International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

A Contact Lens in the Management of Complications of Post - Refractive Surgery: A Case Study

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Abstract: ***Purpose: To manage the complication of post radial keratotomy with corneal scleral lens. Case report: A 55 - year male visited an eye hospital with a complaint of itching in both eyes for one week, he has a history of radial keratotomy done in both eyes 25 years back, his unaided visual acuity for distance RE 6/36 and for LE 6/36p with pinhole the vision in RE 6/12 and in LE 6/9 with corneal irregularities. His best corrected visual acuity was 6/9p in both eyes. We had fitted a corneal scleral lens which has improved the visual acuity and visual comfort. Conclusion: This study suggests that the use of larger diameter lenses will be a good option which will create uniform post lens tears reservoirs that neutralize the optical abnormality of irregular cornea.***

1. Introduction

Radial keratotomy (RK) is a surgical procedure for correcting the refractive error and it is best for low to moderate myopia which is approximately 5 dioptres. Nonprogressive or stable myopias with normal cornea are good candidates for radial keratotomy[1]. One of the complications of this procedure is corneal irregularities which can be managed by contact lenses[2]

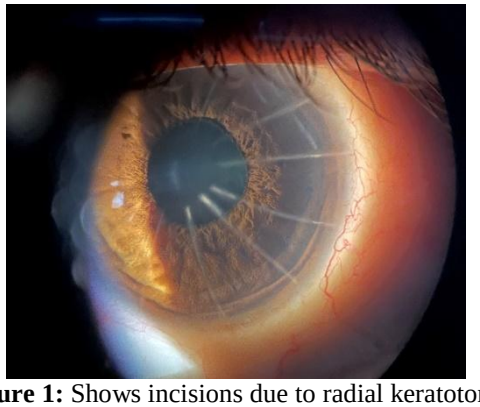

Figure 1: Shows incisions due to radial keratotomy

A corneal scleral lens is a type of gas permeable contact lens with diameter range between 12.6 to 15 mmthatrests on both the corneal and sclera[3] this property of the contact lens helps to manage myopic ablationthat will improve the patient's vision without glare[4]. In this study, we are focusing on RK patients who came up with corneal abnormalities and were treated with a Corneal scleral lens

2. Case Report

A 55 - year male came to an eye hospital with a complaint of glare and diminished of vision in both eyesfor 2 years even with glasses. He had a history of RK done in both eyes 25 years back. There was no other systemic history. His unaided visual acuity for distancewas6/36 and 6/36p respectively for the right eye and left eye which improved with pinholeto 6/12 (right eye) and 6/9 (left eye). Near un - aided visual acuity was found to be N - 24[at]40 cm in both eyes. The spectacle prescription in the right eye was +8.00DS/ - 2.50DC x90 with the visual acuity of 6/9p and in the left eye was +6.50DS with the visual acuity of 6/9p. The addition in his existing glass was the +2.00DS in both eyes with visual acuity of N - 9[at]40 cm. After refraction his best - corrected visual acuity was +8.00DS/ - 2.50DC X 90 6/9p and +6.50DS 6/9p for right and left eye respectively. His near visual acuity improved to N - 6 with the addition of +2.25 DS in both eyes. Intraocular pressure for the right and left eye were within the normal range (Right eye=12 mmHg at 10.52 am and Left eye14 mmHg at 10.52 am). Theslit - lamp examination showed corneal ectasia with radial scars in both eyes while all other anterior and posterior structures were within normal limits.

The keratometry values in the right eye were k1=40.25D, k2 =41.50D whereas the left eye wask1 = 40.00D, k2 = 41.50D. Corneal scleral lens was decided to fit to resolve the underlying symptoms.

Final Contact Lens Parameters

Right eye	Parameters	Left eye
Corneal - Scleral	Design	Corneal - Scleral
L7/7.10/4.47/ - 8.00/14.50	LANDING ZONE/BASE CURVE/SAGGITAL DEPTH/BACK VERTEX POWER/DIAMETER	L7/7.00/4.58/ - 8.00/14.50

Contact Lens Evaluation after 4 Hours of Adaptation

Right eye	Parameters	Left eye
400 microns	Central	400 microns
50 microns	Mid Periphery/ Limbal	50 microns
No compression, No Blanching	Periphery	No compression, No Blanching
	Rotation/Movement	
- 2.75DS VA: 6/6	Over Refraction/ Visual Acuity	- 3.50DS VA: 6/6

Observation/ Modification: IDEAL

Final Lens Specification/Order:

OD	L7/7.10/4.47/ - 10.75/14.5
OS	L7/7.00/4.58/ - 11.50/14.5

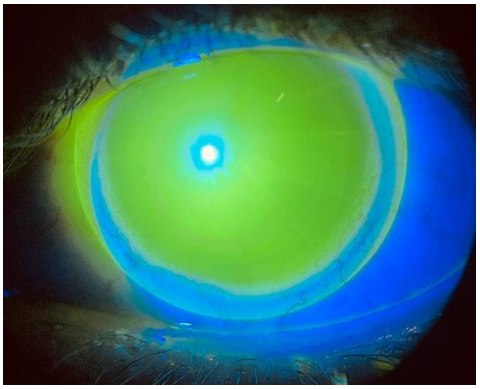

Figure 2: Vaulted cornea under corneal scleral lens

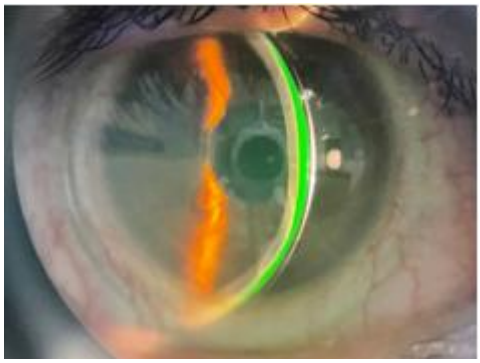

Figure 3: Central vault under the corneal scleral lens

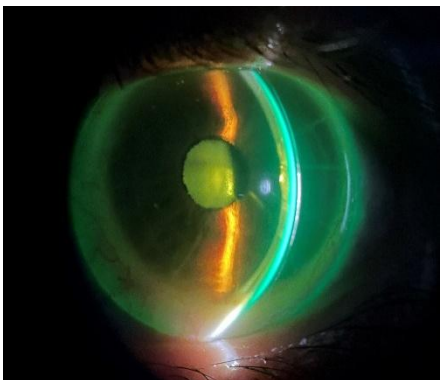

Figure 4: Mid periphery vault under corneal scleral lens

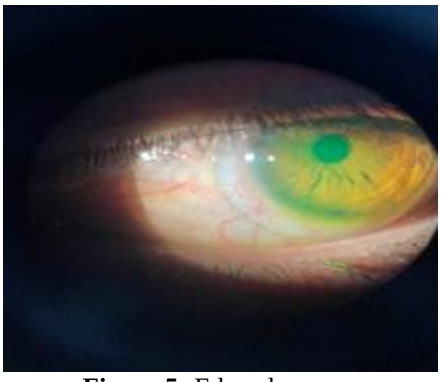

Figure 5: Edge clearance

Visual acuity with contact lens was 6/6 in both the eyes at distance and N - 6 for near with an addition of +2.25DS. The patient was comfortable with this lens compared to the spectacle and symptoms of glare were reduced.

3. Discussion

Radial keratotomy (RK) is a surgical procedure that flattens the central radius of curvature of the cornea to reduce the degree of myopia by making a radial corneal incision. Mostly 8 or 16 incisions are made in the anterior cornea, which is equally spaced. Correction of myopia through radial keratotomy is successfully reported but, in some cases, refractive problems like under correction, overcorrection, induced astigmatism, fluctuation of vision[5], and disability glare or diplopia[6] has also been reported.

The contact lens has a vital role after corneal surgery. It can correct the residual refractive error, irregular astigmatism, and problematic ablations. The diurnal refractive instability associated with radial keratotomy may require multiple pairs of spectacles and contact lenses for visual functions.

The scleral lenses are a good solution for the therapeutic use of the complication listed above. Basically, an ideal fit scleral contact lens has a fluid reservoir that neutralizes corneal first surface optical irregularities. Compared to RGP and soft contact lenses the scleral contact lens will lack contact with old incisions and irregular surfaces also increasing the subjective tolerance

When fitting a reverse geometry rigid lens to an eye that has undergone RK, theaim is to design a lens that significantly reduces central corneal clearance and provides mid - peripheral alignment and appropriate edge clearance with comfort. The soft lens and soft toric lens may not be a good option as they will notneutralize the irregular corneal astigmatism that often occurs as a result of RK. Also, not only visual acuity improvement ocular comfort or vision - related quality of life have also been reported with scleral contact lenses[3, 8, 9]

4. Conclusion

Radial keratotomy is a surgical procedure for the reduction of myopia but it can also lead to corneal scar associated with decreased visual acuity and quality of vision. This study suggests that the use of larger diameter rigid lenses will be a good option which will create uniform post lens tears reservoirs that neutralize the optical abnormality of irregular cornea.

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