*Original Article*

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# A Clinical Study of Lens Induced Glaucoma

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**Abstract**

*Introduction:* Cataract is a major cause of preventable blindness in India accounting to 62.6% [1,2]. A significant proportion of patients still present with advanced cataract leading to complications like Lens-induced glaucoma. There is an ever-increasing backlog of cataract due to the population explosion, increased life expectancy, and low productivity in terms of utilization of the available surgical services. Late reporting for treatment of cataract leading to serious complications like LIG remains one of the most important cause of irreversible loss of vision,. *Aims:* The aim is to study the clinical profile of lens induced glaucoma by intraocular pressure pre and post operatively and to assess the final visual outcome in lens induced glaucoma. *Materials and Methods:* This is a prospective hospital-based study. Eighty cases were studied, encountered during the period of 3 years. *Results:* The total number of cases studied were 80, of which 52 were female and 28 were male showing that occurrence of LIG is more common in females and socioeconomic factors play a major role. Most common type was found to be phacomorphic type of lens induced glaucoma. The occurrence of phacoanaphylactic glaucoma and glaucoma due to subluxation of lens was zero in this study. BCVA at 6 weeks post operatively was 6/18 or better in 57.5% patients. *Conclusion:* Inspite of easy availability of services for cataract surgery socio-economicconditions, poor health education and negligence towards symptoms andwas found to be the main reason for occurrence of LIG. This study signifies that there is a great need to impart health education to thepublic about the importance of timely surgery for better visual outcome.

**Keywords:** Cataract; Lens-induced glaucoma (LIG); Phacomorphic type.

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## Introduction

Cataract is a major cause of preventable blindness in India accounting to 62.6% [1]. A significant proportion of patients still present with advanced cataract leading to complications like Lens-induced glaucoma. Lens-induced glaucoma is a secondary glaucoma in which the crystalline lens is involved in the mechanism of intraocular pressure increase. In the year 1900 Gifford and Von Reuss first described LIG in relation to cataract [2]. Lens-induced glaucoma (LIG) may be due to:

(a) Secondary angle closure from swelling of the lens due to absorption of fluid producing an intumescent cataract (phacomorphic glaucoma).

(b) Occlusion of an open anterior chamber angle by macrophages that has phagocytised lens protein. The lens protein leaks out of the lens capsule of the hypermature cataract (phacolytic glaucoma).

(c) Obstruction of the outflow channels of the anterior chamber angle by inflammatory cells and debris, produced secondary to an immune hypersensitivity reaction to lens protein (phacoanaphylactic glaucoma).

(d) Other types of lens induced glaucomas like lens particle glaucoma and phacotopic glaucoma may also occur.

There is an ever-increasing backlog of cataract due to the population explosion, increased life expectancy, and low productivity in terms of

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utilization of the available surgical services. Late reporting for treatment of cataract leading to serious complications like LIG remains one of the most important cause of irreversible loss of vision, especially so in the rural population. The uptake of eye care services by the rural community has also been suboptimal in countries like India where LIG is not an uncommon cause of ocular morbidity. Mode of treatment is Small incision cataract surgery with PCIOL, or extracapsular cataract extraction with posterior chamber IOL implantation (ECCE with PCIOL) with or without iridectomy. However, postoperative recovery in these conditions remains guarded. The occurrence of Lens Induced Glaucoma in India has high probability. Thus an analysis of magnitude of lens induced glaucoma and assessment of the visual outcome after cataract surgery in patients attending tertiary care centre like Mamata General Hospital, Khammam would provide important information regarding the morbidity produced by this condition and its effect on incidence of blindness. This study is undertaken to study the clinical profile of various types of lens-induced glaucomas and outcome of current management in a patient seen over a two year period in a tertiary eye hospital in Khammam district of Telangana.

### *Aims and Objectives*

The aim of this dissertation is to study the clinical profile of lens induced glaucoma. To study the intraocular pressure pre and post operatively and to assess the final visual outcome in lens induced glaucoma.

## Materials and Methods

This is a prospective hospital-based study in 80 cases encountered during the period from 2015 to 2017 on patients attending the out patient department of Ophthalmology, Mamata General Hospital, Khammam, Telangana from 2015 to 2017 during three year study period.

### *Inclusion Criteria*

All patients were diagnosed as lens induced glaucoma on the basis of clinical symptoms and signs.

### *Exclusion Criteria*

Glaucomas other than those due to phacogenic cause, congenital cataract, traumatic cataract, complicated cataract, secondary cataract and cataract with corneal dystrophy and corneal opacity.

Only those cases which are amenable to follow up were taken up for the study. A detailed case history was taken providing address, age, sex and duration of pain. A detailed clinical examination of both eyes included the visual acuity, status of the lens, peripheral anterior chamber depth by slit lamp biomicroscopy, measurement of intraocular pressure with applanation tonometry, angle of anterior chamber examination by gonioscopy with three mirror Goldmann contact lens. Fundus examination done with a +90.0D lens. Clinical features included pain, loss of vision, redness of the eye, the presence of intumescent, mature or hypermature cataractwith raised intraocular pressure of more than 21 mm Hg. Gonioscopy was notfeasible in some cases due to corneal edema which precluded the visualization ofthe angle of anterior chamber details.

Phacomorphic glaucoma was diagnosed on the basis of acute pain, corneal edema, circumciliary congestion, dilated fixed pupil, intumescent cataract with shallow anterior chamber and on gonioscopy shows narrow angle. Phacolytic glaucoma was diagnosed on the basis of pain, corneal edema, with orwithout anterior chamber flare, deep anterior chamber with open angle ongonioscopy, floating lens particles in AC and or pseudohypopyon. Patients with LIG due to lens displacement (subluxation or dislocation) werediagnosed by history and slit lamp examination may show hypermature morgagnian type of cataract with phacodonesis and iridodonesis.

All cases were treated preoperatively with oral carbonic anhydrase inhibitors, topical Blockers and intravenous mannitol 20% 1 g/kg body weight over 30–40 minutesone hour before surgery to reduce the intraocular pressure. In addition topical steroids were given to reduce the inflammation.

All the patients were explained about the guarded prognosis and an informedconsent was obtained. A small incision cataract surgery was done in all patients andposterior chamber IOL implanted. Sub conjunctival injection of 0.5 CC of dexamethasone 2 mg and gentamycin 20 mg was given at the end of the procedure. The postoperative stay varied from 3 to 5 days with an average of 4 days depending on complications. They were given systemic antibiotics, topical steroid-antibiotic and cycloplegics postoperatively. Systemic and or subconjunctival steroids were given to patients with a severe exudative reaction. At discharge a

detailed examination including uncorrected visual acuity, slit lamp biomicroscopy was performed. Patients were discharged with instruction to use a topical steroid antibiotic combination hourly for 1 week and tapered over 6 weeks duration and were reviewed once in a week. Tonometry, slit lamp biomicroscopy, fundoscopy with +90 D lens and BCVA were examined at the end of 6 weeks. BCVA > 6/18 was considered to be a reasonably good visual recovery and IOP < 21 mm Hg was considered to be within normal range. The results of the study were analyzed in terms of incidence, amount of IOP control preoperatively in response to medical treatment, postoperative IOP range, and visual outcome with respect to the duration of symptoms.

## Results

This study includes a total number of 80 cases of lens induced glaucoma patients who were clinically examined to diagnose the type of LIG. Among the 80 cases examined the most common found to be phacomorphic type. There were no phacoanaphylactic glaucoma and phacotopic glaucoma cases recorded in this study period Lens induced glaucoma is a unilateral condition. Among the 80 cases examined right eye was affected in 43 cases and left eye in 37 cases. (Fig. 1).

**Table 1:** Demographic details of patients in study

| Age | Number of cases | Percentage |
|---|---|---|
| 0–11 | - | - |
| 11–20 | - | - |
| 21–30 | - | - |
| 31–40 | - | - |
| 41–50 | 1 | 1.25% |
| 51–60 | 31 | 38.75% |
| >60 | 48 | 60% |
| Laterality | | |
| Right eye | 43 | 54 |
| Left eye | 37 | 46 |
| Gender | | |
| Males | 28 | 35 |
| Females | 52 | 65 |
| Duration of symptoms | | |
| < 1 week | 43 | 53.75% |
| 1–2 weeks | 26 | 32.5% |
| 2–4 weeks | 9 | 11.25% |
| >4 weeks | 2 | 2.5% |

Lens induced glaucoma is a disease of old age. Majority of patients seen in this study about 48 patients were above the age group of 60 years. No patients were seen below the age of 48 years in our study. About 31 patients were seen between the age group of 51 to 60. In this study it was observed that LIG was more common in females than males. Among 80 patients observed 52 were female and 28 were male patients. Majority of the

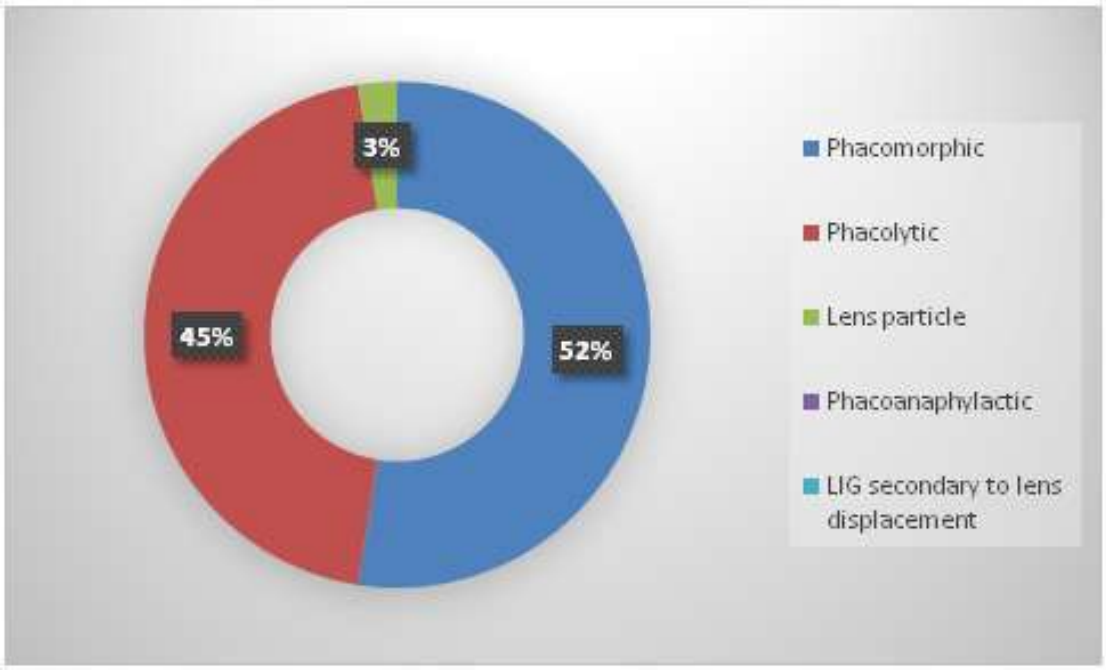


**Fig. 1:** Number of cases and percentages of various forms of LIGs

patients in this study presented within 1 week of onset of symptoms. About 44 cases out of the 80 cases studied presented within 1 week of onset of symptoms. Rest of the cases had symptoms for more than 1 week (Table 1).

**Table 2:** Range of intraocularpressure at the time of admission:

| Range of IOP | Number of cases | Percentage |
|---|---|---|
| 21–25 | 2 | 2.5% |
| 26–40 | 44 | 55% |
| >41 | 34 | 42.5% |
| Range of IOP in response to medical therapy | | |
| <21 mm of Hg | 6 | 7.5% |
| 21–26 mm of Hg | 56 | 70% |
| 26–30 mm of Hg | 12 | 15% |
| 31–40 mm of Hg | 4 | 5% |
| >40 mm of Hg | 2 | 2.5% |
| Range of IOP at 6 weeks | | |
| <21 mm of Hg | 70 | 87.5% |
| >21 mm of Hg | 5 | 6.25% |
| Lost for review | 5 | 6.25% |

In this study 44 out of 80 cases presented with LIG presented with an IOP in the range of 26–40. About 34 patients presented with IOP more than 41 and 2 cases presented with IOP less than 26. Majority of the cases in this study were operated after the IOP has come down to normal limits using medical therapy. About 62 cases had IOP less than 25 mm of Hg pre-operatively. Rest of the cases had higher pre op IOP of more than 26 mm of Hg. Post operative IOP at 6 weeks was found to be within normal range in 87.5% of patients (Table 2).

### *Visual Acuity at Presentation Discharge and Follow up*

*At Presentation*

About 74 cases in this study presented with visual acuity of perception of light only. Only about 6 cases had visual acuity of Hand movements.

*First Postoperative Week*

In the first postoperative week majority of the cases (52.5%%) between 6/24 to 6/60. This was due to post-op iritis and corneal edema which reduced on follow up visits with topical antibiotic-steroid medication. About 22 cases achieved vision better than 6/18 and 16 cases had vision less than 6/60.

*At 6 Weeks Post Operatively*

Forty six cases out of the 80 cases studied had visual acuity 6/6 to 6/18. About 21 cases had vision between 6/24 to 6/60 and 8 cases with less than 6/60. 5 cases were lost for review at sixth post op week (Fig. 2).

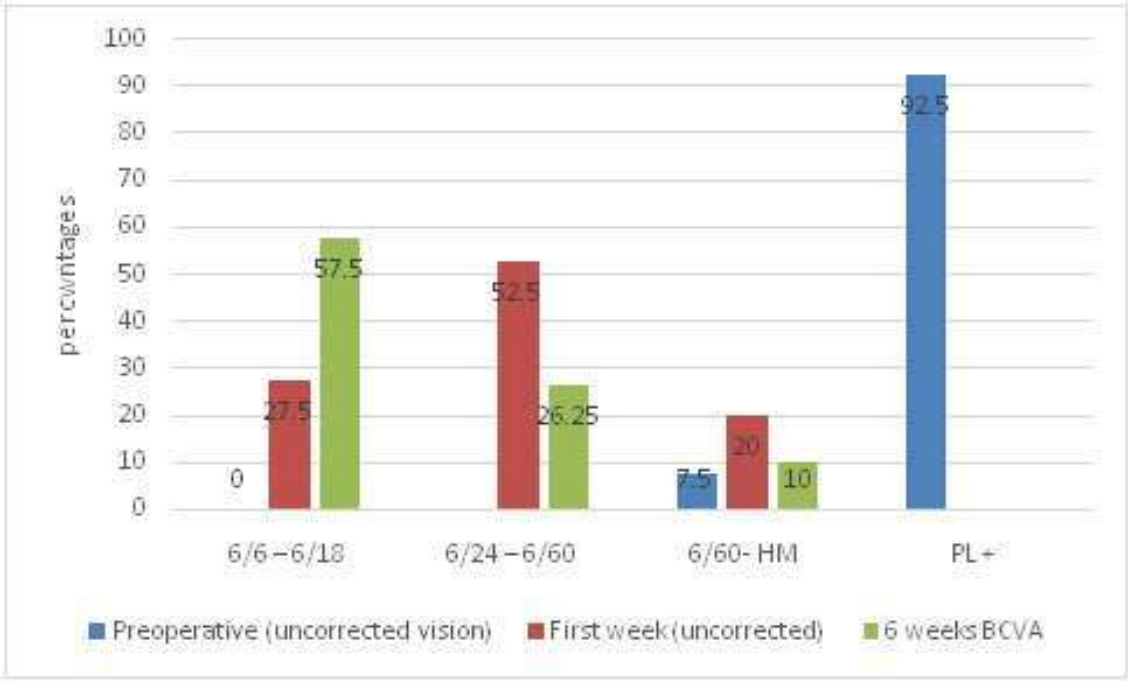


**Fig. 2:** Percentage of patients with visual acuity at presentation, first post op week and 6 weeks post operatively

**Table 3:** Visual acuity in relation to duration of symptoms

| Duration of symptoms | 6/6 | 6/9 | 6/12 | 6/18 | 6/24 | 6/36 | 6/60 | CF-HM | LFR |
|---|---|---|---|---|---|---|---|---|---|
| <1 week | 11 | 10 | 7 | 5 | 6 | 2 | 1 | 0 | 1 |
| 1-2 weeks | 3 | 3 | 4 | 2 | 2 | 4 | 4 | 2 | 2 |
| 2- 4 weeks | - | - | - | 1 | - | - | 1 | 6 | 1 |
| >4 weeks | | | | | | | 1 | | 1 |

In this study it was noted that 33 cases out of 43 cases who presented within 1 week achieved BCVA of 6/6 – 6/18 at 6 weeks post operatively (Table 3).

## Discussion

Lens induced glaucomas occur commonly in India. Though these are clinically distinct entities, they have certain common factors in that they are lens induced, they compromise the function of the optic nerve due to rise of intraocular pressure, cataract surgery is curative in these cases and finally they uniformly share a guarded prognosis.

### *Incidence of Type of LIG*

Lens induced glaucomas are either angle closure or open angle type, resulting due to some disorder of crystalline lens. Phacomorphic glaucoma is defined as secondary angle closure glaucoma due to lens intumescence. An acute rise of IOP can hamper the optic nerve function and may lead to irreversible visual loss if not treated on time. Phacolytic glaucoma is the sudden onset of open angle glaucoma caused by a leaking hypermature cataract. It was observed in this study that patients with phacolytic glaucoma seek medical advice earlier than phacomorphic glaucoma because of the quicker onset of pain, redness and watering in eye with acute elevation of IOP. Lens particle occurs in case of hypermature cataract, traumatic rupture of lens capsule or post operative retained lens matter. Signs include mild to moderate signs of iridocyclitis, deep anterior chamber and very few or no keratic precipitates. The most common form observed in this study was of phacomorphic type constituting 52.5% followed by phacolytic which was 45%. Similar observations were made by other studies where phacomorphic was more common than phacolytic glaucoma (Table 4). Occurrence of various LIGs in the above studies shows variations. Almost always phacomorphic glaucoma is the most common type of LIG among several studies, even in the present study, which is peculiar to the developing countries.

**Table 4:** Percentages of phacomorphic and phacolytic glaucoma in different studies

| | | Phacolytic |
|---|---|---|
| This study | 52.5% | 45% |
| Bhuyan *et al.* [3] | 58.86% | 33.33% |
| Sharanabasama *et al.* [4] | 86% | 14% |
| Ushalatha *et al.* [5] | 62% | 38% |
| Prajna *et al.* [6] | 52.7% | 47.3% |
| Pradhan *et al.* [7] | 72% | 28% |
| Rijal AP [8] | 65% | 35% |
| Murty *et al.* [9] | 62% | 38% |

Phacomorphic and phacolytic glaucoma formed the main bulk of cases constituting 97.5% and lens particle glaucoma constituted 2.5%. Phacoanaphylactic uveitis with secondary glaucoma is seen in cases where there is history of cataract surgery or injury to lens.

As phacomorphic and phacolytic glaucoma are seen following neglected cataract tillit attains hypermaturity and leads to glaucoma, this emphasizes the importance ofearly detection and treatment of cataract. Studies indicated that phacolytic glaucoma occurred more commonly with increasingage probably due to aggregation of high molecular weight proteins over time.

### *Laterality*

Lens induced glaucoma being a secondary glaucoma is a unilateral condition. In thisstudy right eye was effected in 43 (53.75%) of patients and left eye in 37 (46.25%).There was no significant association with the type of LIG. Peram *et al.* showed that 52% cases had LIG in left eye were as 48% cases had LIGin right eye [10]. In a study conducted by Chandrasekhar *et al.* left eye (52.5%) was more affected than right eye (47.5%) [5]. Similar results were found by Rijal and Karki.Left eye was affected in 62% of cases and right eye in 38% cases [8]. They

suggested that there was no preponderance for right eye or left eye.

### *Incidence in Different Age Groups*

In this study the age range was 42–75 years with a mean age of 62.13. The highest number of cases occurred in the age group of more than 60 years (48%). The youngest case in the study group was 42 years old whereas the oldestwas 74 years old.Phacolytic glaucoma was seen more in older age groups than phacomorphicglaucoma. In a study conducted by Bhuyan *et al*. incidence was higher in the fifth decade and above [3]. Similar observations were made by Pradhan *et al* [7]. In a study conducted by Chandrasekhar *et al*. [5] majorityof the cases occurred in the age group of 66–75 years. Sharanabasamma *et al*. [4] found that highest number of cases occurred in the age group of 60–69 years (60%) 42. This correlates well with our study.

A study conducted by Prajna *et al*. [6] stated that age may be a confounding factor inobtaining better visual acuity as in older age groups optic nerve is more susceptibleto damage with increasing intraocular pressure. In our study this could not bestated as most of the patients obtained better visual acuity and no relation was madewith respect to age.

In Lahan study, it has been found that occurrence of LIG is in the age range of 40 to 80 years and highest in the 60 to 69 years age group, indicating that LIGs are acondition of old age [7].

Ushalatha *et al*. stated that onset of senile cataract is earlier in Indian patients andlate reporting for treatment of cataract leads to serious complications like LIG [5].

Occurrence of LIG in the older age group is attributed to the fact that cataract isneglected till they become hyper mature producing symptoms other than diminishedvision and pain requiring immediate medical help. This is because of insidious onset, lack of medical awareness, lack of regular eye check-up, ignorance and limitedresources in developing countries.

### *Incidence by Sex*

The lens induced glaucoma was found to be higher in females than males in ourstudy. This was about 65% with a ratio of 1.8:1 Study conducted by Bhuyan *et al*. [3] also showed that incidence was higher in femalesshowing 60.78% with a ratio of 1.6:136. Ushalatha *et al*. [5] also found that incidence of LIG was more common in females thanmales in a ratio of 2:146. They stated that the reason could be lesser attention received by old women in rural India. This is identical with the studies of Sinha A andPrajan *et al* [6]. Sharanabasamma *et al*. [4] also showed that females had an increased risk of LIG overmales with a ratio of 1.7:1. In this study it was also stated that cataract is more prevalent in females than males. This data was consistent with Punjab study conducted in India and MATLAB study in Bangladesh [6]. In a study conducted by Chandrasekhar *et al*. incidence of LIG was slightly higher infemales (58%) than in males (42%) [5]. Similar results were reported by Rijal AP [8] and Pradhan *et al*. [6]. They observed thatsocio-economic and cultural constraints like most of the patients were daily wageworkers, lack of literacy and dependency on other family members play a roleleading to neglect and late presentation of cataract in females and also females haveshallow anterior chamber, making them more prone to angle closure [6,7]. In this study also female preponderance was found to be due tosocioeconomic repression in this region.

### *Duration of Symptoms*

Majority of cases in our study presented within first week of developing symptoms i.e about 53.75% and rest presented after 1 week (46.25%). Most of the patients in ourstudy were from rural and semi urban areas and of poor socio economicbackground. This might be the cause for late presentation in our study. In a study conducted by Bhuyan *et al*. majority of cases (50.98%) presented withinfirst week of developing symptoms [3]. Pradhan *et al*. in his study found 70% of casespresented after 10 days of onset of symptoms. He stated the reasons for latepresentation were "no escort" and "lack of money" [7]. Chandrasekhar *et al*. found that out of 50 cases 29 cases i.e about 58% presentedwithin first week [5]. In a study conducted by Ushalatha *et al*. about 86% of patients presented to thehospital within 10 days of onset of symptoms 46. A study conducted by sharanabasamma *et al*. [4] stated that reasons for latepresentation were probably because of poverty, ignorance, lack of awareness,facilities for treatment, quackery at peripheries and lack of prompt referral andhelplessness of patients.

In Kothari *et al*. [11] study, they observed that delayed reporting for treatment of cataract leads to serious complications like LIG. In spite of easy availability of services forcataract surgery, reasons

such as poor health education, acceptance of poor visionas part of aging, fear of operation, lesser expectations appear to be the leadingcauses. In their study, Rijal and Karki [8] also found that after taking history of all patients of LIG, all cases are having poor socio-economic conditions due to which negligencetowards symptoms and disease, cases came after longer duration of symptoms 47. Many of them were from far flung areas without any nearby facility of eyecare services. This might be one of the causes for late presentation in our study.In Kothari *et al*. [11] study, they found that longer the duration of symptoms greater thetime to start treatment for LIG.Also many people especially in rural areas take treatment for redness andpain in eyes from some local practitioners who miss the diagnosis initially. It was onlywhen the symptoms became worse, they report to the hospital.Another factor about late reporting found was that the very elderly visuallyhandicapped persons were left to their own fate as no one bothered to bring them tothe hospital.

### *Range of Iop*

#### *At the time of admission*

The range of IOP at the time of admission was found to be 26–40 mm of Hg inmajority of patients i.e in 55% of cases. In 42.5% of cases the IOP range was found to be above 40 mm of Hg. Only 2.5% of patients were found to have IOP of 21–26 mm of Hg. According to other studies, most of the patients presented with IOP more than 40 mm of Hg.In a study conducted by Ushalatha *et al*. 76% of cases have IOP more than 30 mmHg. They observed that the height of intraocular pressure has no relationship withduration of attack and type of cataract [5].

**Table 5:** IOP at presentation in different studies

| Studies | <40 mm of Hg | >40 mm of Hg |
|---|---|---|
| This study | 57.5% | 42.5% |
| Ushalatha *et al*. [5] | 30% | 70% |
| Bhuyan *et al*. [3] | 39.21% | 60.78% |

The highest IOP recorded in this study was 58 mm of Hg with applanation tonometerin case of phacolytic glaucoma. There was no significant difference in IOP among LIG subgroups.

In a study conducted by Kothari *et al*. [11], cases with delay in presentationbetween 2 and 4 weeks tend to present with higher IOP. Sharanabasamma *et al*. [4] also found that intraocular pressure tends to be higher if there is a delay inpresentation beyond 30 days than the duration of presentation less than 2 weeks.Though in this study, we observed that height of IOP had no relationship withduration of attack and type of cataract.

#### *Pre Operatively with Medical Therapy*

Adequate control of IOP with medical therapy was achieved in 77.5% of cases, the IOP was about within 25 mm of Hg. In a study conducted by Sharanabasamma *et al*. [4] found that the reduction of IOP isgreater after medication for glaucoma. Nevertheless, surgical removal of lens is thedefinitive treatment for Lens induced glaucoma and response to medication is good in these cases. This indicates that in LIG, IOP should be reduced by medical line ofmanagement prior to surgery near-normal to normal to achieve stable IOP postoperativelywithout any further anti-glaucoma medications.

In all these cases IOP decreased with medical management.

#### *At 6 Weeks Post-operatively*

The IOP was found to be within normal limits in 87.5% of patients at 6 weeks followup.P value of the post op IOP compared to pre op IOP is 0.0001 showing that IOP reduction was statistically significant after cataract surgery.Ushalatha et al. [5] also found that all the patients maintained a normal postoperativepressure of less than 20 mm Hg at 6 weeks without any additional medical therapy. This correlates with Venkatesh R *et al.* and Singh G studies who too achieved IOP<20 mm Hg in all their patients at the end of follow up period without any antiglaucomamedication [12, 13]. Chandrasekhar *et al.* found that the IOP tends to be higher with the delay inpresentation beyond 2 weeks than the duration of presentation <2 weeks. Thoughthe mean IOP in this study at the last follow up was normal, cases with delay inpresentation of more than 30 days tend to be on higher end of normal [5].

A good intraocular pressure control was defined as a final postoperative intraocularpressure of <21 mmHg, without the need for any anti-glaucoma medication. Those patients who had IOP of more than 21 mm of Hg after surgery which wasabout 6.25% had severe post-operative iritis and exudative membrane in thepupillary area. About 5 patients 6.25% were lost for review at 6 weeks post op.

### *Visual Acuity*

*At Presentation*

All the patients in this study presented with visual acuity of light perception and accurate projection of rays. As the patients in this study were illiterates and from rural areas, they ignore the mild symptoms and visited the doctor only after gross fall of vision. Also most of the patients had fairly good vision in the other eye leading to negligence till they developed complications in the effected eye. Only 7.5% patients presented with visual acuity of <6/60.

*First Post Operative Week*

About 27.5% of patients achieved good visual acuity of 6/6–6/18 within one weekpostoperatively. 52.5% patients got 6/24–6/60 vision and only 20% patients had lessthan 6/60 vision.

*Best Corrected Visual Acuity at 6 Weeks Post Operatively*

The BCVA of 6/6–6/18 at 6 weeks post operative period was obtained in 57.5% ofcases. BCVA of 6/24–6/60 was obtained in 26.25% cases. This was noted in cases that hadlonger duration of symptoms and presented late to the hospital.In a study conducted by Ushalatha *et al.* [5] at 6 weeks BCVA of 6/12 was achieved in 80%, 6/18 to 6/60 in 10% and <6/60 in 12%.

TheMadurai study found that higher number of patients (59.13%) achieved 6/12 or betterthan those less than 6/60 (11.82%). Prajna *et al.* [6] found that 57% of phacomorphic glaucomas and 61% of phacolyticglaucomas attained postoperative corrected visual acuity of 6/12 or better. 10.2% patients with phacomorphic glaucoma and 13.6% patients with phacolytic glaucomahad visual acuity less than 6/60. The poor vision in these patients was found to bedue to compromised optic nerves due to glaucomatous process. Prajna NV *et al.* [6] also showed that BCVA of > 6/60 was achieved in 88% and less than 6/60 in 10%. They documented that the common cause of poor visual outcome wasoptic atrophy. As in our study they too related the final visual acuity more to theduration of attack than to the type of LIG or to the type of surgery, stating that thereis a great need to impart health education to the public about the importance oftimely surgery for better visual outcome.

*Visual Outcome in Relation to Duration of Symptoms*

In this study, duration of symptoms had a linear relation with best corrected visualacuity at the final follow up. About 76.7% of patients presented within 1 week achieved BCVA between 6/6–6/18. Other cases that presented within one week but did not achieve good vision werefound to have post operative complications like corneal edema, posterior capsularopacification and exudative membrane formation. Sharanabasamma *et al.* [4] found that good visual acuity was achieved in casespresented within 2 weeks (72%) was more than cases presented beyond 2 weeks (16%). This study shows linear relationship between the symptom duration and

BCVA at final follow up Sharanabasamma *et al.* also studied the influence of inflammation on final visualacuity. Visual acuity achieved in cases with mild to moderate inflammation (52.78%) was better than cases with severe to very severe inflammation (21.43%). Prajna *et al.* [6] also analyzed the role of age and sex of the patient including theduration of glaucomatous process in the visual outcome. They found that patientsabove the age of 60 years had a marginally significant increase in odds of obtaininga poor visual acuity.

*Visual Outcome in Relation to Pre op IOP*

About 35% patients who presented with less than 40 mm of Hg achieved good visualacuity of 6/6–6/18. 41.1% of patients who presented with IOP more than 40 mm Hg achieved good visual acuity of 6/12 or better. In our study poor visual acuity was not related to thepre op IOP. About 20.5% patients presenting with IOP above 40 mm Hg had vision 6/60 or less. A study conducted by Chandrasekhar *et al.* showed that cases with IOP atpresentation <30 mm of Hg achieved good visual acuity (60%) than cases with IOP more than 40 mm of Hg (20%).The Madurai study found no significant association between level of preoperative IOP and final visual acuity [6].

*Post op Complications*

Most of the patients in our study had mild post operative complications like striate keratopathy and iritis which subsided on hourly institution of topical steroids. Few cases had pupillary capture of PCIOL. Other cases with low visual acuity at 6 weeks post op were found to have exudative membrane in the pupillary area, posterior capsular opacification and pigment deposits on the IOL. 4 of the patients inour study were left aphakic due to posterior capsular

rupture. At 6 weeks post opfundus examination showed normal optic disc in majority of the patients. In 2 cases of the cases glaucomatous optic atrophy was seen which was correlated to theduration of symptoms. Patients who presented beyond 2 weeks had less visualacuity compared to those presented within 2 weeks. Shranabasamma *et al*. also observed similar results where optic disc was normal in 58% of patients at the last follow up. Glaucomatous disc damage was found in 42%cases. Optic disc damage was found to be more in patients presented beyond 2 weeks (64.28%) and especially beyond 30 days (100%) than in cases presentedbefore 2 weeks 42. According to Ushalatha *et al*. [5] 8% cases have developed glaucomatous optic atrophyand 4% developed atrophic bulbi due to delay in attending the hospital.In a study conducted by prajna *et al*. [6] postoperative poor visual acuity was found to bedue to glaucomatous optic atrophy and severe persistent postoperative uveitis withresultant cystoids changes in the macula.

## Conclusion

Most common type was found to be phacomorphic type of lens induced glaucoma. The occurrence of phacoanaphylactic glaucoma and glaucoma due to subluxation of lens was zero. BCVA at 6 weeks post operatively was 6/18 or better in 57.5% patients. Visual outcome bears a definite relationship with the duration of symptoms. BCVA of 6/6–6/18 in 77.6% of cases was attained in patients with duration of symptoms of less than one week. The postoperative IOP was within normal limits in 87.5% of patients. In spite of easy availability of services for cataract surgery socio-economic conditions, poor health education and negligence towards symptoms andwas found to be the main reason for occurrence of LIG. This study signifies that there is a great need to impart health education to the public about the importance of timely surgery for better visual outcome.

## References

1. Hugh R. Taylor. Cataract A Global Public Health Challenge – World Blindness & Its prevention – vision 2020 – The Right to sight, volume 6.
2. Gifford H. The dangers of the spontaneous cure of senile cataract. American Journal of Ophthalmology.1990;17:289–93.
3. Bhuyan J, Bharali MD. Management of "Lens Induced Glaucoma"-A Clinical Study. IOSR-JDMS. 2016 Aug;15:76–82.
4. Sharanabasamma M, Vaibhav K. Management and Visual Outcome in Patients of Lens-induced Glaucomas at a Tertiary Eye Care Hospital in South India. J Curr Glaucoma Pract. 2016;10(2):68–75.
5. Ushalatha. B, Chandrasekhar. B, Bhavani. M. V. A Study of Visual Outcome in Lens Induced Glaucoma. IOSR Journal of Dental and Medical Sciences. 2016 Apr;15:58–61.
6. Prajna NY, Ramakrishnan R, Kishnadas R, Manoharan N. Lens Induced Glaucomas. Visual results and risk factors for final visual acuity. Indian J Ophthalmol. 1996;44:149–55.
7. 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(3):204.
8. Rijal AP, Karki DB. Visual outcome and IOP control after cataract surgery in lens induced glaucomas. Kathmandu Univ Med J (KUMJ). 2006;4Z(1):30–3.
9. Murty *et al*. A clinical Study of Lens Induced Glaucoma. International Journal of Scientfic research and management (IJSRM). 2015;3(4):2535–38.
10. Peram V. Clinical Presentation of Lens induced glaucoma: Study of epidemiology, duration of symptoms, intraocular pressure and visual acuity. JEBMH. 2015 Oct;44(2):7822–28.
11. Kothari R, Tathe S, Gogri P, *et al.* Lens-induced glaucoma: The need to spread awareness about early management of cataract among rural population. ISRN Ophthalmol. 2013;2013:581727.
12. Venkatesh R, Tan CS, Kumar TT, *et al.* Safety & efficacy of manual small incision cataract surgery for phacolytic glaucoma. Br J Opthalmol. 2007;91(3):269–70.
13. Singh G, Kaur J, Mall S. Phacolytic glaucoma-Its treatment by planned ECCE with PC IOL implantation. Ind J Ophthalmol. 1994;42:145–47