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A Comparative Study on Postoperative Visual Outcome between Non Foldable IOL and Foldable IOL in Small Incision Cataract Surgery

Dr. Sandhya Rani Nalluri,
Assistant Professor, RIMS Hospital, Ongole
Corresponding Author: DrT.Suchithra

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I. Introduction:

Cataract remains the leading cause of blindness in the world. Since the first cataract surgery with the removal of nucleus there have been many improvements. The first iol implantation surgery was performed by Harold Ridley in 1949. Since then there have been many improvements in the procedure and the implantable IOLs. The earlier period, typically 10-12 mm, incision required to allow intact removal of the crystalline lens required multiple sutures and frequently caused high levels of induced astigmatism. The small incision cataract surgery with typical incisions of 5 mm are now being commonly used to implant both Non Foldable IOL and Foldable IOLs. Induced astigmatism is reduced by decreasing the size of incision. As the improvement in vision is the major goal of most of the IOL surgeries visual acuity and contrast sensitivity are appropriate outcome measures. Good optical properties, dimensional and material stability and few post operative complications are desirable properties of any IOL. Since the foldable IOLs are usually more expensive than non foldable IOLs, advantages such as improved vision accuring from foldable IOLs must be demonstrated to justify their use. Hence in this study we compared Non foldable IOLs and foldable IOLs.
Most recently Phaco Emulsification with foldable IOLs is the treatment of choice for Cataract Surgery.But this Surgery is expensive and needs trained Surgeon.

Aim
To study and compare Post Operative Visual acuity Outcome between foldable and non foldable IOLs.
To study any major complications.

II. Materials And Methods:

50 patients with cataracts were recruited prior to IOL implantation from government hospital RIMS, Ongole in a 6 months prospective, randomized study. All subjects provided informed consent prior to inclusion in the study, and full ethical approval for the study was taken from hospital ethics committee.
Inclusion criteria are
Age between 60-70 years
Mature senile cataracts
With normal infra ocular pressure
with patent lacrimal apparatus
with normal cornea without dystrophies
Exclusion criteria are Patient with ocular abnormalities like glaucoma, uveitis

Patients with systemic abnormalities such as diabetes mellitus, HIV and hyper tension. Patients were randomly divided into **group r** (receiving non foldable IOL) and **group f** (receiving foldable IOL). Visual acuity was measured in all patients by an ophthalmologist using Snellen's chart and is recorded. IOP and syringing for lacrimal sac patency were done in all the patients. IOL power is calculated by keratometer and A-scan. All the patients were operated by one doctor to nullify any surgical errors. All patients received ciplox eye drops from one day prior to surgery. Tropicamide eye drops and diamox tab were administered to all patients in the study

All patients received peribulbar block prior to surgery. A small fornix based conjunctival flap was prepared. After cauterization of blood vessels a sclero-corneal tunnel, 1.5mm behind the limbus, 5mm anterior chamber opening was performed. Cataract nuclealus was brought into anterior chamber and out by irrigating vectis method. Group r patients received non foldable PMMA IOL (APPa) into posterior chamber. Group f

patients received foldable iol (Alcon) into posterior chamber. Post operative recordings were done on 1st post operative day, after 1 week, after one month and after 6 months.

Post operative corneal edema is treated with steroid drops . Routine post-operative examination by the consulting surgeon , included the following parameters

1. Slit lamp examination of anterior segment
2. Snellens visual acuity unaided and with pin hole
3. Fundus examination
4. Keratometry by bausch and lomb keratometer at the end of 4th week and 8th week,
5. Best corrected visual acuity at the end of 4th week and 8th week,
6. Surgically induced astigmatism was calculated using vector analysis,

III. Observations And Results:

The results of the study were statistically analyzed using t-test.

The mean age in both the groups are similar and is statistically insignificant.

	Group r	Group f
Mean age	62.14	61.98

The preoperative visual acuity in both the groups was comparable and is insignificant.

Visual acuity	Group r	%	Group f	%
6/60	7	28%	8	32%
Hand movement	2	8%	0	0%
Cf 1mt	3	12%	3	12%
Cf 2 mt	3	12%	4	16%
Cf 3 mt	4	16%	3	12%
Cf 4 mt	3	12%	3	12%
Cf 5 mt	3	12%	4	16%

The post operative visual acuity in both the groups was recorded

Visual acuity after 1 week

Visual acuity	Group r	%	Group f	%
6/18	3	12%	2	8%
6/12	4	16%	2	8%
6/9	8	32%	9	36%
6/6	10	40%	12	48%

Visual acuity after 1 month

Visual acuity	Group r	%	Group f	%
6/18	1	4%	1	4%
6/12	2	8%	1	4%
6/9	8	32%	8	32%
6/6	14	56%	15	60%

Visual acuity after 2 months

Visual acuity	Group r	%	Group f	
6/18	1	4%	1	4%
6/12	2	8%	1	4%
6/9	7	28%	7	28%
6/6	15	60%	16	64%

There is no much difference in the visual acuity outcomes with both non foildable IOL and foldable IOL.

Surgically induced astigmatism was comparable in both the groups.

Corrected power	Group r	%	Group f	%
With out Astigmatism	16	64%	18	72%
± 1.00 to 2.00 Cyl	9	36%	7	28%
+ 2.00 Cyl above	Nil	0%	Nil	0%

IV. Discussion:

In group r, uncorrected visual acuity after 1week with vision 6/6 is 40% and vision 6/9 is 32% .In group f, uncorrected visual acuity after 1week with vision 6/6 is 48% and vision 6/9 is 36%.In group r, uncorrected visual acuity after 2months with vision 6/6 is 60%.In group f, uncorrected visual acuity after 2months with vision 6/6 is 64%.Surgically induced astigmatism with ±1 to 2cylinder is 36% in group r and 28%

in group f. Kohnen et al found no difference in low contrast visual acuity between the IOL types in their study of a comparison of visual performance of a non foldable PMMA IOL and a foldable acrylic intraocular lens. The similar kind of result was also observed in the study done by a.j. afsar et al.

Residual spherical refractive error is an indication of the accuracy of prediction of the appropriate iol power. The SRK formula (equation i) and its modifications (SRK II) were used to predict the iol power required for each eye. These formulae were reasonable predictors of the iol power required for the desired refractive error (99% confidence limits between 5 2.30 d and 2 2.74 d). While these limits of agreement, a measure of the predictability of the refractive outcome, were smaller (i.e. Better) with the foldable iol than the rigid iol, this difference was not statistically significant. Similarly, as no significant induced astigmatism was found. It appears that both rigid iol and foldable iol caused minimal post-operative astigmatism.

Optimal iol surgery would not reduce the optical quality of the eye. Post-operative vision is an indirect measure of the optical quality of the eye. As there was no difference in visual acuity or contrast sensitivity between the foldable iol and rigid iol and no apparent corneal distortion, we conclude that both iols can achieve this goal. Therefore, there was no apparent visual benefit of implanting an acrylic foldable iol using small-incision surgery over implanting a rigid pmma 1ol using small-incision surgery.

If there is no benefit to small-incision surgery with foldable iols, implantation of the more expensive foldable iol may be an unnecessary expense. However, visual and refractive outcomes may not be the only important measures of cost-effectiveness. Although long term post-operative complications were not considered for this report, possible long-term benefits of acrylic lols have been suggested by recent reports. If acrylic foldable iols cause fewer post-operative complications and require less post-surgical care they may be cost-effective. Until these reports are confirmed by further, independent studies, it would appear more economical to implant the conventional rigid pmma iol using small-incision surgery, as we have found no additional visual benefits from implanting an acrylic foldable iol using micro-incision surgery.

V. Conclusion:

- In group r, uncorrected visual acuity after 1week with vision 6/6 is 40% and vision 6/9 is 32% .
- In group f, uncorrected visual acuity after 1week with vision 6/6 is 48% and vision 6/9 is 36%.
- In group r, uncorrected visual acuity after 2months with vision 6/6 is 60%.
- In group f, uncorrected visual acuity after 2months with vision 6/6 is 64%.
- Surgically induced astigmatism with ±1 to 2cylinder is 36% in group r and 28% in group f.

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