Scleral Lens Use in a Recurrent Ectasia Following a Posterior Penetrating Keratoplasty for Keratoconus

Abstract
Recurrent ectasia after a penetrating graft is a rare occurrence in the literature. This case highlights the use of scleral lenses as a safe and effective treatment in recurrent keratoconus following a posterior penetrating keratoplasty.

Background
Analogous to the etiology of keratoconus, the etiology of “recurrent keratoconus” is unknown. Theories include inadequate excision of the keratoconic tissue, graft donor corneas that have forme-fruste keratoconus and progression of the original disease process. This recurrence has been reported as a rare complication following penetrating keratoplasty (PK) and have occurred as early as two-months and as late as 40 years. The probability of recurrent ectasia after PK is estimated to be 6%-11%, 20-25 years after surgery. Clinically, recurrent ectasia is diagnosed on an average of two decades after PK and the ectasia is preceded by thinning of the graft-host junction, and occurs most frequently in the inferior quadrant of the cornea. Of note, the recurrent ectasia is often not diagnosed until 20 years after PK, which is similar to the time required for a virgin cornea to develop clinical keratoconus.

Case Report / Past Ocular History
- Penetrating keratoplasty (secondary to keratoconus) OD – 1991
- Pellucid Marginal Degeneration (PMD) OS – unknown date of dx
- Multiple failed contact lens fits due to inadequate vision and lens falling out
- Severe thinning at graft-host interface OD –70% thinned

Clinical Exam Findings
“74 yo WM s/p cornea transplant OD in 1991 with progressively worse vision. Unable to fit hard contact lens and has thinning at graft host interface (very thin)”
OD:
- BCVA: 20/400, PH – 20/80
- Anterior segment: S/P PK with extreme thinning inferior, inferior nasally
- Pentacam: K’s ranging from 42D-115D at steepest
- Endothelial Cell Count: 773 cells/mm² with elevated variance

OS:
- BCVA: 20/20-2
- Anterior segment: subtle thinning inferiorly
- Pentacam: K’s ranging from 37.5D-60D

Diagnosis: PK with Recurrent Ectasia OD, Pellucid Marginal Degeneration OS

Treatment / Management
Zenlens (Alden Optical):
OD: Oblate/ 17.0 DIA/ 7.9 B.C./ 6200 SAG/+1.25/ STD edge/XO2
OS: Oblate/ 17.0 DIA/ 9.7 B.C./ 5300 SAG/+6.50/ STD edge/XO

Improved visual acuity to 20/20 OD, OS
- Successful training of insertion and removal
- Unable to clear steepest part OD with previous lens designs prior to switching to Zenlens
- Required oblate design with highly modifiable parameters
- Educated wear time not to exceed 8 hours, daily wear only
- Monitor closely for rejection episodes (hypoxia, edema)
- Closely co-managing with cornea specialist who is withholding surgery due to great vision with sclerals

Discussion
- Scleral lenses are a safe and effective treatment in recurrent ectasia
- Patient had drastic visual improvement (20/400 to 20/20)
- Graft rejection rates with scleral lens use in PK’s coincide with other non-contact related graft rejection rates
- 50% of patients with recurrent ectasia have been found to progress significantly after s/p year ten
- The latency period for recurrent ectasia can vary depending on the type of surgery performed

Conclusion
- Prolate design unsuccessful at clearing interface in this case
- Consider using Oblate design with multiple modifiable parameters when fitting PK patients to allow clearance of interface
- Patient education and close monitoring for graft rejection episodes are paramount

References