

# Assessment of Risk Factors for Developing Phacomorphic Glaucoma

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## ABSTRACT

**Introduction:** Delay in the extraction of mature cataracts can result in Phacomorphic glaucoma. It is an acute secondary angle closure glaucoma caused by intumescent lens, most commonly. The present study was undertaken to know the incidence, risk factors of phacomorphic glaucoma.

**Material and Methods:** This is a prospective case-control study done in the year 2015 at Department of Ophthalmology, Government Medical college/Government General hospital, Ananthapuramu. Phacomorphic glaucoma was diagnosed by Intraocular Pressure of more than 21 mmHg, intumescent cataract with signs and symptoms of phacomorphic glaucoma, axial length and anterior chamber depth.

**Results:** The Mean Intra ocular pressure of phacomorphic glaucoma was 47.6±7.3 mmHg and of mature cataract was 15.2±8.5 mmHg. It was Light perception in phacomorphic glaucoma and Hand movement was observed mature cataract. The mean axial length was 22.8±1.12 among phacomorphic glaucoma, shorter than mature cataract, where the mean axial length was 23.6±2.13.

**Conclusion:** Screening of all elderly age group in communities is necessary to reduce the incidence of phacomorphic glaucoma and other lens induced glaucoma and also require regular follow-ups to achieve good prognosis by reducing IOP (Intra Ocular Pressure).

**Keywords:** Axial Length, Intra ocular Pressure, Phacomorphic Glaucoma.

## INTRODUCTION

Glaucoma is not as single disease process but a group of disorders characterized by a progressive optic neuropathy resulting in a characteristic appearance of the optic disc and specific pattern of irreversible visual field defects that are associated frequently but not invariably with raised Intraocular pressure.

Lens induced glaucomas may occur by different mechanisms.

1. Phacomorphic glaucoma is caused by intumescent lens it is a type of secondary angle closure glaucoma, which is most common type of lens.
2. Phakolytic glaucoma is a secondary open glaucoma in which lens proteins leaked in anterior chamber.
3. Phacotopic glaucoma in which hyper mature cataractous lens may subluxate.

Delay in the extraction of mature cataracts can result in Phacomorphic glaucoma. It is an acute secondary angle closure glaucoma caused by<sup>1-3</sup> 1. Intumescent lens i.e., swollen cataractous lens due to rapid maturation of cataract or sometimes following traumatic rupture of capsule, most common type. 2. Anterior subluxation or dislocation of lens and spherophakia. Swollen lens pushes the iris forward and obliterate the angle resulting in secondary acute angle closure glaucoma further the increased iridolenticular contact also causes potential pupillary block and iris bombe formation.<sup>4</sup>

Medical treatment to control IOP by IV mannitol. Systemic acetazolamide or topical B blockers are also effective to

decrease IOP. Laser iridotomy may be effective in breaking the angle closure attack, in turn reduce Intraocular Pressure. Cataract extraction with implantation of PCIOL (Posterior Chamber Intra ocular Lens) is the definite treatment.

In western countries incidence of phacomorphic glaucoma is less. 3.9% of all cataracts were phacomorphic glaucoma in India.<sup>5</sup> Incidence of Phacomorphic is glaucoma is high in developing countries, due to delay in the extraction of cataract or mature lens because people with low socioeconomic status cannot afford for the surgery, illiteracy and seeking medical advice is also less.

The present study was undertaken to know the incidence, risk factors of phacomorphic glaucoma.

## MATERIAL AND METHODS

This was a prospective case-control study done in the year 2015 at Department of Ophthalmology, Government Medical college/Government General hospital, Ananthapuramu. Ethical committee has approved to do this study and informed consent was taken from all the studied population.

A total of randomly selected 80 patients were evaluated to do this study and were divided into two groups:

**Group 1** - 40 patients were with phacomorphic glaucoma, considered as cases.

**Group 2** - 40 patients were with mature cataracts but without phacomorphic glaucoma, considered as controls. Controls were selected such that age and sex matches with cases.

Phacomorphic glaucoma was diagnosed by Intraocular Pressure of more than 21 mmHg, intumescent cataract with symptoms such as unilateral transient blurring of vision, colored halos around light, headache, brow ache and eye ache on the affected side, self termination of attack due to physiological miosis and signs as demonstration of deep anterior chamber open angle as identified by slit lamp examination. Those patients presented to OPD with features of phacomorphic glaucoma were considered as cases

A Mature cataract is defined as the stage where there is a complete opacification of lens i.e., whole of the cortex is involved. Lens become pearly white in color. Such a cataract is also labeled as 'ripe cataract'. Among controls patients with pre-ocular surgeries, any ocular tumors, ocular injuries were excluded from the study.

Details regarding all the studied population such as age, sex,

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socioeconomic status were entered into excel sheet. Cases and controls affected eyes were examined by measuring Intraocular Pressure, axial length, anterior chamber depth, Both eyes corrected visual acuity (BCVA).

Intra ocular Pressure (IOP) was measured using Goldman Applanation Tonometry, BCVA was assessed by using Snellen chart and Both Axial length and anterior chamber depth was measured using contact A-scan ultrasonography at this tertiary care hospital Axial length and anterior chamber depth was measured by two optometrists and an average of ten readings was considered.

## STATISTICAL ANALYSIS

Statistical analysis was done using Graph pad software, as the p value <0.05 were considered significant. Descriptive analysis was used to infer results.

## RESULTS

In this prospective study, 40 cases and 40 controls were considered with phacomorphic glaucoma and mature cataract without phacomorphic glaucoma respectively.

All the studied population were selected in the age group of 40-90 years. Cases and Control groups were considered such that M:F ratio was 1:1. The mean age of Group 1 was 68.8±5.2 and Group 2 was 69.4±3.05 (Table-1). Socioeconomic Status was analyzed by considering fathers education, income and occupation. Most of the patients were under upper lower (42.5%) followed by lower middle class (30%).

On BCVA assessment using Snellen chart shown poorer visual acuity among phacomorphic glaucoma (Group 1) when compared to mature cataract (Group 2). It was Light perception among Group 1 and Hand movement was observed in Group 2. Axial length and Anterior Chamber Depth were lesser in Phacomorphic Glaucoma when compared to Mature cataract (Table-2). Axial length was statistical significance in between group 1 and 2. There was no statistical significant difference of Anterior chamber depth between phacomorphic glaucoma and mature cataract.

## DISCUSSION

Phacomorphic glaucoma is a type of lens induced glaucoma,

where its pathophysiology is secondary angle closure glaucoma that may occur as result of hyper mature cataract formation. Gifford has recommended before cataracts changes to hypermature, early extraction of lens is needed.<sup>6</sup>

Risk factors responsible for phacomorphic Glaucoma are age above 60 years<sup>4,7</sup>, female gender<sup>7,8</sup>, Axial length <23.7 mm<sup>3</sup>, narrow anterior chamber.<sup>9</sup>

In the present study the mean age of Group 1 was 68.8±5.2 and Group 2 was 69.4±3.05. Most of the patients were under upper lower (42.5%) followed by lower middle class (30%). Lee JW et al<sup>4</sup> observed the incidence of Phacomorphic glaucoma is more in above 60 years age group and female gender, as in correlation with the present study. Low Socioeconomic group people are predominantly affected by Phacomorphic glaucoma.<sup>11,2</sup>

The Mean Intra ocular pressure of Phacomorphic glaucoma was 47.6±7.3 mmHg and of mature cataract was 15.2±8.5 mmHg in this study. Diagnosis of glaucoma mainly by IOP measurement above 21 mmHg<sup>12</sup>, whereas average of presenting is above 40 mmHg.<sup>1,13</sup> Gonioscopy is a good diagnostic method for the diagnosis of Phacomorphic glaucoma, but it should not use in the presence of corneal edema from the acute IOP elevation.<sup>1</sup> Lee JW et al<sup>4</sup> observed that the mean IOP among Phacomorphic glaucoma was 49.5±11.8 mmHg and among control eyes were 16.7±1.7 mmHg.

On BCVA assessment using Snellen chart shown poorer visual acuity among Phacomorphic glaucoma (Group 1) when compared to mature cataract (Group 2). It was Light perception among Phacomorphic glaucoma patients and Hand movement was observed in mature cataracts without phacomorphic glaucoma as per this study. Visual acuity among Phacomorphic glaucoma in this study is similar to Lee JW et al<sup>4</sup> documented as there is poor vision between acute attack and dense cataract, averaging light perception only.

In this study Axial length and Anterior Chamber Depth were lesser in Phacomorphic Glaucoma when compared to Mature cataract. Axial length was statistical significance in between group 1 and 2. There was no statistical significant difference of Anterior chamber depth between phacomorphic glaucoma and mature cataract. Lee SJ et al<sup>1</sup> reported that anterior chamber depth is less than 2mm. IN contrast the study Tomey KF et al<sup>14</sup> documented that Either shallow or deep anterior chamber cause phacomorphic glaucoma. Short axial length in relation to primary angle closure glaucoma, like short axial length decreases while the risk of primary angle closure gets doubled.<sup>14</sup> It is supported by many studies.<sup>15,4</sup>

Main treatment of Phacomorphic glaucoma is by extraction of cataractous lens. Treatment is the main goal to reduce the IOP, which in turn eliminates the symptoms related to Glaucoma. Surgical treatment may delay in such conditions where there is an acute attack presenting with corneal edema and High IOP. In such conditions need to stabilize the eye by medical treatment, later can go with removal of cataractous lens. Medical treatment includes Beta blockers, alpha -agonists and carbonic anhydrase inhibitors.<sup>16</sup> Argon Laser Peripheral Iridoplasty also can be used

| Characteristics   | Group 1 (n=40) | Group 2 (n=40) |
|---|----------------|----------------|
| Age   | 68.8±5.2       | 69.4±3.05      |
| Sex   |                |                |
| Males   | 14             | 14             |
| Females   | 26             | 26             |
| Socioeconomic status (Modified Kuppuswamy's Classification) |                |                |
| Upper   | 0              | 0              |
| Upper Middle  | 2              | 5%             |
| Middle/Lower Middle   | 9              | 22.5%          |
| Upper Lower   | 17             | 42.5%          |
| Lower   | 12             | 30%            |
| Intra Ocular Pressure                                       | 47.6±7.3 mmHg  | 15.2±8.5 mmHg  |

**Table-1:** Various Demographic features of studied population

| Features               | Group 1   | Group 2   | p value | Significance |
|------------------------|-----------|-----------|---------|--------------|
| Axial Length           | 22.8±1.12 | 23.6±2.13 | 0.0387  | SS           |
| Anterior Chamber depth | 2.35±1.9  | 2.84±2.3  | 0.6674  | NSS          |

**Table-2:** Axial length and Anterior Chamber depth (ACD) among both groups

to reduce IOP, has few side effects than oral or intravenous acetazolamide and hyperosmotics.<sup>17</sup> Before cataract extraction needs to reduce the IOP by using Intravenous mannitol.<sup>7,18</sup>

## CONCLUSION

Phacomorphic glaucoma usually results in elderly age, short axial length or shallow anterior chamber individuals. Raise in Intraocular Pressure is the one responsible for symptoms. Axial length measurement is a easy predictor for diagnosing phacomorphic glaucoma.

Health education in community regarding complications of cataractous lens will avoid them facing problems due to phacomorphic glaucoma. Many organizations are conducting free camps for extraction of cataract, which is a definite treatment for phacomorphic glaucoma. Screening of all elderly age group in communities is necessary to reduce the incidence of phacomorphic glaucoma and other lens induced glaucoma and also require regular follow-ups to achieve good prognosis by reducing IOP.

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