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Original Article

Effect of Different Sizes of Intraocular Lens on Early Changes of Posterior Capsular Opacification

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Abstract

Objectives: To evaluate the effect of different sizes of Intra Ocular lens (IOL) on frequency of development of early changes of posterior capsular opacification (PCO)

Patients and Methods: A descriptive study of 12 months' duration was conducted in department of ophthalmology, Federal Government Services Hospital Islamabad. A non-probability convenient sample of 100 patients aged 58 to 77 years was divided equally into two groups, A and B. Each group was again divided into A-1, A-2 depending on overall lens diameter of 12 mm, 13 mm respectively and B-1, B-2 for optic diameter of 5.25 mm, 6mm respectively. Each subgroup comprised of 25 patients. Planned phacoemulsification was performed on all patients. Follow up with patient's symptoms, Snellen's charts and slit lamp examination was done on day 7, 30 days, 6 months and a year after surgery. All the results were entered on patient's Performa.

Results: In group A where overall IOL size was used, comprising A1(12 mm) & A2(13 mm), 12% (n=3) of (A1) group developed PCO in 1st 12 months and 16% (n=4) of (A2) group developed PCO in 1st 12 months. In group B where optic size was used, comprising B1 (5.25 mm) & B2 (6mm), 24% (6 patients) of B1 group developed PCO and 16% (4 patients) of B-2 group developed PCO during 1st 12 months.

Conclusion: IOL of smaller optic size was associated with higher percentage of early changes of PCO than that of larger optic size. IOL of larger overall size was associated with higher percentage of early changes of PCO than that of smaller overall size.

Keywords: Cataract, Elschnigs Pearls, Intraocular lens sizes, Phacoemulsification,

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Introduction

Cataracts were very common in antiquity.[1-3] The word cataract, means both an opacity of the lens and a torrent of water, comes from the Greek word υπόχυσις (kataráktēs), meaning the fall of water. The Latins called it suffusio, an extravasation and coagulation of humor behind the iris; and the Arabs, white water.[2] Worldwide, 285 million people are visually impaired, 39 million are blind and 18 million are due to cataract. About 82% of all blind above the age of 50 years live in developing countries.[4] There is increasing backlog of cataract leading blindness in developing countries. Globally about 15 million cataract operations are performed annually, an increase of 5 million in 5 years.[5] About 570, 000 adults are estimated to be blind (<3/60) as a result of cataract in Pakistan, and 3,560,000 eyes have a visual acuity of <6/60 because of cataract.[6] Elschnigs pearls were first described by Hirschberg caused by proliferation of equatorial lens fibres located on the posterior capsule to differentiate from posterior capsular fibrosis.[7] It is a major complication of successful cataract surgery, which causes reduction in vision.[8,9] Time after cataract surgery and onset of capsular opacification is variable and the rate for laser capsulotomy ranges from 10% to 37%.[10]

Posterior capsular opacification (PCO) ranges from 50% to as low as <5% in eyes, develops over the clear posterior capsule in a few months to a few years.[11] PCO reduces visual acuity[12] especially central 3 mm zone of the posterior capsule affects high contrast sensitivity.[13] The PCO involves three basic phenomena: proliferation, migration, and differentiation of LECs.[14-16] It is a multi-factorial problem, related to patient factors such as age, surgical factors, and IOL design. Even newer techniques of cataract surgery do not delay PCO. In this study, an account of relation between different lens sizes and the development of early posterior capsular opacification is given.

Patients and Methods

A descriptive study, in which effect of lens sizes on early changes of posterior capsule opacification was described, was conducted in department of Ophthalmology, Federal Government Services Hospital

Islamabad from January 2012 to December 2012. About 100 willing patients with uncomplicated Cataract were selected from outpatient department. The age ranged from 58-77 years with mean age of 67.5 years. Both male and female patients having senile mature cataract were admitted in Ophthalmology unit were selected by non-probability convenient sampling. Patients with history of major medical and surgical illness, glaucoma, exfoliation syndrome, uveitis, history of trauma and myopia were excluded from the study. Patients were divided equally into two groups A and B. Each was further divided into A-1, A-2 (where overall lens diameter was used (12 mm, 13 mm) and B-1, B-2 (where only optic diameter was used (5.25 mm, 6 mm). Each group comprised of 25 patients. Decrease in Snellen's best-corrected vision (BCV) of more than one line or major visual symptoms or both, were examined. Slit lamp examination with full-dilated pupil was performed on 7, 30, 90, 180 and 360 days. PCO grading was done, as presence of lens epitheleal cells (LECs) behind the IOL, Elschnigs pearls, called early changes and wrinkling/fibrous changes called late changes.

Operative Procedure: During one-year study period, a total of 100 uncomplicated patients were operated for standard Phacoemulsification by a single surgeon after taking written consent. Patients were enquired for ocular and systemic disease history. Pre-operative assessment of vision, slit lamp biomicroscopy, fundoscopy, intraocular pressure check-up and sac wash was performed. PCO was evaluated by a decrease of visual acuity compared to the first post-operative best-corrected visual acuity.

Postoperative follow up: Patients were followed up on Day 7, 30, 90, 180 and 360 days. Best corrected visual acuity and LEC's migration behind the centre of IOL was noted using slit lamp bio-microscopy.

A thorough personal history, presenting complaints, complete examination findings and investigations were entered into the patient's performa. Data collected from patient performa was entered on data base s heet and analyzed for the early changes of PCO with different sizes of lens.

Results

The age range of patients was 58 to77 years with mean age was 67.5 years, 52% were male and 48% female patients. About 22(22%) patients were in their late fifties, 35(35%) were in their early sixties and 43(43%) in their late sixties. Preoperative visual acuity was hand movement (HM) 43%, counting fingers (CF) 39% and 6/60- 18% (Table-1). Out of 100 patients, 28 male and 23 female were operated for Right Eye while 25 male and 24 female were operated for Left Eyes. Decrease in Snellen's best corrected vision of more than one lines, significant visual symptoms or both were noted after first week and 24 weeks. HM: Hand movement, CF: Counting fingers

Among 52 males, 78.8% had good, 17.3% had borderline and 3.8% had poor visual acuity results. Among 48 females, 54.1% had good, 29.1% had borderline and 16.6% had poor visual results. Overall 67% had 6/18, 23% had <6/18 and 10% had<6/60 visual results. 22% patients, 9 males and 13 females showed irregular pupil having VA<6/18 17% of the total patients showed early changes of PCO (Elschnig's pearls) within 12 months of surgery. PCO in different IOL sizes (N=100) shown in (Table 2) Group A (Where overall IOL size (12mm and 13mm was used), in group A-1, 3 patients (12%) who received 12mm IOL size developed PCO (Elschnig's Pearls) In Group A-2, 4patients (16%) who received 13 mm developed PCO. In Group B-1 (Where Optic size (5.25mm and 6 mm) was used, 06 out of 25 patients (24%) who received 5.25 mm developed PCO. In Group B-2, 04 out of 25 patients (16%) who received 6mm developed PCO during first 12 months.

Table 2: Association of early changes of PCO with different sizes of lens (n=100)

		Groups				Total
		A1	A2	B1	B2	
		>=12mm	>=13mm	>=5.25mm	>=6mm	
PCO	Present (n)	3	4	6	4	17
	%	12.0	16.0	24.0	16.0	17.0
	Absent (n)	22	21	19	21	83
	%	88.0	84.0	76.0	84.0	83.0
Total		25	25	25	25	100
		100.0%	100.0%	100.0%	100.0%	100.0%

Table 1: Pre-operative visual acuity (n=100)

	No.	Percentage
H.M	43	43
CF	39	39
6/60	18	18

Discussion

In Pakistan, blindness due to cataract is a major problem. This is clearly reflected by the long waiting lists for cataract surgeries in public hospitals. The prevalence of bilateral cataract blindness (VA <3/60) among people over 50 years

was 4.8% (95% CI: 3.8% to 5.9%), which is highest reported in Pakistan.[17] About 570,000 adults are blind (3/60) as a result of cataract in Pakistan, and 3560000 eyes have cataract with visual acuity of 6/60.[18] The prevalence of cataract surgery in India was reported, 8.0% in patients aged 30 years and 17% in those aged 50 years and older.[19] In current study among 52 males, 78.8% had good and 3.8% had poor visual results. Among 48 females, 54.1% had good, and 16.6% had poor visual results. Overall 67% had good, and 10% had poor visual results. The WHO recommends that poor visual outcomes should not be more than 5% after cataract surgery.[20] In this study the visual results are poorer than the WHO categories but still better than those found in most of other studies and consistent with the findings of the "*Pakistan National Blindness and Visual Impairment Survey".*[21,22] In this study overall 22% of patients comprising higher percentage of women than men (13% vs 9%) had irregular pupil and presenting visual acuity(PVA)<6/18. Another important finding in this study was high percentage of poor visual outcome among females than males (presenting visual acuity<6/18). The high rate of poor visual outcome in females may explain the apprehension how "fears" of operation plays the role in poor results.[23]

Out of 100 senile cataract patients, 17 (17%) developed posterior capsular opacification after one year. In this study, the incidence of PCO was higher (24%) in the eyes that received IOL of 5.25mm optic size than those (16%) which received IOL of 6.0mm optic size. This finding is similar to the study conducted by William R. Meacok et al, who found the incidence to be low (1.5%) in the 6.0mm group as compared to (6.9%) in 5.5mm group at 1 year.[24]

Mamalis N and colleagues reported that in the large IOL group, 106 of 280 patients (38%) required YAG laser posterior capsulotomy, in the small IOL group, 25 of 157 patients (16%) required the same. This difference was statistically significant even though the average follow-up was 84.1weeks in the large IOL group and 54.1 weeks in the small IOL group. This study has similar results with Mamalis N. et al and Nishi O et al. and colleagues.[25,26]

Conclusion

A higher percentage of patients developed early PCO changes with smaller optic size IOL while higher percentage of patients developed early PCO changes with larger overall size IOL.

Conflict of Interest

This study has no conflict of interest as declared by any author.

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Authorship Contribution:
Author 1: Conception, Synthesis and Planning of the research, Interpretation, analysis and discussion
Author 2: Active participation in active methodology
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