

## Combined scleral fixated intraocular lens and strabismus surgery

Amit Mohan

Consultant, Dept. of Paediatric Ophthalmology & Strabismus, Global Hospital Institute of Ophthalmology, Abu Road, Rajasthan

Email: mohan.amit1@yahoo.co.in

### Abstract

**Aims & Objectives:** In the presence of aphakia & strabismus there is dilemma whether to manage the two conditions separately or together. Here we evaluate the result of combined strabismus and scleral fixated intraocular lens (SFIOL) surgery.

**Material & Methods:** 5 cases of combined strabismus and SFIOL surgery were reviewed to determine if there was increased risk of complications.

**Results:** A review of these cases revealed there were no complications arising from the combined surgery and there were benefits in decreased time of hospitalization and operation, less psychological stress, improved strabismus surgical outcome and avoidance of staged surgery. Combined surgery provides benefit of no conjunctival adhesion. All patients were attained satisfactory ocular alignment within 10 prism dioptres of horizontal deviation with no overcorrection. Visual acuity was improved in all patients.

**Conclusion:** Simultaneous extra ocular muscle surgery and SFIOL is effective and indicated in patients of aphakia with no capsular support and strabismus and good potential of visual acuity. Standard strabismus surgical amounts are recommended.

**Keywords:** Aphakia, SFIOL surgery, Strabismus.

### Introduction

In clinics it is not uncommon to find patients with both strabismus and Aphakia.<sup>(1)</sup> When treating such patients, the dilemma that the clinician confronts is: whether to manage strabismus and aphakia in two different surgical sessions or to combine the two operations into one. Simultaneous strabismus and secondary intraocular lens (IOL) surgery has received relatively little attention in previous literature. Secondary IOL insertion is better option to correct aphakia than aphakic spectacles or contact lenses and gives superior visual rehabilitation.<sup>(2)</sup> SFIOL, anterior chamber lenses and iris fixated lenses may be considered in aphakia in the absence of adequate capsular support.<sup>(3)</sup> SFIOL is the best and accepted alternative. There is no literature available on combined scleral fixated IOL and strabismus surgery. Combining SFIOL lens procedures with strabismus correction may reduce the number of surgical and anaesthetic procedures, speed rehabilitation, and offer financial benefit to the patient. However, concerns may arise regarding a potential increased risk of postoperative infection, anterior segment ischemia, postoperative ocular alignment or excessive discomfort for the patient. Determining the ocular alignment in eyes with poor vision may be difficult. To address these issues, we herein present the retrospective results of 5 patients who underwent for these combined surgeries.

### Materials and Methods

The inpatient records of 5 patients who underwent combined strabismus and SFIOL surgery were reviewed. All patients underwent comprehensive eye examination and ocular motility examination including measurement of the angle of deviation. This measurement was done by means of the alternate prism

cover test after fitting appropriate contact lens in aphakic eye. Sensory evaluation could not be done in most patients because of obvious strabismus. In all 5 cases, the strabismus surgery was done prior to SFIOL surgery. Strabismus surgery involved operating on horizontal recti, both recession & resection, depending on the amount of eso- or exodeviation. The two main outcome variables were: improvement in vision and decrease in angle of deviation after surgery. The median follow-up was 7.4 months (range: 6 months to 2 years). Success of strabismus surgery was defined as a residual deviation of less than 10 prism dioptres, and visual success was defined as an improvement of vision of at least 3 snellen lines. The operations performed were standard strabismus procedures for the type and amount of deviation followed by the appropriate procedure for SFIOL placement.

**Surgical Technique:** All surgical cases were performed under general anaesthesia. A wire lid speculum was used in all cases. The strabismus surgery was performed first in all 5 cases. A recession and resection was performed with a limbal-based flap. The muscle to be recessed was operated on first and the conjunctival flap remained retracted. The resection procedure was then carried out. In 4 cases recess-resect procedure was done and in one case infraplacement of horizontal recti were done along with recess-resect procedure to correct the coexisting hypertropia. The same conjunctival incision was then used for creating sclera tunnel. Two partial thickness scleral tunnels were made on both sides. A 6.5 mm corneoscleral tunnel was constructed superiorly and anterior chamber was entered with keratome. Anterior chamber was cleared with vitreous by performing automated anterior vitrectomy. A 26-G needle was entered from the temporal wound and a straight needle with 10.0 prolene

suture (10-0 polypropylene, Aurolene®, double armed with two straight spatulated needle) from the nasal wound exactly 180 degrees apart and 1 mm away from the limbus. The directions of both the needles were such that the 26-G needle lumen was docked with 10-0 prolene suture needle. The 26-G needle was then withdrawn from the temporal sclera wound along with the needle of prolene suture. The needle was then cut from suture. 10.0 prolene suture was retrieved out from the section with the help of a Mcpherson's forceps and it was cut and the ends of sutures were tied to the eyelets on the haptics of a single piece 6.5 mm polymethyl methacrylate SFIOL (PMMA Aurolens). The SFIOL was placed in the sulcus and suture holding the IOL was made tight so that IOL would be centred. The prolene sutures were anchored and knotted in the bed of both the nasal and temporal scleral tunnel. The knot was buried and conjunctiva and was sutured with 8-0 vicryl suture.

## Results

Patients' ages ranged from 13 years to 35 years, with 3 males and 2 females. All patient had unilateral aphakia with no or inadequate capsular support. Preoperative visual acuity was less than 20/200 in all 5 patients but all of them had BCVA >20/60 with aphakic glasses. Table 1 shows the summary of demography and clinical analysis of the patients. All cases were acquired aphakia following cataract surgery out of which 4 were operated for traumatic cataract and 1 for dislocated lens. All patients were operated for cataract after age of 8 years which is critical period of vision development. In total, 3 of the strabismus surgeries were performed for exotropia, 1 for esotropia and 1 for combined vertical-horizontal deviations. Table 1 shows the strabismus and visual success in all 5 cases. Strabismus success (postop deviation <10pd) was achieved in 5/5 (100%) patients. Visual success (3 snellen line improvement) was attained in all eyes. There were no visually significant complications in any of the patients.

**Table 1**

| Age/<br>Gender | Type of<br>aphakia | Strabismus<br>aetiology | Preop<br>deviation       | Postop<br>deviation | Preop<br>Vision | Postop<br>vision | Postop<br>sensory<br>status | Other<br>ocular<br>diagnosis    |
|----------------|--------------------|-------------------------|--------------------------|---------------------|-----------------|------------------|-----------------------------|---------------------------------|
| 13/F           | Traumatic          | Sensory<br>comitant     | 35 pd XT                 | Ortho               | 2 Mt FC         | 20/32            | Fusion                      | -                               |
| 24/M           | Traumatic          | Sensory<br>comitant     | 30 PD XT                 | 5 pd X(T)           | 1 Mt FC         | 20/20            | Fusion                      | -                               |
| 30/F           | Traumatic          | Sensory<br>comitant     | 55 PD XT                 | 8 pd X(T)           | 1 Mt FC         | 20/40            | Fusion                      | -                               |
| 19/M           | Subluxated<br>lens | Sensory<br>comitant     | 30 PD ET                 | Ortho               | 20/200          | 20/40            | Suppression                 | Other eye<br>subluxated<br>lens |
| 35/M           | Traumatic          | Sensory<br>comitant     | 30 PD XT &<br>8 PD hyper | Ortho               | 20/200          | 20/60            | Suppression                 | Amblyopic                       |

## Discussion

Unilateral aphakia is one of the leading causes of ocular morbidity in some developing countries.<sup>(4)</sup> Aphakic glasses, contact lenses, and secondary IOL implantation have been advocated as methods of visual rehabilitation in aphakia.<sup>(5)</sup> Spectacles are not suitable in monocular aphakia because they are heavy and uncomfortable. Contact lenses are not easy to manage in patients with low socioeconomic strata. The majority of the population in our region lives in rural areas with low to middle socioeconomic group and also scarcity of clean water in desert area of Rajasthan makes ocular hygiene very difficult; so it is not recommended in our region. Anterior chamber IOLs are known for its sight threatening complications like corneal oedema, uveitis, hyphema, raised intraocular pressure and cystoids macular oedema.<sup>(6,7)</sup> In cases of inadequate capsular support IOL on the capsule may cause IOL decentration, tilting or dislocation into the vitreous cavity. Therefore, SFIOLs are indicated in younger patients with inadequate capsular support.<sup>(8)</sup> However,

the SFIOL can also lead to many complications, such as corneal decompensation,<sup>(9,10)</sup> refractive error after surgery,<sup>(9)</sup> IOL dislocation, vitreous haemorrhage,<sup>(10-12)</sup> infection through the suture,<sup>(13)</sup> and retinal detachment.<sup>(9-11)</sup> SFIOL is the best alternative.<sup>(12)</sup>

Strabismus is very common in monocular aphakia, with frequency ranging from 27 to 100%.<sup>(2,14,15)</sup> Difference in development of strabismus depends upon treatment modality of aphakia whether treated with a contact lens or IOL. Lambert et al described rates of strabismus of 92% with contact lenses and 75% with IOLs in a cohort of 25 infants of unilateral aphakia, but the difference was statistically insignificant.<sup>(14)</sup> Aufrata et al reported 55% strabismus in IOL group and 83% in contact lens group.<sup>(2)</sup> In the IATS, a similar benefit in reduction of squint rates were reported either cumulatively or at 12 months postoperatively however the difference was statistically not significant.<sup>(16)</sup> Esotropia was predominant in the first 2 years of life. At the end of the first decade of life exotropia was up to 80%. A study done by France et al on 36 adult patients

out of which 69% of patients with acquired cataract/dislocated lenses presented with exotropia & remaining 31% presented with esotropia.<sup>(17)</sup>

Considering these entire facts combined SFIOL and strabismus surgery outcome were analysed in our study in terms of visual improvement, ocular alignment, postoperative sensory status and any unwanted complications. Results are rewarding with 100% improvement in vision and ocular alignment with attainment of fusion in 60% cases. There is no complication in any cases. These five cases included four cases of previous ocular trauma resulting in cataracts that had been removed; the patients could not wear contact lens and developed an acquired exotropia over the years following the cataract surgery. One patient had juvenile esotropia with subluxated lens.

To achieve good binocular function, correction with an intraocular lens (IOL) implant is superior to other alternatives such as spectacles or contact lenses, and the patient is thought to restore good binocular function if he or she had good binocular vision before the development of cataract. However, sometimes an adult's binocular vision can be permanently disrupted after longstanding abnormal visual experiences. Acquired disruption of central fusion can develop after prolonged sensory deprivation by unilateral traumatic cataract or even by unilateral senile mature cataract.<sup>(18)</sup>

Maltzman et al presented ten cases of combined IOL and strabismus surgery with good results. The indications for combined surgery would appear to be patients requiring correction of a previous surgical aphakia and strabismus, as well as primary cataract-IOL procedures with strabismus. If a patient were having cataract surgery in a second eye with known juvenile strabismus and alternating suppression, the cosmetic result alone would be a strong enough indication for combined surgery.<sup>(19)</sup>

Ticho B H et al reported no surgical, anaesthetic, and postoperative complications, other than unsatisfactory ocular alignment, were limited to one retinal detachment in a patient with persistent foetal vasculature. Strabismus under corrections (>12pd of horizontal deviation or >5pd of vertical deviation) occurred in 11 cases (37%). There were no overcorrections. A poor visual response (<20/50) to the intraocular surgery was encountered in 6 patients, all as the result of amblyopia or preexisting vitreoretinal pathology.<sup>(20)</sup>

Guha S et al. published the results of combined cataract and strabismus surgery in 50 patients. Ocular alignment (< 10 prism dioptres) was achieved in 35.3% in group 1 and 75.8% in group 2. Visual improvement (better than 20/40) was achieved in 70.6% in group 1 and 57.6% in group 2. Surgical success was attained in the majority of patients that had combined surgery.<sup>(21)</sup>

David Squirrel et al. had reported 3 cases of combined strabismus and phacoemulsification cataract surgery of different aetiologies. In all cases there were

improvements in ocular alignment and the visual acuity with marked cosmetic improvement.<sup>(22)</sup> Limitation of our study is very small sample size and no long term follow up.

## Conclusion

Simultaneous extraocular muscle and SFIOL surgery is a safe and efficacious option for patients with strabismus and aphakia. The added advantage is avoidance of conjunctival scarring because adequate conjunctival incision is necessary for both the procedure and at the end of surgery conjunctival closure should be meticulous. So combined surgery is beneficial in this situation to prevent complication associated with conjunctival adherence or improper closure. Further study is warranted to determine if this approach is comparably effective to consecutive lens and strabismus surgery. Standard strabismus surgical amount is recommended.

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