

## Management and Visual Outcome in Lens Induced Glaucoma: Prospective Clinical Study

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### Abstract

**Aim:** Clinical study of management and visual outcome in lens induced glaucoma.

**Methods:** This prospective study was conducted in department of ophthalmology, JanNayak Karpoori Thakur Medical College & Hospital, Madhepura (JNKTMCH) , Bihar, India for six months . 50 Patients visiting the Hospital with classical symptoms of Lens induced Glaucoma were taken into study. The diagnosis of phacomorphic glaucoma was based on the presence of the classical signs and symptoms such as pain and redness, shallow anterior chamber (AC), cornea oedema and increased IOP with intumescent lens. Phacolytic glaucoma was diagnosed clinically based on the presence of the hyper mature cataract with intact capsule, presence of lens protein and flare in AC.

**Results:** A Total of 50 patients were taken into this study in which 19(38%) were male patients and 31(62%) were Female. Among different LIG patients maximum patients had Phacomorphic Glaucoma accounting 60% (30 patients). Phacolytic Glaucoma was present in 18 patients which accounted 36%. Subluxated Glaucoma was seen in 2 patient in our study (4%) and phacoanaphylactic Glaucoma was not seen in our study. Other eye of the patients was without any Glaucomatous changes or pressure. Pseudophakic were seen in 12 patients (24%), mature cataract was seen in 3 patients (6%) and Immature cataract was seen in 35patients (70%). Intra Ocular pressure was measured on admission before any medication and noted. Highest percentage was among 30-39mmHg (40%) followed by 40-49mmHg (34%) and 50-59mmHg (14%). Highest patients were between 10-19mmHg (88%). Rest were <10mmHg (6%) and 20-29mmHg (6%) making it clear that eyes were out of danger. Similarly Visual acuity were measured at three intervals using Snellens Chart and readings were noted. On admission, highest patients were seen in Hand movements positive (40%) followed by Perception of Light positive (32%). On the day of Discharge, highest patients (40%) were seen in 6/24-6/36 visual acuity followed by 6/60-1/60(30%). 6/12-6/18 was noted in 24%. On the day of follow up after 1 week of surgery and 6 weeks of surgery maximum patients were seen between 6/12-6/18 (42%) followed by 6/24-6/36 (40%) and 6/6-6/9 (6%).

**Conclusion:** LIG is an important vision-threatening disease presenting as a painful red eye. It is remaining as one of the important cause of Blindness not only because of Senile cataract but even after cataract surgery due to Glaucoma caused by neglected cataractous lens.

**Key words:** Subluxated Glaucoma, phacoanaphylactic Glaucoma

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## Introduction

India being a developing country, causes of Blindness in India will be different than developed countries. There are 10million (37 million in world) blind people in India today in which 80 percent if taken care in time, completely preventable. Cataract in India is the most important cause of preventable blindness accounting to 63.7 percent.[1] Refractive errors and Glaucoma being the second and third respectively. Lens-induced glaucoma (LIG) was first described in the year 1900 by Gifford[2] and von Reuss[3] independent of each other. Later many other researchers did research on such type of cases [4-6] and named it differently. At present all those conditions are termed as Lens Induced Glaucoma (LIG) which includes many types of secondary Glaucoma in which Phacomorphic accounts most of cases followed by phacolytic Glaucoma. LIG is a clinical condition characterised by (i) a violent secondary glaucoma (Resembling acute angle closure glaucoma) in one eye with senile mature cataract, hyper mature senile cataract (Rarely immature senile cataract) yet with an open angle, (ii) normal intraocular pressure and open angle in other eye, and (iii) a prompt relief of symptoms and restoration of vision after cataract extraction in the effected eye.[7] LIG is most common in India and in other developing countries due to delay in cataract removal.[8,9] Normally cataract occurs when normal crystalline lens loose its transparency due to ageing process. When left untreated it swells due to osmotic effect of degenerated lens proteins. In phacomorphic glaucoma, the swollen lens may block the anterior flow of the aqueous humor from the posterior chamber pushing the iris forward. Eventually, the trabecular meshwork gets blocked by the iris and leads to a sudden and extreme rise in IOP. Whereas Phacolytic glaucoma is a principal complication of hyper mature cataract. Hyper mature cataract may cause leakage of lens protein from an intact capsule. The

lens protein causes intense inflammation and blockage of trabecular meshwork, subsequently responsible for elevation of IOP.[10]

## Material and Methods

This prospective study was conducted in department of ophthalmology, JanNayak Karpoori Thakur Medical College & Hospital, Madhepura (JNKTMCH), Bihar, India for six months. 50 Patients visiting the Hospital with classical symptoms of Lens induced Glaucoma were taken into study. The diagnosis of phacomorphic glaucoma was based on the presence of the classical signs and symptoms such as pain and redness, shallow anterior chamber (AC), cornea oedema and increased IOP with intumescent lens. Phacolytic glaucoma was diagnosed clinically based on the presence of the hyper mature cataract with intact capsule, presence of lens protein and flare in AC. All the study subjects underwent a through ocular examination using Slit lamp biomicroscopy, Schiottz tonometry and Applanation tonometer. Patients were made ready for operation by giving IV Mannitol and oral T. Diamox. Even Timolol drops were put. And IV mannitol was repeated just before the surgery. These patients were Operated after explaining the possible prognosis, by Small Incision Cataract Surgery with PCIOL implantation. Post operatively immense care was taken to prevent posterior synechiae formation using short acting Cycloplegics. During follow up a detailed Ocular examination was done including Refraction using snellens chart and IOP measurement using Schiottz tonometer and applanation tomometer. All the results were evaluated. Written consent was taken from the study subjects.

## Results:

A Total of 50 patients were taken into this study in which 19(38%) were male patients and 31(62%)were Female. Among these maximum patients were from age

group 60 to 70 years (60%) followed by 70-80 years (30%). Even 50-60 years had 5 patients (10%). There was a Female

dominance seen in number of patients with LIG as compared to male population.

**Table 1: Age and Sex Distribution**

Age in years	Male		Female		Total Number	Percentage%
	Number	Percentage%	Number	Percentage%		
Below 60	3	6%	2	4%	5	10%
60-70	11	22%	19	38%	30	60%
Above 70	5	10%	10	20%	15	30%
Total	19	38%	31	62%	50	100%

Among different LIG patients maximum patients had Phacomorphic Glaucoma accounting 60% (30 patients). Phacolytic Glaucoma was present in 18 patients

which accounted 36%. Subluxated Glaucoma was seen in 2 patients in our study (4%) and phacoanaphylactic Glaucoma was not seen in our study.

**Table 2: Distribution of Different types of LIG**

Type of LIG	Number	Percentage%
Phacomorphic glaucoma	30	60%
Phacolytic glaucoma	18	36%
Subluxated glaucoma	2	4%
Phacoanaphylactic glaucoma	-	-
Total	50	100%

Other eye of the patients was without any Glaucomatous changes or pressure. Pseudophakic were seen in 12 patients

(24%), mature cataract was seen in 3 patients (6%) and Immature cataract was seen in 35 patients (70%).

**Table 3: Status of Fellow eye**

Status of Fellow eye	Number	Percentage %
Pseudophakia	12	24%
Mature cataract	3	6%
Immature cataract	35	70%
Total	50	100%

Intra Ocular pressure was measured on admission before any medication and noted. Highest percentage was among 30-39mmHg (40%) followed by 40-49mmHg (34%) and 50-59mmHg (14%). These pressure were considerably high and needed immediate intervention. After

surgery during discharge all those patients were measured again for IOP and noted. Highest patients were between 10-19mmHg (88%). Rest were <10mmHg (6%) and 20-29mmHg (6%) making it clear that eyes were out of danger.

**Table 4: IOP measurements on admission and on discharge**

IOP (mm of Hg)	On Admission	Percentage%	After surgery On discharge	Percentage%
<10	-	-	3	6%
10-19	-	-	44	88%
20-29	3	6%	3	6%
30-39	20	40%	-	-
40-49	17	34%	-	-
50-59	7	14%	-	-
>60	3	6%	-	-
Total	50	100%	50	100%

Similarly Visual acuity was measured at three intervals using Snellens Chart and readings were noted. On admission, highest patients were seen in Hand movements positive (40%) followed by Perception of Light positive (32%). On the day of Discharge, highest patients (40%) were seen in 6/24-6/36 visual acuity followed by 6/60-1/60(30%). 6/12-6/18

was noted in 24%. On the day of follow up after 1 week of surgery and 6 weeks of surgery maximum patients were seen between 6/12-6/18 (42%) followed by 6/24-6/36 (40%) and 6/6-6/9 (6%). These details clearly indicates there is a complete improvement of visual acuity without any medication and by just removal of cataractous lens.

**Table 5: Visual Acuity on Admission, on Discharge, Post -op 1 week, Post-op 6 weeks**

Visual acuity	On admission	On discharge	Post -op 1 week	Post -op 6 weeks
6/6 – 6/9	-	3 (6%)	3 (6%)	3(6%)
6/12- 6/18	-	12(24%)	21(42%)	22(44%)
6/24- 6/36	-	20(40%)	17(34%)	18(36%)
6/60- 1/60	3 (6%)	15(30%)	9(18%)	7(14%)
CF at ½ M	11 (22%)	-	-	-
HM	20(40%)	-	-	-
PL	16(32%)	-	-	-
No PL	-	-	-	-
Total	50	50	50	50

## Discussion

Lens induced Glaucoma is common in India due to the fact that, In spite of easy availability of surgical facilities with concerted efforts of the National Programme for Control of Blindness (NPCB), NGOs, government agencies, and private practitioners, cataract surgery being a very cost effective and rewarding surgery, still many people are becoming blind due to lack of awareness about significance of early management. Illiterate, older, and rural population are the worst affected.[11] In our study A total of 50 patients were taken into this study in which 19(38%) were male patients and 31(62%) were Female. This female dominance was also seen in study conducted by Venkatesh Prajna et al.[12] Even some more studies Raghunandan Kothari et al.[13] Rijal et al Nepal.[14] [ Reason for these can be the Socio-economical and Gender based constraints present in especially Rural India. Also another reason being cataract more common in female than male population in

our country.<sup>12</sup> In our study among all types of Glaucomas, highest was seen Phacomorphic Glaucoma accounting 60% (30 patients). Phacolytic Glaucoma was present in 18 patients which accounted 36%. Subluxated Glaucoma was seen in 2 patient in our study (4%) and phacoanaphylactic Glaucoma was not seen in our study. Similar findings were seen by Prajna et al.[12] And Raghunandan Kothari et al.[13] It was also noted that phacolytic Glaucoma was seen more in advanced age as compared to phacomorphic Glaucoma. These Similar findings were seen in Jedziniak et al[15] and Spector et al.[16] reason for these can be accumulation of high molecular weight molecules in lens as the time progresses. Intra Ocular pressure was measured on admission before any medication and noted. Intra Ocular pressure was measured on admission before any medication and noted. Highest percentage was among 30-39mmHg (40%) followed by 40-49mmHg (34%) and 50-59mmHg (14%). These pressure were considerably high and needed immediate intervention. After

surgery during discharge all those patients were measured again for IOP and noted. Highest patients were between 10-19mmHg (88%). Rest were <10mmHg (6%) and 20-29mmHg (6%) making it clear that eyes were out of danger. This Drastic fall in IOP was only due to fact that cause for the Glaucoma was Lens induced swelling and elimination of cause, brought the IOP back to normal. Same Findings were seen in studies conducted by Yaakub et al,[17] Raghunandan Kothari et al,[13] Rijal et al.[14] Similarly Visual acuity were measured at three intervals using Snellens Chart and readings were noted. On admission, highest patients were seen in Hand movements positive (40%) followed by Perception of Light positive (32%). On the day of Discharge, highest patients (40%) were seen in 6/24-6/36 visual acuity followed by 6/60-1/60(30%). 6/12-6/18 was noted in 24%. On the day of follow up after 1 week of surgery and 6 weeks of surgery maximum patients were seen between 6/12-6/18 (42%) followed by 6/24-6/36 (40%) and 6/6-6/9 (6%). These details clearly indicates there is a complete improvement of visual acuity without any medication and by just removal of cataractous lens. When the patients came back for follow up on 1<sup>st</sup> week post-operative day and 6<sup>th</sup> week post-operative day there was again improvement of major patient population 6/6-6/36. These changes clearly indicates that cause of Blindness was lens induced and when the cause was eliminated, there was a drastic improvement in the vision. With appropriate IOL implantation majority of patients remained in 6/12-6/18 vision. Similar findings were seen in studies conducted by Venkatesh Prajna et al,[12] Rija et al[14] and Yaakub et al[17] from Malaysia. In the study by Venkatesh Prajna-59% of patients had visual outcome 6/18 or better. Study by Yaakub et al, a study conducted in Malaysia, visual outcome 6/18 or better was 57.9%.

## Conclusion

LIG is an important vision-threatening disease presenting as a painful red eye. It is remaining as one of the important cause of Blindness not only because of Senile cataract but even after cataract surgery due to Glaucoma caused by neglected cataractous lens. A phacomorphic lens disease secondary to a neglected senile cataract is the major cause of LIG. Even after advanced surgical techniques being invented in recent decades and immense efforts of National Programme of Control of Blindness, Lack of awareness among especially rural population of India is causing them to remain with cataractous lens for a prolonged period. So necessary steps should be taken to health 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 is delayed.

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