

A CLINICAL STUDY OF MANAGEMENT AND VISUAL OUTCOME OF LENS-INDUCED GLAUCOMA

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ABSTRACT

BACKGROUND

Glaucoma is a group of eye disease, which results in damage to the optic nerve and vision loss, once it has occurred, is permanent. If treated early, it is possible to slow or stop the progression of disease with medication, laser treatment or surgery. Lens-induced glaucoma is a secondary glaucoma in which the crystalline lens is involved in the mechanism of raised Intraocular Pressure (IOP).

The aim of the study is to study visual outcome in lens-induced glaucoma in patients attending at Government General Hospital, Kakinada, from December 2014 to August 2016.

MATERIALS AND METHODS

This is a longitudinal study included 50 cases of different types of lens-induced glaucoma admitted in ophthalmic wards of Government General Hospital, Kakinada, during the period of December 2014 to August 2016.

RESULTS

The observations from the study were analysed and compared with the existing literature and the factors influencing the visual outcome.

CONCLUSION

The lens-induced glaucomas are a condition of old age with increased risk in females.

KEYWORDS

Phacomorphic Glaucoma, Phacolytic Glaucoma, Secondary Glaucoma, Optic Disc Cupping, Lens Extraction.

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BACKGROUND

Glaucoma is one of the major causes of blindness in our country. Worldwide, it is the second leading cause of irreversible blindness.

Lens-induced glaucoma may occur as either secondary angle-closure or open-angle glaucoma. The angle-closure can be caused by lens swelling (phacomorphic glaucoma) or lens dislocation (ectopia lentis). The open-angle include glaucoma related to leakage of lens proteins through the capsule of a mature or hypermature cataract (phacolytic glaucoma), obstruction of the trabecular meshwork following cataract extraction, capsulotomy or ocular trauma by liberated fragments of lens material (lens particle glaucoma) and hypersensitivity to own lens protein following surgery or penetrating trauma (phacoanaphylactic glaucoma).

In persons suffering abnormally high IOP, a change in Optic Nerve Head (ONH) tissues described as excavation occurs in parallel with progressive loss of visual field function. The change in the ONH is coincident with the death of Retinal Ganglion Cells (RGC) and their axons in the retinal nerve fibre layer.¹

Lens-induced glaucoma in which the lens plays a role, either by size or by position or by causing inflammation have been classified as lens-induced glaucomas. In the past, significant confusion existed about the terminology and mechanisms causing the glaucoma. After an eye surgery or other trauma to the lens capsule, these lens antigens are exposed to the circulation, they may be recognised as 'foreign' by the individual's immune system and they incite an inflammatory response.²

Terms such as phacotoxic reaction, phacogenic glaucoma, phacotoxic glaucoma, lens-induced uveitis and endophthalmitis phacoanaphylactica were used. Lens-related elevation in Intraocular Pressure (IOP) results from a variety of mechanisms such as lens dislocation, lens swelling (intumescent cataract), inflammation due to phacoanaphylaxis and lens particle blocking the trabecular meshwork.³

Aims and Objectives- The aim of the study is to evaluate and management of lens-induced glaucomas and to study

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the visual outcome in lens-induced glaucomas in patients attending at Government General Hospital, Kakinada, from December 2014 to August 2016.

MATERIALS AND METHODS

This longitudinal study included 50 cases of different types of lens-induced glaucoma admitted in ophthalmic wards of Government General Hospital, Kakinada, during the period of December 2014 to August 2016.

Inclusion Criteria

- All patients diagnosed for lens-induced glaucoma.
- Patients who signed written and informed consent.

Exclusion Criteria

- Primary glaucoma.
- Secondary glaucoma other than lens-induced glaucoma.
- Patients unfit for surgery due to very poor general condition.

All consecutive patients diagnosed as LIG on the basis of clinical symptoms and signs were included.

Age Distribution

In this study, female-to-male ratio was 1.94:1 with mean age of 61.56 ± 6.77 years.

In females, mean age 61.36 ± 5.65 years. In males, mean age 61.76 ± 8.71. The most frequent age group among both males and females was 60 to 69 years.

Age (Years)	Male		Female		Total	
	No.	%	No.	%	No.	%
40-49	1	5.88	1	3.03	2	4
50-59	5	29.41	8	24.25	13	26
60-69	7	41.18	23	69.69	30	60
Above 70	4	23.53	1	3.03	5	10
Total	17	100	33	100	50	100

Table 1. Showing Distribution of Cases According to Age and Gender

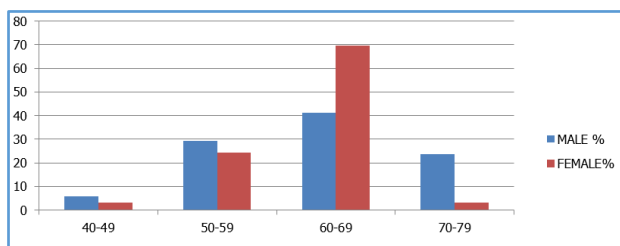


Figure 1. Showing Age and Gender Distribution

Distribution of Cases According to LIG Subgroups

Phacomorphic glaucoma was the most common LIG with 34 cases (68%), followed by phacolytic glaucoma with 16 cases (32%). None of the cases in this study presented with phacoanaphylactic reaction.

Diagnosis	Number of Cases	Percentage
Phacomorphic glaucoma	34	68
Phacolytic glaucoma	16	32
Total	50	100

Table 2. Showing Distribution of Cases According to LIG Subgroups

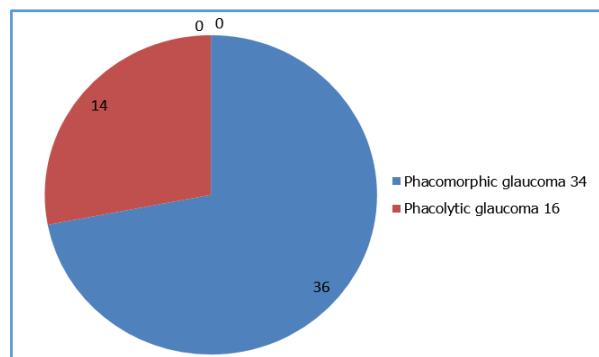


Figure 2. Showing Distribution of Case According LIG Subgroups

Distribution of Cases According to Duration of Symptoms among LIG Subgroups

It was observed that the mean duration of symptoms in phacomorphic glaucoma cases was 16.52 ± 9.89 days, and in phacolytic glaucoma, it was 16.75 ± 9.57 days of a total 50 cases. 26 (52%) have presented with symptoms of more than 2 weeks and 24 (48%) cases with symptoms of less than 2 weeks. 18 (52.94%) of 34 phacomorphic glaucoma cases and 8 (50%) of 16 phacolytic cases presented with symptoms of more than 2 weeks.

Duration in Days	Phacomorphic Glaucoma		Phacolytic Glaucoma		Total	
	No	%	No	%	No	%
00-02	00	00	00	00	00	00
03-07	09	26.47	02	12.50	11	22
08-14	07	20.59	06	37.50	13	26
15-30	11	32.36	04	25.00	15	30
>30	07	20.58	04	25.00	11	22
Total	34	100	16	100	50	100

Table 3. Showing Distribution of Cases According to Duration of Symptoms among LIG Subgroups

Distribution of Cases According to Visual Acuity at Presentation

In this study, it was observed that most of the cases presented with visual acuity of hand movement.

Visual Acuity	At Presentation	
	Numbers	Percentage
HM	34	68
PL	14	28
?PL	2	4
Total	50	100

Table 4. Showing Distribution of Cases According to Visual Acuity at Presentation

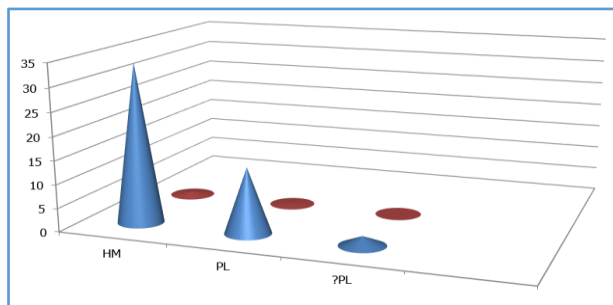


Figure 3. Showing Distribution of Cases According to Visual Acuity at Presentation

Distribution of Cases According to Visual Acuity at Last Follow-up

At last follow up, 21 (42%) cases gained good visual acuity, 17 (34%) cases gained moderate visual acuity and 12 (24%) cases gained poor visual acuity.

Visual Acuity	At Last Follow-up	
	Numbers	Percentage
6/6-6/12	21	42
6/18-6/60	17	34
<6/60	12	24
Total	50	100

Table 5. Showing Distribution of Cases According to Visual Acuity at Last Follow-up

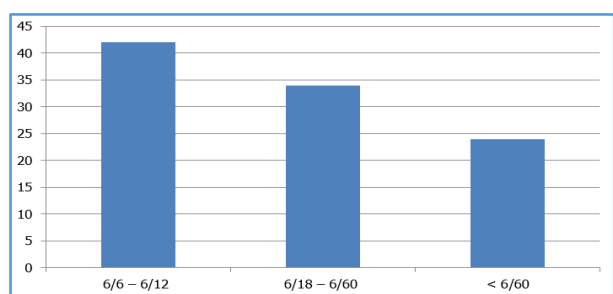


Figure 4. Showing Distribution of Cases According to Visual Acuity at Last Follow-up

Distribution of Cases According to IOP at Presentation after Medication and at Last Follow-up

In this study, the total mean IOP, at presentation was 36.88 ± 7.57 mmHg (range 22-60 mmHg), after medication, it was 18.9 ± 5.12 mmHg, and at last follow up, it was 15.12 ± 3.17 mmHg. Paired t-test was used to compare the reductions of IOP from baseline at presentation to IOP post medication, IOP from baseline presentation to last follow up and IOP post medication to last follow up, the respective mean were 17.98 ± 5.82 (t=21.81).

IOP mmHg	At Presentation		After Medication		At Last Followup	
	No.	%	No.	%	No.	%
0-20	0	0	42	84	48	96
21-30	11	22	6	12	2	4
31-40	18	36	2	4	0	0
>41	21	42	0	0	0	0
Total	50	100	50	100	50	100

Table 6. Showing Distribution of Cases According to IOP at Presentation, After Medication and at Last Follow-up

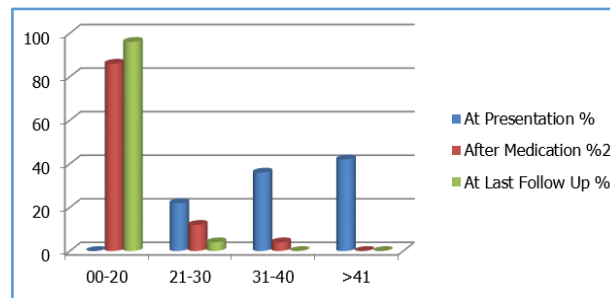


Figure 5. Showing Distribution of Cases According to IOP at Presentation, after Medication and at Last Follow-up

Distribution of Cases According to Surgical Procedure Done

In this study, a majority of cases 43 (86%) underwent SICS + PCIOL.

Procedure	Number of Cases	Percentage
SICS + PCIOL	43	86
SICS + PCIOL + PI	3	6
Combined	2	4
SICS	2	4
Total	50	100

Table 7. Showing Distribution of Cases According to Surgical Procedure Done

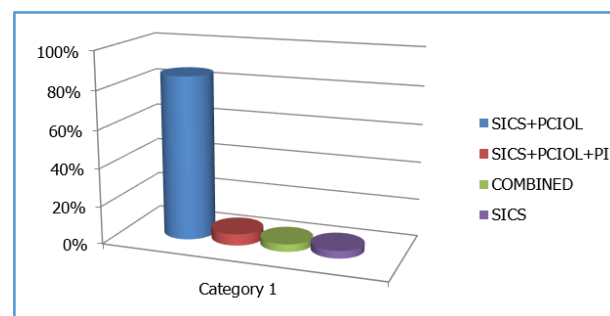


Figure 6. Showing Distribution of Cases According to Surgical Procedure Done

Distribution of Optic Disc Changes and Last Follow-up

In this study, majority of cases, 27 (54%) had normal fundus and 9 (18%) had suffered severe Glaucomatous Disc Damage (GDD).

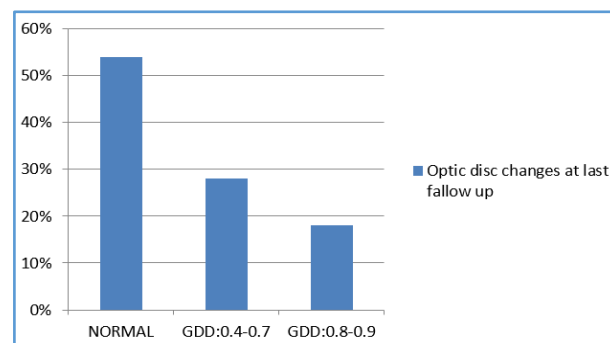


Figure 7. Distribution of Optic Disc Changes and Last Follow-up

Optic Disc Changes	Number of Cases	Percentage
Normal	27	54
GDD- 0.4-0.7	14	28
GDD- 0.8-0.9	9	18
Total	50	100

Table 8. Distribution of Optic Disc Changes and Last Follow-up

Distribution of Cases According to BCVA at Last Follow-up among LIG Subgroups

BCVA of 6/12 or better, at last follow up was achieved in 15 (44.12%) cases of phacomorphic glaucoma and 6 (37.50%) cases of phacolytic glaucoma. Poor visual outcome of less than 6/60 in 10 cases (29.41%) of phacomorphic glaucoma.

BCVA	Phacomorphic Glaucoma		Phacolytic Glaucoma		Total	
	No.	%	No.	%	No.	%
6/6-6/12	15	44.12	6	37.50	21	42
6/18-6/60	9	26.47	8	50	17	34
<6/60	10	29.41	2	12.50	12	24
Total	34	100	16	100	50	100

Table 9. Showing Distribution of Cases According to BCVA at Last Follow-up among LIG Subgroups

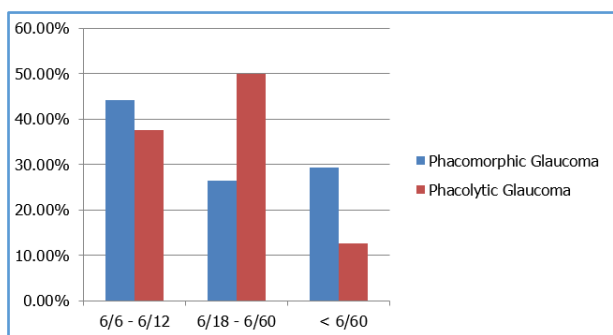


Figure 8. Showing Distribution of Cases According to BCVA at Last Follow-up among LIG Subgroups

Distribution of Cases According to BCVA at last Follow-up and Duration of Symptoms

The BCVA at last follow up of 6/12 or better was achieved in 16 (66.67%) of 24 cases with symptoms less than 2 weeks and in only 5 (19.23%) of 26 cases with symptoms of more than 2 weeks. The poor visual acuity at last follow up of less than 6/60 was found in 12 (46.15%) of 26 cases with symptoms more than 2 weeks and in 0 (0%) case with symptoms of less than 2 weeks. Duration of symptoms had linear relation with visual outcome. More the duration of symptoms, poorer the visual outcome.

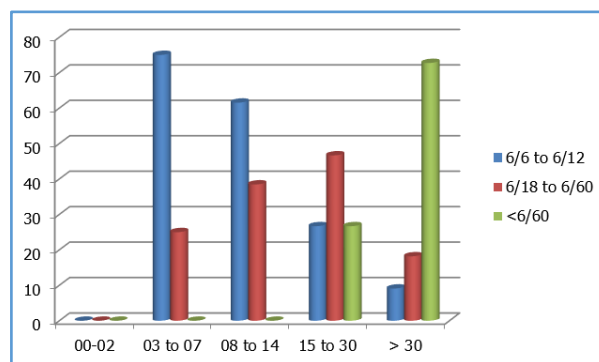


Figure 9. Showing Distribution of Cases According to BCVA at Last Follow-up and Duration of Symptoms

DISCUSSION

Though phacomorphic and phacolytic glaucomas are clinically distinct entities, they have certain common factors in that, they are lens induced, they compromise the function of the optic nerve due to rise of intraocular pressure, cataract surgery is curative in these cases and finally they uniformly share a guarded prognosis. Cataract surgery alone (primary lens extraction) in an eye suffering from both cataract and glaucoma is gaining wide acceptance due to great advances in cataract surgery and IOLs and better medicinal control of glaucoma through a wide variety of hypotensive drops.⁴ Cataract surgery proves to be effective in lowering the intraocular pressure and visual recovery in patients with lens-induced glaucoma.⁵

BBCVA	Duration of Symptoms									
	0-2 Days		3-7 Days		8-14 Days		15-30 Days		>30 Days	
6/6-6/12	0	0%	8	72.73	8	61.54%	4	26.67%	1	9.09%
6/18-6/60	0	0%	3	27.27	5	38.46%	7	46.66%	2	18.18%
<6/60	0	0%	0	0%	0	00%	4	26.67%	8	72.73%
Total	0	0%	11	100%	13	100%	15	100%	11	100%

Table 10. Showing Distribution of Cases According to BCVA at Last Follow-up and Duration of Symptoms

In this study, age range was 46 to 75 years with a mean age of 61.56 ± 6.77 years. Highest number of cases occurred in the age group 60-69 years (60%), mean age was 73.1 ± 10.2 years. All phacomorphic and control eyes were ethnic Chinese.⁶ Females seemed to have an increased risk of having LIG compared to males with ratio of 1.94:1. Phacomorphic glaucoma was the most common LIG with 68%. Phacomorphic glaucoma (28, 73.7%) was the main cause of LIG followed by phacolytic glaucoma (8, 21.1%).

In this study, mean duration of symptoms in phacomorphic glaucoma cases was 16.52 ± 9.89 days, and in phacolytic glaucoma, it was 16.75 ± 9.57 days.

Clinically, significant proportion of cases with IOP at presentation less than 35 mmHg (59.10%) achieved good visual acuity than cases with IOP more than 35 mmHg (28.57%), whereas poor visual outcome in cases presented with IOP more than 35 mmHg (3.29%) than cases with IOP less than 35 mmHg (4.54%). Visual recovery was good in

45% cases (6/12-6/60) and moderately fair in 30% cases (VA <6/60). Preoperative IOP ranged from 24.0-59.0 mmHg. Postoperative IOP ranged from 14-22 mmHg. Duration between symptoms and surgery was 1 week to 4 months.⁷

It is found that the reduction in mean IOP is greater after medication for glaucoma. Nevertheless, surgical removal of lens is the definite treatment for lens-induced glaucoma response to medications is very good in LIG. The IOP at last follow up was reduced to normal limits (15.12 ± 3.17 mmHg). This indicates that in lens-induced glaucomas, IOP should be reduced by medical line of treatment preoperatively to as normal as possible, so as to achieve stable IOP postoperatively with no further antiglaucoma medications.

In this study, none of the cases had vision better than hand movement at the time of presentation. The postoperative vision of patients was as shown that 16% of the patients recovered very good vision (6/18 or better) after surgery. Low vision/visual impairment (<6/18-6/60) occurred in 24% cases. The Best Corrected Visual Acuity (BCVA) of 6/18 or more was found in 54% cases, whereas visual acuity of less than 6/60 was seen in 26% of cases. Visual acuity of 6/12 or better was achieved in 72% (p <0.01) of cases.⁸

Blindness (<6/60-PL+) occurred in 56% cases. The main causes for poor outcome in 94 cases were optic atrophy in 32 (34%) eyes, uveitis in 25 (26.6%) eyes and corneal oedema in 24 (25.5%) eyes.⁹

CONCLUSION

It was observed that most of the cases were seen in females (66%) and when compared to males ratio was 1.94:1.

The most frequent type of LIG was phacomorphic glaucoma (68%) followed by phacolytic glaucoma (32%).

None of the lens-induced glaucomas in the present study had vision more than hand movement at presentation.

The BCVA of 6/12 or better was found in 42% cases, whereas visual acuity of less than 6/60 was seen in 24% of cases.

It is also observed that good visual acuity of 6/12 or better achieved in 16 (66.67%) of 24 cases with symptoms less than 2 weeks and in only 5 (19.23%) of 26 cases with symptoms of more than 2 weeks, which was clinically and

statistically significant (p<0.01). Good visual acuity achieved by cases with IOP of less than 35 mmHg (60%) was more than the cases with IOP higher than 35 mmHg (33.33%). The mean reduction of IOP from post medication to last follow up was also found to be clinically and statistically significant.

The ocular fundus of the affected eye suffered Glaucomatous Disc Damage (GDD) in 46% of the total cases. The damage was more in cases with symptoms for more than 2 weeks, which was clinically and statistically significant (p<0.01).

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