses (CLs), surgically by Collagen Cross Linking (CXL), Penetrating Keratoplasty (PK) [4]. Its prevalence varied in different part of the world [5].

The aim of the study was to find out the clinical profile, and visual outcome of the patient having KCN.

Materials and Methods

The hospital based cross sectional study was conducted at contact lens clinic of Biratnagar Eye Hospital (BEH) by analyzing the data retrospectively between 1st January 2017 to 31st December 2019. Ethical clearance was taken from Institutional Review Committee (BEH-IRC-38/A). All the diagnosed KCN patients referred from cornea clinic to contact lens clinic for contact lens trial were included and patients with other ocular diseases other than KCN were excluded from the study. A total 254 eyes of 133 patients were enrolled in the study. Diagnosis of KCN was done by using keratometry and pachymetry (Zeiss IOL Master 700) findings or by using corneal topography (Bon) findings and slit lamp examination. The routine preliminary examination for contact lens evaluation was performed followed by contact lens trial by an optometrist trained in contact lens care[3]. CXL was performed in most of the KCN patients having corneal thickness >400 microns [6] followed by CL trial. Different types of CL trial were performed by knowing the severity of KCN. For mild to moderate KCN spherical RGP lens, for advance KCN special RGP lens for Keratoconus and for severe KCN Rose K lens was tried. Demographic profile such as age, gender, nationality, laterality, uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) with CL, manifest refraction, types and amount of refractive error, types of CL trial were taken for the analysis by entering in excel sheet

and analysis was performed by using SPSS software version 20. Chi-square test was used for statistical analysis and P value <0.05 was considered for significance. Refractive errors were classified according to following criteria [7]. A) Hyperopia: Refractive error at least +0.5 D. this was further classified as Low (+0.50D to +3.0D), Medium (+3.0D to <+6.0D) and High (more than +6.0D) B) Myopia: Refractive error at least -0.5 D. this was further classified as Low (-0.50D to -3.0D), Medium (-3.0D to <-6.0D) and High (more than -6.0D) C) Astigmatism: astigmatism was classified as Simple Hyperopic Astigmatism (SHA), Simple Myopic Astigmatism (SM-A), Compound Hyperopic Astigmatism (CHA), Compound Myopic Astigmatism (CMA), and Mixed Astigmatism (MA). The Visual Acuity (VA) was categorized as per WHO guidelines. (0.0 to 0.5 logMAR -Normal), (0.6 to 1.0 logMAR-Visual Impairment), (1.0 to 1.3 logMAR- Severe Visual Impairment), (<1.3 logMAR to NPL -Blind) [8].

Results

During the study period, a total of 290 patients were referred to contact lens department for contact lens evaluation among them 254 eyes of 133 patients having Keratoconus (KCN) were included in this study. Out of 580 eyes, KCN 254 (43.8%) was the most common ocular disorders found among the contact lens patients followed by myopia 104 (18%) as shown in Table 1.

Table 1: Diagnosis of 580 eyes of 290 patients

Diagnosis(eyes)	Frequency (N=580)	Percentage
Emmetropia	88	15
Hyperopia	3	0.5
Myopia	104	18
Astigmatism	50	8.6
Keratoconus (KCN)	254	43.8
Corneal Opacity(CO)	66	11.5
Aphakia	10	1.8
Others	5	0.8

The mean (\pm SD) age of the KCN patient was 20.2 (\pm 6.9) with a minimum of 9 and a maximum of 50 years of age. Most of them were male 89 (67%) from India 103 (77.4%) and 78 (58.7%) patients were between 16 to 25 years age group. It was found mostly in both eyes of 121 (91%) patients as shown in Table 2.



Table 2: Demographic profile of 133 KCN patients

Mean age (±SD) Variable	20.2 (±6.9) Frequency (N=133)	Percentage
Gender		
Male	89	67
Female	44	33
Country		
Nepal	28	21.1
India	103	77.4
Bangladesh	2	1.6
Age group(years)		
9 to 15	33	24.8
16 to 25	78	58.7
26 to 50	22	16.5
Laterality		
Right Eye (RE)	7	5.2
Left Eye (LE)	5	3.8
Both Eye (BE)	121	91

Among 266 eyes of 133 patients, KCN was found in 254 eyes in which amount of refractive errors was high 201 (79%) eyes followed by medium 42 (16.5%). Blurred/distorted vision 81 (61%) was the major complaints by the patients followed by frequent power changes in spectacles 22 (16.5%). Moderate 161 (63.4%) type of KCN was found in most of the patients followed by advanced 66 (26%). Contact lens trial was done in all eyes except emmetropic eyes 12 (4.5%). Rigid Gas Permeable (RGP) 245 (96.4%) contact lens trial was done in most of the eyes followed by Rose K contact lens 4 (1.5%). Moderate KCN was found more in 16 to 25 yr of age group which was highly statistically significant (chi square test) as shown in Table 3.

Table 3: Association between Severity of KCN with Age group

Severity of KCN	Age group (Yr)			Total	P value
	9 to 15	16 to 25	26 to 50		
Mild	6	6	10	22	0.003
Moderate	30	104	27	161	
Advance and Severe	24	40	7	71	
Total (eyes)	60	150	44	254	

The maximum number of KCN patients were examined in the year 2019 which was more than 5 times higher than in the year 2017 (Figure 1).

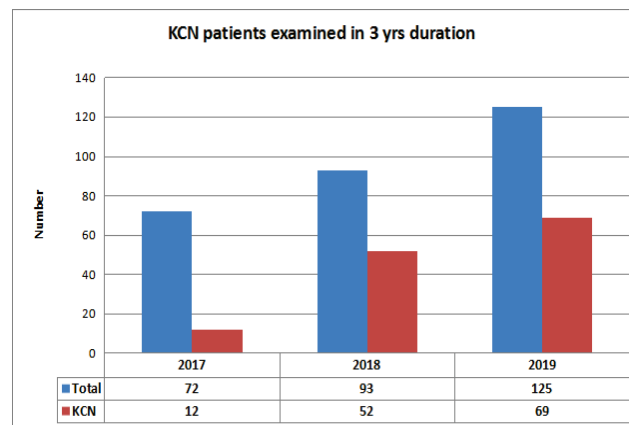


Figure 1: Number of KCN patients examined in 3 year duration

Before contact lens trial, only 54 (20.3%) eyes of KCN patients had normal category vision which was improved to 255 (95.9%), 127 (47.8%) eyes had VI, 41 (15.4%) eyes had SVI and 44 (16.5%) eyes had blind category vision which was reduced to 8 (3%), 1 (0.4%) and 2 (0.7%) respectively after contact lens trial as shown in Figure 2.

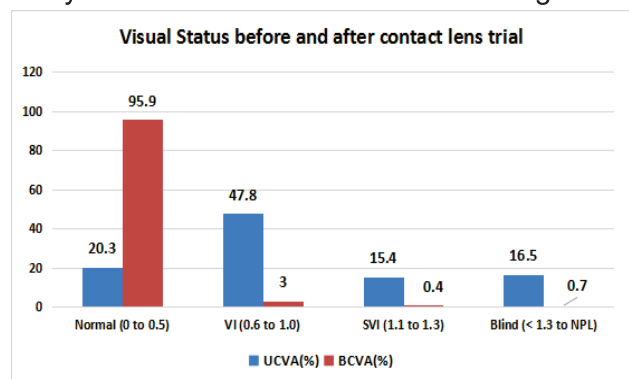


Figure 2: Visual status before and after contact lens trial among 266 eyes of 133 KCN patients

Before contact lens trial, only 16 (6%) eyes of KCN patient had visual acuity better than 0.2 log MAR which was improved to 194 (73%) after contact lens trial as shown in Figure 3.

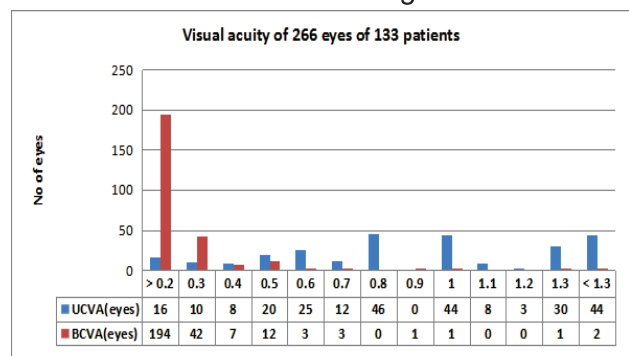


Figure 3: Visual Acuity before and after Contact lens trial in 266 eyes of 133 KCN patients

Discussion

In this study mostly moderate type of KCN was found mainly in 16 to 25 yr of age group. High amount of refractive error was found in most of the eyes. Visual acuity was improved to normal by doing Rigid Gas Permeable (RGP) contact lens trial in most of the eyes. BEH is a Tertiary Eye Care Hospital in Nepal and also the referral center for KCN in eastern Nepal and nearby neighboring countries with different subspecialty clinics including cornea and contact lens where different corneal disorders including KCN and other irregular corneas have been treated medically, optically, and surgically [9]. The mean age of the patient was 20.2 which was similar to the study done in Nepal,[10] Malaysia,[11] and Sudan [12].

KCN was found mostly in male 67% which was similar to the study done in Nepal[10], Malaysia [11], and London[1] but found more in female in study done in Saudi Arabia[13]. It was found mostly in younger age group which was similar to the study done by Kok[14]and Georgiou[15]. The amount of RE was high in the KCN patient which was similar to the study done at Saudi Arabia [15]. The reason might be due to late presentation and less awareness among patients. Most of the eyes were found moderate to advanced KCN followed by mild and severe which was different from the study done in Nepal[10]. KCN was found mostly in both eyes which was similar to studies done in Nepal [10] but different from the study done in US [16] in which it was found in one eye. The reason might be due to referral cases from different places.

Most of the eyes of patients got normal visual acuity (>0.2 Log MAR) after contact lens trial which was similar to the study done in London [1]. RGP contact lens was the most commonly used treatment modalities for all KCN patients similar finding was given in some of the studies [1, 4,6,17,18,19]. Most of the eyes had undergone CXL to stop the progression of KCN followed by contact lens trial and PK was not performed in any of eyes during the study period because the visual acuity was improved in most of the eyes and also due to less availability of donor corneal tissues as in developed countries where KCN is the common indication for PK due to intolerance of CL, frequent CL displacement and poor visual acuity as found in some of the studies [1,20].

There is lack of availability of other types of contact lenses like corneo-scleral, mini scleral and scleral lenses in our contact lens clinic which is beneficial for severe KCN.

Conclusion

Keratoconus was found mostly in younger male patients which was increasing every year and RGP contact lens was most commonly used treatment modality.

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Conflict of interest: None

Financial disclosure: None

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