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VISUAL PROGNOSTIC FACTORS IN PATIENTS WITH LENS-INDUCED GLAUCOMA AFTER TREATMENT IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Lens-induced glaucoma (LIG) is a preventable cause of secondary glaucoma resulting from advanced cataract. Although uncommon in developed countries, it continues to be a significant cause of visual morbidity in countries like India due to delayed presentation and limited awareness regarding timely cataract surgery.

Aim: To evaluate the visual prognosis in patients with lens-induced glaucoma following medical and surgical management.

Methods: This prospective observational study was conducted at Sree Mookambika Institute of Medical Sciences from May 2025 to March 2026. All diagnosed cases of lens-induced glaucoma were included. Detailed history and comprehensive ophthalmic examination, including visual acuity assessment, slit lamp evaluation, intraocular pressure measurement, gonioscopy, and fundus examination of the fellow eye, were performed. Initial medical therapy was administered to control intraocular pressure and inflammation, followed by cataract extraction. Visual outcomes were assessed using best corrected visual acuity (BCVA) at follow-up. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25.0.

Results: At six weeks follow-up, BCVA better than 6/12 was achieved in 33% of patients, 6/18–6/60 in 58%, and less than 6/60 in 9% of cases. Overall, 91% of patients attained BCVA greater than 6/60, indicating satisfactory visual recovery in the majority of cases.

Conclusion: Lens-induced glaucoma, though preventable, continues to contribute to visual impairment due to delayed presentation. Early diagnosis, prompt medical management, and timely surgical intervention result in favorable visual outcomes in most patients. Strengthening awareness and accessibility to eye care services is essential to reduce the burden of this condition.

INTRODUCTION

Lens-induced glaucoma (LIG) represents a group of secondary glaucomas caused by pathological changes in the crystalline lens, leading to elevated intraocular pressure (IOP) and subsequent optic nerve damage if not treated promptly. It remains a significant cause of preventable visual morbidity, particularly in developing countries where delayed presentation of cataract is common [1].

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The condition encompasses various clinical entities, including phacomorphic glaucoma, phacolytic glaucoma, and lens particle glaucoma, each with distinct pathophysiological mechanisms but a shared endpoint of raised IOP and visual compromise [2].

Phacomorphic glaucoma arises due to intumescence of a mature cataractous lens, leading to pupillary block and secondary angle-closure glaucoma. In contrast, phacolytic glaucoma occurs due to leakage of high-molecular-weight lens proteins through an intact but permeable lens capsule, inciting an inflammatory response and obstruction of the trabecular meshwork [3]. Lens particle glaucoma, on the other hand, is typically seen following trauma or surgery, where liberated cortical material blocks aqueous outflow [4]. Despite these differences, all forms can rapidly progress to irreversible optic nerve damage if not managed effectively.

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The burden of LIG is closely linked to the prevalence of untreated cataracts, which remain the leading cause of blindness worldwide. In regions with limited access to healthcare, patients often present late with advanced cataracts complicated by glaucoma, resulting in poor visual prognosis [5]. Early diagnosis and timely intervention are therefore critical in preventing permanent visual loss. However, socioeconomic factors, lack of awareness, and inadequate healthcare infrastructure often contribute to delayed presentation [6].

Management of lens-induced glaucoma involves both medical and surgical approaches. Initial medical therapy aims to reduce IOP and control inflammation using antiglaucoma medications such as beta-blockers, carbonic anhydrase inhibitors, and hyperosmotic agents, along with topical steroids and cycloplegics [7]. These measures help stabilize the eye and prepare it for definitive surgical intervention. However, medical therapy alone is insufficient, as the underlying cause—the pathological lens—must be addressed.

Definitive treatment typically involves cataract extraction, which not only removes the source of obstruction but also leads to normalization of IOP in most cases. Surgical options include extracapsular cataract extraction (ECCE), small incision cataract surgery (SICS), or phacoemulsification, depending on the clinical scenario and available resources [8]. The timing of surgery is crucial; early intervention is associated with better visual outcomes, whereas delayed treatment may result in irreversible optic nerve damage and poor prognosis [9].

Visual prognosis in LIG depends on several factors, including duration of symptoms, level of IOP at presentation, degree of optic nerve damage, and promptness of treatment. Studies have shown that patients presenting early with minimal optic nerve involvement tend to have favorable outcomes, while those with prolonged elevated IOP often experience suboptimal visual recovery despite successful surgery [10]. Additionally, corneal edema, intraoperative complications, and postoperative inflammation can further influence visual outcomes.

Given the significant impact of LIG on vision and its preventable nature, it is essential to evaluate the effectiveness of current management strategies. Understanding the visual outcomes following medical stabilization and surgical intervention can help guide clinical practice and improve patient care. This study aims to assess the visual prognosis in patients with lens-induced glaucoma after appropriate medical and surgical management, thereby highlighting the importance of early diagnosis and timely intervention in preserving vision.

Aim

To evaluate the visual prognosis in patients with lens-induced glaucoma following appropriate medical stabilization and definitive surgical management.

Objectives

To assess the improvement in visual acuity after treatment of lens-induced glaucoma.

To evaluate the effectiveness of preoperative medical therapy in controlling intraocular pressure (IOP).

To analyze the outcomes of different surgical interventions used in the management of lens-induced glaucoma.

MATERIALS AND METHODS

This prospective observational study was conducted at Sree Mookambika Institute of Medical Sciences in collaboration with the Department of Ophthalmology over a period from May 2025 to March 2026. All patients diagnosed clinically with lens-induced glaucoma during the study period were included after obtaining informed consent. A detailed history was obtained from each patient, including duration of symptoms, ocular complaints, and relevant past ocular history. All patients underwent a comprehensive ophthalmic examination. Visual acuity was assessed in both eyes using a Snellen chart, and best corrected visual acuity (BCVA) was recorded. Anterior segment evaluation was performed using slit lamp biomicroscopy with particular attention to circumcorneal congestion, corneal clarity, lid edema, keratic precipitates, and anterior chamber characteristics such as depth, presence of cells, flare, and lens particulate matter or proteins. Iris features including color, pattern, posterior synechiae, atrophic patches, and iridodonesis were noted. Pupil size, shape, reaction to light, and degree of dilatation were assessed. The lens was examined for size, transparency, position, anterior capsule integrity, and degree of cataractous changes. Intraocular pressure (IOP) was measured using Goldmann applanation tonometry. Gonioscopy was performed using a Zeiss four-mirror lens to evaluate the anterior chamber angle. Posterior segment examination in the affected eye was often limited due to corneal edema and dense cataract; hence, detailed ophthalmoscopic evaluation of the fellow eye was carried out to rule out pre-existing primary glaucoma, with emphasis on lens status, anterior chamber angle, optic disc, and IOP. All patients initially received medical management to control intraocular pressure and inflammation, followed by definitive surgical management in the form of cataract extraction once the ocular condition stabilized. The primary outcome measure was postoperative visual prognosis assessed by BCVA, while secondary outcomes included IOP control and complications. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25.0, where descriptive statistics

were expressed as mean, standard deviation, and percentages; paired t-test was used to compare preoperative and postoperative parameters, and Chi-square test was applied for categorical variables, with a p-value <0.05 considered statistically significant.

RESULT

Table -I Iop at the Time of Admission

IOP Range	No Of Cases	Percentage
20-30	18	18
31-40	39	39
41-50	25	25
>51	18	18
Total	100	100

Maximum No Of Cases Had Intraocular Pressure Between 31 To 40 Mmhg I.E., 39 %.

Table I demonstrates the distribution of intraocular pressure (IOP) at the time of admission among the study population. The majority of patients (39%) had IOP values between 31–40 mmHg, followed by 25% with IOP between 41–50 mmHg. Patients with IOP ranging from 20–30 mmHg and those with IOP greater than 51 mmHg each constituted 18% of the cases.

Table -Ii Comparison between Preoperative Iop and Postoperative Bvca

Preoperative IOP			Postoperative BCVA
20 - 40 Mmhg	**41 - 50 Mmhg**	**>51 Mmhg**	
30	3	-	>6/12
27	20	11	6/18 — 6/60
-	2	7	<6/60

In The Present Study When IOP At Initial Presentation Was Below 40mmhg, All Patients Had A Visual Acuity Better Than 6/60. When 10P Was Between 41 - 50 Mmhg, 23 (92%) Patients Out Of 25 Had BVCA Better Than 6/60 And Patients With IOP More Than 50mmhg Only 11 (61.11%) Out Of 18 Had BVCA Better Than 6/60.

Table II shows the relationship between preoperative IOP and postoperative best corrected visual acuity (BCVA). Patients presenting with IOP below 40 mmHg had comparatively better postoperative visual outcomes, with all patients achieving BCVA better than 6/60. Among patients with IOP between 41–50 mmHg, 92% achieved BCVA better than 6/60 postoperatively. In contrast, among patients with IOP greater than 51 mmHg, only 61.1% attained postoperative BCVA better than 6/60, indicating that higher preoperative IOP was associated with poorer visual outcomes.

Table -Iii Vision after Surgery

BCVA	No of Cases	Percentage
< 6/60	9	9
6/60 — 6/36	8	8
6/24 — 6/18	50	50
6/12 — 6/6	33	33
TOTAL	100	100

Most of the Patients (91 %) Had BCVA Better Than 6/60 After Surgery.

Table III summarizes postoperative visual acuity following surgery. Half of the patients (50%) achieved BCVA between 6/24 and 6/18, while 33% attained good visual acuity between 6/12 and 6/6. Only 9% of patients had BCVA worse than 6/60 after surgery. Overall, 91% of patients achieved postoperative BCVA better than 6/60, suggesting favourable visual outcomes in the majority of cases following surgical intervention.

DISCUSSION

Lens-induced glaucoma (LIG) remains an important cause of secondary glaucoma in developing countries despite being a largely preventable and treatable condition. While it has become relatively uncommon in developed nations due to early detection and timely cataract surgery, it continues to be prevalent in countries like India, largely due to delayed presentation, limited access to eye care, and lack of awareness regarding cataract management [8]. The persistence of LIG reflects gaps in public health delivery systems, even though cataract surgical services have expanded considerably in recent decades [9].

In the present study, visual outcomes following medical stabilization and surgical intervention were generally favorable. At six weeks postoperatively, best corrected visual acuity (BCVA) better than 6/12 was achieved in 33% of patients, 6/18–6/60 in 58%, and less than 6/60 in 9% of cases. Overall, BCVA greater than 6/60 was observed in 91% of patients, indicating that the majority of individuals attained functional vision following treatment. These findings are comparable to the study conducted by Prajan NV et al., which reported BCVA >6/60 in 88% of cases and <6/60 in 10% [10]. This similarity suggests that timely surgical management following adequate medical control of intraocular pressure can lead to satisfactory visual recovery in most patients with LIG.

The favorable outcomes observed in this study can be attributed to prompt preoperative management aimed at reducing intraocular pressure and controlling intraocular inflammation. Elevated intraocular pressure at presentation is a key determinant of optic nerve damage and subsequent visual prognosis. Early initiation of antiglaucoma therapy helps in stabilizing the ocular environment and minimizing further damage prior to surgery [11]. In addition, careful surgical planning and appropriate choice of cataract extraction technique play a crucial role in determining postoperative outcomes.

Despite the overall positive results, a small proportion of patients (9%) in the present study had poor visual outcomes (BCVA <6/60). This could be attributed to factors such as delayed presentation, prolonged duration of elevated intraocular pressure, and irreversible optic nerve damage. Corneal edema at presentation, which often obscures fundus visualization, may also delay accurate assessment of optic nerve status and contribute to suboptimal outcomes [12]. Furthermore, postoperative complications such as persistent inflammation, corneal decompensation, or cystoid macular edema may have adversely affected visual recovery in these patients.

The findings of this study reinforce the importance of early diagnosis and timely intervention in improving visual prognosis in LIG. Public awareness regarding cataract and its complications must be strengthened to encourage early healthcare-seeking behavior. Community-based screening programs and improved accessibility to ophthalmic services can significantly reduce the incidence of advanced cataract and its complications, including LIG [13].

In conclusion, lens-induced glaucoma, though largely curable, continues to pose a clinical challenge in developing settings. With appropriate medical management followed by timely surgical intervention, favorable visual outcomes can be achieved in the majority of patients. However, delayed presentation remains the most significant factor contributing to poor prognosis, highlighting the need for enhanced awareness and early treatment strategies.

CONCLUSION

Lens-induced glaucoma remains an important yet preventable cause of visual impairment, particularly in developing regions. The present study demonstrates that with timely medical management to control intraocular pressure followed by appropriate surgical intervention, favorable visual outcomes can be achieved in the majority of patients. A significant proportion of cases attained useful vision postoperatively, indicating the effectiveness of combined therapeutic approaches. However, delayed presentation continues to be a major factor associated with poor visual prognosis due to irreversible optic nerve damage and associated complications. These findings highlight the critical need for early detection, prompt referral, and timely cataract surgery. Increasing public awareness and improving accessibility to ophthalmic care services are essential to reduce the burden of lens-induced glaucoma and prevent avoidable blindness.

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