



Eye and Ear Institute
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See the Difference

Two Cases of Asymmetric Posterior Vaulting with an Accommodating IOL

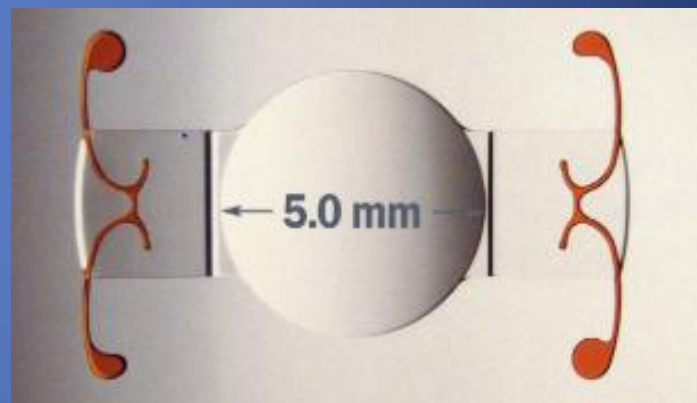
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Accommodating IOL (A-IOL)

- Crystalens (Bausch&Lomb, Rochester, NY)
 - First intraocular lens (IOL) approved by the U.S. Food and Drug Administration (FDA) for the correction of presbyopia following cataract surgery
 - Crystalens AO
 - 3rd generation in series
 - Parameters
 - Optic diameter: 5.0mm
 - Plate diameter: 10.5mm
 - Overall diameter
 - » 11.5mm for 17- 33 diopters
 - » 12.0mm for 10- 24 diopters
 - Ideal intraoperative A-IOL position
 - Haptics flexed posteriorly and symmetrically



A- IOL positioning

Z- SYNDROME

- Well- described in the literature
- Asymmetric flexing of the haptics secondary to postsurgical capsular fibrosis and phimosis syndrome (Yuen et al, 2008)

ASYMMETRIC POSTERIOR VAULTING (APV)

- APV is an unique clinical entity not previously described in the literature
- Intraoperative asymmetric flexing of the haptics and optic tilt upon A- IOL insertion

Both can result in loss of accommodative amplitude, myopic shift, and astigmatism

Methods and Materials

- Retrospective analysis of visual acuity (VA), biomicroscopy, axial length (AL), anterior chamber depth (ACD), and manifest refraction before and after cataract surgery in 2 patients (2 eyes) implanted with an A- IOL complicated by APV
- AL and ACD were calculated by the IOLMaster (Carl Zeiss Meditec, Dublin, CA)
- Single surgeon, routine and uneventful standardized phacoemulsification done for both cases
 - 5.5mm capsulorhexis
- Postoperative topical antibiotic, steroid, and Atropine 1% were given

Patients and Results

Case	Age/ Gender	Preoperative distant BCVA	Manifest refraction	AL (mm)	ACD (mm)	POD 1 UCVA
1- OD	45/Female	20/50 ⁺²	+4.50+0.50x090	22.09	2.59	20/150 ⁺¹
2- OD	67/ Female	20/50	-12.25+0.75x075	26.32	3.82	20/20

Crystalens implanted

Case 1: +2.75 diopter Crystalens AT50AO

Case 2: +13.5 diopter Crystalens AT50AO

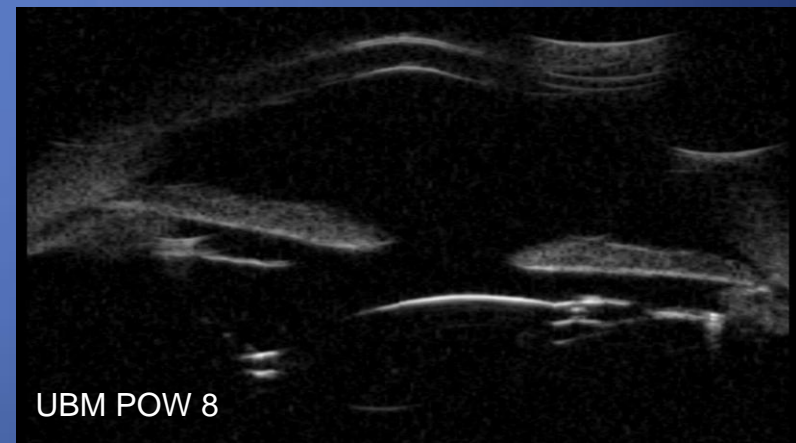
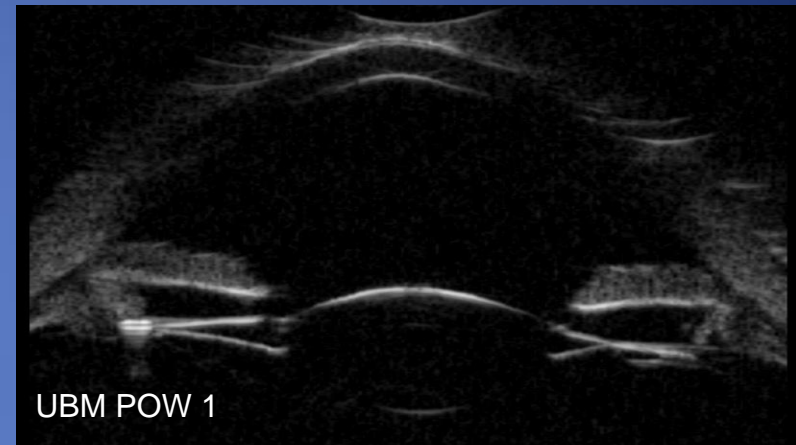
Case 1: Intraoperative

- Immediately upon insertion of the A- IOL, asymmetric posterior flexing of the two haptics were noted
 - One haptic was almost completely vertical in configuration with a 90-degree angle at the optic- haptic junction
- A suture was placed per manufacturer guidelines
- When additional BSS was placed through the paracentesis due to anterior chamber shallowing and anterior IOL displacement, intraoperative aqueous misdirection occurred
 - IOL remained vaulted slightly anteriorly
 - Given IV mannitol 12.5g (to dehydrate the vitreous)
 - After 1 hour, the IOL assumed a planar configuration, appeared well-centered
 - Additional Atropine was given.

Case 1: Postoperative Myopic Shift

- POW 1
 - UCVA: 20/150⁺¹
 - Mrx: -3.25 sph \longrightarrow 20/30⁺²

- POW 8
 - UCVA: 20/200
 - Mrx: -6.00+3.50 x 155 \longrightarrow 20/40



Pt underwent eventual IOL exchange with a monofocal lens aimed for -1.50 diopters at POW 12 due to worsening myopic shift.

Case 2: Intraoperative

- Similar far posterior, asymmetric vaulting was seen intraoperatively immediately after insertion of the A- IOL
- A capsular tension ring (CTR) was placed
- The lens was then rotated 90 degrees
- Persistent asymmetric vaulting after viscoelastic material was removed
 - Wounds were water tight
 - AC was completely formed
 - Intraoperative mannitol given
- The decision was made to explant the lens, and replace it with a second A- IOL
- A second lens was placed in the eye and it was very well positioned

Discussion

- APV was immediately noted upon insertion of the lens in both cases. Intraoperative asymmetric posterior vaulting of the Crystalens can be due to a smaller capsular bag size relative to the length of the IOL such as in our first case with a short axial length (22.09mm).
- When this situation is encountered, we recommend the use of a capsular tension ring anterior to the haptics to maximize capsule bag volume in addition to intravenous mannitol to reduce positive vitreous pressure. Capsular tension rings (CTR) are known to provide lens stability including prevention of lens rotation, decentration, and inhibition of posterior capsule opacification (Lee et al, 2001 and Kim et al, 2005).
- Additionally, after reviewing the literature, we feel the placement of a CTR in all cases will minimize subsequent capsular fibrosis that has been associated with posterior or asymmetric optic shift. Furthermore, in a cases of loose zonules, a CTR can, theoretically, aid the ciliary muscle, capsule, and A-IOL to function as an anatomical entity to permit for pseudoaccommodation.

Conclusion

- We described the first cases in the literature of intraoperative asymmetric capsular vaulting (APV) in association with an A- IOL.
- Additionally, we highlight the use of the capsular tension ring and intravenous mannitol to aid with the positioning of an A-IOL.
- It is important to recognize and address this clinical entity before it leads to future undesirable visual consequences.

References

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