

## Biometry for the Management of Angle Closure in Young patients

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## Abstract

**Importance:** To describe the clinical and biometric features in patients with angle closure presenting before the age of 40 years.

**Observations:** We describe three young patients with angle closure and a customized treatment plan for each guided by the biometric findings, axial length (AL), keratometry, ACD, Lens Thickness, Lens Vault and LT/AL ratio. We found that lens thickness to axial length ratio of  $>0.2$  may suggest the need for clear lens extraction in these cases for better IOP control.

**Conclusions and relevance:** Biometry plays a pivotal role in elucidating the etiopathogenesis and management of angle closure in young patients, and should be included in the evaluation of such patients.

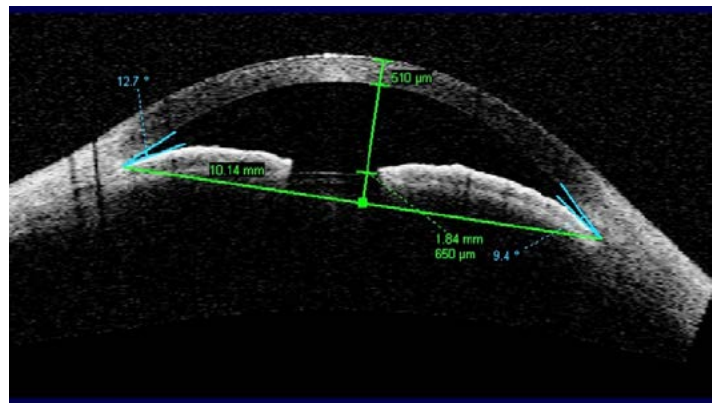
**Keywords:** Angle Closure, Lens Vault, Lens thickness axial length ratio.

## Introduction

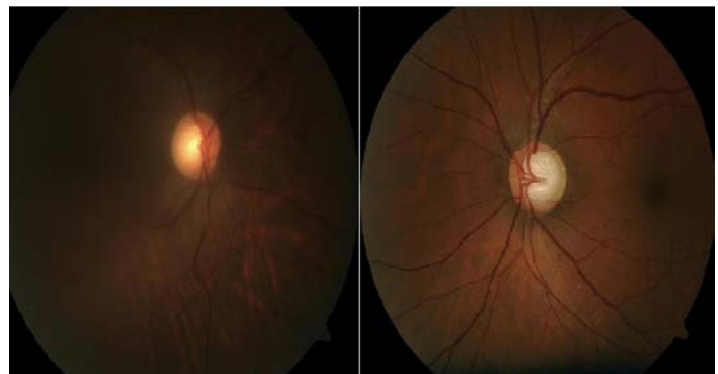
Primary angle closure (PAC) predominantly occurs after 40 years of age. With age the lens thickness (LT) increases, anterior chamber depth (ACD) decreases, thus predisposing to relative pupillary block and angle closure. Secondary etiologies like short axial length, relative anterior nanophthalmos, increased lens thickness, plateau iris syndrome have been implicated [1]. We report three consecutive cases of angle closure in young patients along with their biometric findings that helped in proper management.

**Case 1:** A 39 year old male presented with complaints of occasional ocular pain BE with headache in evenings for past 6 months. On examination his vision was 6/9 BE, shallow anterior chamber (Fig 1a), clear lens, IOP right eye (RE) 40mm Hg and left eye (LE) 42mm Hg, with BE glaucomatous cupping - cup disc ratio (CDR) of 0.7:1 in RE and 0.8:1 in LE (Fig 1b). Gonioscopy revealed closed angles in BE. Humphrey Visual Field (HVF) showed a superior arcuate scotoma in BE. The ACD was shallow (Table 1) in BE.

**Management:** The IOP was controlled with intravenous, oral and topical anti glaucoma medications after the IOP was controlled the patient underwent BE Nd: YAG peripheral iridotomy (PI). The patient IOP ranges between 12- 14 mm Hg on 2 topical medications.



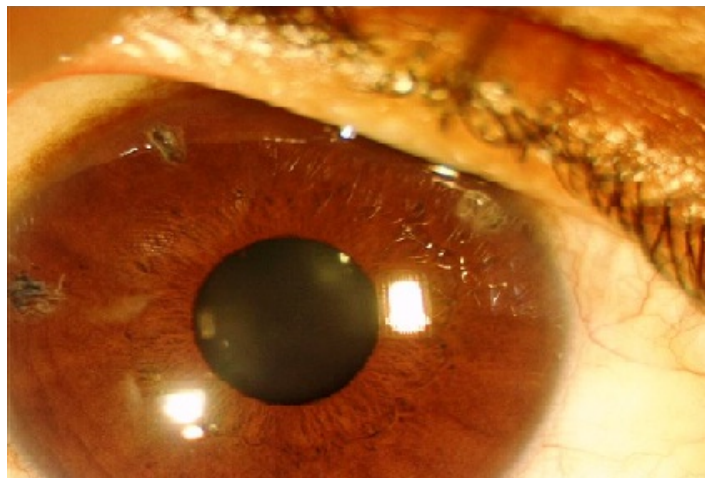
**Figure 1a:** Anterior segment OCT image of case 1 depicting shallow ACD and marginally increased lens vault in RE.



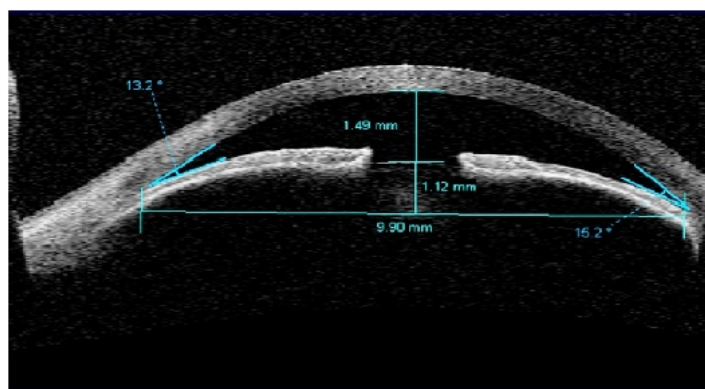
**Figure 1b:** ASOCT image of case 1 depicting shallow ACD.

**Case 2:** A 38 year old female patient, with LE operated Trabeculectomy presented to our Glaucoma clinic with pain in RE and headache. On examination her visual acuity was 6/9 in right eye (RE) and finger counting at 1 meter in LE. On examination of the RE we found a shallow anterior chamber, clear lens, and an IOP of 36mm Hg (Fig 2a). Her LE eye had a complicated pseudophakia with an IOP of 8mm Hg. BE had glaucomatous cupping - CDR of 0.8:1 in RE and 0.9:1 in LE. Gonioscopy revealed closed angles in RE. Humphrey Visual Field (HVF) showed a superior arcuate scotoma in RE. ASOCT, showed a significantly increased lens vault (Fig 2b). Past records of LE surgery showed that patient had shallow anterior chamber and intumescent lens after left eye Trabeculectomy. Anterior chamber reformation and lens aspiration was required in early post operative period. Her RE had iridotomy in the past.

**Management:** IOP of RE was first controlled with anti-glaucoma medication. Next the patient underwent RE clear lens extraction with intraocular lens implantation. A 24 hour diurnal IOP control was done 3 weeks later and target IOP of 10-14 mm Hg was found to be achieved on 2 topical anti glaucoma medications.



**Figure 2a:** ASOCT image of case 2, RE depicting a significantly increased lens vault.

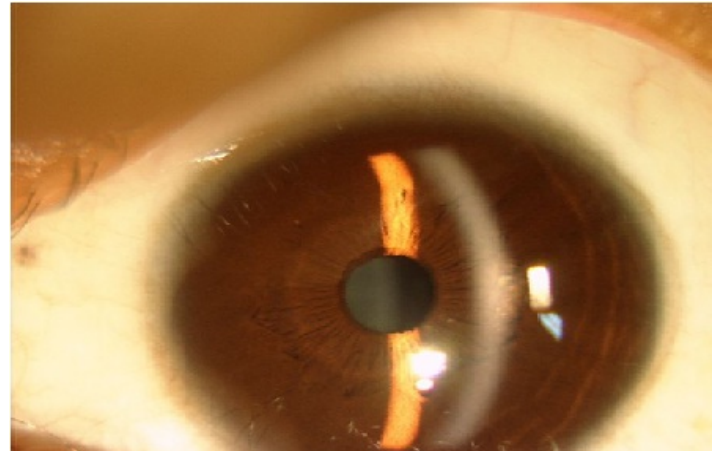


**Figure 2b:** ASOCT image of case 2, RE depicting a significantly increased lens vault.

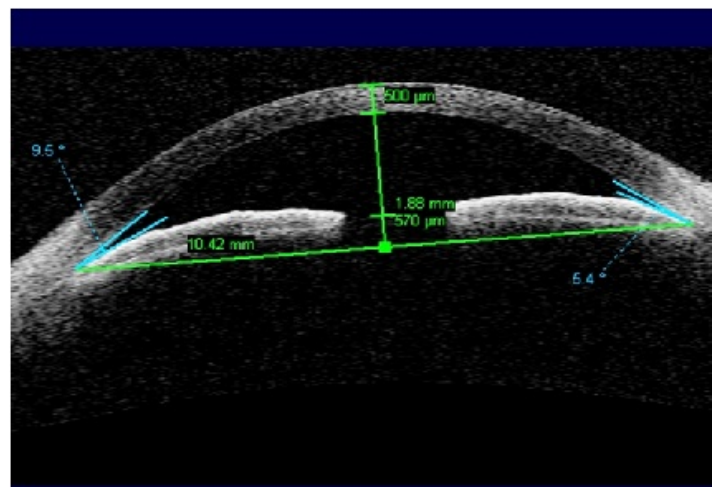
**Case 3:** A 19 years old male presented with pain BE with headache. On examination his vision was 6/6 in both eye (BE), shallow anterior chamber (Fig 3a), clear lens, IOP RE 42mm Hg and LE 30mm Hg, ONH showed small crowded disc and a CDR of 0.2:1 in BE. Biometry (Table 1) established a diagnosis of nanophthalmos.

His ASOCT confirmed a shallow anterior chamber and normal lens vault (Fig 3b).

**Management:** After medical control of IOP patient underwent BE Nd: YAG PI. After 1 week his IOP was 36mm Hg RE and left eye (LE) 18mm Hg on topical anti glaucoma medication and oral acetazolamide. Patient underwent RE Trabeculectomy with mitomycin. LE IOP was controlled with E/d Latanoprost 0.005% and E/d timolol. Post operative period was uneventful with well controlled IOP in the range of 10-12 mm of Hg. We did not encounter any complication like uveal effusion, malignant glaucoma, and retinal detachment [2].



**Figure 3a:** ASOCT image of case 3 RE depicting shallow ACD and marginally increased lens vault.



**Figure 3b:** ASOCT image of case 3 LE depicting shallow ACD.

## Discussion

Unlike angle closure glaucoma in elderly, where one of the most common a etiology is relative pupillary block, angle closure in young is usually associated with other anatomical anomalies for which a biometric evaluation helps in deciding management as borne out in this case series.

In our first case we identified shallow ACD, but the lens thickness was not significantly increased and hence the raised IOP was amenable to YAG PI and medical therapy. In our second case biometry revealed a markedly increased lens vault (normal- 486.2-567.6) and lens thickness [3]. Hence a clear lens extraction was found appropriate. Such biometric guidance would have been

appropriate for the patient's LE that had undergone a complicated course after trabeculectomy in the past. In our third case biometry suggested a diagnosis of nanophthalmos with angle closure. In this case the IOP could not be controlled with peripheral iridotomy and topical anti glaucoma medication and hence patient underwent an uneventful trabeculectomy. Management of glaucoma in nanophthalmos eyes is controversial and surgery is fraught with complications [4, 5].

We used the LT to AL ratio as a biometric parameter to guide the management in our patients. The ratio  $LT/AL > 0.18$  has been found to be suggestive of angle closure [6-9]. We believe it can be used as a guide for management of these young patients, with values of  $> 0.2$  suggesting the need to err towards early lens extraction for IOP control. However in a young patient the role of clear lens extraction needs to be weighed against potential disadvantages, and hence we reserved it for the second case where LT/AL ratio was 0.23.

This case series underscores the importance of performing biometry in all cases of angle closure especially in the young to guide appropriate management.

## References

1. Ritch R, Chang BM, Liebmann JM (2003) Angle closure in younger patients. *Ophthalmology* 110: 1880-1889.
2. FP Calhoun (1975) The management of glaucoma in nanophthalmos. *Trans Am Ophthalmol Soc* 73: 97-122.
3. Rajesh Sasikumar, Sathidevi A.V, Dhawal Haria, Dhanraj A. Rao, Ramgopal Balu, et al. (2011) Lens Vault in Asian Indian Eyes with Angle Closure. *Invest Ophthalmol Vis Sci* 52: 6272.
4. Yalvac IS, Satana B, Ozkan G, Eksioğlu U, Duman S (2008) Management of glaucoma in patients with nanophthalmos. *Eye (Lond)* 22: 838-843.
5. Wu W, Dawson DG, Sugar A, Elner SG, Meyer KA et al. (2004) Cataract surgery in patients with nanophthalmos: results and complications. *J Cataract Refract Surg* 30: 584-90.
6. Mingguang He, Monisha E. Nongpiur ME (2011) Lens Vault, Thickness, and Position in Chinese Subjects with Angle Closure. *Ophthalmology* 118: 474-479.
7. R George, P G Paul, Baskaran M, Ramesh SV, Raju P, et al. (2003) Ocular biometry in occludable angles and angle closure glaucoma: a population based survey. *Br J Ophthalmol* 87: 399-402.
8. Qi Y (1993) Ultrasonic evaluation of the lens thickness to axial length factor in primary closure angle glaucoma. *Yan Ke Xue Bao* 9: 12-14.
9. Markowitz SN, Morin JD (1985) The ratio of lens thickness to axial length for biometric standardization in angle-closure glaucoma. *Am J Ophthalmol* 99: 400-402.

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