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The Visual Outcome between Foldable and Rigid Intraocular Lens Implantation in Phacoemulsification – A Hospital Based Study

Dr.Mona Liza Mahesar[1], Dr.Azfar Ahmed Mirza[2], Dr.Noman Ahmed[3], Dr.Sameen Afzal Junejo[4]& Dr. Asif Mashood Qazi[5]

[1](Assistant Professor, Department of Ophthalmology, Bilawal Medical College, LUMHS, Pakistan)
[2&3](AssiatantProfessort, Institute of Ophthalmology, LUMHS, Pakistan)
[4](Professort, Institute of Ophthalmology, LUMHS, Pakistan)
[5](Assistant Professor, Al-Ibrahim Eye Hospital, ISRA University, Pakistan)

Abstract:*This comparative study was carried at Liaquat University Eye Hospital of Liaquat University of Medical and health Sciences/ Jamshoro, Pakistan from 30/03/2011 to 29/03/2013 to compare visual outcome between Foldable and Rigid intraocular lens implantation in Phacoemulsification and to determine how Phacoemulsification with Foldable intraocular lens is more effective and preferred method of choice than Phacoemulsification with Rigid Polymethylmethacrylate intraocular lens. All patients included in the study had cataract with no evidence of any other disease. Mean age of the patient was 56.69 ±8.95 years. Most of the patients were male, i.e. 58%. Mean and standard deviation of measure of preoperative and post-operative Astigmatism on 1st day, 1st month, 3rd month and 6 month was found to be 0.84±0.42 D, 0.56±0.40 D, 0.57±0.38 D, 0.65±0.46 D and 0.71±0.48 D respectively. Friedman two way ANOVA was applied to measure the effect of postoperative Astigmatism on 1st day, 1st month, 3rd month and 6th month which shows that there is a significant difference found in the measurement of effect of postoperative Astigmatism on 1st day, 1st month, 3rd month and 6 month (P-Value 0.001).*

I.Introduction

Cataract is the leading cause of curable blindness world-wide as well as in Pakistan[1,2]. Cataract surgery form the major workload of most Ophthalmic units in the country. Three hundred fourteen people are visually impaired worldwide, and forty-five million of them are blind[3]. According to World Health Organization, eighteen million people are blind worldwide from bilateral mature cataract. With an aging population that figure is estimated to rise to fifty million by Two thousand twenty[4]. This is special concern in developing nations where 87 percent of the world's blind are located[5]. Conventional extracapsular cataract extraction, Manual small incision cataract surgery and Phacoemulsification are the three most popular forms of cataract surgeries frequently practiced in Pakistan. Extracapsular cataract extraction is a procedure in which cataract is removed through limbal or corneal section. After anterior capsulotomy, nucleus is removed and residual cortical matter is aspirated with two-way cannula. Phacoemulsification method of cataract extraction is performed with help of phaco machine. The cataract is fragmented (emulsified) and aspirated with phacoemulsifier probe[6]. In 1967, first phacoemulsification was carried out by Charles Kelman[7].Phacoemulsification is the most popular and preferred method of choice[8]. Recent advances and refinements in machines and microsurgical instruments have made it more effective. In Phacoemulsification, foldable lens is implanted through small 3mm incision which generally does not require any stitch, as it is watertight, with more rapid wound healing, less astigmatism and early visual rehabilitation[9,10,11]. Foldable intraocular lenses are biocompatible. Rigid intraocular lens implantation has many disadvantages that require larger incision about five to seven mm with at least two stitches, can result into postoperative induced astigmatism. There can also be chances of postoperative endophthalmitis, secondary glaucoma in larger incision. Phacoemulsification with foldable intraocular lens has become the routine procedure of choice over Extracapsular cataract extraction in the Western World as well as in our country. The patient can resume their normal activity faster.

II.Material and methods:

2.1Patients:The current study was carried at Liaquat University Eye Hospital of Liaquat University of Medical and Health Sciences/ Jamshoro, Pakistan,From 30/03/2011 to 29/03/2013. 100 patients between 45-65 age range of both genderdiagnosed with cataract with no evidence of any other major disease were part of the current study. This StudyincludedPreoperative and Postoperative Best

corrected visual acuity of all patient admitted for Foldable or Rigid intraocular lens implantation in Phacoemulsification surgery.

- Unaided and aided visual acuity postoperative [After: 1st day, 1st month, 3rd month, 6th month]
- Measurement of preoperative and postoperative astigmatism.
- Intra- operative and post-operative complications: corneal edema.

Foldable and Rigid Intraocular Lens in Cataract Phacoemulsification

2.2Phacoemulsification Procedure:

- Legacy vision System with software 2.03 or higher, Torsional hand piece (HP)
- Anaesthesia : Topical and subtenon
- Incision: Limbal corneal 3mm single plane for foldable lens and 5-7mm for rigid lens.
- Capsulorrhexis and hydrodissection, sculpting and division using step by step chop in situ and lateral separation, irrigation and aspiration.
- Single piece foldable or rigid intraocular lens in the bag.

III. Results and Discussion:

Total one hundred patients were enrolled in our study. The mean age of the patients was found to be 56.69 years with the standard deviation of ±8.95 years (Table 1). Gender distribution shows that 58 patients were male, while 42 patients were female.Most of the patients in our study had 12 O'clock type of incision, i.e. 75, while only 25 patients had temporal type of incision.

Measurement of post-operative unaided visual acuity shows most of the patients had 6/6 visual acuity on day 1, month 1, month 3 and month 6, i.e. 23%, 24%, 23% and 23% respectively (Figure 1, 2, 3 and 4).

Most of the patients had 6/6 best corrected visual acuity on day 1, month 1, month 3 and month 6 as well, i.e. 38%, 39%, 38% and 34% respectively (Figure 5,6,7 and 8).

Mean and standard deviation of measure of preoperative and post-operative Astigmatism on 1st day, 1st month, 3rd month and 6 month was found to be 0.84±0.42 D, 0.56±0.40 D, 0.57±0.38 D, 0.65±0.46 D and 0.71±0.48 D respectively. Assumption of normality was not assumed therefore non-parametric test, i.e. Friedman two way ANOVA was applied to measure the effect of postoperative Astigmatism on 1st day, 1st month, 3rd month and 6 month at 0.05 level of significance and p-value was found to be 0.001 which shows that there is a significant difference found in the measurement of effect of postoperative Astigmatism on 1st day, 1st month, 3rd month and 6 month (Table 2 and 3).

Out of 100 patients postoperative complication was found in only 7 (7%) patients, 6% patients had Keratitis, while only 1% patient had corneal edema in our study (Figure 11). None of the patient found with intra operative complication in our study. Chi-square test was applied to compare visual outcome between Foldable and Rigid intraocular lens implantation in Phacoemulsification and it shows that there is difference found in visual outcome between rigid and foldable IOL implantation. P-value was found to be 0.031 for day 1, 0.031 for month 1, 0.045 for month 3 and 0.033 for month 6 (Table 4).

Table 1 showing the mean age of patients
n=100

Age of the patients (in years)	Mean	Standard Deviation	Minimum	Maximum
	56.69	±8.95	45	75

Table 2: showing preoperative Astigmatism
n=100

Per operative Astigmatism	Mean	Standard Deviation
	0.84	±0.42

Table 3: showing Mean of Postoperative Astigmatism
n=100

Postoperative Astigmatism	Mean	Standard Deviation	P-Value
1st Day	0.56	±0.40	0.001
1st month	0.57	±0.38	
3rd month	0.65	±0.46	
6th month	0.71	0.71	

Table 4:showing % of postoperative Astigmatism & Rigid and Foldable IOL n=100

Post-operative Astigmatism		Rigid IOL n(%)	Foldable IOL n(%)	P-value
1st day	≤1	28(56)	34(68)	0.031
	>1	22(44)	16(32)	
1st month	≤1	28(56)	34(68)	0.031
	>1	22(44)	16(32)	
3rd month	≤1	22(44)	35(30)	0.045
	>1	28(56)	15(30)	
6th month	≤1	24(48)	15(30)	0.033
	>1	26(52)	30(60)	

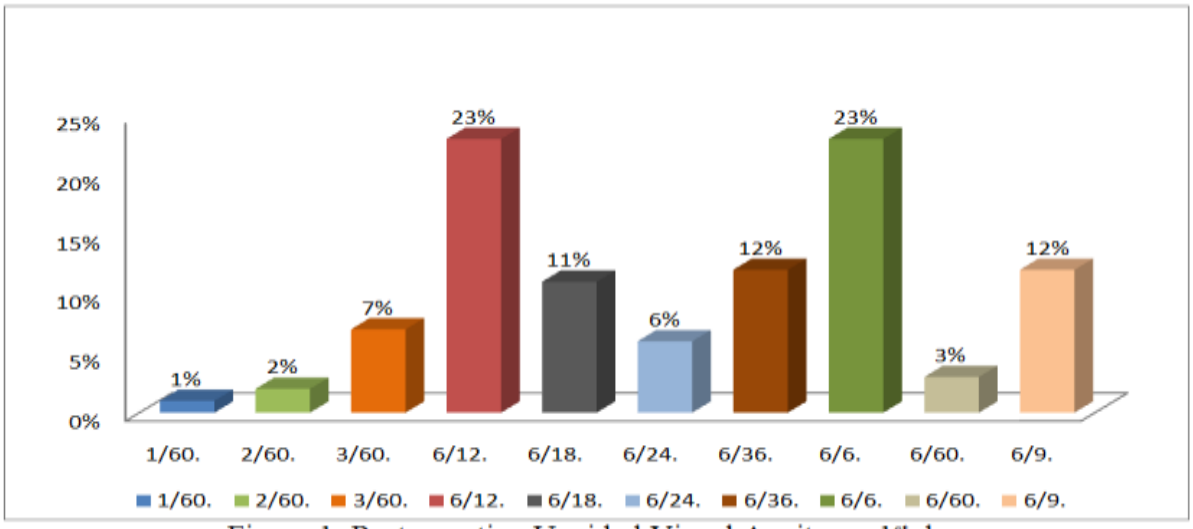

Figure 1: Postoperative Unaided Visual Acuity on 1st day

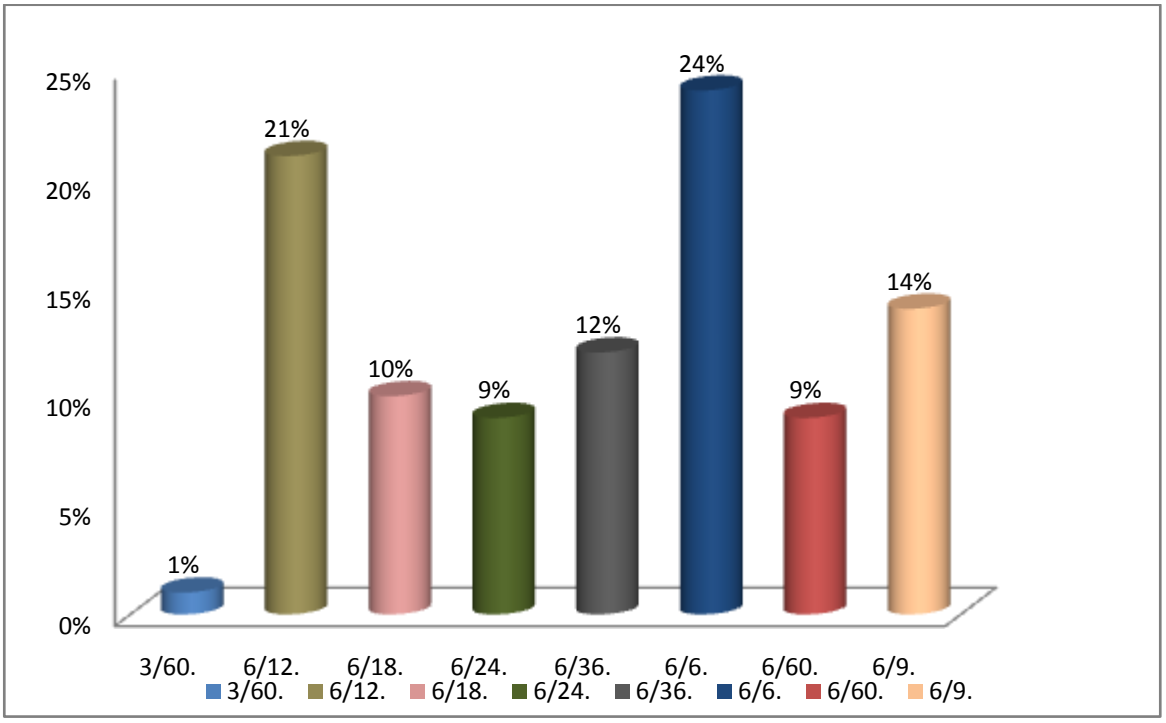

Figure 1: Postoperative Unaided Visual Acuity on 1st month

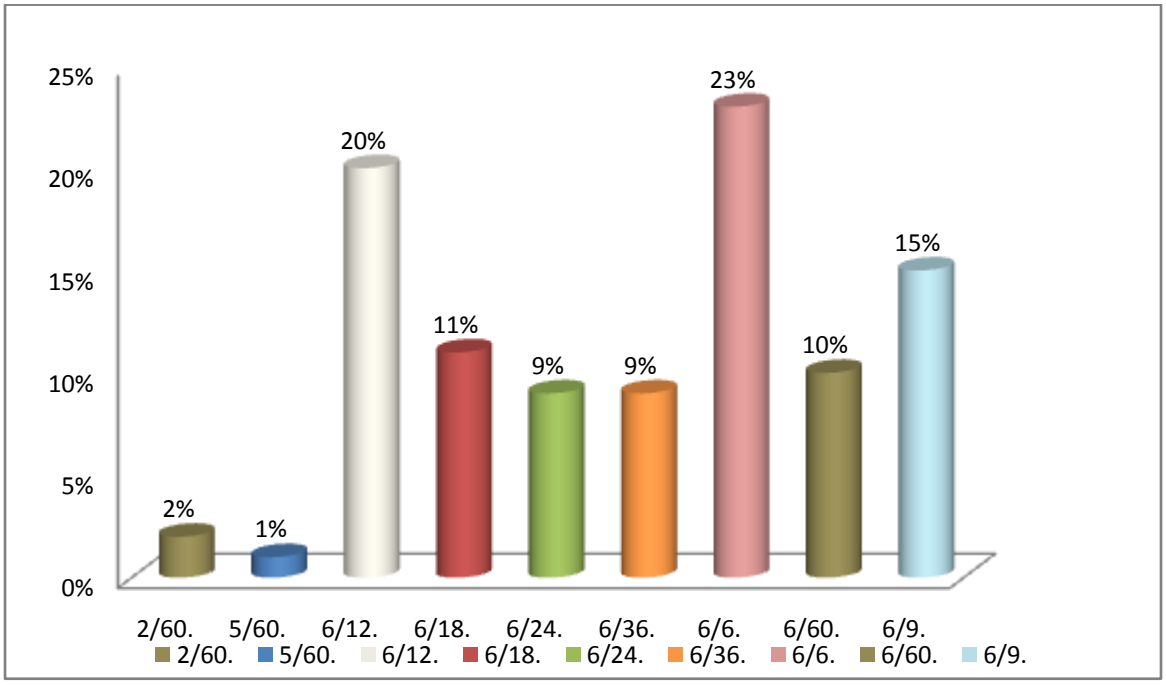

Figure 2: Postoperative Unaided Visual Acuity on 3rd month

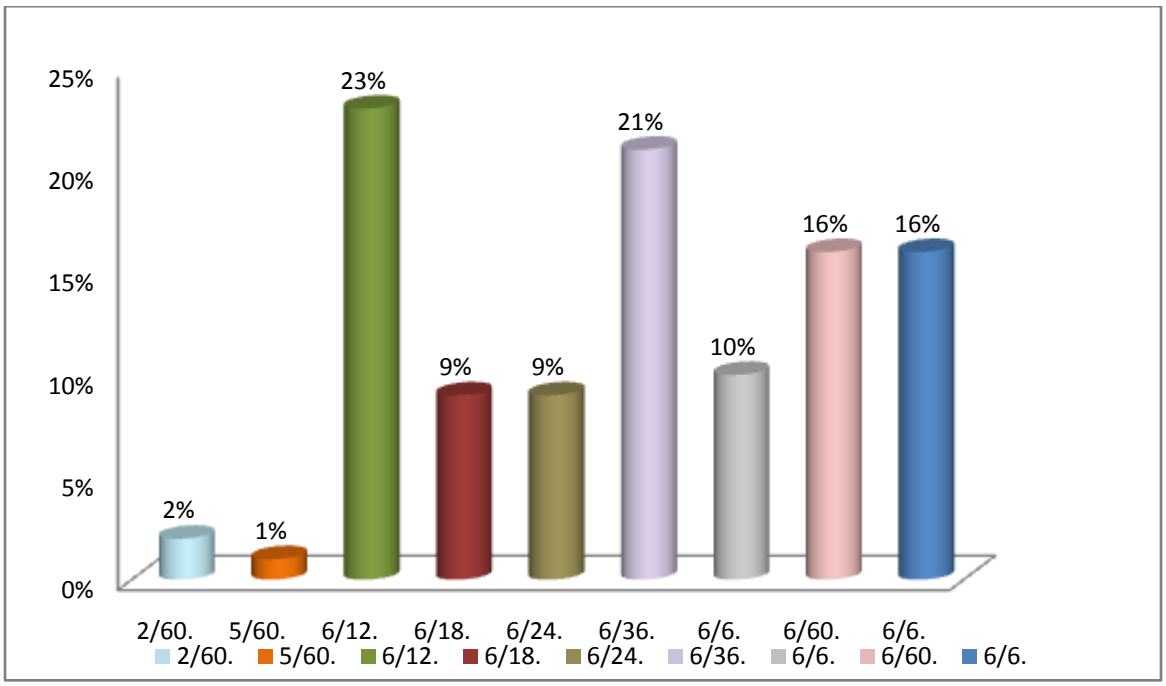

Figure 3: Postoperative Unaided Visual Acuity on 6th month

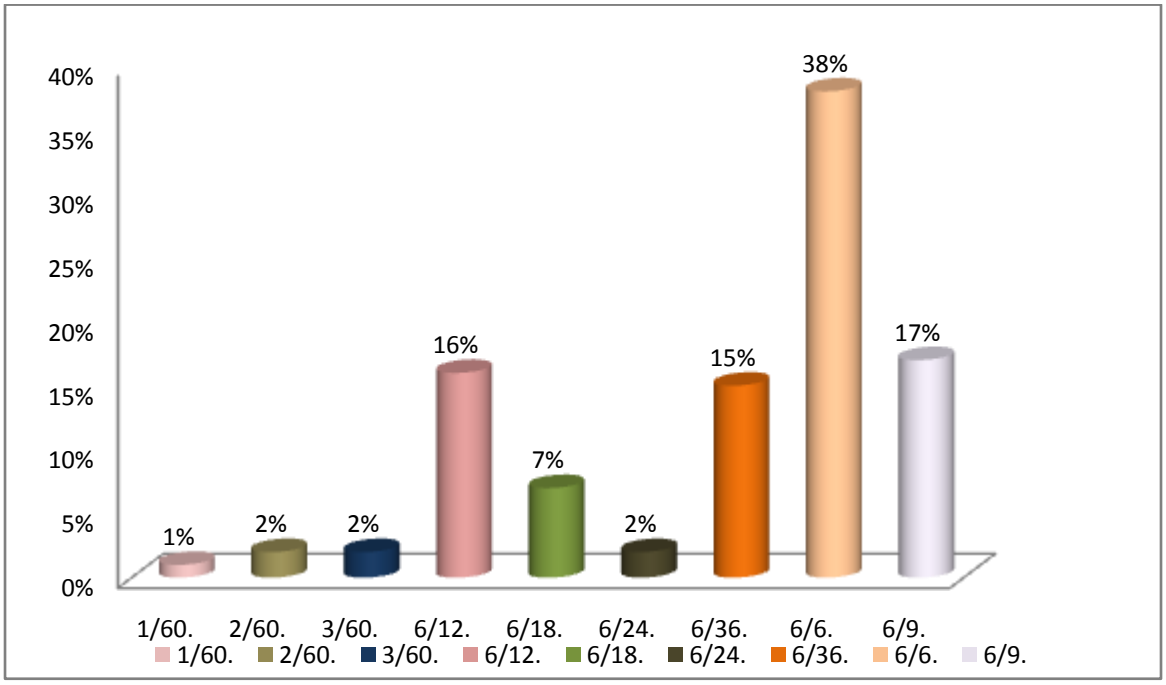

Figure 4: Postoperative best corrected visual acuity on day 1

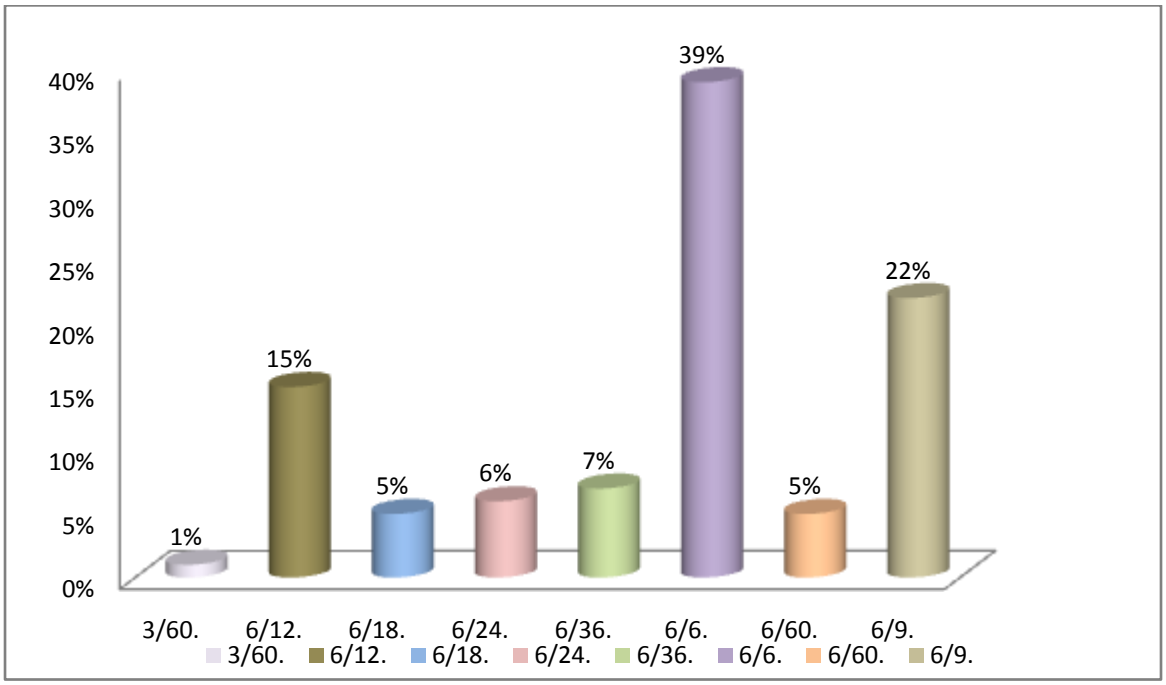

Figure 5: Postoperative Best corrected Visual Acuity on month 1

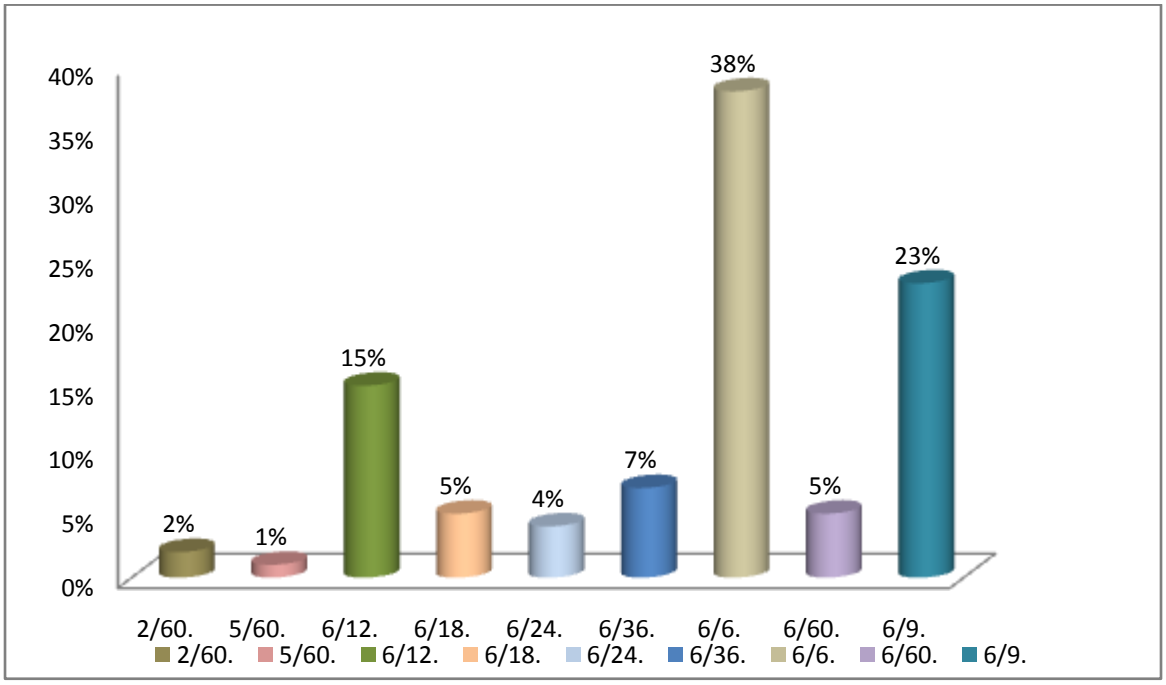

Figure 6: Postoperative Best corrected Visual Acuity on month 3

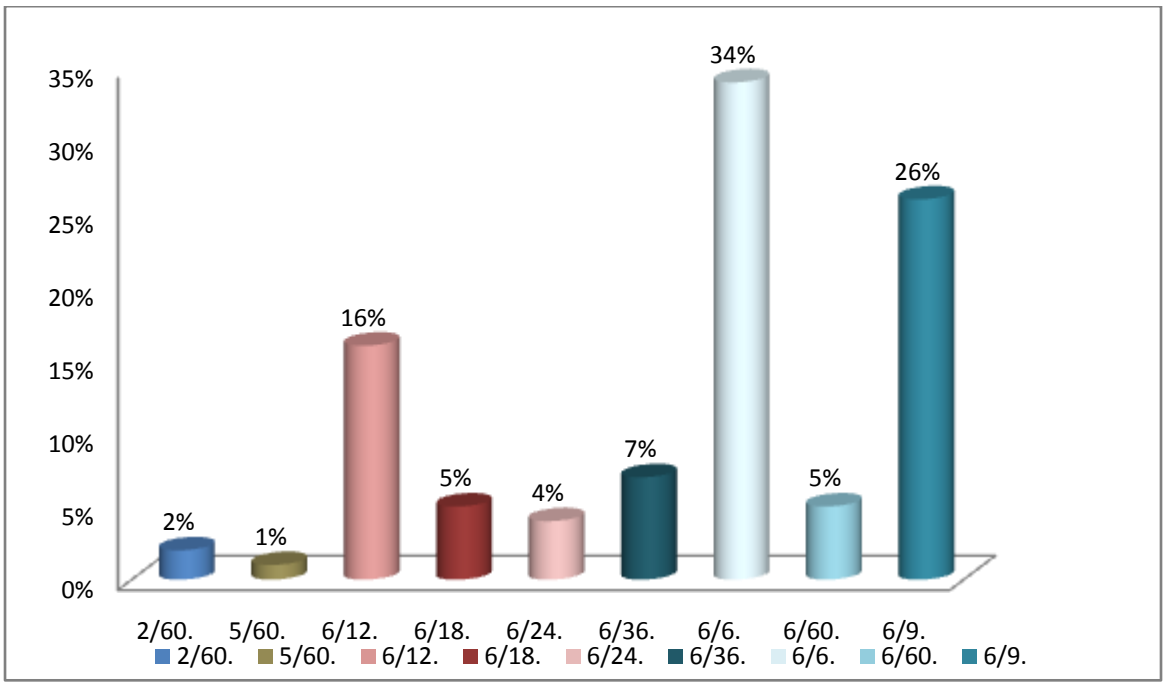

Figure 7: Postoperative Best Corrected Visual Acuity on month 6

IV.Conclusion:

There is significant difference found in visual outcome between rigid and foldable IOL implantation. Foldable IOL implantation is better than Rigid IOL implantation.

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