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Original Research Article

Management and visual outcome in patients of phacolytic glaucoma at a tertiary eye care hospital

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ABSTRACT

Background: Phacolytic glaucoma is one of the commonest cause of secondary glaucoma due to senile cataracts. This study was conducted to evaluate the visual outcome of phacolytic glaucoma.
Objectives: 1. To study the management of phacolytic glaucoma; 2. To study the visual outcome after planned manual SICS.
Materials and Methods: Participants were 30 patients in a tertiary eye care hospital for both urban and rural population diagnosed as phacolytic glaucoma. Demographic data, duration of the symptoms, IOP of the patients before presenting to the hospital were noted. Patient underwent Manual SICS with PCIOL implantation after the control of intraocular pressure and inflammation. The data was analyzed by simple statistical methods.
Results: Mean age of the patients was 61.63 yrs. Female to male ratio was 1.8:1. Duration of the presenting symptoms before reporting to the hospital was <1 week in 16 (53%), 1-2 week in 11 (37%) and >2 week in 3 (10%). Mean IOP was 40.7mmHg preoperatively. Visual Acuity was perception of light in 16 (53.33%) and hand movements in 14 (46.66%) preoperatively. Postoperative visual acuity at 6 weeks was 6/6-6/12 in 19(63.33),6/18-6/60 in 8 (27%), <6/60 in 3 (10). Following surgery 28 of 30 eyes (93.33%) had IOP less than 21 mmHg at discharge. Fellow eye showed pseudophakia in 18 (60%), immature cataract in 12 (40%).
Conclusions: Cataract surgery proves to be effective in lowering the intraocular pressure and visual recovery in phacolytic glaucoma.

1. Introduction

Lens induced glaucoma (LIG) occurs commonly in India. It is a secondary glaucoma due to elevated intraocular pressure affecting the function of optic nerve by cataractous lens and abnormalities of lens[1]. It can develop either through open angle or closed angle mechanisms. This is one of the important and common cause of blindness in developing countries.[1,2]

India being a developing country, causes of blindness will be different from developed countries. There are 10 million (37 million in world) blind people in India today out of which 80 percent can be completely cured if taken care in time.[2] Cataract is the most important cause of preventable blindness in India accounting for upto 63.7 percent.[1–4] Refractive errors and glaucoma being the second and third respectively.

With a cataract backlog of around 12 million and annually increasing at an estimated rate of 3.8 million,[2] the occurrence of lens induced glaucoma (LIG) is a frequent event in India, due to the population explosion, increased life expectancy and low productivity in terms of utilization of the available surgical services.

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Though lot of public health initiatives have come up, the occurrences of lens induced glaucoma shows that there is still need for more awareness regarding the disease entity. Ignorance is the major cause in our country for not seeking medical help at appropriate time. This can be battled with more intense campaigning and awareness regarding the disease.

While the cataract process is quite slow, once a lens become hypermature, phacolysis can develop rapidly. When prolonged over a week or month it may lead to irreversible tissue damage. Phacolytic glaucoma may worsen the visual prognosis, which depends on the effect of glaucoma on optic nerve and the visual acuity and the time interval between the onset and treatment.[5] Hence detailed knowledge of phacolytic glaucoma is necessary for early diagnosis and effective management to reduce ocular morbidity and blindness.

Much studies have been done on visual outcome in lens induced glaucoma and have shown that cataract extraction done as early as possible in such cases can give better visual prognosis. Lens extraction with IOL implantation has shown to be successful in such cases with guarded vision prognosis.[6–12]

Our hospital being a tertiary eye care centre covers a large population, and hence gets referral from various primary health centers. So, this study is conducted to analyse the clinical presentation, management and what best measures can be taken to minimize intraoperative and postoperative complications of phacolytic glaucoma.[13–19]

2. Objectives

1. To study the management of phacolytic glaucoma
2. To study the visual outcome after planned manual SICS.

3. Materials and Methods

The study was carried out from November2017- May 2019 in the department of Ophthalmology at a tertiary care centre.

Study design: Hospital based prospective study.

Sample size: Based on previous study of M Sharanabasamma et al.[20]

The sample size calculated is: n = $Z\alpha 2\sigma 2/d2$

Where $Z\alpha$=1.96

σ =6.91

d=2.5

n= (1.96)2(6.91)2/(2.5)2

n=30

A careful and detailed history was elicited from the patient with respect to age, sex, symptoms and duration.

Detailed examination which includes:

1. Recording of Visual acuity.
2. Measurement of IOP was done by Goldmann Applanation tonometry.
3. Gonioscopy was done using single or three mirror Goldmann Goniolenses and grading of angle done according to Shaffers grading whenever possible.
4. Examination of Anterior segment by slit lamp biomicroscopy was done to look for corneal edema, anterior chamber depth and reaction and lens status.
5. Examination of Posterior segment by direct and indirect ophthalmoscopy using +20D and +90 D Biomicroscopy.
6. B scan was done in all cases as fundal glow was not present/media was hazy.

Cases diagnosed as phacolytic glaucoma were admitted and intra ocular pressure controlled with medical management.

3.1. Pre-operative management

All the admitted cases were given 100 ml of intravenous Mannitol 20% under monitoring. Patients were started on oral Acetazolamide 250mg tid/ qid, along with topical antibiotic steroids and topical antiglaucoma medication. After getting basic blood investigations like HIV, HbSAg, RBS and confirming sac patency, consent taken for cataract extraction and IOL implantation under guarded vision prognosis. Patients were started on systemic antibiotics Oral Ciprofloxacin 500mg bd as prophylaxis.[21–24]

All the cases underwent cataract extraction (SICS) under peribulbar anaesthesia. Capsulorrhexis was tried in all the cases and converted to capsulotomy when there was difficulty due to run away of rhexis due to thin lens capsule. Thorough cortical wash was given in all the cases to clean up angles and prevent IOP rise post operatively. 3 cases were left aphakic due to PC rent. Remaining cases underwent rigid PCIOL implantation. Post operatively, visual acuity testing, detailed slit lamp examination and IOP measurement was done on all the patients. Patients were started on antibiotic steroid hourly with cycloplegics bd. Oral steroids was started in cases of severe reaction and hypopyon. Patients underwent follow up for day1, day 7 and at 6 weeks for visual acuity, IOP and fundus examination. Data was entered in MS excel spreadsheet and analyzed using IBM SPSS version 24.0 software. P value less than 0.5 was considered significant.

3.2. Method of statistical analysis

Results will be presented as descriptive statistics in the form of mean/proportion and percentage and possible associations will be derived by using suitable parametric and nonparametric tests of significance.

Results will be presented as tables, charts and figures as applicable.

Proportions were compared using Chi-square test of significance.

4. Results

Table 1: Age distribution

Age in years	45-55	56-65	66-75	>75
Males	2	4	4	0
Females	7	4	8	1
Total	9	8	12	1

In our study mean age of presentation in phacolytic glaucoma was 61.63years ± 9.45 ranging from 45 years to 78 years. Most frequent age group was 66 to 75 years.Table 1

Table 2: Sex distribution

Sex	Number of cases	Percentage
Male	10	33
Female	20	67
Total	30	100

In our study female constituted 67% while males were 33%. Female to male ratio was 1.8:1.Table 2

Table 3: Eye affected

Eye affected	Number of cases	Percentage
RE	12	40
LE	28	60
Total	30	100

In our study, right eye was affected in 12 (40%) of cases and left eye in 18 (60%).Table 3

Table 4: Duration of symptoms

Duration (weeks)	No. of patients	Percentage
< 1 week	16	53
1-2 week	11	37
> 2 week	3	10
Total	30	100

In our study out of 30 cases, 16 cases (53%) presented within the first week, 11 cases (37%) within second week and rest presented within 3 weeks after development of symptoms.Table 4

Table 5: Condition of the other eye

Condition of the other eye	Number of cases	Percentage
Normal	00	00
Immature/Mature Cataract	12	40
Pseudophakia	18	60
Total	30	100

In our study, it was observed that about 18 cases (60%) were pseudophakic in the other eye. About 12 cases (40%) had cataractous lens in the other eye.Table 5

Table 6: Vision in other eye

BCVA	Number of cases	Percentage
6/6 – 6/12	09	30
6/18 – 6/60	15	50
< 6/60	06	20

Overall 24 cases (80%) had vision in other eye between 6/6 - 6/60 while the remaining 6 cases had vision < 6/60 in other eye.Table 6

Table 7: Pre-operative IOP

Pre-Op IOP	Number of cases	Percentage
22 – 30	04	13
31 – 40	9	30
> 40	17	57

A total of 4 cases (13%) presented with IOP less than 30 mmHg,9 cases (30%) presented with IOP between 30-40 mmHg. 17 cases (57%) presented with IOP more than 40 mmHg. A minimum value of 24 mmHg and maximum of 52 mmHg was recorded. Most frequent IOP was in the range of 42-50 mmHg.Table 7

Table 8: Distribution of surgical procedure

Surgical Procedure	Total	Percentage
SICS + PCIOL	22	73
SICS	3	10
SICS+PCIOL+PI	3	10
SICS+ACIOL+PI	2	7

In the study, most of them underwent SICS + PCIOL (73%). In 10% of cases SICS +PCIOL+ PI was done and in 3 cases (10%) of cases plain lens extraction was done and was later planned for SFIOL implantation.Table 8

Table 9: BCVA AT POST-OP D1, D7 & 6^{th} week

Duration	6/6 - 6/12 (%)	6/18 - 6/60 (%)	< 6/60 (%)
Day 1	1 (3.33)	13 (43.33)	16 (53.33)
Day 7	10 (33.3)	14 (47)	6 (20)
6 week	19 (63.33)	8 (27)	3 (10)

Out of 30 cases, on postoperative day 1, 16 cases (53%) had vision<6/60 and 13 (43%) had vision 6/18-6/60 . On follow up on 6 th week, 19 cases (63%) hadBCVA6/6-6/12,8 cases (27%) had vision 6/18-6/60 and 3 (10%) had vision<6/60.Table 9

Out of 16 cases (53%) who presented within 1 week, 6 cases (37%) had visual acuity 6/18-6/60, while 9 cases (56%) had vision<6/60 and remaining one case had vision 6/6-6/12. 11 cases who presented within 1-2 week ,7 cases (67%) had vision6/18-6/60 and 4 cases had vision<6/60. All 3 cases who presented after 2 weeks had vision<6/60.Table 10

Table 10: Duration of symptoms & final BCVA

Duration	6/6 - 6/12(%)	6/18 - 6/60(%)	< 6/60(%)
< 1 week	1 (6.25)	6 (37.50)	9 (56.25)
1 – 2 week	0	7 (67)	4 (37)
> 2 week	0	0	3 (100)
Total	1 (3.33)	13 (43.33)	16 (53.33)

Table 11: Distribution of cases as per IOP

IOP	10-20 mmHg	21-30 mmHg	31-40 mmHg	>40 mmHg
Pre-op IOP	0	3	10	17
Post-op IOP	28	2	0	0
Final IOP	29	1	0	0

In the study, mean IOP preoperatively was 40.7mmHg ± 5.34, and final IOP post-operatively was 15.96 mmHg ± 1.75. Most of them 97% of cases had IOP between 10-21mmHg post-operatively.Table 11

Table 12: Pre-operative IOP & final BCVA

Preop IOP (In mmHg)	6/6 - 6/12 (%)	6/18 - 6/60 (%)	< 6/60 (%)
22 – 30	4 (13.33)	0	0
31 – 40	10 (33.33)	2 (6.66)	0
> 40	5 (16.66)	6 (20)	3 (10)

Out of the cases 4 who presented with IOP less than 30 mmHg had good BCVA at the end of 6 week. Out of 12 cases presented with IOP between 30-40 mmHg, 10 cases (33%) had good visual acuity while 2 (7%) had fairly useful vision. Out of 14 cases presented with IOP more than 40 mmHg, 5 cases (17%) had good vision, 8 (27%) had fairly useful vision and 3(10%) had poor vision.Table 12

Table 13: Correlation of IOP at presentation with final post OP BCVA AT 6^{th} week

Baseline IOP	6/6-6/18	6/6-6/24	< 6/60	Total	X^2 value	P value
< 40	14	2	0	16	9.17	0.0102
	87.5 %	12.5 %	0	100%		
> 40	5	6	3	14		
	37.71%	42.85%	21.42 %	100%		

In the study, BCVA post operatively was better than 6/60 in 16 cases who presented with IOP less 40mmHg and who presented with IOP of more than 40mmHg, poor vision of less than 6/60 was seen in 3 cases.Table 13

5. Discussion

Lens induced glaucoma is a common occurrence in India. The population explosion with an increased life expectancy causing increasing backlog of cataract cases, an expanding aging population and suboptimal utilization of the available cataract surgical services by the rural community lead to an increase in phacolytic glaucoma especially in areas with a poor access to medical care.[25–27]

All the 30 patients were managed by manual SICS after the control of preoperative IOP and inflammation. There was a decline in the IOP of all cases after surgery along with reduction of inflammation by first week.

In the study, mean age of presentation in phacolytic glaucoma was 61.63 years ± 9.45 ranging from 45 years to 78 years. The females were affected more than males with a ratio of 1.8:1, which could be due to the social and cultural constraints. This shows that there is a need for awareness in the population so that females also receive early cataract treatment.[28–30]

In our study most of the patients had visual acuity with perception of light (53%) and hand movements at the time of presentation (47%). All patients presented with symptoms of progressive decrease in vision, followed by an acute onset of redness, pain and watering in the affected eye with a mean of duration 1-2 days. Out of 30 cases, 16 cases(53%) presented within the first week,11 cases(37%) within second week and rest presented within 3 weeks after development of symptoms. This shows that even though patients had diminution of vision for about a year, they presented to us after they developed acute symptoms. This is due to lack of awareness about cataract surgery, complication related to delayed treatment, inability to access health care and status of fellow eye. In our study 60% of patients were pseudophakic in the fellow eye. This could have made patients reluctant to seek treatment in affected eye as they could manage with the fellow pseudophakic eye.

In our study, a total of 4 cases (13%) presented with IOP less than 30 mmHg, 9 cases (30%) presented with IOP between 30-40 mmHg. Rest of the cases (57%) presented with IOP more than 40 mmHg. In our study, mean IOP preoperatively was 40.7mmHg ± 5.34. A minimum IOP of 24 mmHg and maximum of 52 mmHg was recorded. Most frequent IOP was in the range of 46 – 50mmHg. Intra ocular pressure was controlled with intravenous mannitol and oral acetazolamide. Our study showed that many patients had IOP more than 30mmHg which suggests that patients develop acute symptoms after IOP is more than 30mmHg in such cases.[31–33]

In our study 73% (22) cases successfully underwent SICS with PCIOL implantation and in 10% (3) cases surgical peripheral iridectomy was done to augment IOP control while other 3 cases were taken up for SFIOL implantation at a later date. While 7%(2) cases was having anterior chamber IOL implantation with surgical peripheral iridectomy due to posterior capsule rent and vitreous loss.

In our study, BCVA was better 6/6-6/12 in 63% of patients6/18– 6/60 in 27% of patients and 3 % had BCVA

less than 6/60. Out of 30 patients,16 patients presented to us within 1 week of onset of symptoms,6 cases had visual acuity between 6/6-6/12, 9 cases had visual acuity between 6/18-6/60, 1 had visual acuity less than 6/60. Out of 30 patients, 3 patients who came after 2 week of onset of symptoms had poor visual acuity of less than 6/60.

In our study, 16 cases who presented with IOP <40 mmHg had good visual acuity, while 14 cases who came with IOP >40 mmHg, 11 cases had good visual acuity and only 3 cases had poor vision as compared to others. The correlation between height of IOP and visual outcome was significant both clinically and statistically. In the study mean IOP preoperatively was 40.7 mmHg. Mean final IOP post operatively was 15.96 mmHg± 1.75. Most of them, 97% of cases had IOP between 10-21 mmHg. This indicates that in phacolytic glaucoma IOP should be reduced by medical line of treatment preoperatively to as normal as possible, so as to achieve normal IOP postoperatively with no further antiglaucoma medication.

6. Conclusion

Our study demonstrated that phacolytic glaucoma is still a challenging complication of cataract which can be prevented by early treatment of cataract. It was more common in the age group of 66-75 years. Our study showed that the condition is more common in females and pseudophakics. Good visual acuity can be achieved in phacolytic glaucoma patients presenting within two weeks, with IOP <40 mmHg and with meticulous control of intraocular pressure and inflammation with medication preoperatively. Medical management of IOP with intravenous and oral anti glaucoma medication to reduce IOP pre-operatively is important to reduce intra operative complications. Most of the cases had better visual acuity after SICS in phacolytic glaucoma and IOP came to control immediately after surgery. This shows that, SICS with PCIOL implantation is an effective method in the management of phacolytic glaucoma with a good postoperative visual outcome and postoperative IOP control.

7. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

8. Source of Funding

None.

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