



CLINICAL EVALUATION AND MANAGEMENT OF LENS-INDUCED GLAUCOMA

Dr Anubhuti Gulla M.S. Ophthalmology

Dr Harsha Singh M.S. Ophthalmology

Dr Sakina Kanchwala M.S. Ophthalmology

ABSTRACT

Introduction: Lens-induced glaucoma (LIG) is a preventable secondary glaucoma associated with advanced cataract and delayed treatment. **Methods:** A prospective cross-sectional study was conducted at Netaji Subhash Chandra Bose Medical College, Jabalpur, from June 2024 to December 2025, including 40 patients aged >40 years with newly diagnosed LIG. Clinical findings, IOP, gonioscopy, glaucoma subtype, surgical timing, and visual outcomes were assessed. **Results:** Mean age was 63.30 ± 11.71 years; 57.5% were females and 60% rural. Pain, redness, and decreased vision were universal. Phacomorphic glaucoma predominated (57.5%), followed by phacolytic (35%) and lens-particle glaucoma (7.5%). Mean IOP decreased from 45.10 ± 5.82 to 16.18 mmHg at 1 month ($p < 0.001$). Surgery within 3 days was performed in 80%, and 77.5% achieved 6/24–6/60 vision. Glaucoma subtype was significantly associated with clinical and gonioscopic findings ($p < 0.001$). **Conclusion:** Phacomorphic glaucoma was the commonest LIG subtype. Prompt IOP control and cataract surgery significantly reduced IOP and improved visual outcomes, emphasizing the importance of early diagnosis and referral.

KEYWORDS : Lens-Induced Glaucoma; Phacomorphic Glaucoma; Phacolytic Glaucoma; Cataract; Intraocular Pressure; Cataract Surgery; Visual Outcome.

INTRODUCTION

Glaucoma is a progressive optic neuropathy characterized by optic nerve damage and visual field loss, with increased intraocular pressure (IOP) being an important associated factor.¹ It is a leading cause of irreversible blindness, particularly in developing countries where inadequate awareness, screening, and treatment contribute to delayed diagnosis.² Lens-induced glaucoma (LIG) is an important preventable form of acute secondary glaucoma, particularly in eyes with advanced cataract.³

LIG was first described by Gifford in 1900 in association with hypermature senile cataract. It typically presents with a painful red eye, inflammation, sudden visual deterioration, and markedly elevated IOP. Lens enlargement, protein leakage, and lens fiber degeneration can impair aqueous outflow and rapidly increase IOP.⁴ Progressive cataract maturation may result in hypermature cataract and LIG.⁵

LIG includes phacomorphic, phacolytic, lens-particle, and phacoanaphylactic glaucoma, caused by mechanical or inflammatory obstruction.⁶ Delayed cataract surgery contributes to its prevalence.^{7,8} Prompt IOP control and cataract extraction are essential,⁹ with outcomes influenced by subtype, duration, IOP, inflammation, and optic nerve damage.^{10,11}

MATERIAL AND METHODS

A prospective cross-sectional observational study was conducted in the Upgraded Department of Ophthalmology, Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, Madhya Pradesh, over 18 months. Patients presenting to the Ophthalmology OPD or emergency services with features of lens-induced glaucoma were evaluated. The sample comprised 36 patients.

Table 1: Association of LIG Type with Ocular Findings (n = 40)

Variable	Category	Phacomorphic (n=23)	Phacolytic (n=14)	Lens Particle (n=3)	Total n (%)	p- value
Anterior Chamber Depth	Shallow	23 (100%)	0 (0%)	0 (0%)	23 (57.5%)	<0.001
	Normal	0 (0%)	14 (100%)	3 (100%)	17 (42.5%)	
Gonioscopy	Closed	22 (95.7%)	0 (0%)	0 (0%)	22 (55.0%)	<0.001
	Open	1 (4.3%)	14 (100%)	3 (100%)	18 (45.0%)	
Cell & Flare	Present	0 (0%)	14 (100%)	3 (100%)	17 (42.5%)	<0.001

Inclusion Criteria

Patients aged >40 years, of either sex, with newly diagnosed LIG presenting to the OPD/emergency services and willing to provide written informed consent.

Exclusion Criteria

Patients aged <40 years; vitreous haemorrhage or detachment; previous retinal detachment; coexisting posterior segment pathology likely to affect visual prognosis; and patients unable to cooperate or with physical/mental disabilities interfering with examination.

RESULTS & OBSERVATION

Among 40 LIG patients, mean age was 63.30 ± 11.71 years; 57.5% were female, 60% rural, and 55% from lower socioeconomic groups. Pain, redness, and decreased vision were universal, with shallow anterior chamber/closed angles in 57.5%.

Phacomorphic glaucoma predominated (57.5%), followed by phacolytic (35%) and lens-particle (7.5%); hypertension and diabetes occurred in 57.5% and 42.5%, respectively. Mean presenting IOP was 45.10 ± 5.82 mmHg versus 16.08 ± 2.45 mmHg in the fellow eye.

All patients received medical therapy followed by SICS with IOL implantation; 80% underwent surgery within 3 days. Postoperative visual acuity was not significantly associated with subtype ($p = 0.78$). IOP decreased significantly ($p < 0.001$), reaching 16.18 mmHg at 1 month.

LIG subtype was significantly associated with gonioscopic findings ($p < 0.001$): phacomorphic glaucoma showed predominantly closed angles (95.7%), whereas phacolytic and lens-particle glaucoma had open angles. Symptom onset also differed significantly ($p < 0.001$), with phacomorphic cases presenting suddenly and the other subtypes predominantly gradually.

	Absent	23 (100%)	0 (0%)	0 (0%)	23 (57.5%)	
Pseudohypopyon	Present	0 (0%)	14 (100%)	3 (100%)	17 (42.5%)	<0.001
	Absent	23 (100%)	0 (0%)	0 (0%)	23 (57.5%)	
Lens Particles	Present	0 (0%)	14 (100%)	3 (100%)	17 (42.5%)	<0.001
	Absent	23 (100%)	0 (0%)	0 (0%)	23 (57.5%)	
Total		23 (100%)	14 (100%)	3 (100%)	40 (100%)	

Phacomorphic glaucoma was associated with shallow anterior chamber and closed angles, while phacolytic and

lens-particle glaucoma showed inflammatory features and lens particles ($p < 0.001$).

Table 2: Association of LIG Type with Treatment-related Factors (n = 40)

Variable	Category	Phacomorphic (n=23)	Phacolytic (n=14)	Lens Particle (n=3)	Total n (%)	p-value
Cycloplegic Use	Yes	0 (0%)	14 (100%)	0 (0%)	14 (35.0%)	<0.001
	No	23 (100%)	0 (0%)	3 (100%)	26 (65.0%)	
Time to Surgery	≤3 days	19 (82.6%)	12 (85.7%)	1 (33.3%)	32 (80.0%)	<0.001
	>3 days	4 (17.4%)	2 (14.3%)	2 (66.7%)	8 (20.0%)	
Total		23 (100%)	14 (100%)	3 (100%)	40 (100%)	

Fisher's Exact Test Was Used Where Expected Cell Counts Were Less Than 5

Cycloplegics were mainly used in phacolytic glaucoma. Early

surgery (≤3 days) was more common in phacomorphic and phacolytic cases, while delayed surgery predominated in lens-particle glaucoma ($p < 0.001$).

Table 3: Association of LIG Type with Socio-demographic Factors (n = 40)

Variable	Category	Phacomorphic (n=23)	Phacolytic (n=14)	Lens Particle (n=3)	Total n (%)	Test value
Education	Illiterate	9 (39.2%)	3 (21.4%)	1 (33.3%)	13 (32.5%)	$\chi^2 = 6.15$ (df=4), p = 0.046*
	Primary	7 (30.4%)	4 (28.6%)	1 (33.3%)	12 (30.0%)	
	Secondary	7 (30.4%)	7 (50.0%)	1 (33.4%)	15 (37.5%)	
Sex	Male	9 (39.1%)	7 (50.0%)	1 (33.3%)	17 (42.5%)	$\chi^2 = 0.52$ (df=2), p = 0.77
	Female	14 (60.9%)	7 (50.0%)	2 (66.7%)	23 (57.5%)	
Residence	Urban	9 (39.1%)	6 (42.9%)	1 (33.3%)	16 (40.0%)	$\chi^2 = 0.18$ (df=2), p = 0.915
	Rural	14 (60.9%)	8 (57.1%)	2 (66.7%)	24 (60.0%)	
Socioeconomic Status	Middle	4 (17.4%)	2 (14.3%)	1 (33.3%)	7 (17.5%)	$\chi^2 = 0.73$ (df=4), p = 0.947
	Lower Middle	6 (26.1%)	4 (28.6%)	1 (33.3%)	11 (27.5%)	
	Lower	13 (56.5%)	8 (57.1%)	1 (33.4%)	22 (55.0%)	
Total		23 (100%)	14 (100%)	3 (100%)	40 (100%)	

Chi-square test applied; Fisher's exact test used where expected cell counts were less than 5
 $p < 0.05$ considered statistically significant

"Among socio-demographic factors, education showed a statistically significant association with type of glaucoma ($p = 0.046$). Sex, residence, and socioeconomic status did not show any significant association ($p > 0.05$)."

DISCUSSION

The mean age was 63.30 ± 11.71 years, consistent with Sinha et al.¹² and Tudu et al.¹³, who reported predominance in the 61–70-year group. Females constituted 57.5%, similar to Magdum et al.¹⁴, while 60% were rural, consistent with Sinha et al.¹² and Kothari et al.¹⁵. Lower socioeconomic status and limited education were common, as reported by Navya K et al.¹⁶, suggesting poor awareness and healthcare access contribute to delayed presentation.

Pain, redness, and decreased vision were universal; nausea/vomiting and halos occurred in 57.5% and 47.5%, respectively, consistent with Shah and Meyer¹⁰, Verma and Verma¹¹, and Yaakub et al.¹⁷. Sudden onset occurred in 57.5%, particularly in phacomorphic cases. Shallow anterior chamber was present in 57.5%, consistent with Magdum et al.¹⁴ and Tudu et al.¹³.

Phacomorphic glaucoma predominated (57.5%), followed by phacolytic (35%) and lens-particle glaucoma (7.5%), consistent with Sinha et al.¹², Reddy et al.¹⁸, and Bhuyan et al.⁵. Phacomorphic cases showed closed angles, whereas other subtypes had open angles, supporting Shah and Meyer¹⁰ and Kulkarni et al.¹⁸.

Mean presenting IOP was 45.10 ± 5.82 mmHg versus 16.08 ± 2.45 mmHg in the fellow eye, comparable to Tudu et al.¹³ and Kulkarni et al.¹⁸. Cataract extraction was definitive treatment, consistent with Shah and Meyer¹⁰, Verma and Verma¹¹, and Kumar et al.²¹. Postoperatively, 77.5% achieved 6/24–6/60 and

$22.5\% \geq 6/18$; IOP decreased significantly to 16.18 mmHg at one month ($p < 0.001$), consistent with Tudu et al.¹³ and Kumar et al.²¹. Subtype was associated with clinical presentation ($p < 0.001$), while education was associated with glaucoma type ($p = 0.046$).

CONCLUSION

Lens-induced glaucoma predominantly affected elderly patients, with higher occurrence among females and those from rural and lower socioeconomic backgrounds. Hypermetropes were more prone to phacomorphic glaucoma, likely due to a crowded anterior segment and shallow anterior chamber. Most patients presented with acute pain, redness, and decreased vision, accompanied by corneal edema, conjunctival congestion, and shallow anterior chamber, indicating advanced symptomatic disease at presentation.

REFERENCES

- Quigley H, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol. 2006 Mar;90(3):262–7. doi:10.1136/BJO.2005.081224 PubMed PMID: 16488940.
- Weinreb RN, Aung T, Medeiros FA. The pathophysiology and treatment of glaucoma: a review. JAMA. 2014 May 14;311(18):1901–11. doi:10.1001/JAMA.2014.3192 PubMed PMID: 24825645.
- Ayub R, Tom LM, Venkatesh R, Srinivasan K. Outcomes and Reasons for Late Presentation of Lens Induced Glaucoma: A Prospective Study. Ophthalmol Glaucoma. 2021 Sep 1;4(5):504–11. doi:10.1016/j.ogla.2021.01.005 PubMed PMID: 33548550.
- Sreelakshmi V and Abraham A*. Age Related or Senile Cataract: Pathology, Mechanism and Management. Austin J Clin Ophthalmol [Internet]. 2016 Jun 15;3(2). Available from: www.austinpublishinggroup.com
- A K Khurana - Theory and Practice of Optics and Refraction (2023, Elsevier) - Libgen - Li | PDF [Internet]. [cited 2025 Dec 4]. Available from:https://www.scribd.com/document/709698048/A-K-Khurana-Theory-and-Practice-of-Optics-and-Refraction-2023-Elsevier-Libgen-li
- Lens Induced Glaucomas - EyeWiki [Internet]. [cited 2025 Dec 4]. Available from: https://eyewiki.org/Lens_Induced_Glaucomas
- Lens-Induced Glaucoma - StatPearls - NCBI Bookshelf [Internet]. [cited 2025 Dec 4]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK574524/
- Sowka J. Phacomorphic glaucoma: Case and review. Optometry - Journal of the American Optometric Association. 2006 Dec 1;77(12):586–9. doi:10.1016/j.optm.2006.08.013 PubMed PMID: 17157240.
- Bhuyan DrJ, Dutta Bharali DrM. Management of "Lens Induced Glaucoma"-A Clinical Study. IOSR Journal of Dental and Medical Sciences. 2016 Aug;15(08):76–82. doi:10.9790/0853-150807682

10. Elsayed MEA, Lander B, Senthil S, Edward DP, Malik R. The secondary childhood glaucomas. *Surv Ophthalmol.* 2025 May 1;70(3):544–62. doi:10.1016/j.survophthal.2024.10.005 PubMed PMID: 39486644.
11. Vashist P, Senjam SS, Gupta V, Gupta N, Shamanna BR, Wadhwani M, et al. Blindness and visual impairment and their causes in India: Results of a nationally representative survey. *PLoS One.* 2022 Jul 1;17(7 July). doi:10.1371/journal.pone.0271736 PubMed PMID: 35862402.
12. Magdum R, Goli K, Gandhi S. Clinical Profile, Prognostic Factors and Surgical Outcomes in Lens Induced Glaucoma: A Prospective Study from a Tertiary Care Centre in Western Maharashtra, India. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH.* 2024. doi:10.7860/jcdr/2024/74709.20145
13. 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 Ophthalmol.* 2013 Jun 25;2013:1–3. doi:10.1155/2013/581727 PubMed PMID: 24555131.
14. K. Navya SSKN sultana. early-detection-lifelong-vision-the-promise-of-timely-treatment-in-lens-induced- glaucoma _June_ 2025_3469174945_3428779. *Int J Sci Res.* 2025 Jun;14(06). doi:10.36106/ijsr
15. Raihan SI, Tajudin Yaakub A AL, Tajudin A, Yaakub A, Abdullah N, Raihan Ishak S, et al. Number 2 LS. Lens-induced glaucoma in a tertiary centre in northeast of Malaysia. *Malaysian Family Physician.* 2014.
16. Kulkarni VM, Sultana N, Abid AR. Lens induced glaucoma – Clinical profile and prognosis in tertiary care centre. *Indian Journal of Clinical and Experimental Ophthalmology.* 2023;9(4):587–92. doi:10.18231/ij.ijceo.2023.111
17. Reddy GA, Ram P, Lal M, Reddy A. A Clinical Study of Lens Induced Glaucoma. *International Journal of Health and Clinical Research [Internet].* 2021;4(22):194–9. Available from: www.ijhcr.com
18. Sree Kumar V, Satya E, Murthy N, Preethi B. Clinical Study of Visual Prognosis in Lens Induced Glaucoma [Internet]. 2018 Mar. Available from: www.ijcmr.com
19. Pradhan D, Hennig A, Kumar J, Foster A. A prospective study of 413 cases of lens-induced glaucoma in Nepal. *Indian J Ophthalmol.* 2001 Jun;49(2):103–7. PubMed PMID: 15884514.
20. 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 Ophthalmol.* 2013 Jun 25;2013:1–3. doi:10.1155/2013/581727 PubMed PMID: 24555131.
21. 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 May 1;10(2):68–75. doi:10.5005/jp-journals-10008-1204 PubMed PMID: 27536050.