

Comparison of Visual Acuity and Astigmatic Changes in Phacoemulsification with Posterior Chamber Foldable Vs Non Foldable Intraocular Lens Implant

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Purpose: To compare visual acuity and astigmatic changes in phacoemulsification with posterior chamber foldable versus non-foldable IOL implants.

Materials and Methods: This comparative study was conducted in the Ophthalmology Department of Khyber Teaching Hospital, Peshawar from January 2001 to June 2002.

We selected 50 patients with age related cataract and divided them into two groups A & B, each comprising of 25 patients. All of these patients underwent cataract removal by phacoemulsification. In group-A, foldable posterior chamber IOL while in group-B, non foldable posterior chamber IOL were implanted in the bag. Visual acuity and astigmatic changes were recorded on first post operative day, end of first week and at the end of first month.

Results: At the end of first month, in group-A, 84% of patients had best corrected visual acuity of 6/6 and 16% of patients had 6/9. In group-B, 80% of patients had best corrected visual acuity of 6/6, 16% had 6/9 while 4% had 6/12. At the end of first month, in group-A, 92% of patients had astigmatism between 0 – 0.9D and 8% had 1 – 1.9D. In group-B, 76% of patients had astigmatism between 0 – 0.9D, 16% had 1 – 1.9D while 8% had 2 –2.9D.

Conclusions: In both groups, visual acuity is comparable, however astigmatic changes are more in the non-foldable IOL's as compared to the foldable IOL's group.

Cataract is a major cause of blindness in old age group¹. Every year millions of people need surgery for this disease. Surgical management of cataract has a long history spanning over 20 centuries passing through various methods and

procedures. Charles Kelman (1967) dramatically revolutionized cataract surgery by describing ultrasonic fragmentation of cataract called phacoemulsification (KPE)². He first showed his work in the American Academy of Ophthalmology (AAO)

meeting in 1969 whereas the first human eye was operated upon in 1971. Phacoemulsification results in much reduced post-operative astigmatism even with non foldable IOL^{3,4}, as compared to standard Extra Capsular Cataract Extraction (ECCE) with posterior chamber IOL implants. There is good visual acuity, less inflammation and early convalescence. Initially it has difficult learning curve⁵ with complications like endothelial damage, posterior capsule rupture, vitreous loss and the dropping of nucleus into the vitreous. As the microsurgical technique has improved and better viscoelastics are available the rate of complications has decreased. Depending upon the size of IOL, incision size is variable. For foldable IOL, a standard 3.2mm incision is given while in case of non-foldable IOL, the size needs to be increased to 5.5mm. In foldable IOL cases there is no need to suture the wound but in case of non foldable IOLs, sometimes a single suture is applied to seal the wound. Phacoemulsification can be done either by scleral or corneal wound.

MATERIALS AND METHOD

We selected 50 patients of age related cataract and divided them into two groups A and B for foldable and non-foldable IOL respectively. Out of these 50 patients 31 were male and 19 female with the age range of 45 year to 75 years.

Exclusion criteria

Patients with

1. Diabetes Mellitus
2. Hypertension
3. Glaucoma.
4. Previously operated eyes.

The preoperative visual acuity and astigmatism were comparable between the two groups (Table 1,2). To avoid bias all the surgeries were done by a single skilled surgeon and all the observations were recorded by a single observer. Preoperatively pupils were dilated with Mydracyl 1% and Phenylephrine 10% eye drops. All of these patients were operated under local peribulbar anesthesia with a corneal tunnel incision.

In group A, a 3.2mm incision was given and in all patients continuous curvilinear capsulorhexis (CCC) was made. A site port was made with a 15° knife. After hydrodissection the nucleus was fragmented with phacoemulsification and fragments aspirated out. The remaining cortical matter was washed out with automated I/A cannula. In all the cases, an IOL was

implanted in the bag. In 11 patients stromal hydration was done to seal the wound. In-group B, the same procedure was adopted, however the incision size was enlarged to 5.5mm after which a non-foldable IOL was implanted in the bag. In 9 patients a single suture was used to seal the wound. These sutures were removed after a week. In remaining patients only stromal hydration was done to seal the wound. All the patients were given gentamicin and dexamethasone injection sub-conjunctivally, they were put on steroid and antibiotics eye drops and advised oral pain killers for one week. Post-operative assessment was done on first post-operative day, end of first week and then end of first month.

Table 1: Preoperative VA

	Group A	Group B
CF	16 (64%)	15 (60%)
6/60	4 (16%)	5 (20%)
6/36	5 (20%)	3 (12%)
6/24	-	2 (8%)

Table 2: Preoperative Astigmatism

Astigmatism Diopters (D)	Group A	Group B
0-0.9 D	17 (68%)	16 (64%)
1-1.9 D	5 (20%)	5 (20%)
2-2.9 D	3 (12%)	3 (12%)
3-3.9 D	-	-
4-4.9 D	-	-
5 and above D	-	1 (4%)

RESULTS

On 1st postoperative day; in group A, 72% of patients had visual acuity of 6/18 or better. Whereas in group B, only 52% of patients had visual acuity (VA) of 6/18 or better (Table 3).

At 1st week; in group A, 88% of patients had VA 6/18 or better. Whereas in group B, 96% of patients had VA 6/18 or better.

At the end of 1st month; in group A, 96% of patients had VA 6/18 or better. Whereas in group B, 100% of

patients had VA 6/18 or better. After one month; in group A, 84% patients had best corrected VA (BCVA) of 6/6 while 16% had VA 6/9. In group B, 80% of patients had VA 6/6, 16% 6/9 while 4% had VA 6/12.

The following were astigmatic changes in Dioptre (D) (Table 4). On the 1st postoperative day, in group A, 48% of patients had astigmatism of 0-0.9 D, 36% had 1-1.9D, 12% 2-2.9D and only 4% had 3-3.9 D. In-group B, 60% patients had 0-0.9 D, 6% 1-1.9 D and 24% 2-2.9D.

At the end of 1st week; In group A, 84% patients had Astigmatism of 0-0.9 DC and 16% 1-1.9 DC. In group B, 76% patients had 0-0.9 DC, 16% 1-1.9 DC, 4% 2-2.9 DC and 4% 3-3.9 DC.

At the end of 1st month; in group A, 92% had Astigmatism of 0-0.9 DC while 8% had 1-1.9 DC. In group B, 76% had 0-0.9 DC, 16% 1-1.9 DC while 8% 2-2.9 DC.

DISCUSSION

Phacoemulsification is an established procedure for cataract extraction resulting in early visual outcome. There is less astigmatism and early convalescence provided the surgeon is skilled. Initially rigid non-

foldable IOLs were implanted but with the introduction of foldable IOLs this procedure has become more fruitful. In our study the results of both foldable and non-foldable IOLs regarding VA at the end of 1st month are comparable and there is not much difference between the two.

In the study by Iftikhar and Kiani⁴, it has been concluded that sutureless phacoemulsification with implantation of 6mm PMMA intraocular lenses is a safe procedure with acceptable levels of post-operative astigmatism. However, it is still higher as compared to foldable IOL. Moreover, no comment has been made regarding visual outcome. In the study by Khan et al⁶, the uncorrected VA is less but they had better result regarding astigmatism. Foldable IOL have better results in some other studies. In the study of Agarwal et al⁷, the best corrected VA at the end of 1st month was found to be 6/6 in 76% and 6/9 in 24% of the patients of phaco with foldable IOL⁷. The results of our study as compared to their study are better. In this study astigmatism at the end of one month was comparable to our group A patients but better than

Table 3: Postoperative Visual Acuity

VA	Group A				Group B			
	1 st post operative day	1 st week	1 st month	Best corrected	1 st post operative day	1 st week	1 st month	Best corrected
CF	2 (8%)	-	-	-	1 (4%)	-	-	-
6/60	-	-	-	-	1 (4%)	-	-	-
6/36	4 (16%)	1 (4%)	-	-	1 (4%)	-	-	-
6/24	1 (4%)	2 (8%)	1 (4%)	-	9 (36%)	1 (4%)	-	-
6/18	8 (32%)	1 (4%)	1 (4%)	-	4 (16%)	7 (28%)	3 (12%)	-
6/12	4 (16%)	5 (20%)	2 (8%)	-	3 (12%)	5 (20%)	4 (16%)	1 (4%)
6/9	2 (8%)	10 (40%)	6 (24%)	4 (16%)	1 (4%)	6 (24%)	6 (24%)	4 (16%)
6/6	4 (16%)	6 (24%)	15(60%)	21 (84%)	5 (20%)	6 (24%)	12(48%)	20 (80%)

Table 4: Postoperative astigmatism in Dioptre Cylinder (DC)

Astigmatism	Group A			Group B		
	1 st post operative day	1 st week	1 st month	1 st post operative day	1 st week	1 st month

0-0.9DC	12 (48%)	21 (84%)	23 (92%)	15 (60%)	19 (76%)	19 (76%)
1-1.9DC	9 (36%)	4 (16%)	2 (8%)	4 (16%)	4 (16%)	4 (16%)
2-2.9DC	3 (12%)	-	-	6 (24%)	1 (4%)	2 (8%)
3-3.9DC	1 (4%)	-	-	-	1 (4%)	-

group B. Li S, Liu Y study⁸ has better visual acuity in phaco with IOL at the end of one week. It shows visual acuity of 6/9 or better in 72.72% of patients. Generally foldable IOL have good visual acuity at international level. The study of Xie et al⁹ shows visual acuity of 6/6 in 65.3% patients at the end of 1st week which is better than our study. Phacoemulsification has an effect on the visual acuity and astigmatism in foldable and non-foldable IOL⁷. The study of Khan et al⁶ shows visual acuity of both foldable and non-foldable IOL of 6/6 – 6/12 in 58% patients, 6/18 in 18% and lesser than 6/18 in 24% patients. These results are not comparable to our study. However the astigmatism changes are less in both Group A and Group B patients.

CONCLUSION

Our study shows that final visual acuity in both foldable and non-foldable IOL groups are comparable to each other. Patients have early visual recovery with early convalescence. However the astigmatism changes are more in non-foldable group than the foldable group. Therefore proper planning and careful technique can give very satisfactory results with both foldable and non-foldable IOL in phaco cataract extraction.

In a developing country like Pakistan a large number of people can not afford cost of the foldable intraocular lenses implants. Hence, phacoemulsification with non-foldable IOL implants which costs the same as ECCE with PC IOL implant, is a recommended surgical option for these patients.

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Glaucoma diagnosis and management should not be based on a single Intraocular pressure (IOP) measurement. Multiple IOP readings at various times of the day are more contributory and IOP should be correlated with corneal thickness especially in myopes.

