Outcomes of cataract surgery in patients with Lens induced glaucoma : A clinical study on IOP control and Visual Prognosis.

Introduction

Cataract and glaucoma are the leading causes of blindness throughout the world. Lens-inducedglaucoma (LIG) was first described in the year 1900 by Gifford and von Reuss independent of eachother. Lens-induced glaucoma (LIG) is common in India.
It is a common condition seen in patients with senile cataracts and is one of the commonest cause of secondary glaucoma, requiring an immediate attention and management to prevent blindness.These are heterogeneous group of disorders which develop through either open-angle or angleclosure mechanisms. It is of following types:

1)Phacomorphic glaucoma is defined as a secondary angle-closure glaucoma due to lens intumescence. An acute rise of IOP can hamper the optic nerve function and may lead to irreversiblevisual loss if not treated on time.
2)Phacolytic glaucoma is the sudden onset of open-angle glaucoma caused by a leaking mature ohypermature cataract.The lens proteins from hypermature cataract escape into the aqueous .The patient presents with sudden rise of IOP.
3)Phacoanaphylactic uveitis, now termed as lens-induced uveitis, is not truly an anaphylactic reaction butis a granulomatous reaction that can cause open-angle or angle-closure glaucoma or combined open-angleand angle-closure glaucoma
4)Phacotopic glaucomas occur often due to a traumatic pathology.They are seldom due to a congenital oracquired zonular disease.In complete dislocation of lens into the anterior chamber ,the entire angle may beblocked especially if the iris becomes firmly contracted over the posterior surface of the lens.

This preventable and curable condition though rare in developed countries is still prevalent in developincountries due to large backlog of cataract, poor health education, poor socioeconomic status, fear of operation.The definitive treatment for lens induced glaucoma is cataract extraction. The outcome following surgery in lens induced glaucoma is primarily related with the duration between the onset of symptoms and the treatment and the presence of optic atrophy, uveitis and corneal edema.

Materials and Methods

This prospective study was conducted in Ophthalmology department at Tertiary eye care center in Maharashtra in study duration of 14 months (November 2023 to January 2025). The present study was approved by the Institutional Ethical committee and written informed consent was obtained prior to the study from all patients.Total 16 cases were included in the study.

Inclusion Criteria:
All patients diagnosed with LIG.

Exclusion Criteria:
1.Patients having primary glaucoma.
2.Patients with posterior segment pathology causing visual problems.

Results:

Over 1 year period 16 cases of lens induced glaucoma were enrolled. In our study,phacomorphic glaucoma was found to be more common 10 cases(62.5%) than phacolytic 6 cases(37.5%) No cases were reported of phacotopic glaucoma andphacoanaphylactic glaucoma.

Table 1. Type of LIG :

Type of LIG (19) (2.6%)	No. of Patients	Percentage (%)
Phacolytic glaucoma	6	37.5%
Phacomorphic glaucoma	10	62.5%
Phacotopic glaucoma	0	0%
Phacoanaphylactic uveitis leading to glaucoma	0	0%
Total	16	100.00%

Table 2. Age and gender wise distribution

Age In years	**Male**	**Female**	**Total**
51 - 60	1(6.25%)	2(12.5%)	3
61 - 70	1(6.25%)	2(12.5%)	3
71 - 80	2(12.5%)	6(37.5%)	8
>80	1(6.25%)	1(6.25%)	2
Total	5	11	16

Table 3. At time of presentation:

At presentation majority of the patients in the affected eye had visual acuity hand movement or perceptionof light (PL) present. Only 2 cases (12.5%) were havinginaccurate Projection of rays (PR) vision onpresentation. Most commonly they present within 1-2 days of onset of symptoms.

BCVA	**N (%)**
HMCF, PL+,PR+	9(56.25%)
PL+, PR+	5(31.25%)
PL+, PR faulty	2(12.5%)
Total	16(100.00%)

Duration (days)	N (%)
1-2 days	8(50%)
3-4 days	2(12.5%)
5-6 days	3(18.75%)
>6 days	3(18.75%)
Total	16(100.00%)

Table 4. IOP at time of presentation and at last follow up:
The IOP at time of presentation ranged from 20 to more than 60 mmHg. Maximum number of eyes have an IOP of more than 45 mm Hg.

IOP(mm of Hg)	At presentation	At last follow-up (after 6 weeks)
11 - 20	0	13(81.25%)
21- 30	0	2(12.5%)
31 - 40	2(12.5%)	1(6.25%)
41 - 50	9(56.25%)	0
51 - 60	4(25%)	0
>60	1(6.25%)	0
Total	16	16

Table 5.Best corrected visual acuity after 6 weeks:
In our study, post-operative BCVA at the end of 6 weeks was >6/12 in 1(6.25%) case, 6/18 to 6/60 in 7 cases (43.75%).

BCVA	N (%)
>6/12	1(6.25%)
6/18-6/60	7(43.75%)
5/60 -3/60	4(25%)
2/60 -HM	1(6.25%)
PL+ PR accurate	1(6.25%)
PL+ PR inaccurate	2(12.5%)
Total	16(100.00%)

Table 6.Post-operative complications:
Cause of low vision in some cases was due to anterior uveitis, corneal edema , bullouskeratopathy and hyphaema and optic atrophy.

Complication	No. of Patients	Percentage (%)
Bullous keratopathy	0	0.00%
Uveitis	1	6.25%
Cystoid macular edema (late)	1	6.25%
Hyphaema	2	12.5%
Vitreous in anterior chamber	2	12.5%
Optic atrophy	3	18.75%
Total	9	100.00%

Discussion

Cataracts remain the leading cause of bilateral blindness in India, with lens-induced glaucomabeing one of the primary contributors to vision impairment, particularly in developing countries.This condition is often driven by a lack of awareness regarding cataract treatment and limitedaccess to healthcare services, especially in rural or remote areas.This clinical study was undertaken to outline the different characteristics of LIG, to determinethe risk factors and theirconsequences on postoperative visual acuity, IOP following cataract extraction. In this study, the magnitude of LIG was 2.4% during the study period as against 1.5%in Lahan study.

In our study a total of 16 patients were taken into this study in which 5 (31.25%) were malepatients and 11 (68.75%) were female. This female dominance was also seen in study conductedby Dr. Venkatesh Prajna et al.In our study among all types of LIG's, highest was seen Phacomorphic Glaucoma accounting62.5% (10 patients). Phacolytic Glaucoma was present in 6 patients which accounted 37.5%. Nocases of phacotopic and phacoanaphylactic glaucoma were seen.Similarfindings were seen by VPrajna et al.

Lahan study has reported female-to-male ratio of 1.7:1.Although it is possible that these entities are morecommon in females because of socioeconomic constraints, we also have to consider the fact that theprevalence of LIG is more common in females than males.

In this study; none of the cases had vision better than hand movement at presentation. In this study, BCVA o6/60 or better is slightly higher 50%. Most frequent age group was 71-80 years.Intra Ocular pressure was measured on admission before any medication and noted. Highest percentage wasamong 41-50 mmHg (56.25%) followed by 51-60 mmHg (25%) and 31-40 mmHg (12.5%). At last follow up all those patients were measured again for IOP and noted. Highest patients were between 11-20 mmHg(81.25%). Rest was 21-30 mmHg (12.5%) and31-40mmHg(6.25%) making it clear that eyes were out ofdanger. This drastic fall in IOP was only due to fact that cause for the glaucoma was lens induced swellingand elimination of

cause, brought the IOP back to normal. Same findings were seen in studies conducted byYaakub et al.

Conclusion

Our study demonstrated that lens induced glaucoma is still a challenging complication of cataractwhich can be prevented by early treatment of cataract. Study showed that condition is morecommon in females.

Patients presenting with high IOP at presentation significantly affect the final visual outcome post-operatively.Good visual acuity can be achieved in lens-induced glaucoma presenting within 1 week, with intraocular pressure of <40mm of Hg and with meticulous control of intraocular pressure andinflammation with medications preoperatively . Proper evaluation for glaucoma is required in all the cases of lens induced glaucoma after cataractsurgery.Most of the cases had better visual acuity after SICS in lens induced glaucoma and IOP came to control immediately after surgery. This shows that, SICS is still gold standard that effectively controls IOP and gives better visual outcome.Necessary steps should be taken to educate especially rural population of India, the importance of timely surgery for better visual outcome and the dangers of poor visual result if cataract surgery isdelayed.

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Abstract

Background:
Lens-induced glaucoma (LIG) is a secondary glaucoma associated with advanced cataract and remains a significant cause of preventable blindness in developing countries, including India. Prompt diagnosis and timely cataract extraction are essential to prevent irreversible optic nerve damage and vision loss.

Objectives:
To study the clinical profile, types, intraocular pressure (IOP), visual outcomes, and postoperative complications of lens-induced glaucoma in patients presenting to a tertiary eye care center.

Materials and Methods:
This prospective observational study was conducted at a tertiary eye care center in Maharashtra over a period of 14 months (November 2023 to January 2025). Sixteen patients diagnosed with lens-induced glaucoma were included. Patients with primary glaucoma and posterior segment pathology were excluded. Detailed clinical evaluation, IOP measurement, visual acuity assessment, and postoperative follow-up at 6 weeks were performed. All patients underwent cataract extraction after medical control of IOP and inflammation.

Results:
Among the 16 cases, phacomorphic glaucoma was the most common type (62.5%), followed by phacolytic glaucoma (37.5%). Females constituted 68.75% of cases, with the most affected age group being 71–80 years. At presentation, all patients had severe visual impairment, and the majority had IOP >45 mmHg. Following cataract surgery, IOP was controlled in all cases, with 81.25% achieving IOP between 11–20 mmHg at 6 weeks. Postoperative best-corrected visual acuity of 6/60 or better was achieved in 50% of patients. Poor visual outcomes were mainly due to optic atrophy, uveitis, corneal oedema, and other postoperative complications.

Conclusion:
Lens-induced glaucoma remains a preventable cause of visual morbidity, particularly among elderly females in rural populations. Early presentation, prompt surgical intervention, and effective preoperative control of IOP are critical for favourable visual outcomes. Timely cataract surgery and public awareness can significantly reduce the burden of lens-induced glaucoma.