



## A PROSPECTIVE STUDY OF LENS INDUCED GLAUCOMA REPORTED AT A TERTIARY CARE CENTER IN SOUTHERN ODISHA : THE PANDEMIC SCENARIO

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### ABSTRACT

**Introduction:** Lens induced glaucoma is one of the important causes of blindness in rural Indian population and the incidence is on a rise due to current pandemic situation.

**Objective:** To find out the sociodemographic and clinical profile of LIG, reasons for delayed presentations and factors affecting the outcome of surgery in lens induced glaucoma patients admitted and operated in our centre in this pandemic scenario.

**Materials And Methods:** A prospective hospital based study of 76 patients with lens induced glaucoma who presented to the ophthalmology department and got operated over a period of 1 year from July 2020 to July 2021. Sociodemographic factors, clinical profile, reason for delayed presentation and visual outcome were assessed and analysed using SPSS.

**Results:** The mean age was 64.6 with a female predominance (57.89%). Phacomorphic (56.57%) was the most common type followed by phacolytic. Majority of the patients were having visual acuity of only perception of light (PL) at the time of presentation (65.78%) which improved to 6/6-6/18 in 43.43% post operatively. 51.31% were having IOP >40 mmHg at presentation while post operatively 92.10% had a normal IOP (<20 mmHg). VA and IOP at presentation were found to have significant association with post operative visual outcome (p value < 0.05). Majority of patients presented after 1 year of onset of visual symptoms (47.36%). The major cause for this delay was found to be lack of transportation facilities due to covid 19.

**Conclusion:** The number of LIG cases are on a rise due to delay in presentation of cataract cases. This delay is significantly related to poor visual outcome. Public awareness and aggressive screening of cases in the rural India is necessary for reducing the burden of irreversible blindness caused by LIG.

**KEYWORDS :** Cataract, Intra Ocular Pressure (IOP), Phacomorphic Glaucoma, Phacolytic Glaucoma, Visual Acuity (VA)

### INTRODUCTION

Cataract is the major cause of blindness in India.<sup>1</sup> It is also the most important cause of preventable blindness accounting for 63.7%.<sup>2</sup> In rural India the patients present with advanced cataract, mature or hypermature stages, due to various financial, cultural and social factors. This delay in presentation is associated with higher incidence of complications like lens induced glaucoma (LIG).

Lens induced glaucoma is a 2° glaucoma in which the crystalline lens is involved in the mechanism of intra ocular pressure increase.<sup>3</sup> It is a potential cause of irreversible blindness especially in developing world.

Due to the current Covid-19 situations, there is a huge back log of cataract cases. Restrictions on elective surgeries, lack of transportation facilities due to lock down, financial constraints, health issues and lack of outreach camps are the major reasons for this. This has badly affected the rural India where the back log of cases were already high. This delayed presentation is associated with an increased incidence of LIG.

We did this study as our institute is a tertiary care centre catering the eye care needs of large rural population of southern Odisha and a high volume of advanced cataract patients undergo surgery here.

The objective was to find out the sociodemographic and clinical profile of LIG, reasons for delayed presentations and factors affecting the outcome of surgery in lens induced glaucoma patients admitted and operated in our centre in this pandemic period.

### MATERIALS & METHODS

A prospective hospital based study of 76 patients with lens induced glaucoma reported to ophthalmology department of M.K.C.G. Medical College & Hospital, Berhampur and got operated over a period of 1 year from July 2020 to July, 2021 was done. After taking informed consent patients were interviewed based on a face validated questionnaire.

A detailed history including age, gender, duration of symptoms, reason for delayed presentations and details of other systemic diseases were recorded.

Visual acuity was assessed with Snellen's chart. Anterior segment was

examined under slit lamp giving emphasis to AC depth and cataract status of lens. IOP was measured with Goldman's applanation tonometry.

Patients with pre-existing glaucoma, complicated or traumatic cataract were excluded from the study.

Patients presented with acute onset of pain, redness and diminished vision of certain duration were classified under phacomorphic glaucoma when examination revealed circumcorneal congestion, corneal edema, shallow AC, intumescent cataract and IOP >21 mmHg. Phacolytic glaucoma was diagnosed when patients presented with acute pain and redness over long duration of diminished vision and examination revealed corneal edema, normal or deep AC, lens particles in AC or hyper mature cataract with IOP >21 mmHg.<sup>4</sup>

All patients were pre-operatively treated with topical Brimonidine & timolol eye drops, oral acetazolamide and I.V. mannitol to reduce the IOP.

SICS with PCIOL implantation was done in all cases after taking written informed consent. Post operatively antibiotic - steroid combination topical eye drops was given and IOP was recorded and anti-glaucoma drugs given when required.

Patients were regularly followed up at 1 week, 4 week and 6 weeks after surgery.

### RESULTS

76 Cases of lens induced glaucoma presented to our centre during July, 2020 to July, 2021 were included in the study.

Among the 76, 44 (57.89%) were females and 32 (42.10%) were males. The female : Male ratio was 1.37:1.

### Age Distribution

The study included patients aged between 40 years and 87 years. Mean age : 64.60

**Table 1: Age Distribution**

| Age Group in Years | No. of Cases | Percentage |
|--------------------|--------------|------------|
| 40 - 50 Yrs.       | 6            | 7.89       |
| 50 - 60 Yrs.       | 15           | 19.73      |

|              |    |       |
|--------------|----|-------|
| 60 - 70 Yrs. | 34 | 44.73 |
| 70 - 80 Yrs. | 18 | 23.68 |
| > 80         | 3  | 3.94  |
| Total        | 76 | 100   |

Among the 76 patients, 58 (76.31%) were from rural areas and 18 (23.68%) were from urban areas.

**Duration of Diminished Vision**

Majority of patients presented after 1 year of onset of diminished vision (47.36%).

**Table 2: Duration Of Diminished Vision**

| Duration          | No. of Cases | Percentage |
|-------------------|--------------|------------|
| <6 Months         | 12           | 15.78      |
| 6 Months - 1 Year | 28           | 36.84      |
| >1 year           | 36           | 47.36      |

**Reason for Delayed Presentation**

Lack of transportation facilities due to lockdown has played a crucial role in this surge in lens induced glaucoma cases during the pandemic. Fear of Covid, good vision in other eye, lack of outreach camps and stopping of elective surgeries due to Covid has also contributed for the same.

**Table 3: Reason For Delay In Presentation**

| Reasons   | No. of Cases | Percent age |
|---|--------------|-------------|
| Lack of Transportation facilities due to lockdown | 30           | 39.47       |
| Good vision in other eye                          | 15           | 19.73       |
| Fear of Covid-19                                  | 12           | 15.78       |
| Having no attendants                              | 6            | 7.89        |
| Lack of outreach camps                            | 8            | 10.52       |
| Stoppage of elective surgeries due to Covid       | 5            | 6.57        |

**BCVAAt Presentation & Last Follow Up**

The visual acuity was only perception of light in majority of patients due to the cataractous lens and corneal edema caused by raised IOP. 10 patients were having defective PR. At last follow up majority of patients gained good visual acuity of 6/18 or better.

**Table 4:BCVAAt Presentation**

| BCVA       | No. of Cases | Percentage |
|------------|--------------|------------|
| HM +Ve     | 16           | 21.05      |
| PL PR      | 50           | 65.78      |
| PL PR Def. | 10           | 13.15      |

**Table 5:BCVAAt Last Follow Up**

| BCVA        | No. of Cases | Percentage |
|-------------|--------------|------------|
| 6/6 - 6/12  | 33           | 43.42      |
| 6/18 - 6/60 | 28           | 36.84      |
| <6/60       | 15           | 19.73      |

**IOP**

In this study the mean IOP at presentation was 38.02 (Range 22-58 mmHg). At last follow up it was 16.05 mmHg.

**Table 6:IOPAt Presentation And Last Follow Up**

| IOP (mmHg) | At presentation |            | Last follow up |            |
|------------|-----------------|------------|----------------|------------|
|            | No. of Cases    | Percentage | No. of Cases   | Percentage |
| 0 – 20     | 0               | 0          | 70             | 92.10      |
| 21 – 30    | 16              | 21.05      | 4              | 5.26       |
| 31 – 40    | 21              | 27.63      | 2              | 2.63       |
| >40        | 39              | 51.31      | 0              | 0          |

**Type of Lens Induced Glaucoma**

Phacomorphic glaucoma was found to be the most common subtype of LIG comprising of 43 cases (56.57%), phacolytic glaucoma being second with 31 cases (40.78%). 2 Cases with anterior dislocation of lens and phacotopic glaucoma was found. No cases in the study was diagnosed with phacoanaphylactic or lens particle induced glaucoma.

**Table 7:Type Of Glaucoma**

| Type         | No. of Cases | Percentage |
|--------------|--------------|------------|
| Phacomorphic | 43           | 56.57      |
| Phacolytic   | 31           | 40.78      |
| Phacotopic   | 2            | 2.63       |

**Table8: Correlation Between Duration Of Diminished Vision And BCVAAt Last Follow Up**

| Duration           | BCVA       |             |       |
|--------------------|------------|-------------|-------|
|                    | 6/6 - 6/12 | 6/18 - 6/60 | <6/60 |
| <6 months          | 9          | 2           | 1     |
| 6 months to 1 year | 18         | 6           | 4     |
| > 1 year           | 6          | 20          | 10    |

Pvalue: 0.000408 (<0.05) - Significant

**Table 9: Correlation Between IOP At Presentation & BCVA At Last Follow Up**

| IOP at presentation | BCVA       |             |       |
|---------------------|------------|-------------|-------|
|                     | 6/6 - 6/12 | 6/18 - 6/60 | <6/60 |
| 21 - 30             | 10         | 1           | 1     |
| 31 - 40             | 20         | 6           | 2     |
| >40                 | 3          | 21          | 12    |

Pvalue: <0.00001 (Significant)

**DISCUSSION**

Inspite of increasing number of cataract surgeries, cataract blindness continues to be a challenge in India<sup>5</sup>. Number of advanced cataract cases has increased in the current pandemic scenario due to the delay in presentation of cases. This has led to an increase in incidence of lens induced glaucoma(LIG) and irreversible blindness.

This study was done to find out the incidence of LIG, clinical presentations and types, reasons for delayed presentations and outcome of surgery in lens induced glaucoma in rural Indian set up in the covid 19 era.

The age range in this study was found to be 40-87 years with mean age of 64.6. Maximum number of patients were in the age group 60-70 years(44.73%). A study by Pawan et al in Rajasthan in similar set up also found LIG in an age range of 37-75 years with maximum number of cases between 60-69 years<sup>6</sup>.

This study found an increased incidence of LIG in females compared to males(1.375:1). A study conducted in Nepal also found a female:male ratio of 1.7<sup>7</sup>. This data was also consistent with a study done in Madurai<sup>7</sup>. This difference may be attributed to the socio demographical factors in rural Indian population.

In this study majority of the patients presented after 1 year of onset of diminution of vision(47.36%) and the reason for this was mainly lack of transportation facilities due to covid 19, good vision in the other eye and fear of Covid 19. Similarly in a study done by Shruti et al 44.7% of the patients presented after 1 year of onset of visual symptoms for surgery in cases of hypermature cataracts<sup>8</sup>. Some previous studies have shown Good vision in the other eye, inability to afford and fear of surgeries to be the main causes for delaying surgery<sup>8,9,10</sup>.

All the study participants were having a visual acuity equal to or worse than HM+ at the time of presentation. Among which 65% were having only perception of light. Post operatively the VA was improved to 6/12-6/6 in 43.42%. But the visual outcome was <6/60 in 19.7% patients. Similar results were obtained in a studies by Pawan et al and Ruchi et al<sup>6,11</sup>. The intraocular pressure at presentation was >40mmHg in 51.31% of the study population while postoperatively 92% of the patients achieved normal IOP(<20mmHg). This result was consistent with finding of study by Damodhar et al where 89% of patients achieved IOP<22 mmHg postoperatively<sup>4</sup>.

In this study Phacomorphic glaucoma(56.57%) was found to be the most common type of LIG followed by phacolytic. 2 cases of phacotopic glaucoma due to dislocation of lens was also found. Similar studies by Ruchi et al and Rijal et al<sup>12</sup> found 71.7 and 65% of their study population to have phacomorphic glaucoma respectively. Similar results were obtained in Madurai study also(52.68%)<sup>5</sup>.

Statistical analysis of the data showed a significant association between the time delay in presentation and visual outcome(p value<0.05). Similarly in a study by shruti et al showed the delayed presentation is associated with poor post operative VA. IOP at presentation also was found to be a significant risk factor for poor visual outcome(p value<0.05). Majority of patients with IOP>40mmHg at presentation were found to have post op vision<6/18. This linear relationship between IOP and delay in

presentation with final visual outcome was highlighted in studies by M Sharanabasamma and Chandrasekhar G<sup>13,14</sup>.

## CONCLUSION

The study concludes that LIG is a disease of old age with a slight female predominance. Phacomorphic glaucoma is the most common variant. Delay in presentation and high IOP at the time of presentation are significant risk factors for poor visual outcome. Lack of transportation facilities due to covid lockdown and good vision in the other eye are major factors leading to the delay in presentation. Aggressive community based screening is required for early detection and management of cataract cases in rural india. Spreading awareness regarding requirement of early intervention is the key to reduce the burden of LIG cases.

More effective utilisation of tele ophthalmology services in rural areas for referral of cases including ophthalmic assistants, ASHA workers and other health professionals should be implemented for breaking the barrier between the patients and health care system due to the pandemic scenario.

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## REFERENCES

1. Thulasiraj RD, Nirmalan PK, Ramakrishnan R, Krishnadas R, Manimekalai TK, Baburajan NP, *et al*. Blindness and vision impairment in a rural South Indian population: The Aravind Comprehensive Eye Survey. *Ophthalmology* 2003;110:1491-8.
2. Government of India, *National Survey on Blindness and Visual Outcome after Cataract Surgery, 2001-2002*, vol. 77, National Programme for Control of Blindness, Ministry of Health, Government of India, New Delhi, India, 2002.
3. Kelly Laurenti, Sarwat Salim. Lens induced glaucoma: Diagnosis and management, *Ophthalmology pearls*.
4. Pradhan D, Hennig A, Kumar J, Foster A. A prospective study of 413 cases of lens-induced glaucoma in Nepal. *Indian J Ophthalmol* 2001;49:204.
5. Vijaya L, George R, Arvind H, Baskaran M, Raju P, Ramesh SV, *et al*. Prevalence and causes of blindness in the rural population of the Chennai glaucoma study. *Indian J Ophthalmol* 2006;90:407-10.
6. Jarwal PN. Clinical study of lens-induced glaucoma at community health center in India. *TNOAJ Ophthalmic Sci Res* 2020;58:162-8.
7. Prajna NV, Ramakrishnan R, Krishnadas R, Manoharan N. Lens induced glaucomas – Visual results and risk factors for final visual acuity. *Indian J Ophthalmol* 1996;44:149-55.
8. Hegde SP, Sekharreddy MR, Kumar MR, Dayanidhi VK. Prospective study of hypermature cataract in Kanchipuram district: Causes of delayed presentation, risk of lens-induced glaucoma and visual prognosis. *Kerala J Ophthalmol* 2018;30:187-92.
9. Patil S, Gogate P, Vora S, Ainapure S, Hingane RN, Kulkarni AN, *et al*. Prevalence, causes of blindness, visual impairment and cataract surgical services in Sindhudurg district in the Western coastal strip of India. *Indian J Ophthalmol* 2014;62:240-5.
10. Fletcher AE, Donoghue M, Devavaram J, Thulasiraj RD, Scott S, Abdalla M, *et al*. Low uptake of eye services in rural India: A challenge for programs of blindness prevention. *Arch Ophthalmol* 1999;117:1393-9.
11. Shrestha R *et al*. Lens induced glaucoma in Western Nepal. *Nepal J Ophthalmol* 2019; Vol 11 (22): 145-151.
12. Rijal AP, Karki DB (2006). Visual outcome and IOP control after cataract surgery in lens induced glaucomas. *Kathmandu University Medical Journal*; 4(1): 30-33.
13. Sharanabasamma M, Vaibhav K (2016). Management and Visual Outcome in Patients of Lens-induced Glaucomas at a Tertiary Eye Care Hospital in South India. *Journal of current glaucoma practice*; 10(2): 68-75.
14. Chandrasekhar G, Kumar S, Varalakshmi U, Shaik MV (2015). Management and final visual outcome of various types of the lens induced glaucoma's attending to Narayana Medical College Hospital. *International Archives of Integrated Medicine*; 2(9): 33-39.