

Assessment of Intraocular Pressure and Visual Acuity in Patients of Lens Induced Glaucoma before and after Manual Cataract Surgery

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ABSTRACT

Introduction: Lens induced glaucoma is commonly come across in elderly people if not treated early and promptly leads to poor visual prognosis and adds to old age disabilities. The aim of this study was to clinically assess IOP and visual acuity depending upon duration of lens induced glaucoma before and after lens extraction.

Material and Methods: This was a prospective study which was done among 100 cases of lens induced glaucoma (LIG) during September 2014 to October 2016. To reduce the intra ocular pressure by topical beta-blockers and Dorzolamide eye drops were used. Small incision cataract surgery with posterior chamber intra ocular lens implantation was performed. Posterior segment evaluation by ophthalmoscopy (direct and indirect) and +90D biomicroscopy wherever possible. Follow up of every case was done on first postoperative day, at 1 week and 6 weeks.

Results: Out of 100 cases, 45 cases (45%) improved to BVCA, indicating that majority of patients had recovered good vision. Among the 100 patients included in this study, 12 patients (12%) presented with IOP < 30 mm Hg, 44 patients (44%) presented with IOP 31-40 mmHg, 24 patients (24%) with IOP 41- 50 mmHg and 20 patients (20%) presented with IOP more than 50 mmHg.

Conclusion: The current study showed that phacomorphic glaucoma (56%) was more common than phacolytic glaucoma. Postoperatively visual acuity is improved and intraocular pressure reduced.

Keywords: Lens Induced Glaucoma, Intra Ocular Pressure, Visual Acuity, Cataract Surgery

or by secondary open angle by either of two mechanisms: Anterior flow block at pupil or at the angle and Trabecular meshwork blockage.^{2,3}

Many patients with glaucoma have concurrent cataracts and some studies have suggested that glaucoma itself is a risk factor for cataract development. The mainstay of glaucoma treatment is to lower intraocular pressure. Traditional glaucoma surgeries such a trabeculectomy and tube shunts work well to lower intraocular pressure and decrease progression of glaucoma, but these procedures carry significant risk.⁴

Initial rise in IOP may be subclinical, but patients present with acute symptoms of acute closed angle glaucoma like severe pain, redness, nausea, blurring of the vision due to edema of cornea. Depending on the duration of pathology, permanent changes develop that require a drainage procedure along with lens extraction to reduce IOP, sometimes require lifelong medication. It is observed from the literature that 18.7 million were found to be blind, out of which 9.5 million were causes related to cataract with a prevalence of 69.8%.⁵ Cataract surgery is a very common, successful, highly refined surgery with a favorable risk/benefit profile including improved visual acuity and visual field. The widespread general belief that cataract extraction alone lowers IOP two to four mmHg is slowly evolving towards an understanding of a larger and more sustained IOP reduction, especially in patients with higher preoperative IOP.^{6,7}

Even though cataract surgery alone lowers IOP, combined glaucoma/ataract surgery lowers IOP more with fewer postoperative pressure spikes. Surgeons should carefully monitor IOP after cataract surgery to prevent a postoperative pressure spike that could “snuff” the nerve especially in patients with pseudo exfoliation syndrome. Cataract surgery

INTRODUCTION

Cataract and glaucoma are the first and second leading causes of blindness globally. Although usually not severe enough to cause blindness, it is not surprising that these two diseases occur simultaneously in many patients. Many studies have demonstrated intraocular pressure reduction after cataract surgery.¹ However, most recent data indicated that IOP reduction after cataract surgery is more significant and sustained than previously thought. Glaucoma is defined as chronic, progressive optic neuropathy leading to optic disc changes and related visual field defects, IOP being a most common modifiable risk factor. Glaucoma that is induced by lens pathology is called as “Lens Induced Glaucoma” a common secondary glaucoma. It occurs commonly in various stages of development of cataract. The severity of reduction in drainage of aqueous produced by the ciliary body determines the rise of intraocular pressure. Lens induced glaucoma is caused by secondary angle closure

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How to cite this article: Battula Yallamanda Babu Rao, Rajender Gupta, Bhukya Harish. Assessment of intraocular pressure and visual acuity in patients of lens induced glaucoma before and after manual cataract surgery. International Journal of Contemporary Medical Research 2018;5(12):L6-L9.

DOI: <http://dx.doi.org/10.21276/ijcmr.2018.5.12.12>

to lower IOP may be especially beneficial in developing countries or are where the close follow-up necessitated by traditional glaucoma surgery is difficult. Nonetheless, cataract surgery seems to be emerging as a safe way to lower IOP in patients with mild to moderate glaucoma while avoiding the morbidity of traditional glaucoma surgery.^{8,9}

The treatment for any lens induced glaucoma is initially medical to reduce IOP followed by surgery. Despite of best possible treatment the visual prognosis is relatively compromised when compared to simple cataract surgery. This study was planned because cataract is a common problem of geriatric population even at present and also to assess visual prognosis in the current scenario of relatively improved medical facilities, awareness among people and transport facilities.^{10,11}

Patients who attended the hospital were more in number with various eye diseases. Among surgical cases, cataract occupies larger proportion of cases from urban and rural population. Hence, the aim of the present study was to compare IOP and visual acuity depending upon the duration of lens induced glaucoma before and after lens extraction.

MATERIAL AND METHODS

This prospective study was undertaken in patients who attended Sarojini Devi Eye Hospital, Hyderabad and was diagnosed as lens induced glaucoma on the basis of clinical symptoms and signs. The study was conducted during the period of September 2014 to October 2016. A total 100 cases of lens induced glaucoma were studied. A careful detailed clinical history was taken from the patient regarding age, sex and duration of symptoms. Comprehensive ocular examination including visual acuity, detailed anterior segment examination, applanation tonometry and Gonioscopy was done. Posterior segment evaluation with the help of ophthalmoscopy (direct and indirect) and +90D biomicroscopy was also performed wherever required. Procedures like B-scan ultrasonography, lacrimal syringing to rule out chronic dacryocystitis, systemic evaluation to rule out for diabetes and hypertension was also performed. IOL power calculation by keratometry and A-scan was done using SRK T formula. All cases of lens induced glaucoma were included in the study. Patients with primary glaucoma, retinal pathology, lacrimal sac infections and with any other eye disease like uveitis that reduces vision were excluded from the study.

All cases were treated preoperatively to bring down the intra ocular pressure by topical beta blockers or beta blocker and Dorzolamide eye drops and systemic IV 20% Mannitol and / or oral Acetazolamide 250 mg TID was given to the patients. After controlling the intra ocular pressure, patients were considered for one of the following surgeries depending on the duration of symptoms and noted findings. Small incision cataract surgery was planned with posterior chamber intra ocular lens implantation. Combined SICS and filtering surgery in cases of longer duration and vectis removal of lens with anterior vitrectomy in cases of zonular dehiscence. All patients were treated post operatively with topical/

systemic antibiotics, topical steroids, and cycloplegics and systemic NSAIDs to control inflammation. In some patient's anti-glaucoma medication continued for some time to control intra ocular pressure. Follow up of every case was done on first postoperative day, at 1 week and 6 weeks. During each visit uncorrected and best corrected visual acuity, slit lamp examination, ATN, fundus examination was done and postoperative complications were noted and managed accordingly.

RESULTS

The incidence of lens induced glaucoma in this study showed females (64%) were found to be more than males (36%) in (Table no. 1) which indicated higher incidence of LIG among females. The incidence of lens induced glaucoma was found to be increased in patients with age more than 50 years (86%) and the oldest in the study group was 78 years and the youngest was found to be 37 years (Table no. 2). Out of 100 patients, 48 patients (48%) presented in 2-4 days, 26 patients (26%) presented in 5-10 days and 26 patients (26%) presented in 11-14 days after the occurrence of symptoms (Table no. 3).

In the present study, out of 100 patients, 12 patients had pre-operative IOP values <30 mmHg, which reduced to a range of 10-15 mmHg in 8 patients (66.7%) 4 patients (33.3%) to 16-20 mm Hg post operatively. 44 patients had a pre-operative IOP of 31-40 mmHg, which reduced to 10-15 mmHg in 24 patients (54.5%), 16-20 mmHg in 18 patients (40.9%) and 21-30 mmHg in 2 patient (4.5%) post operatively. Similarly, the other 44 patients had a pre-operative IOP of >40% mmHg which reduced to 10-15 mmHg in 24 patients, 16-20 mmHg in 18 patients and 21-30 mmHg in 2 patient post operatively (Table no.4)

Out of 100 patients, 10 patients with pre-preoperative visual acuity of CF-CF, 3 patients improved to 6/6- 6/18, 7 patients to 6/24-6/60 post operatively. 2 patients had a VA of CF - 1/2mt, improved to 6/6- 6/18 and 10 patients with VA between CF -1mt to 2mt improved to 6/6-6/18 in 4 patients, 6/24-6/60 in 4 patients and <6/60 in 2 patients. The rest 78 patients had pre-operative VA of PL+ PR accurate, improved to 6/6-6/18 in 36 patients, 6/24 -6/60 in 6/24 -6/60 in 24 patients and <6/60 in 18 patients. (Table no. 5)

In this study 84% of cases underwent small incision cataract surgery with posterior chamber intra ocular lens implantation. 4% underwent lens extraction with anterior vitrectomy. 12% underwent combined small incision cataract surgery with posterior chamber intra ocular lens implantation and trabeculectomy (Graph no.1). Fundus postoperatively found to be normal in 96% of cases and in 4% of cases there was optic atrophy (Graph no. 2).

RESULTS

Gender	No. of cases	Percentage
Male	36	36%
Female	64	64%
Total	100	100

Table-1: Shows distribution of gender

Age group in years	No of cases	Percentage
0-40	4	4%
41-50	10	10%
51-60	42	42%
>60	44	44%
Total	100	100

Table-2: Shows distribution of age groups

Duration (days)	No. of patients	Percentage
2-4	48	48
5-10	26	26
11-14	26	26
Total	100	100

Table-3: Shows duration of symptoms

Pre-operative IOL (mmHg)	Post-operative IOP (mmHg)			
	10-15	16-20	21-30	Total
<30	8 (66.7%)	4 (33.3%)	-	12
31-40	24 (54.5%)	18(40.9%)	2 (4.5%)	44
41-50	12 (50%)	10(41.7%)	2 (8.3%)	24
>50	12 (60%)	8 (40%)	-	20
Total	56 (56%)	40 (40%)	4 (4%)	100

Table-4: Shows pre-operative and post-operative IOL among study subjects

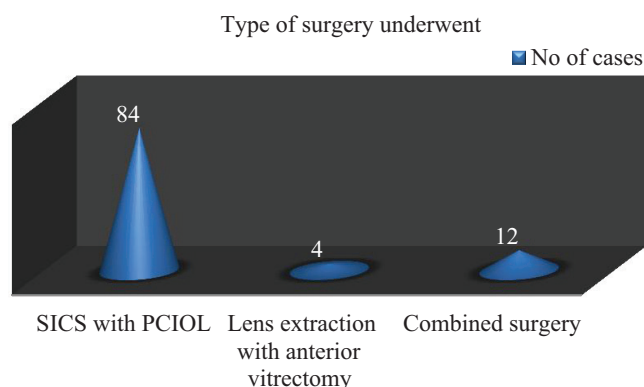
Pre-operative			Post-operative (BCVA)			Total
Visual acuity	No. of patients	%	6/6-6/18	6/24-6/60	>6/60	
CF – CF	10	10	3	7	0	10
CF –1/2 mt	2	2	2	0	0	2
CF – 1 mt	8	8	2	4	2	8
CF – 2 mt	2	2	2	0	0	2
PL + PR +	78	78	36	24	18	78
Total	100	100				100

Table-5: Shows pre-operative and post-operative BCVA among study subjects

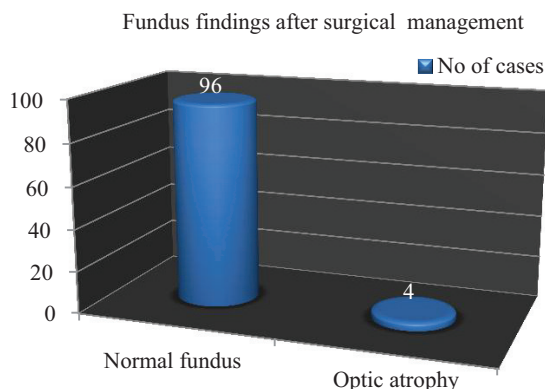
DISCUSSION

Lens Induced Glaucomas (LIG), a group of conditions characterized by rise in IOP due to some disorder of crystalline lens including phacomorphic, phacolytic, phacotoxic, phacotopic glaucomas. These are a common occurrence in India and the definitive management of these cases is by surgical extraction of the crystalline lens. This study included 100 cases of LIG, mainly phacomorphic type of LIG and phacolytic type of LIG who attended OPD at Sarojini Devi Eye Hospital, in Hyderabad. The patients were followed up from the time of admission to 6 weeks postoperatively.

In the present study, 86 patients were above 50 years, 10 patients were between 41 to 50 years and 4 patients were below 40 years. In a clinical study on lens induced glaucoma done by GL Dhar, Sudhir Bagotha, reported that lens-induced glaucoma to be common in age group of > 50 years (100%). In another study done by Mohinder Singh revealed that lens induced glaucoma to be common in age group of > 50 years (97.5%) on implantation of intra ocular lens in



Graph-1: Shows type of surgery underwent among study subjects



Graph-2: Shows fundus findings after surgical management

Phacomorphic glaucoma.^{12,13}

In this study, females (64%) were having a higher incidence of occurrence of LIG, when compared to males (36%) with a ratio of 1.7: 1. In a study done by N. Venkatesh Prajna and R. Ramakrishnan, it was noted that lens induced glaucoma was common in females (54%). In a similar study done on intra ocular lens implantation in phacomorphic glaucoma by Mohinder Singh, he noted that lens induced glaucoma to be more common in females (58%) and these findings are consistent with the present study.^{14,15}

In this study, majority of cases had similar clinical features i.e. pain, redness, watering, fall of vision. Signs included marked conjunctival congestion, circum ciliary congestion, corneal edema causing hazy cornea which decreased after intraocular pressure was controlled. Shallow anterior chamber was seen in phacomorphic glaucoma where as normal anterior chamber depth was found in phacolytic glaucoma. In majority of cases, pupil was mild dilated and fixed. In a clinical study on lens induced glaucoma was done by GL Dhar, Sudhir Bagotha, it was found that diminished

vision, pain, redness of eye, headache, watering of eye and vomiting were common symptoms and circum ciliary congestion, corneal edema, dilated pupil and raised intra ocular pressure were commonly observed signs.^{12,13}

Out of the 100 cases under study, 78 cases (78%) presented with perception of light and projection of rays accurate in all 4 quadrants and the rest 22 cases (22%) presented with visual acuity between CF -CF to CF 2 meters. Visual acuity from 6/6 - 6/60 was considered as good visual acuity and visual acuity less than 6/60 poor visual outcome. Out of 78 cases having perception of light with projection of rays preoperatively, 36 cases (46.15%) improved to BCVA of 6/6 -6/18 postoperatively.

Out of the 56 cases of phacomorphic type of LIG, 26 cases (46.4%) had a BCVA of 6/6-6/18, 20 cases (35.7%) had a BCVA of 6/24-6/60 and only 10 cases (17.8%) had a BCVA of less than 6/60. In a study conducted by Singh M, Al-Arrayed in Bahrain medical Bulletin, 61% of the cases recovered very good vision (6/12 or better) and poor visual acuity was found in 3 cases.¹³ In this study phacomorphic glaucoma had a better visual outcome (82.1%) when compared to visual outcome in phacolytic glaucoma (77.1%) which was clinically significant.

Out of 44 cases (44%) of phacolytic glaucoma, 19 cases (43.1%) had a BCVA of 6/6-6/24, 15 cases (34%) had a BCVA of 6/24-6/60 and in 10 cases (22%) had a BCVA of less than 6/60. In this study phacomorphic glaucoma had a better visual outcome (82.1%) when compared to visual outcome in phacolytic glaucoma (77.1%) which was found to be clinically significant.

Intra ocular pressure mostly ranged between 31-40 mmHg in 44 cases out of 100 cases, which reduced 10-15 mmHg in 24 cases during the follow-up period, 18 cases to 16-20 mmHg which indicated that in majority of patients the IOP was reduced. A mean pre-operative IOP of 41±8.56 was reduced to a mean postoperative value of 14.94±3.08 with P<0.001 which was found to be significant and was calculated using paired 't' test. This is in consistent with a study published by Singh M, Al-Arrayed in Bahrain medical Bulletin 2002, where out of 41 cases analyzed, in 37 cases (90%) the postoperative IOP remained below 21 mmHg.¹³

Preoperatively, routine ocular examination was done with tonometry, gonioscopy and fundus evaluation. Postoperatively visual acuity and IOP recorded and other ocular findings noted during follow up on 1st postoperative day, after 1 week, and after 6 weeks and treated accordingly.

CONCLUSION

Among the lens induced glaucomas included in this study, phacomorphic glaucoma (56%) was more common when compared to phacolytic glaucoma (44%). Postoperatively it was found that visual acuity improved and IOP reduced.

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

Submitted: 24-10-2018; **Accepted:** 26-11-2018; **Published:** 07-12-2018