MRIMS Journal of Health Sciences 2018;6(1) pISSN: 2321-7006, eISSN: 2321-7294
http://www.mrimsjournal.com/

Original Article

A study of visual outcome of phacomorphic glaucoma

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Abstract:

Background: Lens induced glaucoma are phacomorphic (closed angle) or phacolytic (open angle). Its definitive treatment after the control of the high intraocular pressure and inflammation is cataract extraction alone or combined with a filtration surgery.
Objective: To evaluate the Visual outcome of Phacomorphic Glaucoma, a common cause of ocular morbidity.
Methods: Participants were Seventy two patients in a tertiary care hospital for both urban and rural population. Seventy two eyes of patients clinically diagnosed as Phacomorphic Glaucoma were treated. Demographic data and the Duration of the symptoms before presenting to the hospital were noted. Intraocular pressure and Visual Acuity were recorded preoperatively and postoperatively. Small Incision cataract surgery with posterior chamber intraocular lens (PCIOL) implantation was done after the control of intraocular pressure. Postoperative complications were noted. The data was analyzed by simple statistical methods.
Results: Mean age was 61.6 yrs. RE in 38 (52.7%) and LE in 34 (47.3%) were involved. 53 (73.6%) were Rural and 19 (26.4%) were Urban. Duration of the presenting symptoms before reporting of the patients to the hospital was < 1wk. in 44 (61.1%) with 6 (8.4%) within 48 hrs and 38 (52.7%) after 48 hrs - < 1 wk. and > 1 wk. in 28 (38.9%). The Mean IOP was 46.3 mmHg preoperatively and 13.5 mmHg postoperatively. Visual Acuity preoperatively was PL doubtful in 9 (12.5%), PL + ve in 46 (63.8%) and HM - < 3/60 in 17 (23.6%) and postoperatively was <6/60 in 17 (22.2%) and >6/60 in 56 (77.8%). Postoperative complications were Striate Keratopathy in 11 (15.3%), Anterior Uveitis with membrane on IOL in 5 (6.9%), posterior capsular tear in 5 (6.9%) and Zonular dialysis in 5 (6.9%).
Conclusion: This study showed that the effective control of preoperative IOP and inflammation was important for a better visual outcome.
Key words: Phacomorphic Glaucoma, Lens Induced Glaucoma, Senile Cortical Cataract, Intraocular pressure, Visual outcome

Introduction:

In India, with 20 million blind people, 80.0% of the blindness is due to preventable causes. The Lens induced secondary glaucoma, is common in India due to an increase of about 3.8 million cataract cases annually and also with a cataract backlog of about 12 million due to the incidence of cataract cases more than the total number of surgeries done currently. There are about 11.2 million with glaucoma in the age group above 40 yrs, in which the secondary glaucoma could affect 2.28 million. [1 – 4]

Lens Induced Glaucoma, is characterized clinically by (i) an acute secondary closed or open angle glaucoma in one eye with senile cortical cataract usually mature or hyper-mature (rarely immature) (ii) normal intraocular pressure and open angle in other eye and (iii) visual recovery with relief of symptoms and signs after cataract extraction in the affected eye. So, Lens induced glaucoma are phacomorphic (closed angle) or phacolytic (open angle). Its definitive treatment after the control of the high intraocular pressure and inflammation is cataract extraction alone or combined with a filtration surgery. Whatever is the surgical approach, the visual recovery remains guarded? [5 – 10]

In India, Phacomorphic glaucoma is common due to delayed cataract extraction because of socioeconomic problems and also to the general misbelieve that cataract must be mature at the time of surgery to avoid complications. [11] In India, the incidence of phacomorphic glaucoma due to an intumescent senile cortical cataract is more when compared to Europeans. The cataract in our population develops sudden hydration and intumescence in contrast to the Europeans due to the reasons unknown. [12] This study was to evaluate the visual outcome of phacomorphic glaucoma after the control of preoperative IOP and inflammation

Material and Methods:

This was a tertiary hospital study in the Glaucoma dept., Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Osmania Medical College (Govt.) Hyderabad over a period from Feb. 2015 to Jan. 2016. The study group included 72 eyes of Patients clinically diagnosed as Phacomorphic Glaucoma. The study was approved by our

institute ethical committee with the informed consent from all the study group patients.

Methodology:

Senile cataract patients with the symptoms of pain, redness and visual deterioration with a raised intraocular pressure were included. Primary open or narrow angle glaucoma, secondary glaucoma due to posterior segment pathology associated with Senile Cortical cataract, congenital cataract, secondary cataract, traumatic cataract and complicated cataract were excluded.

Demographic data and Clinical history with duration of the symptoms were taken. A Complete clinical examination of both eyes with slit lamp biomicroscopy, Visual acuity by Snellens chart, intraocular pressure measurement by Goldman's applanation tonometer, angle of anterior chamber by Gonioscopy and B scan to exclude the posterior segment pathology was done. Visual acuity and tonometry were repeated postoperatively at 6 - 8 wks.

Phacomorphic glaucoma was diagnosed by the complaints of pain and redness with the presence of corneal edema, shallow anterior chamber, an intumescent cataractous lens and intraocular pressure > 21 mmHg. Intraocular pressure (IOP) was controlled with 20.0% intravenous Mannitol, Acetazolamide 250 mg orally 3 times a day and topical Timolol maleate 0.5% 2 times a day. Topical dexamethasone 0.1% 4 times a day was given to reduce inflammation. Once the intraocular pressure was controlled and the corneal edema was subsided, all the patients were subjected to cataract surgery with posterior chamber IOL implantation under peribulbar anesthesia after explanation of relatively guarded prognosis. The technique was Small Incision Cataract Surgery (SICS). The follow-up was done at 7 days and 6 - 8 weeks in the outpatient Glaucoma clinic. Post operatively topical steroid for 6 – 8 weeks and an antibiotic for 1 week were given. During the follow-up at 6 – 8 weeks visual acuity and tonometry were repeated. Post operative complications were noted. Postoperative IOP of < 21mm Hg without the need for any anti-glaucoma drugs was taken as good IOP control. Best corrected visual acuity of <6/60 at postoperative 6 - 8 weeks was taken as poor visual outcome. All the data was analyzed by simple statistical methods.

Results:

The study group was 72 eyes of patients clinically diagnosed as Phacomorphic Glaucoma.

Table 1: Age and Sex Distribution

Age (years)	Male	Female	Total	%
41-50	0	8	8	11.1
51-60	10	18	28	38.9
61-70	11	21	32	44.5
> 70	1	3	4	5.5
Total	22 (30.6%)	50 (69.4%)	72	100
Mean age	61.6 years			

Age group distribution was 8 (11.1%) in 40 – 50 yrs, 28 (38.9%) in > 50 – 60 yrs, 32 (44.5%) in > 60 – 70 yrs and 4 (5.5%) in > 70 yrs. Sex distribution was 22 (30.6%) of Males and 50 (69.2%) of Females. Mean age was 61.6 yrs.

Table 2 – Laterality Distribution

Laterality	Male	Female	Total	%
RE	11	27	38	52.7
LE	11	23	34	47.3
Total	22 (30.6%)	50 (69.4%)	72	100

Laterality was RE in 38 (52.7%) and LE in 34 (47.3%).

Table 3- Rural / Urban status

Residence	Male	Female	Total	%
Rural	13	40	53	73.6
Urban	9	10	19	26.4
Total	22 (30.6%)	50 (69.4%)	72	100

Rural / Urban status was 53(73.6%) rural and 19 (26.4%) Urban

Table 4: Duration of the Presenting Symptoms at the time of reporting to the Hospital

Duration		Number	Percentage	Total	%
< 1 week	48 hours	6	8.4	44	61.1
	49 hours to 1 week	38	52.7		
> 1 week	1-2 weeks	17	23.6	28	38.9
	> 2 weeks	11	15.3		
Total		72	100	72	100

Duration of the presenting symptoms before reporting of the patients to the hospital was
< 1 wk. in 44 (61.1%) with 6 (8.4%) within 48 hrs and 38 (52.7%) after 48 hrs - < 1 wk. and > 1 wk. in 28 (38.9%) with 17 (23.6%) in > 1- 2 wks. and >2 wks. in 11 (15.3%).

Table 5: Intraocular Pressure (IOP) in mmHg

Range	Per-operative		Post operative at 6-8 weeks	
	Number	%	Number	%
< 20	0	0	61	84.7
20-30	7	9.7	7	9.7
30-40	19	26.4	2	0
40-50	23	31.9	2	2.8
50-60	12	16.7	0	0
60-70	11	15.3	0	0
Total	72	100	72	100
Mean IOP	46.3 mmHg		13.5 mmHg	

Preoperatively IOP was 20- 30 mm Hg in 7(9.7%), >30 – 40 mm HG in 19 (26.4%), >40 – 50 mm Hg in 23 (31.9%), >50- 60 mm Hg in 12 (16.7%) and >60 -70 mm HG in 11 (15.3%). Postoperatively IOP was < 20 mm Hg in 61 (84.7%) and >20 – 30 mmHg in 7 (9.7%), >30-40 mmHg in 2 (2.8%) and >40-50 mmHg in 2 (2.8%). Mean IOP was 46.3 mm Hg pre operatively and 13.5 mmHg postoperatively.

Table 6: Visual Acuity (VA)

Snellens VA		Pre-operative				Post operative at 6-8 weeks			
		No.	%	Total	%	No.	%	Total	%
< 6/60	PL doubtful	9	12.5	72	100	0	0	16	22.2
	PL +ve	46	63.8			0	0		
	HM < 3/60	17	23.6			5	6.9		
	3/6- - < 6/60	0	0			11	15.3		
> 6/60	6/60 - < 6/60	0	0	00	00	39	54.2	56	77.8
	6/18 – 6/6	0	0			17	23.6		
TOTAL				72	100			72	100

Preoperatively Visual Acuity was PL doubtful in 9 (12.5%), PL + ve in 46 (63.8%) and HM - < 3/60 in 17 (23.6%)). Postoperatively at 6-8 wks. Visual Acuity was 6/6 – 6/18 in 17 (23.6 %), <6/18 – 6/60 in 39 (54.2 %), <6/60 – 3/60 in 11 (15.3%) and <3/60 - HM in 5(6.9 %).
So, postoperative Visual Acuity was <6/60 in 16 (22.2%) and >6/60 in 56 (77.8%).

Table 7: Post-Operative Complications

Complications	No.	%
Striate Keratopathy	11	15.3
Anterior Uveitis (with membrane on IOL)	5	6.9
Posterior Capsular Tear	5	6.9
Zonular Dialysis	5	6.9

Postoperative complications were Striate Keratopathy in 11 (15.3%), Anterior Uveitis with membrane on IOL in 5 (6.9%), posterior capsular tear in 5 (6.9%) and Zonular dialysis in 5 (6.9%).

Discussion:

Lens induced glaucoma develops when a senile cortical cataract becomes mature or hyper mature. Delayed treatment of senile cortical cataract leads to Lens Induced secondary Glaucoma. Though is preventable and curable; it is still prevalent in India, in spite of the easy available cataract surgical services under the National Programme for Control of Blindness (NPCB). [1 – 4] Phacomorphic glaucoma is acute secondary angle closure glaucoma with pupillary block and angle closure due to an intumescent lens resulting from sudden hydration in the development of senile cortical cataract, characterized by the symptoms of severe pain, diminished vision, colored halos, nausea and vomiting. Cataract extraction is the only definitive treatment for an intumescent cataract. [8 – 10]

Age group distribution was 11.1% in 40 – 50 yrs, 38.9% in >50 – 60 yrs, 44.5% in >60 – 70 yrs and 5.5% in > 70 yrs. Mean age of 61.6 yrs was compared to R Ramakrishnan et al (13) of 66.61 yrs, Mohindar Singh et al [14] of 64.5 yrs, Prajna et al [15] of 62 yrs, and Jain IS et al [16] of 62.5 yrs. Sex distribution of 69.2% of Females and 30.6% of Males with a female to male ratio of 2.3:1 was compared to Ramakrishnan et al [13] 70.0% Females and 30.0% Males, Mohindar Singh et al [14] 59.0% Females and 41.0% Males, Prajna et al [15] 54.0% females and 46.0% males and Jain IS et al [16] 53.5% females and 46.5% males. Our study correlates with the other studies that the age after 60 yrs and females were commonly affected, because of the socio-economic and cultural factors.
Laterality was RE in 38 (52.7%) and LE in 34 (47.3%).
Rural / Urban status was of 53 rural and 19 Urban.
Duration of the presenting symptoms before reporting of the patients to the hospital was
< 1 wk in 61.1% with 8.4% within 48 hrs and 52.7% after 48 hrs - < 1 wk and > 1 wk in 38.9% This was compared to Ramakrishnan et al (13) of 82.0% within 10 days, 16.0% in 11 -20 days and 1.0% in 21-30 days and Mohindar Singh et al (14) of 16.0% in < 48 hours, 58.5% in 3- 5 days and 17% in > a week. Our study correlates with the other studies that there was a delayed reporting of the patients to the hospital after the presenting symptoms. This may be due to the reasons of 1) poor vision acceptance as a part of aging, fear of surgery and socioeconomic problems 2) people taking local indigenous drugs for the symptoms and reporting to the hospital only when the symptoms become worse and 3) the elderly persons are left to their own fate as no one takes care to bring them to the hospital.
Visual Acuity at clinical presentation was PL doubtful in 12.5%, PL + ve in 63.8% and HM - < 3/60 in 23.6%. This was compared to Ramakrishnan et al (13) of PL +ve in 89.0% and PL doubtful in 10.0%, Mohindar Singh et al (14) of PL +ve in 90.0% and PL doubtful in 5.0% and Jain IS et al (14) of PL +ve in 67.5% and PL doubtful in 32.5%. PL +ve were the visual acuity in the clinical presentation in majority of the cases of our study and other studies.
Preoperative Intraocular pressure (mmHg) was 20- 30 mm Hg in 9.7%, >30 – 40 mm HG in 26.4%, >40 – 50 mm Hg in 31.9%, >50- 60 mm Hg in 16.7% and >60 -70 mm HG in 15.3%. This was compared to Ramakrishnan et al (13) of 25 – 40 mmHg in 58.0%, 41 – 55 mmHg in 36.0% and 56 – 70 mmHg in 4.0%. Our study mean IOP of 46.3 mmHg was compared to Ramakrishnan et al (13) of 38.4 mmHg, Mohindar Singh et al (14) of 44.0 mm Hg, Prajna NV et al (15) of 45.0 mmHg and Jain IS et al (16) of 45.5 mmHg. The IOP was raised with the mean around 40 mmHg in the clinical presentation of our study and other studies.
Postoperative IOP was < 20 mm Hg in 84.7% and >20 – 30 mmHg in 9.7%, >30-40 mmHg in 2.8% and >40-50 mmHg

in 2.8% was compared to < 20.0 mmHg of Ramakrishnan et al (13), <21 mm Hg in 95.0% of Prajna NV et al (15) and 93.0% of Jain IS et al (16). Our study Postoperative mean IOP of 13.5 mm Hg was compared to 12.7 mmHg in Ramakrishnan et al (13) and 14.0 mmHg of Prajna NV et al (15).

Postoperative visual Acuity at 6 – 8 weeks was 6/6 – 6/18 in 23.6 %, <6/18 – 6/60 in 54.2 %, <6/60 – 3/60 in 15.3% and <3/60 - HM in 6.9 %. This was compared to Ramakrishnan et al (13) of 6/18 -6/6 in 68.0%, <6/18 – 6/60 in 20.0%, < 6/60 in 2.7% and HM in 8.1%, Mohindar Singh et al (14) of 6/18-6/6 in 61.0%, <6/18-6/60 in 31.7%, <6/60 in 7.3%, Prajna NV et al (15) of 6/18- 6/6 in 57.1%, < 6/18 - 6/60 in 32.7% and < 6/60 in 10.2%, and Jain IS et al (16) of 6/6- 6/18 in 27.9%, <6/18 -6/60 in 52.3%, <6/60 in 5.8%, HM- PL +ve in 11.6% and No PL in 2.3%. Our study visual acuity of > 6/60 postoperatively in 77.8% correlates with 88.0% of R Ramakrishnan et al (13), 89.8% of Prajna NV et al (15) and 80.2% of Jain IS et al (16).

Study	Mean age (years)	Sex %		Symptoms		VA %		Mean pre IOP mm Hg
		Female	Male	Duration (years)	%	Preop PL +ve	Postop > 6/60	
Our study	61.6	69.2	30.6	< 7	61.1	63.8	77.8	46.3
Ramakrishnan	66.61	70	30	< 10	82.0	89.0	88.8	38.4
Mohindar Singh	64.5	59	41	<5	74.5	90.0	92.7	44.0
Prajana	62	54	46	-		-	89.8	45.0
Jain	62.5	53.5	46.5	-		67.5	80.2	45.5

The above table shows that our study correlates with other studies that in majority of cases

1) Patients after 60 years age and females were commonly affected

2) Delayed reporting of the patients to the hospital after the presenting symptoms

3) The visual acuity was PL +ve in the clinical presentation and >6/60 postoperatively

4) The IOP was raised to around 40 mmHg in the clinical presentation

Postoperative complications correlate with other studies as shown below.

Complications	Our study	Ramakrishnan et al	Prajna et al	Jain IS et al
Striate keratopathy	15.3	24.0	-	10.4
Anterior Uveitis	6.9	48.0	84.0	33.3
Posterior capsular tear	6.9	6.8	4.0	20.2
Zonular Dialysis	6.9	1.3	-	-

Conclusion:

This study showed the importance of effective preoperative control of IOP and inflammation in Phacomorphic Glaucoma, as they were the bad prognostic factors for a good postoperative visual outcome. There is a need to educate the population about the complications of the delayed treatment of senile Cataract, as it may result in poor visual outcome due to phacomorphic glaucoma.

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Cite this article as: Venkataratnam P, Srihari Atti, S Mahendra. A study of visual outcome of phacomorphic glaucoma. MRIMS J Health Sciences 2018;6(1):20-24.

Source of Support: Nil. **Conflict of Interest:** None.