

A Study of Visual Outcome and IOP Control in Lens Induced Glaucoma Following Cataract Surgery

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Conflicts of Interest: Nil

Abstract

Purpose: To study the various modes of presentation, final visual outcome, IOP and factors influencing it in different types of LIG.

Methodology: 50 patients were included. A detailed ophthalmological work up was done. Medical management for IOP reduction followed by Temporal/Supero-temporal MSICS was performed, patients followed up for 3 months.

Results: Majority of them were in the age group of 61-70years with a female preponderance of 66%. 22% presented with phacolytic glaucoma and 78% with phacomorphic glaucoma. 22 cases (44%) presented with IOP less than 35mm Hg. 28 cases presented with IOP >35 mm Hg (56%). 3 of them (6%) presented within 2 days, 26 (52%) presented within the first week and 14

patients (28%) within 2nd week and rest (14%) presented more than 2 weeks after development of symptoms. Good BCVA of 6/12 or better achieved in 100% of cases with symptoms <1 weeks and in 92.30% cases with IOP <35 mm Hg at presentation. Optic disc pallor in 90% cases with symptoms >2 weeks.

Conclusion: Early diagnosis and treatment is beneficial. Positive correlation was found between duration of presentation and post-operative BCVA, IOP at presentation and post-operative BCVA. Delay in presentation >2 weeks, IOP >35 mm Hg affects optic nerve deteriorating the vision. Emphasis should be made on creating awareness about cataract.

Keywords: Blindness, Phacolytic glaucoma, Preponderance, Neuropathy.

Introduction

The leading causes of blindness throughout India are cataract and glaucoma, the foremost being cataract which accounts for 62.4%.¹

Glaucoma is characterized by a progressive optic neuropathy with irreversible visual field defects.² Lens induced glaucoma (LIG) is one of the commonest causes of secondary glaucoma seen in patients with senile cataracts.³ It requires immediate management to prevent blindness. LIG develops through either open-angle or angle-closure mechanisms.³ Phacolytic glaucoma and lens particle glaucoma are types of secondary open angle glaucoma.

Phacomorphic glaucoma and lens displacement glaucoma are types of secondary angle closure glaucomas.^{3,4} Lens induced uveitis is a granulomatous reaction that can cause open angle or angle closure or combined open angle and angle closure glaucoma.⁴

LIG has higher pre- and post-operative morbidity than a typical, uncomplicated cataract. Regardless of the surgical intervention, the visual results are to some extent impaired, and the prognosis is guarded. The need for this study was driven by the significance of patient education, early cataract diagnosis, and treatment of all cataract cases before they develop complications. It was conducted to highlight the fact that individuals with lens-induced glaucoma may benefit from prompt treatment by having good vision, which will enhance their quality of life.

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Objectives of the Study

1. To study the duration of presentation of lens induced glaucoma.

2. To assess the final visual outcome and intraocular pressure in lens induced glaucoma after surgical management.
3. To assess the factors influencing the final visual outcome.

Materials and Methods

It was a hospital-based prospective observational study carried out among 50 patients presenting to the outpatient department of ophthalmology of a tertiary care center, HIMS Hassan from June 2022 to June 2023. The aims and objectives of the intended study were explained to the subjects and informed written consent was taken. Data was collected as per the proforma sheet. Institutional ethical clearance was obtained. No financial support and conflicts of interest.

Phacomorphic glaucoma, Phacolytic glaucoma and Lens particle glaucoma were included in the study. Patients who did not give consent, patients with pre-existing corneal dystrophies and corneal opacities with cataract, those with congenital or developmental glaucoma and other secondary glaucoma were excluded from the study. Socio demographic data was collected. The details of history including duration of symptoms like diminution of vision and its progression, onset of pain, redness, watering, and photophobia in the affected eye was taken. Detailed past history was taken. All patients underwent a detailed ophthalmic assessment, including visual acuity and best corrected visual acuity measurement using Snellen's chart, intraocular pressure (IOP) measurement by non-contact tonometry, slit-lamp biomicroscopy, and fundus examination of other eye using indirect ophthalmoscope with 20D lens. B scan as the posterior segment visibility was lost in mature cataracts. A scan biometry and lacrimal syringing was done.

All patients were medically managed preoperatively for reduction of IOP. Following control of IOP, patients underwent supero-temporal Manual Small Incision Cataract Surgery under peribulbar block. The need for filtering surgery was decided postoperatively.

Post-operative antibiotics and analgesics were given which included Moxifloxacin- Dexamethasone eye drops 1° hourly, Nepafenac eye drops 1°TID. Patients were checked on postoperative day 1,7,21,45 and 90 for BCVA and IOP. The data collected was subjected to statistical analysis and results were tabulated.

Results

Out of 50 patients in our study majority of them were in the age group of 61-70years with a female preponderance of 66%. The age distribution of our study is given in Table 1.

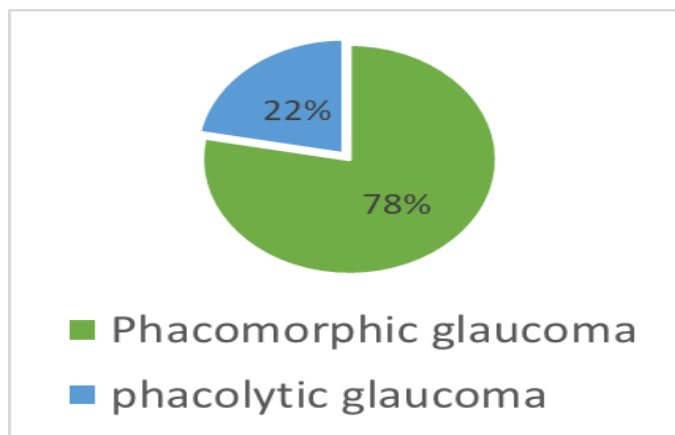
Table 1: Age distribution

Age	No of Cases	Percent
50	3	6.0
51-60	18	36.0
61-70	24	48.0
> 70	5	10.0
Total	50	100.0

Table 2: Gender distribution

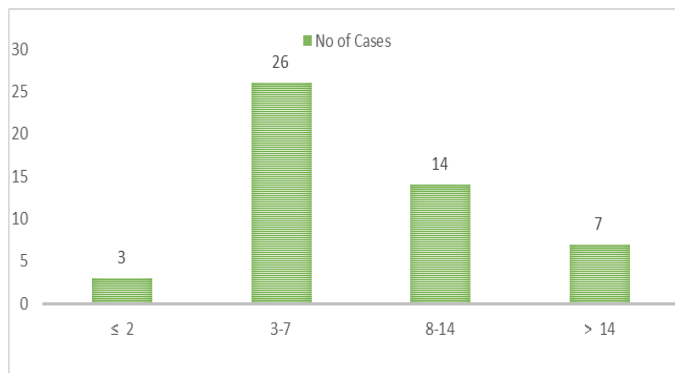
Gender	No of Cases	Percent
Male	33	66.0
Female	17	34.0
Total	50	100.0

78% presented with phacolytic glaucoma and 22% with phacomorphic glaucoma.



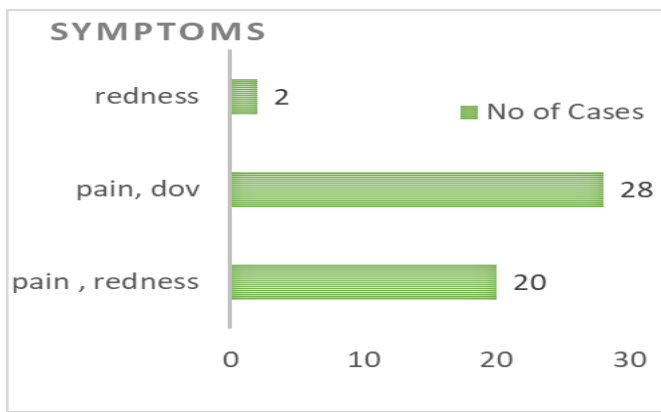
Graph 1: Distribution of patients based on type of glaucoma

Out of the 50 patients, 3 of them (6%) presented within 2 days, 26 (52%) presented within the first week and 14 patients (28%) within 2nd week and rest (14%) presented more than 2 weeks after development of symptoms.



Graph 2: Distribution of patients based on duration of presentation

56% presented with pain and DOV, 22% with pain and redness and 2% with redness alone.



Graph 3: Distribution of patients based on symptoms

22 out of 50 cases (44%) had visual acuity of positive perception of light with accurate projection of light rays. Hand movements was present in 17 cases (34%), counting fingers close to face was present in 10 cases (20%) and negative perception of light in 1 case (2%).

Table 3: Visual Acuity at presentation.

VA	No of Cases	Percent
CF @ CF	10	20.0
HM+ve	17	34.0
PL +ve	22	44.0
PL -VE	1	2.0
Total	50	100.0

A total of 22 cases (44%) presented with IOP less than 35mm Hg. 28 cases presented with IOP >35 mm Hg (56%). The highest pressure recorded during the study was 55.00 mm Hg.

Table 4: IOP at presentation

IOP	No of Cases	Percent
< 35	22	44.0
> 35	28	56.0
Total	50	100.0

Table 5: Early post-operative complications

Early postoperative complications	N	Percentage
Hyphema	1	2.0

Raise in IOP	3	6.0
Corneal edema	7	14.0
Striate keratopathy	5	10.0

Table 6: Late post-operative complications

Late post-operative complications	N	Percentage
Corneal edema	3	6.0
Striate keratitis	2	4.0
Pre-existing disc pallor	4	8.0

For analyzing the visual outcome following cataract surgery, the grading of BCVA at the end of three months was done as per WHO guidelines as follows:

Table 7: grading of Poat operative BCVA

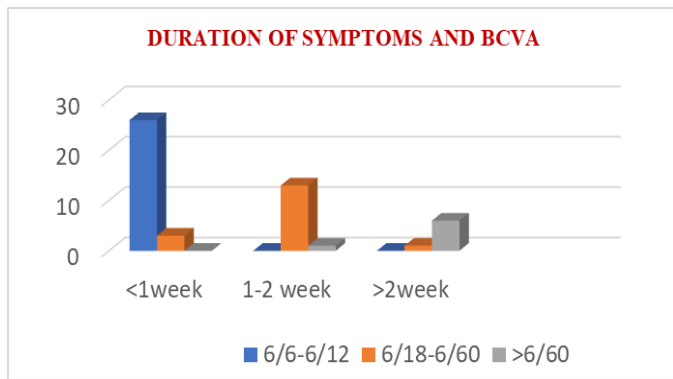
Grading	Bcva	Frequency	Percentage
Good	6/6-6/12	26	52.00
Boderline	6/18-6/60	17	34.00
Poor	<6/60	7	14.00
Total		50	100

Poor visual outcome of less than 6/60 visual acuity was found in 14%

of cases, borderline visual acuity (6/18-6/60) was found in 34% cases and good visual outcome (6/6-6/12) was found in 52% cases.

The below chart describes that the BCVA after cataract surgery is good ($\leq 6/12$) in 26 cases and all of them presented earlier that is less than 1 week. Out of 17 cases of borderline BCVA 3 cases (17.64%) presented less than 1 week, 13 cases (76.47%) presented between one to two weeks and 1 case (5.58%) more than 2 weeks. The poor visual outcome (BCVA). Among 7 cases of poor BCVA, 1 case (14.28%) presented between one to two weeks and 6 cases (85.71%) presented after 2 weeks. There is a statistical significance between duration of symptoms and the BCVA,

Graph 4: Correlation of Post-operative BCVA with duration of symptoms



Among 26 cases with good BCVA 24 cases had IOP at presentation of <35 mmHg and 2 cases with >35 mmHg. Among 17 cases of borderline BCVA 6 cases had <35mmHg IOP at presentation and 11 had >35mmHg IOP at presentation. All cases with poor BCVA had their IOP at presentation of >35mmHg. IOP at presentation and BCVA at the end of one month are related, the p value is less than 0.05 which narrates that both are statistically significant.

Table 8: Correlation of IOP at presentation and post-operative BCVA.

VA at 30 Days	IOP		Chi Square Value	P Value
	< 35	> 35		
6/6 - 6/12	24	2	12.1008	.000504
6/18 - 6/60	6	11		
< 6/60	0	6		
PL +VE	0	1		
Total	30	20		

Discussion

This study aimed to investigate the clinical aspects of lens-induced glaucoma (LIG), focusing on the duration of presentation, visual outcomes, and intraocular pressure (IOP) control following surgical management. Our findings indicate several critical insights into the management and prognosis of LIG, which is crucial

given the higher morbidity associated with this condition compared to uncomplicated cataract surgery.

The majority of patients in our study were aged between 61-70 years, with a notable female preponderance. This aligns with existing literature^{1,4}, which often identifies older adults as a higher-risk group for both cataract and glaucoma due to age-related changes in ocular structures. The findings showed that most patients presented within the first two weeks of symptom onset, which underscores the need for timely intervention. The delay in presentation beyond two weeks in a significant proportion of patients suggests a gap in early diagnosis and treatment.

At presentation, 56% of patients had IOP greater than 35 mmHg, reflecting significant glaucoma-related damage. This elevated IOP is associated with poorer visual outcomes, as demonstrated in our results. The correlation between initial IOP levels and post-operative visual acuity is statistically significant (p < 0.05), indicating that higher IOP at presentation is strongly associated with poorer visual outcomes after surgery. Similar findings were noted in the other studies.^{1,7,8}

The visual acuity outcomes post-surgery showed that 50% of patients achieved a good visual outcome (BCVA of 6/6 to 6/18), while 42% had borderline outcomes (6/18 to 6/60), and 8% had poor outcomes (<6/60). The correlation between the duration of symptoms and visual outcomes was also significant, with earlier presentation associated with better visual acuity. This finding reinforces the importance of early intervention in LIG to improve visual prognosis.

Surgical management primarily involved superior-temporal manual small incision cataract surgery with posterior chamber intraocular lens implantation. The choice of surgical approach and the incidence of

complications were consistent with expectations for LIG. Early postoperative complications included corneal edema and striate keratopathy, while late complications were less frequent but included persistent corneal edema and striate keratitis. These findings highlight the need for careful postoperative management to mitigate complications and optimize recovery.

The visual outcomes were notably better in patients who presented early and had lower IOP at presentation. This emphasizes the critical role of prompt diagnosis and treatment in LIG, which can significantly affect visual recovery and overall patient quality of life.

Conclusion

In summary, this study demonstrates that timely presentation and intervention in lens-induced glaucoma are crucial for improving visual outcomes. The significant correlation between the duration of symptoms, initial IOP levels, and postoperative visual acuity underscores the importance of early diagnosis and prompt surgical management. Despite the challenges associated with LIG, early intervention can lead to better visual outcomes and reduced complications.

Future efforts should focus on enhancing patient education about the importance of early cataract diagnosis and timely management of symptoms suggestive of glaucoma. Additionally, increased awareness among healthcare providers about the presentation and management of LIG could further improve outcomes and reduce the incidence of preventable blindness due to this condition.

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