

## Factors Leading to Subnormal Vision after Small Incision Cataract Surgery

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### Abstract

**Introduction:** Avoidable blindness which could be treated or prevented by known and cost effective means is cataract. Therefore majority of blindness due to cataract can be prevented by simple techniques called conventional ECCE, SICS and phacoemulsification. Around 62.6% of blindness is due to cataract and thereby it is burdening the country with major morbidity. To reduce this burden most easy technique and cost effective method employed in developing countries like India is small incision cataract surgery (SICS).

**Aim & Objective:** To find out the causes of subnormal vision post operatively in patients undergoing small incision cataract surgery at a tertiary care center.

**Methods:** The present study was a prospective study done on 100 patients who attended OPD during the study period between 2018-2020. Patients underwent detailed examination before cataract surgery and best corrected visual acuity was recorded at day 1, 1 week, 6 weeks post-operatively. Complications were noted to determine the causes for subnormal vision at 6 weeks post-operatively.

**Results:** Out of the 100 patients severe visual loss (6%) was caused by iridocyclitis (65%) in majority of patients on 1st post op day. At 1st post op week residual lens matter (3%) and astigmatism (59%) contributed equally to moderate vision loss (55%). At 6 weeks astigmatism (88%) and Pigment Dispersion on IOL (16%) were the causes of moderate visual loss (55%).

**Conclusion:** Astigmatism was the major cause of subnormal vision at 6 weeks causing mild moderate vision loss in majority of the patients.

**Keywords:** Astigmatism; Complications; Cataract Surgery; Subnormal vision.

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## INTRODUCTION

Cataract is a blinding condition resulting from an opacity of the crystalline lens of the eye. The only treatment to restore sight is by performing cataract surgery to remove the opaque lens. Therefore cataract surgery represents the most frequent surgical procedure performed by most ophthalmic surgeons.<sup>1</sup>

Two types of eye surgeries can be used to remove cataracts. Intracapsular cataract extraction (ICCE)



and extra capsular cataract extraction (ECCE). ICCE has the disadvantage of more surgically induced astigmatism compared to ECCE because of its longer incision length of 10-11mm, ECCE has various types like conventional SICS and phacoemulsification.<sup>2</sup>

Manual small incision cataract surgery is one of the most innovative and popular technique.<sup>3</sup>

The use of small cataract incisions is thought to reduce surgically induced astigmatism resulting in more stable refraction.<sup>4</sup> Surgical techniques are continuously modified and improved upon to decrease surgically induced astigmatism.

Even after all the efforts, vision might not reach up to expectations post-operatively, thereby this study aims at noting out the factors responsible for unexpected or poor results after SICS with PCIOL implantation.

Hence, this study was conducted to find out the causes of subnormal vision in patients undergoing cataract surgery with IOL implantation with no co-existing ocular morbidity.

## **AIMS AND OBJECTIVE**

1. To find out the causes of subnormal vision post operatively in patients undergoing small incision cataract surgery.

## **MATERIALS AND METHODS**

- A total of 100 patients between the age group of 30 to 90 years undergoing small incision cataract surgery under peribulbar block with intraocular lens implantation at a tertiary care center were selected randomly after taking complete history and informed consent.
- Pre-operative evaluation includes best corrected visual acuity, slit lamp examination, dilated fundus examination, sac syringing, measurement of intraocular pressure by applanation tonometry, routine blood investigations, A scan biometry and keratometry.
- Power of IOL was calculated using SRK II formula.
- Patients was undergoing manual small incision cataract surgery under peribulbar

block with PCIOL implantation made of single piece PMMA. The post operative patients will be started on antibiotic and steroid combination eye drops which be tapered on weekly basis.

- Post-operative evaluation was done on 1st post-operative day, at the end of 1 week and 6 weeks. On each visit best corrected visual acuity, slit lamp examination, fundus examination and IOP measurement will be done. Postop B Scan USG, FFA & OCT was done in indicated cases.

### ***Inclusion Criteria:***

1. Patients undergoing small incision cataract surgery at a tertiary care center.
2. Patients within the age group of 30 to 90 years.
3. Patients with pre-senile cataract.

### ***Exclusion Criteria:***

1. Patients below 30 years of age.
2. Patients above 90 years of age.
3. Patients with ocular infections, trauma, congenital anomaly of the eye, hypertension and diabetes mellitus.
4. Patients with history of previous ocular surgeries (trabeculectomy, retinal detachment surgery etc).
5. Patients with any retinal pathologies, glaucoma, uveitis and posterior segment pathology.
6. Any other ocular morbidity that causes subnormal vision.
7. Patients not fit for surgery due to systemic co-morbidities.

### ***Statistical Analysis:***

Statistical analysis was done by using SSPS software to determine the causes of subnormal vision in patients undergoing cataract surgery. MS Excel 2007 was used to prepare Master chart and graphs. Variables including various percentages and proportions were statistically analysed using Chi square test.  $p < 0.05$  was considered statistically significant at 5% level of significance. A sample size of 100 patients was enrolled in the study.

## RESULTS

A total of 100 patients were enrolled in the study 60 patients were females, 40 were males. Majority of the patients included in this study was between age group of 61-65 years that is 35%, with and in 58 patients right eye was operated and left eye was operated in 42 patients.

The visual loss was classified into Mild, Moderate and Severe visual loss (Fig. 1). On the first postoperative day (Fig. 2) 58% of the patients had mild visual loss, 37% had moderate visual loss, 1% had severe visual loss and remaining 4% of the patients had normal vision.

On post operative 1 week (Fig. 3) patients had mild vision loss of 58% in comparison with 9% on day 1, moderate vision loss of 37% in comparison

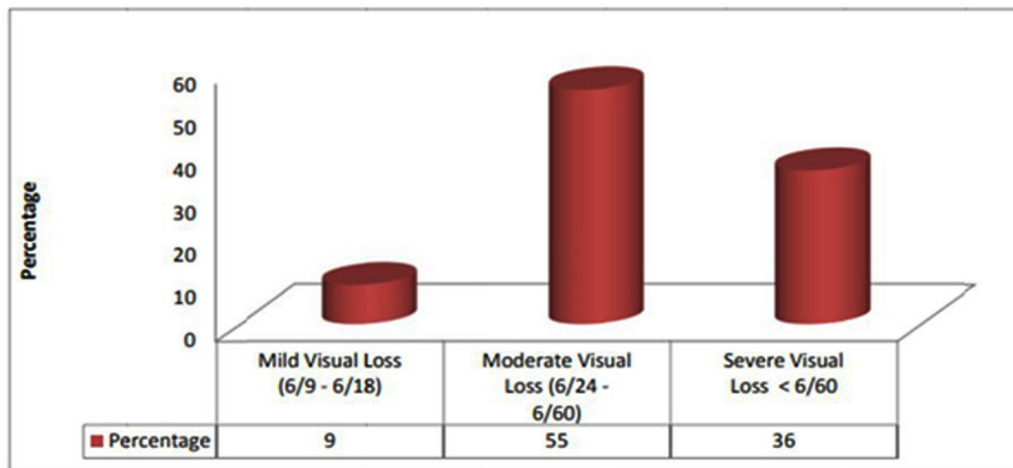


Fig. 1: Classification of Visual Loss

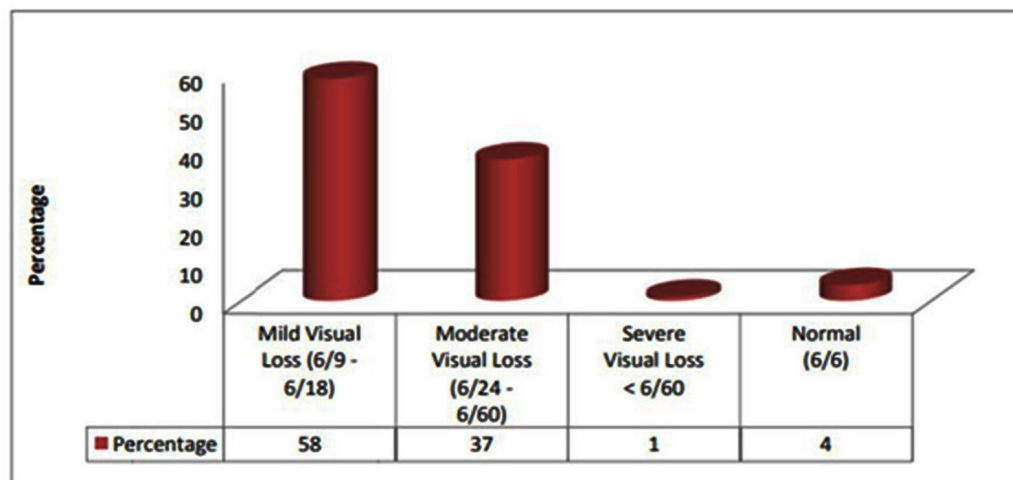


Fig. 2: Visual outcome on the first post-operative day

with 55% on day 1 and severe vision loss of 1% in comparison with 36% on day.

Best corrected visual acuity was done at 6th week showed, 55% of the patients had mild visual loss, 11% had moderate visual loss, 1% had severe visual loss and remaining 33% of the patients had normal vision (Fig. 4)

At 1st day along with striate keratopathy (80%), iridocyclitis (65%), inflammatory membrane (6%), residual lens matter (7%) and Vitreous in AC (1%)

played a major role in hampering the vision post-operatively (Fig. 5).

At 1st week along with astigmatism (59%), striate keratopathy (31%), Pigment Dispersion on IOL (13%), iridocyclitis (12%), inflammatory membrane (1%) and Vitreous in AC (1%) played a major role in hampering the vision post operatively (Fig. 6).

At 6th week along with astigmatism (88%), Pigment Dispersion on IOL (16%), inflammatory

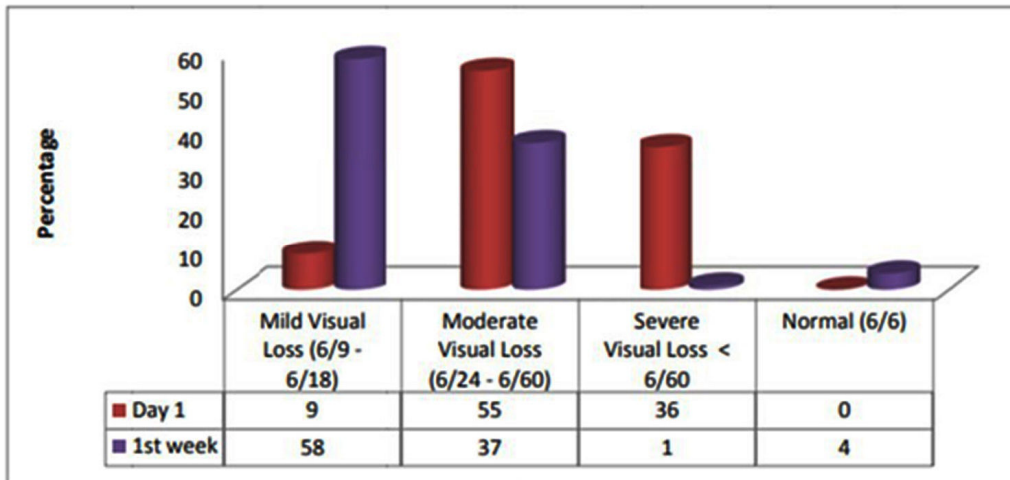


Fig. 3: Visual outcome at 1st week

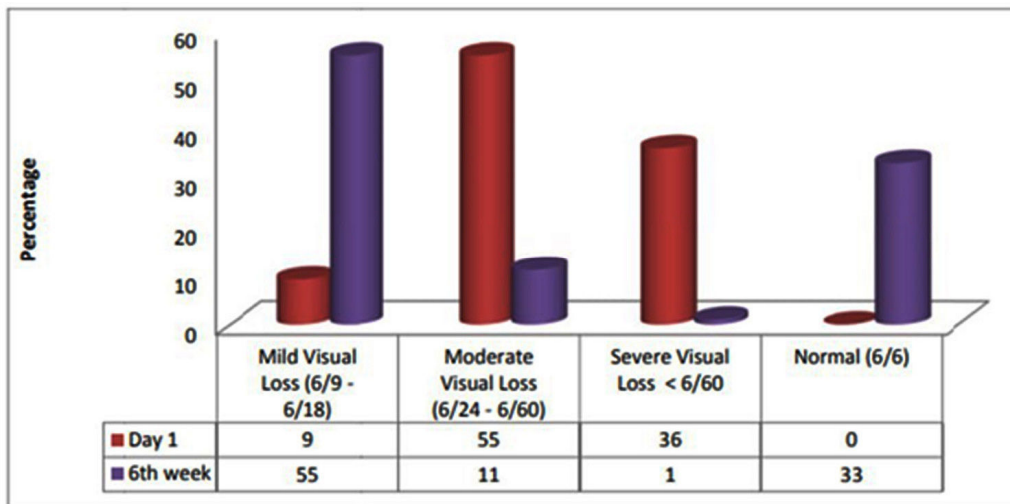


Fig. 4: Visual outcome at 6th week

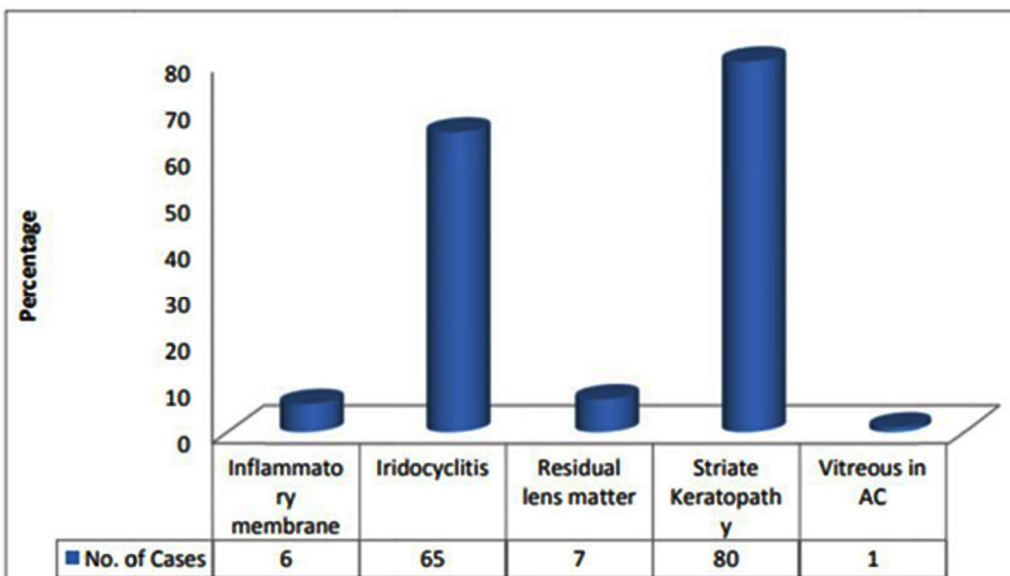


Fig. 5: Causes of sub normal vision on POD 1

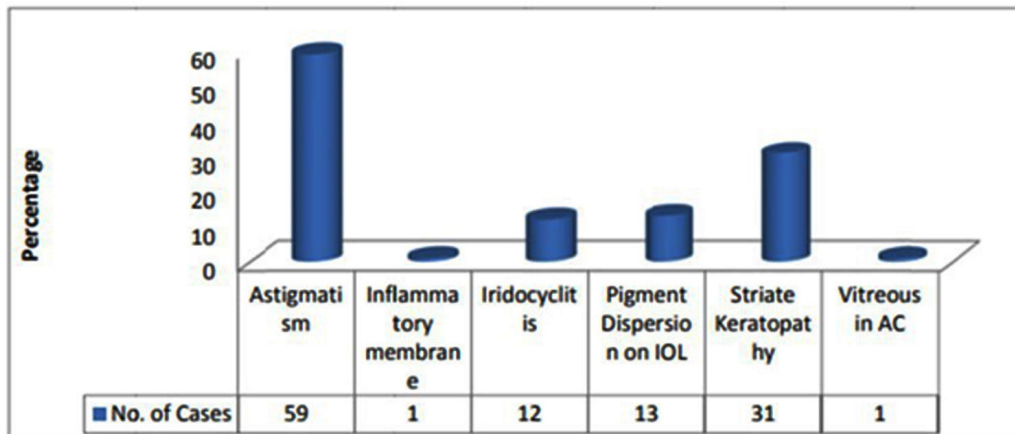


Fig. 6: Causes of subnormal vision on POD 1 week

membrane (1%) and Vitreous in AC (1%) played a major role in hampering the vision post-operatively (Fig. 7).

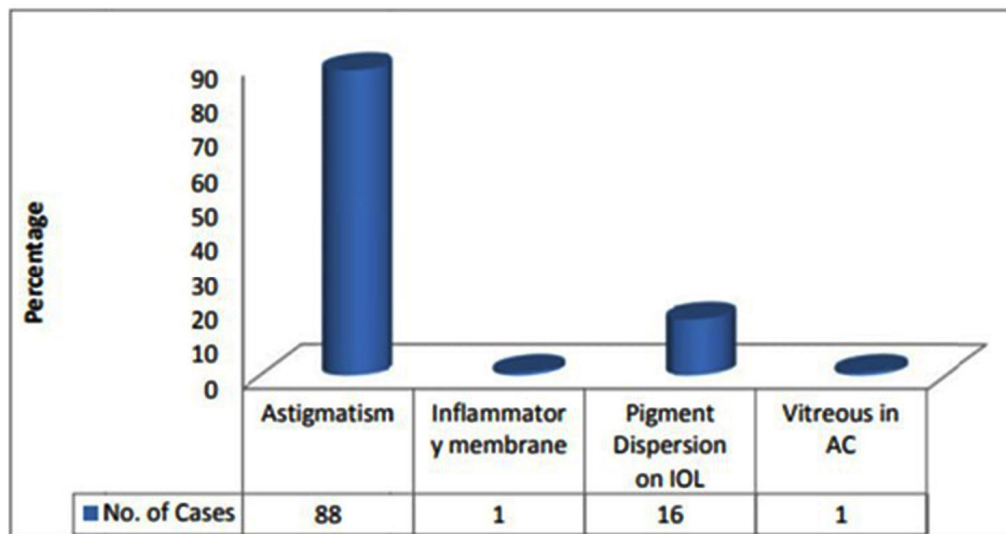


Fig. 7: Causes of subnormal vision on POD 6 weeks

## DISCUSSION

In the fast progressing world most of developed countries are evolving with phacoemulsification with IOL implantation, but in developing countries like India, planned SICS with PCIOL implantation is the most commonly done surgery due to socioeconomic status. Any IOL has a capability of producing a vision of 6/6, good field of vision without chromatic aberration after an accurate IOL power estimation, smooth surgery and uneventful post-operative time.

As multiple numbers of factors determine the end visual outcome after cataract surgery few are related to surgeon like skills, few are related to

operating setup, few are also related to patient's compliance.

A Total of 100 patients underwent small incision cataract surgery, 99 patients received posterior chamber intraocular lens. 1 patient was rendered Aphakic.

### *Intra-operative Complications Leading to Subnormal Vision:*

Posterior capsule tear was seen in only 1 patient for which manual clear anterior vitrectomy was done and patient was called for secondary IOL implantation on later date, 3 patients had iridodialysis which occurred during small incision cataract surgery was seen during nuclear prolapse,



Iris prolapse occurred in 4 patients which occurred due to positive pressure during the surgery.

### ***Post-Operative Complications Leading to Subnormal Vision:***

6% of patients on day 1 and 1 patient on post-op 1 week, 1 patient on post op 6 weeks were found to have inflammatory membrane, 65% of patients on day 1 and 12% of patients on postop 1 week were found to have iridocyclitis which was attributed to excessive handling of iris tissue due to iris prolapse, synechiae, hard nucleus. These patients were started on homatropine eye drops and were followed up regularly. 7% of patients on day 1 had residual lens matter, intra operative miosis.

80% of the patients on day 1 and 31% of patients on post op 1 week had striate keratopathy for which hypertonic solution eye drops was started. Only 1 patient had vitreous in anterior chamber on post op day 1 and 1 week due to posterior capsular rent and vitreous loss. 13% of patients on 1 week and 16% of patients on 6th week showed signs of pigment dispersion on IOL. 59% of the patients and 88% of the patients developed astigmatic error on post op 1 week and 6th week respectively, All the patients had with the rule astigmatism and best corrected visual acuity arranged from 6/6 to 6/18.

At the end of 6 weeks, 1 patient had severe visual loss which was due to vitreous in anterior chamber, 11% of patients had moderate visual loss, which was due to astigmatism with associated pigment dispersion of IOL and 55% of patients had mild visual loss due to astigmatism. Moderate & Severe visual loss which was found to be higher in the 1st week, reduced by the end of 6th week with maximum number of patients falling into mild visual loss category the main reason for which was found to be astigmatism.

Numbers of complications are reduced due to the advancements in cataract surgery and also due to better way of handling tissue. Few complications like toxic anterior segment syndrome, infectious endophthalmitis, cystoid macular edema, choroidal detachment, bullous keratopathy were not seen in any of the patients. Incidences of these devastating complications are almost nearing 0% in this advancement era of surgeries.

Cataract surgery can be a doubled edged sword where it can give vision as clear as 6/6 and can also

make patient to loose the vision due to its dreadful complications. In this times of phacoemulsification manual small incision cataract surgery can still be best option in developing countries as it is more economical.

### **CONCLUSION**

Cataract surgery is one of the commonly performed surgeries. To conclude striate keratopathy and iridocyclitis were found to be the major cause for low vision on post-operative day 1. Astigmatism, striate keratopathy, pigment dispersion on IOL are major cause of reduced vision on postoperative 1st week. Astigmatism was found to be the commonest factor causing subnormal vision after cataract surgery where the best corrected visual acuity ranged from 6/6 to 6/18.

Post-operative complications though inevitable when diagnosed at right time and proper management of these complications can still reduce the ocular morbidity. To reduce all these complications proper decontamination of ocular adnexa and conjunctiva with povidine iodine, achieving soft eyeball following peribulbar anesthesia, pre operative and timely postoperative evaluation, ensuring adequate wound closure and creating awareness about the hygiene and usage of eye drops and regular follow ups are emphasized.

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