

## Lens-induced glaucoma in the rural population: Is cataract surgery in one eye a boon or bane?

Anitha S. Maiya<sup>1,\*</sup>, Ravindra B.<sup>2</sup>, Manjunath BH<sup>3</sup>, Meghana Patil<sup>4</sup>

<sup>1</sup>Associate Professor, <sup>2</sup>Professor & HOD, <sup>3</sup>Professor, <sup>4</sup>Assistant Professor, Dept. of Ophthalmology, JJMMC, Davangere

**\*Corresponding Author:**

Email: dranithasmaiya@gmail.com

### Abstract

**Purpose:** To evaluate the characteristics of Lens Induced Glaucoma among the rural population and to determine if cataract surgery in one eye plays a role in causing Lens Induced Glaucoma in the other eye.

**Methods:** This prospective study included 43 eye of 43 patients who were clinically detected to have lens induced glaucoma and operated by one surgeon. A comprehensive ophthalmic evaluation was done and medical management instituted. All patients underwent Manual Small Incision Cataract Surgery and were followed up for 6 weeks.

**Results:** Majority of the patients were in the age group of more than 60 years. The incidence of lens induced glaucoma was more among females (65.12%). Phacomorphic glaucoma was more common (30 cases; 69.77%) than phacolytic glaucoma (13 cases; 30.23%). Following cataract surgery, 26 eyes (60.47%) had visual acuity 6/18 or better. Majority of our patients(69.77%) presented within 7 days of onset of symptoms; among the 13 patients who presented after 7 days of onset of symptoms, the postoperative visual acuity tended to be poorer than in those who presented early. A majority of them (34 patients; 79.07%) mentioned having good vision in the fellow eye as the reason for delaying cataract surgery in the affected eye.

**Conclusions:** Since LIG is a preventable condition, Ophthalmologists should stress the importance of undergoing cataract surgery when the cataract is still immature and in bilateral cases advice early surgery for the fellow eye. With advances in surgical techniques, good preoperative control of IOP and postoperative treatment, it is possible to restore good vision in patients with LIG who present early.

**Keywords:** Lens induced Glaucoma, Manual small incision cataract surgery, Phacolytic glaucoma, Phacomorphic glaucoma.

### Introduction

Lens induced glaucomas (LIG) are types of secondary glaucoma in which the crystalline lens plays a vital role, either due to an increase in its thickness, change in its position or by an inflammatory process. LIG is most commonly seen in eyes with neglected advanced cataracts. Delay in reporting for treatment of cataract can lead to the patient developing LIG which can cause irreversible loss of vision if not treated early. This preventable and curable condition, though rare in developed countries, is unfortunately still prevalent in India.

Of the 20 million blind people in India, cataract contributes to 63.7% of the preventable causes of blindness.<sup>(1)</sup>

With dedicated efforts of the National Programme for Control of Blindness (NPCB), NGOs, government agencies and private practitioners, cataract surgery has become a very cost effective and rewarding surgery. In 2012, the cataract surgical rate (number of cataract surgeries per million population, per year) was 6000.<sup>(2)</sup> Despite such a large number of people getting operated annually, LIG still continues to be prevalent in our country due to illiteracy, ignorance, lack of awareness and poor health-seeking behavior especially among the rural population.

Another reason that may be attributed for delaying or avoiding surgery despite having visually impairing cataract is having good vision in the fellow eye which allows the individual to perform all the routine

activities. Most people tend to delay surgery in the other eye after having undergone cataract surgery in one eye since their visual needs are taken care of by the operated eye. We undertook this prospective study to study the characteristics of LIG with a special attention to evaluate if prior cataract surgery did contribute to a delay in seeking treatment in the affected eye.

### Materials and Methods

This prospective study was undertaken over a 3-year period between November 2013 and November 2016. Ethical clearance from the Institutional Ethical Committee was obtained. All consecutive patients attending the Ophthalmology outpatient department diagnosed as LIG on the basis of clinical symptoms and signs were included. A written informed consent was obtained from all the patients.

A total of 43 patients/eyes were included. A detailed history including presenting symptoms with duration and the reasons for delay in presentation for cataract surgery was noted down. Congenital cataract, traumatic cataract, complicated cataract, and known cases of glaucoma were excluded from the study.

A detailed clinical examination of both eyes included the best corrected visual acuity, status of the lens, depth of the anterior chamber by slitlamp biomicroscopy, IOP by applanation tonometry and gonioscopy to determine the status of the anterior chamber angle. Based on the slitlamp examination the type of LIG was determined. An Ultrasound B-scan

was done in the affected eye to know the status of the posterior segment. The posterior segment of the fellow eye was evaluated by slit lamp fundus biomicroscopy.

All patients received preoperative treatment to reduce IOP that included topical timolol and brimonidine, oral acetazolamide and intravenous mannitol (200 ml of 20% was given intravenously just before surgery for a period of thirty minutes) in refractory cases. Systemic and topical antibiotic prophylaxis was administered. In phacolytic glaucoma, additionally topical dexamethasone every two hours and homatropine eye drops thrice a day were also used. All patients were posted for Manual Small Incision Cataract Surgery (MSICS) under guarded prognosis.

All the surgeries were performed under peribulbar block anaesthesia by a single surgeon (ASM) using the standard surgical protocols for MSICS. The additional precautions taken were avoiding ocular massage after peribulbar block, slow ocular decompression during paracentesis, use of Trypan blue dye to stain the anterior capsule, sphincterotomy / viscosynechiolysis as and when needed and careful hydrodissection. The surgical duration was kept as short as possible while keeping a watch for any signs of intraoperative suprachoroidal hemorrhage. All intra-operative difficulties and complications were noted down.

The patients were discharged after 2 to 5 days depending on post-operative inflammation and IOP. Topical drops containing Moxifloxacin-Dexamethasone (hourly for 7 days) and Homatropine eye drops (thrice daily) were used postoperatively. Systemic steroids were given to patients with a severe post-operative uveitis. All patients received topical timolol eye drops for the first postoperative week, which was discontinued depending on the IOP response.

All patients were followed up on days 1, 7, 14, 30 and 45. At each visit a detailed examination including uncorrected visual acuity, IOP, slitlamp biomicroscopy and fundoscopy with 90 D lens was performed. Refraction with spectacle correction was done at 6-weeks post-op.

## Results

43 eyes of 43 patients clinically diagnosed to have LIG were studied during the three-year study period.

Age and gender distribution of the patients:

There were 15 males and 28 females. Females outnumbered males with a male to female ratio of 1: 1.86.

Their age ranged from 55 to 79 years with a mean of 66.5 years.

**Table 1: Age and sex distribution of patients**

Age (Yrs)	Male		Female		Total	
	No. of patients	%	No. of patients	%	No. of patients	%
51-60	2	4.66	3	6.98	5	11.63
61-70	12	27.9	24	55.81	36	83.72
71-80	1	2.33	1	2.32	2	4.65
Total	15	34.89	28	65.11	43	100

**Presentation:** Pain in the affected eye was the chief mode of presentation seen in all 43 (100%) patients. The other presenting complaints were redness in the affected eye seen in 38 patients (88.37%) and watering seen in 21 patients (48.84%).

The time gap between onset of the acute symptoms and presentation to the hospital ranged between 2-14 days. Eight cases (18.61%) presented to the hospital within 48 hours of onset of the disease. Twenty-two patients (51.16%) came to the hospital between the 3rd and the 6th day. In 13 patients (30.23%), the symptoms had been present for more than a week before any treatment was sought.

Phacomorphic glaucoma was present in 30 patients (69.77%) and phacolytic glaucoma in 13 (30.23%). We did not encounter any case of phacoanaphylactic or phacotoxic glaucoma during the study period.

**Visual acuity at presentation:** Visual acuity of the affected eye at presentation:

The visual acuity was markedly reduced in all cases due to cataract as well as due to loss of corneal transparency secondary to a sudden rise of intraocular pressure. Eight patients (18.61%) had a VA of hand movements, thirty-two patients (74.42%) had only light perception, and in three cases (6.97%), even perception of light was doubtful.

**Visual acuity of the fellow eye:** Examination of the fellow eyes revealed that 8 eyes (18.61%) were phakic, 2 eyes (4.65%) were aphakic and 33 eyes (76.74%) were pseudophakic. Of the 43 fellow eyes, 2 eyes (4.65%) had a visual acuity less than <6/60 and 6 eyes (13.95%) had a VA of 6/24- 6/60. A majority of patients i.e. 35 eyes (81.40%) had vision of 6/6 to 6/18 of whom 33 eyes were pseudophakic and 2 eyes were phakic.

**Post-operative visual acuity in the affected eye:** The postoperative vision of patients was as shown in Table 2. It can be seen that 60.47% of the patients recovered very good vision (6/18 or better) after surgery. Low vision/visual impairment (<6/24-6/60) occurred in 12 (27.91%) cases. Best corrected visual acuity of <6/60-3/60 was seen in 5 (11.62%) cases. None of our patients had a post-operative VA of <3/60.

**Table 2: Postoperative best corrected visual acuity of patients**

Vision	Number of patients	Percentage
6/6–6/18	26	60.47
<6/18–6/60	12	27.91
<6/60–3/60	5	11.62
<3/60–1/60	0	0
<1/60–PL	0	0
No PL	0	0
Total	43	100

**Cause for delay in presentation:** The major reasons cited for a delay in undergoing cataract surgery in the affected eye were "having good vision in the fellow eye" in 34 patients (79.07%) "no escort" in 14 (32.55%) and "lack of money" in 2 (4.65%) cases and "fear of surgery" in 3 (6.98%) patients.

**Intraocular pressure:** The mean presenting intraocular pressure was 46 mm Hg (range 24–68). In 28 (65.12%) patients, the intraocular pressure could be reduced to less than 30 mm Hg by hypotensive medications prior to cataract surgery.

Following surgery, 34 eyes (79.07%) had an IOP of 21 mm Hg or less in the first post-operative week. At 6 weeks post-op, only 2 eyes (4.65%) continued to require one anti-glaucoma medication for the control of IOP.

#### **Intra-operative and post-operative complications:**

The intra-operative and post-operative complications encountered in the study are as depicted in Table 3. The most frequently encountered intra-operative difficulty was repeated shallowing of the anterior chamber due to posterior vitreous pressure seen in 23.26% of cases and difficulty in performing continuous curvilinear capsulorhexis in 18.6% of cases. Posterior capsular rupture occurred in one eye with phacomorphic glaucoma and the patient had to be left aphakic since it was not possible to implant a posterior chamber intraocular lens. In the postoperative period, striate keratopathy was seen in 41.86% of cases and most of these eyes had phacomorphic glaucoma. Patients with Phacolytic glaucoma had more severe postoperative uveitis which settled down in 2-4 weeks with intensive steroid therapy. None of our patients required any additional surgical intervention in the postoperative follow up period.

**Table 3: Intraoperative and postoperative complications**

Intraoperative and postoperative complications	Cases	%
Intra-operative shallow anterior chamber	10	23.26
Difficulty in capsulorhexis	8	18.6
Posterior capsule rupture and vitreous loss	01	2.32
HypHEMA	02	4.65

Post-operative uveitis	9	20.93
Striate keratopathy	18	41.86

#### **Discussion**

In a developing country like India, there is a still significant backlog of cataract due to the population explosion, increased life expectancy and low productivity in terms of utilisation of the available surgical services (particularly in the rural population). This has resulted in lens induced glaucoma being a common cause of ocular morbidity.

In our study, majority of the patients were more than 60 years of age (38 patients; 88.37%). Other studies have described LIG to be highest in the age group above 60 years (64.9%), indicating that the lens induced glaucomas are a condition of old age.<sup>(3,4)</sup>

Our study found a higher incidence of LIG among females (male to female ratio being 1:1.86). This corresponds with other studies which also found a female preponderance of LIG.<sup>(3,4,5)</sup>

The higher risk of LIG in females can be explained by (i) higher prevalence of senile cataracts in females as shown by several studies.<sup>(6,7)</sup> (ii) females have a poorer access to health care services especially in the rural areas.

Pain was the predominant presenting feature and majority of our patients (69.77%) presented within 7 days of onset of symptoms. Among the 13 patients who presented more than 7 days after the onset of symptoms, the postoperative visual acuity tended to be poorer than in those who presented early. This corresponds with the results of a study by Raghunandan et al.<sup>(8)</sup>

When we looked into the causes for a delay in undergoing cataract surgery in the affected eye which eventually led to the development of LIG, a majority of them (34 patients; 79.07%) mentioned that having good vision in the fellow eye took care of their visual needs. Among these 34 patients, 32 patients were pseudophakic and 2 eyes were phakic with early cataract and had a visual acuity of >6/18 in the fellow eye. This shows that the elderly rural population tended to delay cataract surgery in the fellow eye until it led to complications like LIG. This is another aspect to be considered in patients undergoing cataract surgery. We need to counsel the importance of undergoing cataract surgery in the other eye in order to avoid complications of cataract like LIG. This also emphasizes the need for health education particularly in the rural population so that the prevalence of LIG can be reduced significantly.

#### **Conclusion**

This prospective study evaluated the characteristics of LIG among the rural population. Early diagnosis, differentiation from other forms of glaucoma, good preoperative medical management to control IOP and inflammation with a meticulous surgery taking adequate precautions and good postoperative care can

restore good vision in a majority of these patients. Since LIG is a preventable disease which continues to persist despite increase in the cataract surgical rates in India, Ophthalmologists need to stress the importance of undergoing surgery when the cataract is still immature. In patients with bilateral cataracts, it is important to convince the patient to undergo early surgery for the other eye.

### References

1. Government of India. National Survey on Blindness and Visual Outcome after Cataract Surgery, 2001-2002. Vol. 77. New Delhi, India: National Programme for Control of Blindness, Ministry of Health, Government of India; 2002.
2. National Program for Control of Blindness: State wise targets and achievements for various eye diseases during 2012-13.
3. Pradhan D, Hennig A, Kumar J, Foster A. A prospective study of 413 cases of lens-induced glaucoma in Nepal. *Indian J Ophthalmol* 2001;49:103-7.
4. Shazia Q, Dinesh Gupta, Shagufta R, Ravi B. A study to evaluate visual outcome, IOP control, and complications in patients with lens induced glaucoma following manual SICS. *Ind J of Clin and Exp Ophthalmol*, April-June,2016;2(2):112-114 .
5. Prajna NV, Ramakrishnan R, Krishnadas R, Manoharan N. Lens induced glaucomas – visual results and risk factors for final visual acuity. *Ind J Ophthalmol* 1996;44:149-55.
6. Chatterjee A, Milton R, Thyle S. Prevalence and aetiology of cataract in Punjab. *Br J Ophthalmol* 66:35-62,1982.
7. Kahn H, Leibowitz H, Ganley J, et al. The Framingham Eye Study: association of Ophthalmic pathology with variables previously measured in the Framingham Heart Study. *Am J Epidemiol* 106:33-41,1977.
8. Kothari R, Tathe S, Gogri P, Bhandari A. Lens-Induced Glaucoma: The Need to Spread Awareness about Early Management of Cataract among Rural Population. *ISRN Ophthalmology*. 2013;2013:581727. doi:10.1155/2013/581727.