

### Primary Lens Extraction in Angle Closure Glaucoma- Is It Effective?

**Divya Jain**

Assistant Professor, Department of Ophthalmology, Pediatric Super Speciality Hospital, Noida, India

**Received:** April 24, 2018; **Accepted:** April 25, 2018; **Published:** April 27, 2018

**Corresponding Author:** Divya Jain, Assistant Professor, Department of Ophthalmology, Pediatric Super Speciality Hospital, Noida, India. Email: [divyajain27@hotmail.com](mailto:divyajain27@hotmail.com)

**Copyright:** © 2018 Jain D, Primary Lens Extraction in Angle Closure Glaucoma-Is It Effective?. J Ophthalmol Vision; 1(1): 1- 04.

#### Editorial

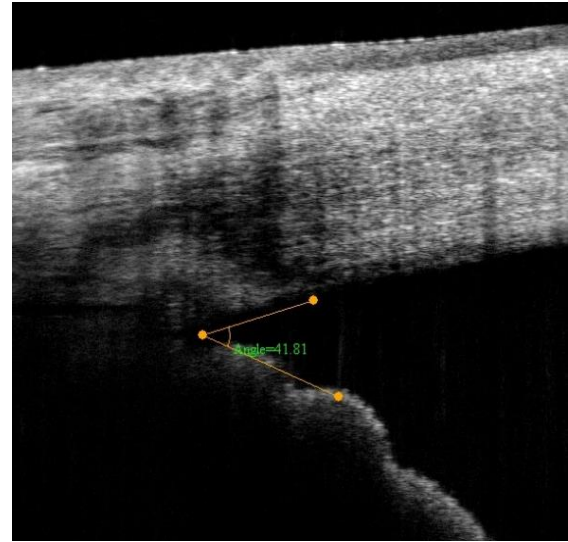
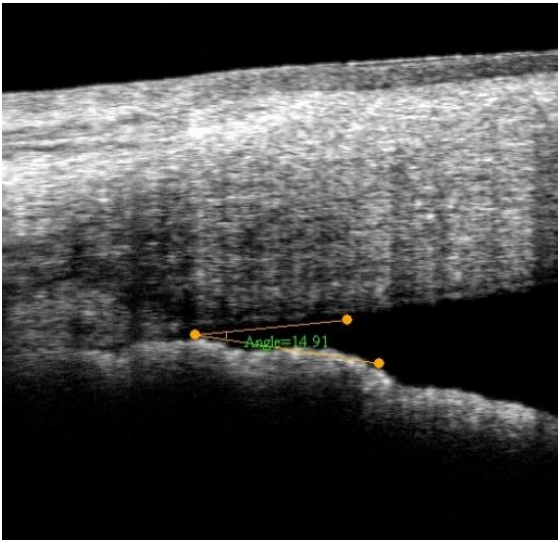
Primary angle closure glaucoma is a protean disease with presentation and outcome varying in different races. WHO has ranked glaucoma as the leading cause of blindness [1], according to the estimates the burden of primary angle closure glaucoma is projected to increase from current 20 million to 34 million by 2040 [2]. Majority of narrow angle population reside in South east Asia [3]. Primary angle closure glaucoma (PACG) appears to be more visually threatening, about 25% of those afflicted become blind, with blinding rate twice that of Primary open angle glaucoma (POAG) [4].

Conventional methods used as a first line treatment for PACG i.e. Laser iridectomy, trabeculectomy, Glaucoma drainage devices are associated with higher chances of complications and failure rates.

Primary Lens extraction has shown beneficial effect in various studies in terms of IOP control, decreasing the extent of PAS, decreasing the dependency on glaucoma medications [5].

PAC eyes have thicker and anteriorly positioned lenses [6] predisposing those to narrow angles. Lens vaulting quantified by the amount of the lens situated anterior to a plane between the scleral spurs, has been found to a better marker of the relationship of the lens with anterior chamber angles, as compared to the lens thickness or relative lens position. In the presence of a large lens vault or a thick lens, lens extraction is preferable as it would deepen the anterior chamber (Figure 1,2) and relieve lens crowding of the angle [7] The deepening of anterior chamber angle in the range of 1.10 to 1.23 has been noted in various studies [8,9].

**Figure (1,2):** Deepening of Anterior chamber angle after lens extraction noted on Anterior segment OCT



The deepening of the anterior chamber by lens extraction improves aqueous access to the angle resulting in reduction of IOP [10,11]. IOP lowering effect of lens extraction has been reported in studies dating as early as 1980 [12]. Lens extraction per se has been shown to lower the IOP in non-glaucomatous patients in range of 1.5-3mm Hg post-surgery [13,14]. In a study done by [8] in non-glaucomatous eyes with occludable angles a mean decrease of  $2.31 \pm 0.99$  mm Hg was noted. In PACG eyes, the IOP reduction of 2 - 12 mm Hg has been documented following lens extraction in other studies [12,15,16]. Of note, the IOP-lowering effect after lens extraction has been found to be more marked in PACG than in POAG [5]. In study by [17] association between preoperative lens vault and IOP reduction following phacoemulsification for eyes with PACG has been reported, suggesting a positive predictor of the degree of IOP lowering and angle widening after cataract surgery.

The postulated mechanisms of IOP reduction following lens extraction in angle closure are an improvement in aqueous outflow [18] resulting from increased postoperative ACD and the stretching of zonules resulting from in the bag

implantation of IOL which creates traction on the trabecular meshwork leading to opening of the trabecular spaces to facilitate aqueous outflow [19,20]. Increased prostaglandin release in the peri-operative period might be a cause of IOP lowering effect of the surgery [20].

Lens extraction in PACG also leads to reduction in amount of peripheral anterior synechiae. In randomized control trial by [21], clear lens extraction done resulted in statistically significant improvement in synechial angle closure on gonioscopy, an increase in anterior chamber angle width and anterior chamber depth was documented by UBM in PACG eyes without cataract as compared to eyes undergoing trabeculectomies. The biometric parameters in terms of AOD 500, TCPD, ACD showed a positive change after lens extraction [21,22].

In a recent multi centric RCT done by [23] in patients with PAC with high IOP and PACG improvement in overall health status, visual impairment and disability, and glaucoma-specific disability were noted in clear lens extraction group in as compared to LPI group.

Lens extraction in PACG has emerged as an effective treatment option in cases of Primary angle closure. Accumulating

Jain D (2018) Primary Lens Extraction in Angle Closure Glaucoma-Is It Effective?. J Ophthalmol Vision; 1(1): e101.

evidence from various studies has shown positive results of early lens extraction in PAC and PACG over and above LPI in terms of better ACD, angle opening, decrease in peripheral anterior synechiae, IOP control. Improvement in quality of life in terms of decrease in number of glaucoma medications, improvement in visual acuity, correction of associate hyperopic refractive error, better disc grading and improvement in visual field indices in cases with associated cataract is noted in these patients. Therefore to conclude lens extraction in narrow angle can be opted as an initial procedure to lower IOP, deepen angle and decreases the conversion of appositional angle closure to syncheial angle closure.

## References

1. WHO. Global Data on Visual Impairments 2010.(WHO/NMH/PBD/12.01). Geneva: World Health Organization, 2012
2. Tham YC, Li X, Wong TY, et al. (2014) Global prevalence of glaucoma and projections of glaucoma burden through 2040: a systematic review and meta-analysis. *Ophthalmology*; 121(11): 2081-2090.
3. Day AC, Baio G, Gazzard G, et al. (2012) The prevalence of primary angle closure glaucoma in European derived populations: a systematic review. *Br J Ophthalmol*; 96(9): 1162-1167.
4. Foster PJ, Johnson GJ (2001) Glaucoma in China: How big is the problem? *Br J Ophthalmol*; 85(11): 1277-1282.
5. Lai JS, Tham CC, Chan JC (2006) The clinical outcomes of cataract extraction by phacoemulsification in eyes with primary angle-closure glaucoma (PACG) and co-existing cataract: a prospective case series. *J Glaucoma*; 15(1): 47-52.
6. Lowe RF (1969) Causes of shallow anterior chamber in primary angle-closure glaucoma. *Ultrasonic biometry of normal and angle-closure glaucoma eyes. Am J Ophthalmol*; 67(1): 87-93.
7. Nongpiur ME, He MG, Amerasinghe N, et al. (2011) Lens vault, thickness and position in Chinese subjects with angle closure. *Ophthalmology*; 118(3): 474-479.
8. Shin HC, Subrayan V, Tajunisah I. (2010) Changes in anterior chamber depth and intraocular pressure after phacoemulsification in eyes with occludable angles. *J Cataract Refract Surg*; 36(8): 1289-1295.
9. Hayashi K, Hayashi H, Nakao F, et al. (2000) Changes in anterior chamber angle width and depth after intraocular lens implantation in eyes with glaucoma. *Ophthalmology*; 107(4): 698-703.
10. Vizzeri G, Weinreb RN (2010) Cataract surgery and glaucoma. *Curr Opin Ophthalmol*; 21(1): 20-24.
11. Pereira FA, Cronemberger S (2003) Ultrasound biomicroscopic study of anterior segment changes after phacoemulsification and foldable intraocular lens implantation. *Ophthalmology*; 110(9): 1799-1806.
12. Wishart PK, Atkinson PL (1989) Extra capsular cataract extraction and posterior chamber lens implantation in patients with primary chronic angle-closure glaucoma: effect on intraocular pressure control. *Eye (Lond)*; 3(6): 706-712.
13. Matsumara M, Mizoguchi T, Kuroda S, et al. (1996) Intraocular pressure decrease after phacoemulsification-aspiration and intraocular lens implantation in primary open angle glaucoma eyes. *Nippon Ganka Gakkai Zasshi*; 100(11): 885-889.
14. Jahn CE (1995) Lowering intraocular pressure by phacoemulsification and posterior chamber lens implantation. *Ophthalmology*; 92(4): 560-563.
15. Gunning FP, Greve EL (1998) Lens extraction for uncontrolled angle-

Jain D (2018) Primary Lens Extraction in Angle Closure Glaucoma-Is It Effective?. J Ophthalmol Vision; 1(1): e101.

- closureglaucoma: long-term follow-up. J Cataract Refract Surg; 24(10): 1347-1356.
16. Hayashi K, Hayashi H, Nakao F, et al. (2001) Effect of cataract surgery on intraocular pressure control in glaucoma patients. J Cataract Refract Surg; 27(11): 1779-1786.
  17. Huang G, Gonzalez E, Lee R, et al. (2012) Association of biometric factors with anterior chamber angle widening and intraocular pressure reduction after uneventful phacoemulsification for cataract. J Cataract Refract Surg; 38(1): 108-116.
  18. Meyer MA, Savitt ML, Kopitas E (1997) The effect of phacoemulsification on aqueous outflow facility. Ophthalmology; 104(8): 1221-1227.
  19. Cekic O, Batman C (1999) Effect of capsulorhexis size on postoperative intraocular pressure. J Cataract Refract Surg; 25(3): 416-419.
  20. Thomas R, Walland MJ, Parikh RS (2011) Clear lens extraction in angle closure glaucoma. Curr Opin Ophthalmol; 22(2): 110-114.
  21. Man X, Chan NC, Baig N, et al. (2015) Anatomical effects of clear lens extraction by phacoemulsification versus trabeculectomy on anterior chamber drainage angle in primary angle-closure glaucoma (PACG) patients. Graefes Arch Clin Exp Ophthalmol; 253(5): 773-778.
  22. Nonaka A, Kondo T, Kikuchi M et al. (2006) Angle widening and alteration of ciliary process configuration after cataract surgery for primary angle closure. Ophthalmology; 113(3):437-441.
  23. Azuara-Blanco A, Burr J, Ramsay C, et al. (2016) Effectiveness of early lens extraction for the treatment of primary angle-closure glaucoma (EAGLE): a randomised controlled trial. Lancet; 388(10052): 1389-1397.