International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsjournals.com
Volume 1; Issue 3; October 2015; Page No. 59-61

Rose K contact lenses for keratoconus—visual outcome and comfort

[1] Geetika Srivastava, [2] Uma Sridhar, [3] Yogeshwari Bansal, [4] Atul Shrivastav

[1] Resident Doctor, ICARE eye hospital and Post graduate institute, NOIDA, UP

[2] Senior Consultant, Cornea Department, ICARE eye hospital and Post graduate institute, NOIDA, UP

[3] Senior Optometrist of ICARE eye hospital and Post graduate institute, NOIDA, UP

[4] Asso. prof., Dept. of Pathology, GMERS Medical College, Himmatnagar, 383001

Abstract
Introduction: Keratoconus is a non-inflammatory, progressive thinning of the cornea that is usually bilateral and involves the central two-thirds of the cornea. Etiology is unknown and most likely multifactorial.
Aims & Objectives: study evaluated the visual outcome and patient acceptability with Rose K contact lenses in patients with irregular astigmatism due to keratoconus.
Material & Methods: About 14 patients (21 eyes) with keratoconus were fitted with Rose K lens in the Cornea Department of our institute between January 2012 to October 2012. All the patients underwent a complete ophthalmic examination and best-corrected visual acuity measurements were taken with glasses at the baseline visit.
Results: There was a significant increase in visual acuity with Rose K lens compared with best corrected spectacle visual acuity.
Conclusion: Rose K lens design is useful in the management of all grades of keratoconus.

Keywords: Kertoconus, Rose K lens, Visual acuity.

Introduction

KERATOCONUS is a developmental anomaly in which the inferior or central portion of the cornea becomes thinner and bulges forward in a cone-shaped fashion as a result of non-inflammatory thinning of the corneal stroma [(1)]. Thinning of the superior portion of the cornea has been reported but is very rare [(2)]**.**The corneal thinning induces irregular astigmatism and myopia leading to mild to marked visual impairment [(3)]**.**

The hereditary pattern is not predictable although the strongest evidence of genetic involvement is a high concordance rate in monozygotic twins [(4)]. A 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 [(5)].The incidence and severity of keratoconus in Asian eyes may be high with an early onset and more rapid progress to the severe disease stage at a young age; frequently by the second decade [(6)]

Keratoconus is bilateral, although usually asymmetric in severity and progression. In many cases, the disorder may start unilaterally, but eventually the other eye becomes involved [(7)]**.**The disease has its usual onset at puberty and, in many cases, progresses until the third to fourth decade of life, when it usually arrests[(1)]. Keratoconus affects both genders, although it is unclear whether significant differences between males and females exist. The preponderance of men over women has been noted in the most recent studies [(8-10)]. Georgiou et al reported a difference of 2.6 times higher in men than women [(11)]. 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. Although a large proportion of keratoconic patients can be managed with contact lenses, an average of about 20% of all keratoconic corneas require keratoplasty; some authors report markedly different surgical indication rates of 6.5% and 12 to 45% [(12, 13, 14)]**.**

Contact lenses often provide better vision than spectacles by masking irregular astigmatism (higher-order aberrations). Rose K contact lens is a multi-spherical posterior design with aberration control aspheric optics across the back and front optic zone diameters. This study represents a case series of patients assembled to evaluate visual outcome in patient of keratoconus after using Rose K contact lens and subjective comfort after using of Rose K lens.

Materials and Methods

A longitudinal interventional study was done at ICARE eye hospital and Post graduate institute Noida over a period of 10 months (JANUARY 2012 TO OCTOBER 2012) in which Rose K contact lenses were fitted in 21 eyes of 14 patients (12 males and 2 females)of keratoconus.

Inclusion Criteria

Motivated patient with keratoconus and no other ocular cause of low vision, age more than 16 yrs, patients already using other contact lens, or who had underwent C3R(Corneal Collagen cross linking) procedure for keratoconus.

Exclusion Criteria

Patient with anterior or posterior segment pathology, unwilling patient, age below 16 yrs. Ocular allergies (veneral keratoconjuctivitis and others), dry eye, pregnancy and patient who lost follow up.

An informed consent was taken. Any history of intolerance to contact lens, Ocular allergies, if present was noted. 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) and 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 subgrouped 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 [14].

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.

In static fit, the goal was to achieve a "feather touch" in the centre with mid peripheral bearing and peripheral clearance. If first trial lens was steep than a flatter base curve was taken. The trial was repeated until we achieved an acceptable dynamic and static fit. After finding the optimal lens fit, the final power was calculated by performing a spherical objective and subjective over refraction over the trial lens. Any ocular discomfort or foreign body sensation with the lens was noted. Rose K lenses were given to the patients who had successful trials. Follow up was done after 2 and 4 weeks. At each follow up BCVA, subjective comfort, daily lens wearing time, and numbers of contact lens removal per day were evaluated.

Results

6 patients (42.85 %) were in the age group of 16-25 years, 6 patients (42.85 %) were in the age group of 26-35 years and 2 patients were in the age group of above 35 years (14.28 %). Age and sex distribution are shown in figure 1.

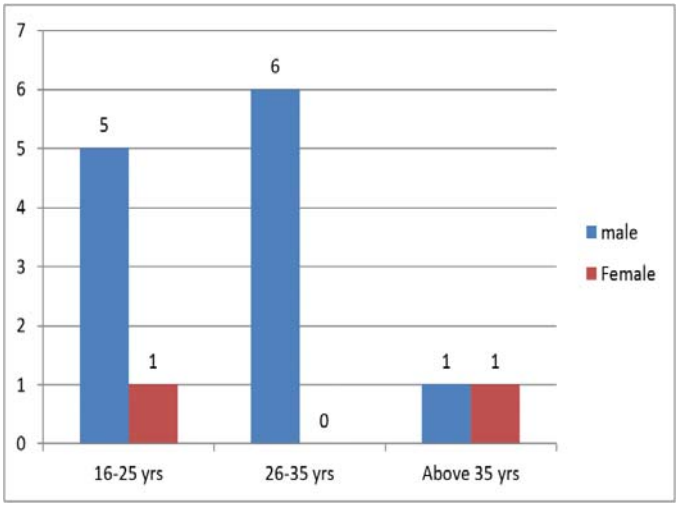

Fig 1: Bar Diagram Showing Age And Sex Distribution.

Out of 21 eyes 3 (14.28 %) eyes in our study group had mild keratoconus, 11 eyes (52.38 %) had moderate keratoconus, 6 eyes (28.57 %) had advanced keratoconus and 1 (4.76 %) had severe kaertoconus. (Figure 2) The study evaluated the visual performance for all eyes. There was a significant increase in the visual acuity with the Rose K lens compared with best corrected spectacle visual acuity (BCVA)**.**

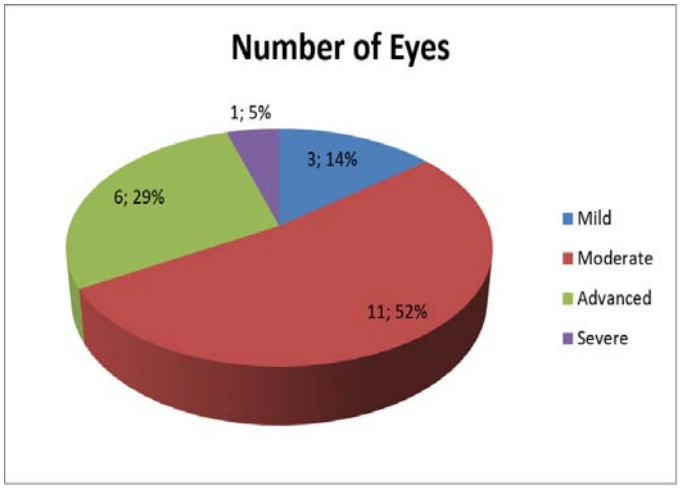

Fig 2: Pie chart showing eyes distribution on basis of severity.

Average values of base curve of Rose K lens (mm) for mild cases was 7.5 +/- 0.43, for moderate cases 7.2 +/- 0.32, advanced cases 6.7 +/- 0.21, and for the severe case it was 6.4 mm (Table 1). In our study it is shown that minus power of Rose K contact lens increases as the keratoconus advances (Table 2). Average vision improvement with Rose K lens was 0.15 +/- 0.13, as comparison to average vision improvement with glasses which was 0.44 +/- 0.25. It was very significant (p = 0.0001) (Table 3). Average BCVA (LogMAR) at 2 weeks was 0.11 +/- 0.11 while at 4 weeks it was 0.10 +/- 0,11, which was not very significant. Number of wearing hours of Rose K lens was increasing with the duration. Patients were comfortable and there was no need to remove lens in course of a day (Table 4).

Table 1: Comparison of Rose K lens base curve in different stages of keratoconus

Stages of keratoconus	Base curve of Rose K contact lens (mm)	Equivalent diopter
Mild	7 – 7.8	48.25 – 43.25
Moderate	6.6 – 7.6	51.12 – 44.37
Advanced	6.4 – 7.0	52.6 – 48.25
Severe	6.4	52.6

Table 2: Comparison of diopteric power of Rose K lens in different Stages of keratoconus

Stages of keratoconus	Power of contact lens (ROSE K)
Mild	-2.58 +/-2.1
Moderate	-3.20 +/-2.01
Advanced	-8.33 +/-2.6
Severe	-14

Table 3: Comparison of vision improvement with glasses with Rose K lens in keratoconus patients

	VISION (LogMAR)
WITH GLASSES	0.44 +/- 0.25
WITH ROSE K	0.15 +/- 0.13

Table 4: Follow up of Rose K lens

FOLLOW UP	Average BCVA (Log MAR)	AVERAGE NO. OF WEARING HOURS PER DAY	NO. OF TIMES LENS REMOVED IN COURSE OF A DAY
2 WEEKS	O.11 +/- 0.11	13.38 +/- 0.64 hrs.	-
4 WEEKS	0.10 +/- 0.11	13.61 +/- 0.49 hrs.	-

Discussion

For mild or moderate irregularities- soft, soft toric or custom soft toric-contact lenses can be used. Severe irregularities require rigid gas permeable (RGP) lenses in order to mask the irregular astigmatism. Fitting rigid gas-permeable (RGP) contact lenses in irregular astigmatism is difficult because of lens instability due to the superior flat and inferior steep profile of the cornea with a significant decentration tendency of the contact lenses. Of the 21 eyes 3 were mild, 11 were moderate, 6 were advanced and 1 was severe grade of keratoconus. Keratoconus was subgrouped on basis of average Sim K value. In our study 21 eyes were analyzed and in these eyes vision improved from 0.44 +/-0.25 prefitting best spectacle corrected LogMAR visual acuity) to 0.15 +/- 0.13 with Rose K lens (in LogMAR). Sudherman et al [14] described that vision improved from 0.62 (prefitting best spectacle-corrected LogMAR visual acuity average value) to 0.12 with the final Rose K lens in LogMAR visual acuity [14]. In a study conducted by Ozkurt et al[15] prefitting average best corrected visual acuity of patients was 0.44 +/- 0.14 and average visual acuity (Log MAR) with Rose K contact lens was 0.12+/-0.15 [15].

Fatima et al [16] analyzed that with Rose K contact lens BCVA improved to 0.18 LogMAR or better in 91.2 % and all improved to 0.48 LogMAR. In this study we have also done trial of Rose K lens in 2 post C3R patients (3 months). Both cases were advanced keratoconus. Vision improved up to 0.18 (LogMAR) in both the cases.

Follow up of Rose K lens was done at 2 weeks and 4 weeks. During follow up we assessed BCVA, wearing time of Rose K lens, number of times lens were removed in a day, and subjective comfort like watering, redness, foreign body sensation and discomfort. At 2 weeks follow up average BCVA (log MAR) with Rose K lens was 0.11 +/- 0.11, while at 4 weeks follow up average BCVA was 0.10 +/- 0.11. Average number of wearing hours of Rose K lens at 2 weeks was 13.28 +/- 0.64, while average number of wearing hours at 4 weeks was 13.61 +/- 0.49. There was not much difference in average wearing hours at 2 and 4 weeks. Patients were comfortable with Rose K lens. Average number of wearing hours varied from person to person according to their profile and comfort. In only 1 patient, deterioration of subjective comfort was noted during their follow up. Complications noted included epithelial abrasion in two eyes of one patient at 2 weeks follow up. One of the drawback of our study was that qualitative analysis using contrast acuity charts was not done.

Conclusion

Rose K contact lens is an important emerging modality in case of keratoconus. There was a significant increase in visual acuity with Rose K lens compared with best corrected spectacle visual acuity. Our study showed that the Rose K lens design is useful in the management of all grades of keratoconus.

References

1. Krachmer JH, Feder RS, Belin MW. Keratoconus and related no inflammatory corneal thinning disorders. Surv Ophthalmol 1984; 28:293-322.
2. Prisant O, Legeais JM, Renard G. Superior keratoconus. Cornea 1997; 16:693-94
3. Tuft SJ, Moodaley LC, Gregory WM, Davison CR, Buckley RJ. Prognostic factors for progression of keratoconus. Ophthalmology 1994; 101:439-47.
4. Edwards M, McGhee CN, Dean S. The genetics of keratoconus. Clin Exp Ophthalmol 2001; 29:345-51.
5. Wang Y, Rabinowitz YS, Rotter JI, Yang H. Genetic epidemiological study of keratoconus: Evidence for major gene determination. Am J Med Genet 2000; 93:403-9.
6. Saini JS, Saroha V, Singh P, Sukhija JS, Jain AK. Keratoconus in Asian eyes at a tertiary eye care facility. Clin Exp Optom 2004; 87:97-101.
7. Holland DR, Maeda N, Hannush SB, Riveroll LH, Green MT. Unilateral keratoconus Incidence and quantitative topographic analysis. Ophthalmology 1997; 104:1409-13.
8. Ertan A, Muftuoglu O. Keratoconus clinical findings according to different age and gender groups. Cornea 2008; 27:1109-13.
9. Millodot M, Shneor E, Albou S, Gordon-Shaag A. Prevalence and associated factors of keratoconus in Jerusalem: A cross-sectional study. Ophthalmic Epidemiol 2011; 18:91-97.
10. Weed KH, MacEwen CJ, Giles T, Low J, McGhee CN. The Dundee university scottish keratoconus study: Demographics, corneal signs, associated diseases, and eye rubbing. Eye (Lond) 2008; 22:534-41.
11. Georgiou T, Funnell CL, Cassels-Brown A, O'Conor R. Influence of ethnic origin on the incidence of keratoconus and associated atopic disease in Asians and white patients. Eye (Lond) 2004; 18:379-83.
12. Ota R, Fujiki K, Nakayasu K. Estimation of patient visit rate and incidence of keratoconus in the 23 wards of Tokyo. Nihon Ganka Gakkai Zasshi 2002; 106:365-72.
13. Gordon MO, Steger-May K, Szczotka-Flynn L, et al. Baseline factors predictive of incident penetrating keratoplasty in keratoconus. Am J Ophthalmol 2006; 142:923-30.
14. Sudharman PM, Rathi V, Dumapati S. Rose K lenses for keratoconus--an Indian experience. Eye contact lens 2010; 36(4):220-2
15. Ozkurt YB, Sengor T, Kurna S, Evciman T, Acikgoz S, Haboğlu M *et al.* contact lens fitting for keratoconus. Int Ophthalmol 2008; 28(6):395-398.
16. Fatima T, Acharya MC, Mathur U, Barua P. Demographic profile and visual rehabilitation of patients with keratoconus attending contact lens clinic at a tertiary eye care centre. Cont lens anterior eye 2010; 33:19-22.