

Case Series: Glaucomatous Surgical Intervention and Irregular Astigmatism Correction with Gas Permeable Contact Lenses



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Introduction

Glaucoma is known to be the most common cause of blindness worldwide. There are an estimated 90,000 glaucoma surgical procedures per year in the United States. These surgeries can include: trabeculectomies, glaucoma drainage device procedures, cyclodestructive procedures, and minimal invasive glaucoma devices (MIGs). These procedures regularly involve change in the conjunctival and scleral architecture.

Post-operatively there can be a change in vision that usually resolves over 6-12 weeks. Patients that undergo this procedure and have decreased vision, compared to their pre-operative acuity, are evaluated for the potential cause. When all other post-operative complications are treated or ruled out, patients are evaluated for refractive or corneal changes. These changes can be objectively confirmed with corneal topographical data. If a patient has irregular corneal astigmatism post-operatively, specialty gas permeable (GP) contact lenses can be a successful treatment that can result in improved visual acuity for patients.

Case 1

A 50 year old female presents for contact lens evaluation and refraction due to blurred vision in the right eye. Her glaucoma specialist reported she had stable IOP and posterior segment findings.

Ocular History Right Eye:

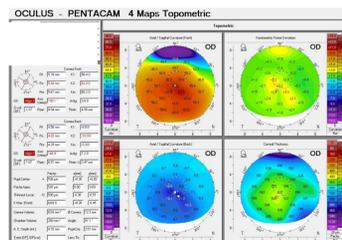
- pigmentary dispersion glaucoma
- laser peripheral iridotomy (LPI)
- argon laser trabeculoplasty (ALT)
- trabeculectomy

Habitual Spectacles: -3.00-3.50x090 → **20/60**

Manifest refraction: -4.50-3.75 x 097 → **20/50**
- significant ghosting, monocular diplopia remained

Slit lamp exam findings: superior cystic bleb, overlying onto the cornea 2 mm. A topography was performed due to this finding (Figure 1).

Figure 1. Pentacam topography right eye

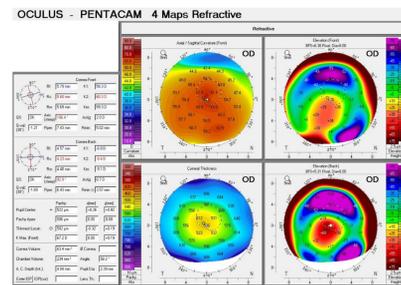


A corneal GP lens was applied to assess vision potential.

- Diagnostic GP:** 6.50 BC/ 8.8 mm (-6.00)
- Over-refraction (OR): +7.25-2.00 x 015
 - VA: **20/25**
 - significant improvement in ghosting and monocular diplopia
 - central touch with mechanical interaction superiorly to bleb
 - lift off inferior

The glaucoma specialist proposed revising the position of the bleb due to its very elevated position and overhanging location onto the cornea. The patient returned for a follow up contact lens evaluation 3 months later and a second topography was obtained (Figure 2)

Figure 2. Pentacam topography right eye post bleb revision



Case 1: Post-Bleb Revision Contact Lens Evaluation

Entering VA with habitual spectacles: 20/80, no improvement with refraction

At this visit, diagnostic GP lenses were again applied to the right eye. The GP lens decentered significantly with consistent mechanical interaction with the bleb.

Diagnostic Ultrahealth (Synergeyes) Hybrid lens:

- 8.4/14.5, 400 flat (-9.00)
- OR: +7.00 -0.25 x 025
- Distance VA: **20/25**
- Near VA: 20/20 with +2.25 add

The fit of the lens was intentionally fit with a flatter skirt to minimize mechanical pressure on the bleb surface. The patient has successfully worn hybrid lenses for 4 years without complication and continues to have regular follow up visits with her glaucoma specialist. Contact lens follow ups include IOP measurement and careful examination of the bleb at each visit.

Figure 3. Anterior segment photo of Hybrid contact lens



Case 2

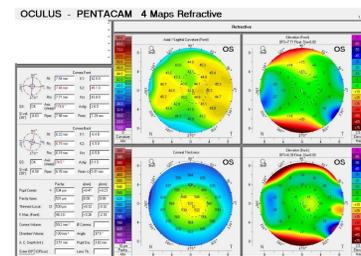
A 73 year old male with history of open angle glaucoma presents for a refraction and contact lens evaluation following post-trabeculectomy reduced visual acuity in the left eye per his glaucoma specialist

Ocular History Left Eye:

- Ocular hypertension following cataract surgery
- Open angle glaucoma with pseudoexfoliation component
- Trabeculectomy
 - Developed post-op choroidal effusion at 4 weeks, resolved at 7 weeks

Habitual Spectacles: -0.50 -1.00 x 085 **20/70**
Manifest Refraction: +0.75 -3.00 x 087 **20/60**

Figure 4. Pentacam topography left eye



Diagnostic GP trial: 7.50 BC/ 9.4 mm

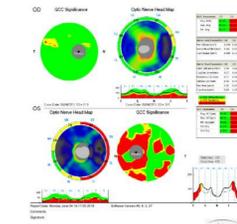
- OR: plano
- Distance VA: **20/25**
- Near VA: 20/20 with +3.00 add
- Significant subjective improvement in quality of vision per patient

The patient has an advanced visual field defect and severe optic nerve damage that limits best corrected acuity (Figures 5,6).

Figure 5. Visual Field



Figure 6. OCT Optic Nerve



Case 3

A 63 year old male with history of mixed mechanism glaucoma presents for a refraction and contact lens evaluation following reduced vision after a tube shunt and patch graft in the left eye.

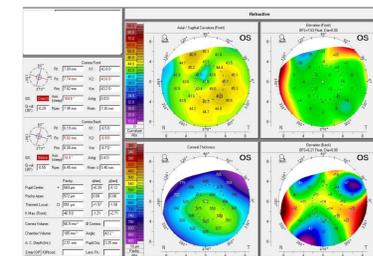
Ocular History Left Eye:

- Mixed mechanism glaucoma with visual field defect
- Baerveldt tube with corneal patch graft
- LPI
- Anterior chamber IOL
- Proliferative diabetic retinopathy with panretinal photocoagulation (PRP) and macular atrophy
- External levator repair

Manifest Refraction: +1.50 -3.00 x 058 **20/60**

A topography was obtained prior to applying any diagnostic contact lens (Figure 7). Quality of image was limited by post surgical lid position.

Figure 7. Pentacam topography left eye



A diagnostic hybrid lens was applied to assess best corrected vision. A corneal GP was declined by the patient due to poor past experiences with modality.

Diagnostic Ultrahealth FC (Synergeyes) Hybrid Lens:

- 8.1/14.5 305/Medium (-4.00)
- OR: +6.75 sphere
- Distance VA: **20/30**
- Near VA with +3.00 add 20/20-2

The patient noted a significant improvement in vision at distance and near. He is able to wear the lens for 10 hours per day without complication. He has continued follow ups with his glaucoma specialist and retinal specialist. His IOP is assessed at every contact lens follow up to monitor any change due to lens fit.

Anterior segment photos of his final lens are demonstrated in Figure 8. Figure 9 demonstrates ocular surface and tube without contact lens. Visual field defect and retinal findings are visible in Figure 10 and 11, respectively.

Figure 8. Hybrid Lens on eye for 4 hours

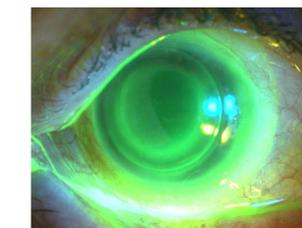


Figure 9. Ocular Surface without lens

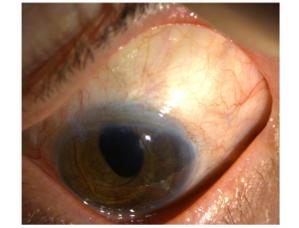


Figure 10. Visual Field

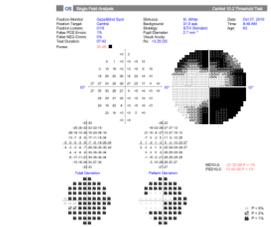
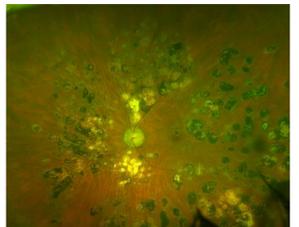


Figure 11. Optos Image



Discussion

Glaucoma surgical procedures can reduce a patient's vision post-operatively due to complications from the surgery and astigmatism changes. When these changes do not resolve during the expected post-operative period and they are not resolved with updated refraction, it can be beneficial to diagnostically assess the patient's vision with a gas permeable contact lens. The patient's vision will be limited by any other ocular pathology present, but can provide usable vision that can improve quality of life and visual acuity.

When a gas permeable lens improves the patient's vision, it can provide additional information to the glaucoma specialist in that glaucomatous disease progression may not be responsible for the acuity change.

References

Dietze, Paul J., et al. "Visual Function Following Trabeculectomy." *Journal of Glaucoma*, vol. 6, no. 2, 1997, doi:10.1097/00061198-199704000-00005.
Kankariya, Vardhaman P., et al. "Femtosecond Laser-Assisted Astigmatic Keratotomy for Postoperative Trabeculectomy-Induced Corneal Astigmatism." *Journal of Refractive Surgery*, vol. 30, no. 7, 2014, pp. 502-504., doi:10.3928/1081597X-20140527-01.
Mansouri, Kaweh, et al. "Global Rates of Glaucoma Surgery." *Graefes Archive for Clinical and Experimental Ophthalmology*, vol. 251, no. 11, 2013, pp. 2609-2615., doi:10.1007/s00417-013-2464-7.