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Original Research Article

A cross-sectional study to compare the complications of cataract surgery with phacoemulsification in eyes with high and normal axial length

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Abstract

Introduction: High myopia is a risk factor for cataract formation. A relationship between myopia and higher complications in cataract surgeries has long been suggested.
Materials and methods: After obtaining ethics committee clearance, this cross-sectional, case-control observational study was conducted in 100 participants of age above 18 years. They underwent cataract surgery. Participants were divided into two groups:- **Group A & B** - Participants with axial length between 21 and 26 mm and more than 26 mm respectively.
Results and discussion: This shift of myopic individuals undergoing cataract surgery at an earlier age was found to be statistically significant. There was a statistically significant association between increasing age and PCR. Most common type of cataract in group A is cortical (30.8%) followed by nuclear (28.8%). Most common type of cataract in a group B is PSC (50%) followed by nuclear (22.9%). There was no statistical association between type of cataract and any complication.
Conclusions: Intraoperative complications of cataract surgery do not increase significantly with increase in axial length. Myopic individuals are prone to develop cataracts earlier. NS and PSC type of cataracts are more common compared to cortical type of cataracts in emmetropic individuals.
Keywords: Myopia, Cataract, High axial length, Phacoemulsification.

1. Introduction

The incidence of highly myopic eyes has been increasing.[1,2] These eyes have degenerative changes involving the sclera, choroid, vitreous and retina. Myopic eyes may more commonly have coexisting ocular conditions, such as retinal tears and lattice degeneration.

High myopia is also a risk factor for cataract formation. A relationship between myopia and higher complications in cataract surgeries has long been suggested, although some studies have found no relationship.[3-5]

We designed a study to evaluate type of cataracts in myopic eyes and to compare the intraoperative complications of phacoemulsification with intraocular lens implantation in eyes with high and normal axial length.

2. Materials and methods

2.1 Ethics

Procedures followed were in accordance with the ethical standards of the institutional committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. Approval of Institutional Review Board was obtained. Informed consents from adult research participants were obtained for participating in the trial. Confidentiality was maintained regarding participants.

2.2 Study design

This prospective, case-control observational study was conducted in 100 participants of age above 18 years. They underwent phacoemulsification with IOL implantation. Participants were divided into two groups:-

Group A - Participants with axial length between 21 and 26 mm.

Group B – Participants with axial length more than 26 mm.

Routine preoperative evaluation was done. Complications such as PCR, VL, Nucleus drop and IOL dislocation were evaluated. Participants with diabetic retinopathy, glaucoma, age related macular degeneration, previous ocular trauma, ocular surgery, retinal photocoagulation and secondary cataracts were excluded from the study.

3. Results

The study enrolled 52 participants in group A and 48 in group B.

Table 1: Age Comparison

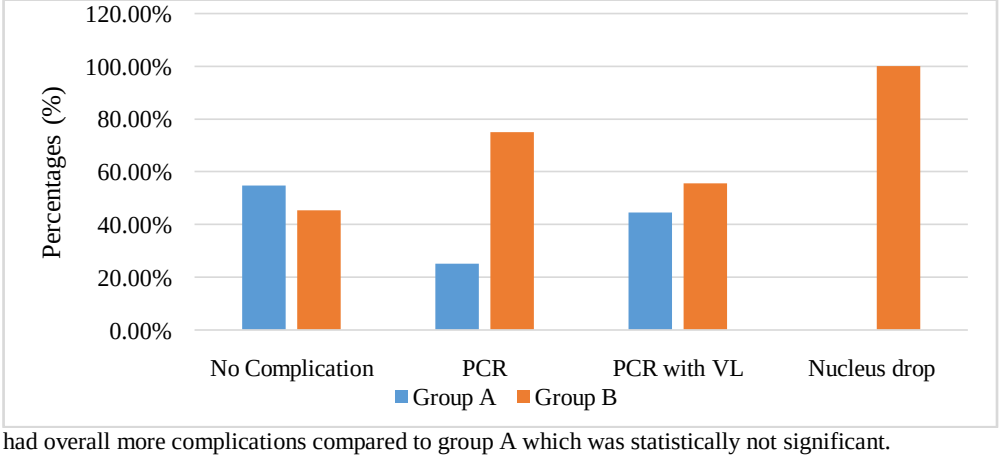
		Age group				Total	P Value
		<40 year	40-50 year	50-60 year	>60 year		
Group A	No.	0	4	19	29	52	0.001
	%	0.0%	23.5%	65.5%	61.7%	52.0%	
Group B	No.	7	13	10	18	48	
	%	100.0%	76.5%	34.5%	38.3%	48.0%	
Total	No.	7	17	29	47	100	
	%	100.0%	100.0%	100.0%	100.0%	100.0%	

This shift of myopic individuals undergoing cataract surgery at an earlier age was found to be statistically significant. (p value: 0.001). Complications occurred during the surgeries of 14 out of 100 individuals. Rest of them underwent uneventful surgeries.

Table 2: Complications

	Complications				Total	P Value
	No Complication	PCR	PCR with VL	Nucleus drop		
Group A	47	1	4	0	52	0.440
	54.7%	25.0%	44.4%	0.0%	52.0%	
Group B	39	3	5	1	48	
	45.3%	75.0%	55.6%	100.0%	48.0%	
Total	86	4	9	1	100	
	100.0%	100.0%	100.0%	100.0%	100.0%	

Figure 1: Complications



Group B had overall more complications compared to group A which was statistically not significant.

Table 3: (Complications VS Age)

Complications	Age group				Total
	<40 year	40-50 year	50-60 Year	>60 year	
PCR	0	0	1	3	4
	0.00%	0.00%	25.00%	37.50%	30.77%
PCR with VL	0	1	3	5	9
	0.00%	100.00%	75.00%	62.50%	69.23%
Total	0	1	4	8	13
	0.00%	100.00%	100.00%	100.00%	100.00%

No PCR or PCR with VL occurred in individuals under the age of 40 years. Most PCR with or without VL occurred after the age of 60. There was a statistically significant association between increasing age and PCR.

Table 4: (Type of Cataract)

Cataract type	Group		Total	P Value
	A	B		
Cortical	16	5	21	0.003
	30.8%	10.4%	21.0%	
Nuclear	15	11	26	
	28.8%	22.9%	26.0%	
PSC	9	24	33	
	17.3%	50.0%	33.0%	
MSC and HMSC	12	8	20	
	23.1%	16.7%	20.0%	
TOTAL	52	48	100	
	100.0%	100.0%	100.0%	

Most common type of cataract in group A is cortical (30.8%) followed by nuclear (28.8%). Most common type of cataract in a group B is PSC (50%) followed by nuclear (22.9%). There was a statistically significant association between both groups and type of cataracts. There was no statistical association between type of cataract and any complication.

4. Discussion

Most of the individuals were of >60 years of age in both the groups, but 7 out of 100 individuals were operated at < 40 years of age in GROUP B, suggesting that myopia could be a cause of presenile cataract in this age group. This mirrored the findings by Sohee Jepon *et al*[6] and a study by Praveen MR *et al*.[7]

In our study out of 14 intraoperative complications 4 were PCR (4%), 9 were PCR with viterous loss (9%) and 1 was nucleus drop (1%). There was no IOL displacement or any suprachoroidal haemorrhage. Hamid Fesharaki *et al* studied total 866 eyes, PCR occurred in 27(3.11%).[8] Rate of PCR occurrence was thus comparable in both the studies. But 23(3%) PCR with viterous loss occurred in that study compared to 9% in our study.

In our study out of 14 complications, 5 complications occurred in group A and rest 8 occurred in group B which was not statistically significant. In a study done by Day AC *et al* PCR rates showed little change with axial length (overall mean 1.95%, 95% CI: 1.89 to 2.01%), except for a borderline increase in eyes with axial length <20.0 mm where rates were 3.6% (95% CI: 2.0 to 6.3%), which is comparable to the results of our study.[9] This was in contrast to some other studies, a study done by Hamid Fesharaki *et al* concluded axial length is a risk factor for intra-operative complications.[8] With 1 mm increase in axial length the incidence of intraoperative complications raised 1.22-folds (P = 0.007). There was no significant correlation between axial length and incidence of vitreous loss. Incidence of posterior capsular rupture and nucleus fragment drops increased with increment in axial length. Another study done by Amanda tang *et al* concluded in their study chances of pcr-2.3-9.3% for axial length >27mm, zonular dehiscence-1.7% for axial length >30mm, anterior capsular tear-1.1% for axial length >30mm.[10] These findings are in contrast to our study.

PCR with or without vitreous loss from all of the complications was the most common complication in our study. There was a significant statistical association between increasing age and PCR with or without vitreous loss. This was similar to the findings by Hamid Fesharaki *et al*.[8] In their study age was a risk factor for incidence of intraoperative complications in either normal or high axial length groups. Every 1 year increase in the age of patients increased incidence of intraoperative complications by 1.04-folds.

Nuclear and PSC cataracts were more common in group B individuals and cortical cataracts in group A. This mirrored the findings in a study done by Praveen *et al*.[7] In their study nuclear cataract was strongly associated with high axial myopia. The density of the cataract was higher in the high myopia group. But no association was observed between PSC or cortical cataract and high axial myopia.

5. Conclusion

Intraoperative complications of cataract surgery do not increase significantly with increase in axial length. Myopic individuals are prone to develop cataracts earlier. NS and PSC type of cataracts are more common compared to cortical type of cataracts in emmetropic individuals.

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