



ORIGINAL RESEARCH PAPER

Ophthalmology

A STUDY OF FACTORS AFFECTING VISUAL OUTCOME IN LENS INDUCED GLAUCOMA

KEY WORDS: Lens induced glaucoma, Intraocular pressure, visual acuity.

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ABSTRACT

Background: Lens induced glaucoma (LiG) is one of the commonest causes of secondary glaucoma in India requiring immediate attention and management to prevent blindness. There has been a significant improvement in the outcome of cataract surgery in patients with LiG, but even today the visual prognosis is guarded.

Materials and Methods: This prospective observational descriptive longitudinal study was conducted in a Tertiary care hospital with the aim to study the various factors affecting visual prognosis in LiG. 59 cases of lens induced glaucoma were included who had attended the hospital over a period of eighteen months, from 1st January 2018 to 1st July 2019.

Results: Most common type of lens induced glaucoma was "phacomorphic" variety. Most common type of cataract causing lens induced glaucoma was intumescent cataract. Duration of disease, presenting IOP, type of LiG (phacomorphic) had a significant effect on visual outcome. Most common observed complication of LiG was optic atrophy. **Conclusion:** Lens induced glaucoma converts curable disease into incurable emergency and decreases the chances of good visual recovery in a normal case of cataract. There is, thus, an urgent need to create awareness regarding cataract extraction surgeries before it reaches a stage of maturity, to prevent the problem of LiG.

INTRODUCTION

Lens induced glaucoma is a common condition seen in patients with senile (hyper mature / intumescent) cataracts and is one of the commonest causes of secondary glaucoma¹, requiring immediate attention and management to prevent blindness. In India, there is an increasing backlog of cataract due to the population explosion with increased life expectancy and sub-optimal utilization of the easily available cataract surgical services by the rural community.²

In recent times, there has been a significant improvement in the outcome of cataract surgery in patients with lens induced glaucoma, but even today the visual prognosis is guarded in these cases.

MATERIALS AND METHODS

This prospective observational descriptive longitudinal study was conducted in the Department of Ophthalmology in a Tertiary care hospital and medical college after approval from the Institutional Ethical Committee. The aim of study was to note factors affecting visual prognosis in patients of LiG. 59 cases of lens induced glaucoma were included who had attended the hospital over a period of eighteen months, from 1st January 2018 to 1st July 2019.

Data analysis performed by using SPSS version 23:00 and Chi-square test was used to compare the final vision with various qualitative data variables (p-value < 0.05 considered as significant).

INCLUSION CRITERIA:

1. All lens induced glaucoma patients coming for treatment. Appropriate criteria were applied to clinically diagnose the various types of LiGs such as³
 - Phacomorphic glaucoma:
 - Phacolytic glaucoma⁴
 - Phacotoxic uveitis/lens particle glaucoma
 - Phacoanaphylactic glaucoma
 - Glaucoma secondary to lens dislocation

EXCLUSION CRITERIA:

1. Primary glaucoma associated with cataract.
2. Lens induced glaucoma with other vision affecting lesions like corneal opacity.

Complete preoperative cataract surgery work up of all cases

was done including history, clinical examination, ophthalmic and systemic investigations and a physician checkup for systemic evaluation.

Medical management usually included:^{3,5}

1. Inj. Mannitol
2. Tab. Acetazolamide
3. Tab. Ibuprofen (400 mg) for analgesia

Routinely all patients received topical antiglaucoma eye drops.

All patients were operated by small incision cataract surgery with or without posterior chamber intraocular lens implantation and with or without trabeculectomy with appropriate pre and post operative procedures. Phacoemulsification was avoided in these patients⁶

All the patients were called up for follow up after 7, 15, 30 and 45 days postoperatively with minimum period of follow up of 6 months. Follow up examination included looking for evidence of inflammation, intraocular pressure record, fundus examination, visual acuity estimation and slit lamp examination for functioning of bleb. Refractive correction was ordered 8 weeks after surgery.

OBSERVATION AND RESULTS

Age & Gender distribution of Lens induced glaucoma.

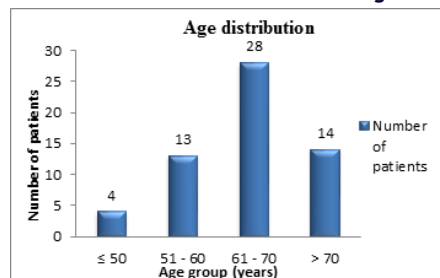


Chart 1-Age distribution of patients with LiG

- The youngest patient in our study was 44 years old and oldest patient was 95 years old.
- Maximum number of patients were in the age group of 61-70 years.

- Mean age of our study was 65.69 year (standard deviation:8.69 year).

Table 1-Gender distribution of lens induced glaucoma

| GENDER | NO. OF PATIENTS | PERCENTAGE |
|--------|-----------------|------------|
| FEMALE | 43 | 72.9% |
| MALE | 16 | 27.1% |
| TOTAL | 59 | 100.0% |

- Male:female ratio in our study was 1:2.7

Type of Lens induced glaucoma

Table 2-Distribution of type of lens induced glaucoma

| Type Of LIg | No. Of Patients | Percentage |
|-----------------|-----------------|------------|
| Phacomorphic | 46 | 78.0% |
| Phacolytic | 12 | 20.3% |
| Dislocated Lens | 1 | 1.7% |
| Total | 59 | 100.0% |

- Most common type of lens induced glaucoma was "phacomorphic" variety.

Time of presentation of cases after onset of disease

Table 3-Time of presentation of cases after onset of disease.

| Duration In Days | No. Of Patients | Percentage |
|------------------|-----------------|------------|
| 7 | 11 | 18.64% |
| 8-14 | 11 | 18.64% |
| 15-21 | 17 | 28.81% |
| >21 | 20 | 33.89% |
| TOTAL | 59 | 100% |

- 62.7% of patients presented after 2 weeks of onset of disease.

Intra-ocular Pressure on presentation

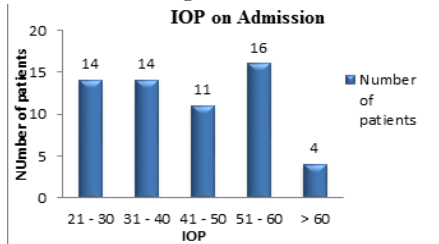


Chart 2-Intraocular pressure on admission

- In majority of cases intraocular pressure was between 51-60 mm Hg with mean IOP being 41.41 mm Hg in our study.

Type of cataractous lens causing lens induced glaucoma

Table 4-Type of cataractous lens causing lens induced glaucoma.

| Type Of Cataract | No. Of Patients | Percentage |
|----------------------------------|-----------------|------------|
| Intumescent | 39 | 66.1% |
| Hyper mature Morgagnian | 19 | 32.2% |
| Total Cataract (dislocated Lens) | 1 | 1.69% |
| Total | 59 | 100% |

- Most common type of cataract causing lens induced glaucoma was intumescent cataract.

Type of surgery performed

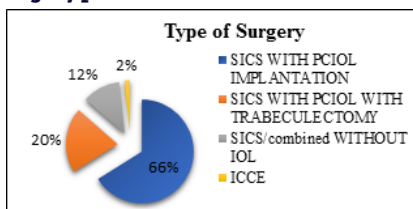


Chart 3- Type of surgery performed

- Cataract extraction with PCIOL implantation done in 39 cases.
- Complications which occurred in the study group were resolved within 7-8 days post operatively.
- The most common complication of LIg that was observed was optic atrophy.

Relationship of type of surgery with final visual outcome

Table 5- Relationship of type of surgery with final visual outcome

| Surgery | VISUAL ACUITY | | | | | | Total |
|---------|---------------|-------------|-------------|----------------|-------|-------|-------|
| | > 6/12 | 6/18 - 6/24 | 6/36 - 6/60 | Less Than 6/60 | PL/HM | No PL | |
| SICS | 9 | 12 | 14 | 6 | 2 | 0 | 43 |
| SICS | 1 | 0 | 6 | 7 | 0 | 2 | 16 |
| TRAB | | | | | | | |
| TOTAL | 10 | 12 | 20 | 13 | 2 | 2 | 59 |

Final corrected visual acuity in relation to duration of disease on presentation.

Table 6- Final corrected visual acuity in relation to duration of disease on presentation

| Duration Of Disease In Days | No Of Patients | >6/12 | 6/18-6/24 | 6/36-6/60 | Less Than 6/60 | HM/PL | NO PL |
|-----------------------------|----------------|-------|-----------|-----------|----------------|-------|-------|
| 1-7 | 11 | 4 | 4 | 3 | - | - | - |
| 8-14 | 11 | 3 | 4 | 3 | 1 | - | - |
| 15-21 | 17 | 3 | 4 | 6 | 4 | - | - |
| >21 | 20 | - | - | 8 | 8 | 2 | 2 |
| TOTAL | 59 | 10 | 12 | 20 | 13 | 2 | 2 |

- In our study the duration of disease on presentation had significant impact on visual outcome. (p value <0.001, Chi square test used). As the duration of disease increased visual outcome was poor.

Final corrected visual acuity in relation to type of glaucoma.

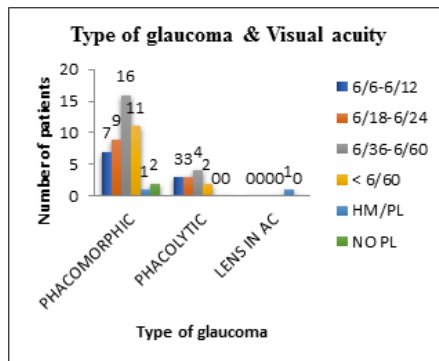


Chart 4- Final corrected visual acuity in relation to type of glaucoma.

- In our study the type of glaucoma had significant impact on visual outcome. (P value <0.001, Chi square test used). Phacomorphic glaucoma had poor visual outcome.

Final corrected visual acuity in relation to presenting intraocular pressure.

Table 7- Final corrected visual acuity in relation to presenting intraocular pressure.

| IOP (mm Hg) | VISUAL ACUITY | | | | | | Total |
|-------------|---------------|-------------|-----------|----------------|-------|-------|-------|
| | > 6/12 | 6/18 - 6/24 | 6/36-6/60 | Less Than 6/60 | PL/HM | No PL | |
| 21-30 | 4 | 5 | 3 | 2 | 0 | 0 | 14 |
| 31-40 | 4 | 2 | 6 | 0 | 1 | 1 | 14 |
| 41-50 | 1 | 2 | 4 | 3 | 0 | 1 | 11 |
| 5160 | 1 | 2 | 6 | 6 | 1 | 0 | 16 |
| > 60 | 0 | 1 | 1 | 2 | 0 | 0 | 4 |
| TOTAL | 10 | 12 | 20 | 13 | 2 | 2 | 59 |

Presenting intraocular pressure had significant impact on visual outcome (p value 0.04, Chi Square test used) Out of patients with intraocular pressure more than 50 mm Hg, 80% patients had visual outcome less than 6/36, in our study.

DISCUSSION

There is a cataract backlog of around 12 million in India, which is annually increasing at an estimated rate of 3.8 million. This huge backlog of ever-increasing cataract is due to increased life expectancy, rapidly growing ageing population and disparity between rate of new cases and rate of surgical removal. Thus, occurrence of Lens Induced Glaucoma in India has high probability. Also the illiteracy rate in socio-economic backward classes is significantly high who tend to ignore conditions like cataract.

Similar age and gender distribution was found by Dr. Jyoti Bhuyan et al⁷, Venkataratnam Peram et al (2015)⁹, Dr. Ch. Srinivasa Murthy et al (2015)⁹ and Dr. B. Ushalatha et al (2016)¹⁰ in their studies as was found in our study.

According to most of the studies, socio-economic and cultural constraints play a role leading to neglect and late presentation of cataract in females in region where the study was done. In our study we also found that these entities are more common in females because of socio-economic constraints.

In our study, it is seen that Phacomorphic glaucoma is more common variety. Results of our study are similar to other studies^{8,9,10,11} except for study done by Prajna et al.⁵

We observed that financial constraint was the most important reason for delay in approaching health care facilities. Lack of awareness regarding the condition, lack of transportation, ignorance by relatives to take these patients to health care services as these patients are old age and debilitated and less need for useful vision were other important reasons.

Our recordings of Intraocular pressure on admission were comparable to those found by other recent studies.^{8,9,10} and so was the finding that intumescent cataracts are responsible for lens induced glaucoma in majority of cases.

Maximum Indian studies preferred doing small incision cataract surgery including our study. Phacoemulsification is difficult in lens-induced glaucoma especially in phacomorphic because of the shallow chamber, iris prolapse, peripheral capsulorhexis tears and greater endothelial cell loss.^{6,12} Most of the studies preferred SICS (except Andreea Morarau) including our study for similar reasons.

The incidence of intra operative and post operative complications was similar to that of other studies.

A) INTRA OPERATIVE

- 1. PC rent with Vitreous loss^{5,8,9,12,13}

B) POST OPERATIVE

- 1. Corneal oedema^{8,11,12}
- 2. Hyphaema^{8,11}
- 3. Post op uveitis with pupillary membrane¹²
- 4. Post op shallow Anterior chamber:
- 5. Epithelial defect:

C) COMPLICATIONS OF LENS INDUCED GLAUCOMA:

- 1. Optic atrophy^{8,9,11,14}

We found that in combined surgery the visual outcome was poor because

- 1. Duration of disease more which resulted in optic atrophy.
- 2. Intra operative vitreous loss due to
 - a) Hypermaturity of cataract
 - b) Weak posterior capsule and zonules

- c) Compromised cornea, decreasing the visibility during surgery.

Our findings are comparable to Senthil et al¹⁵ whereas not in consensus with Angra et al⁴. We also observed that as the duration of disease increased visual recovery was poor as did many other recent studies.^{5,7,13,14,16} Other studies^{5,14} and our studies it can be stated that though all type of lens induced glaucoma had poor visual outcome, phacomorphic glaucoma had worse prognosis than phacolytic glaucoma due to early formation of peripheral anterior synechie and higher IOP levels.

From observations of our study and those of V Sree Kumaret al in 2018¹⁶, Anitha S et al¹³ and Dr Jyoti Bhuyan et al⁷ it can be concluded that high initial IOP significantly decreased chances of good visual recovery.

SUMMARY

Despite widespread availability of cataract management services, lens induced glaucoma is largely prevalent in India. Lens induced glaucoma converts curable disease into incurable emergency and decreases the chances of good visual recovery in a normal case of cataract. As our study proves that the visual recovery is remote if the treatment is prolonged. Thus, there is an urgent need to create awareness regarding cataract extraction surgeries before it reaches a stage of maturity, to prevent the problem of LiG.

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