



Research Article

A Study on Refractive Outcome Following Manual Small Incision Cataract Surgery with Rigid PCIOL

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Abstract

Introduction: *Cataract is a significant and increasing global problem with vast economic and social implications^[1]. It is the principal cause of blindness in India accounting for 62.6% (92). The prevalence of blinding cataract will only increase as people live longer, so cataract will continue to be, by far, the most important treatable cause of blindness. It is estimated that the present number of 20 million of cataract blind will double by year 2030.^[2]*

Materials and Methods: *Study design: Cross sectional observational study*

Source of data: All the patients admitted with small incision cataract surgery (SICS) with PCIOL implant, in the department of Ophthalmology Rajarajeshwari Medical College and Hospital, Bangalore
Study period: 18 months (Jan 2021- June 2022)

Sample size: 200 patients.

Results and Observations: *In our study, at 1st post operative week, most patients had visual acuity score of better than 6/9 and least had less than 6/60 score. A follow up of patients at 2nd week, 6th week and end of 6th week showed that visual acuity improved at 2nd and 6th post-operative weeks.. Most patients were in the refraction range of < -0.50.*

Conclusion: *From our study we conclude that the uncorrected visual acuity of cataract patients improved in the early and late post-operative weeks, after undergoing Manual Small Incision Cataract Surgery with Rigid PCIOL (MSICS) to a great extent. MSICS can be accepted as an alternative to phacoemulsification in developing countries like India.*

Keywords: *Cataract, Small incision, Astigmatic, Visual outcome.*

Introduction

Cataract poses both a significant socioeconomic burden and a public health concern as it is the leading cause of avoidable blindness worldwide and cataract surgery forms the major workload of most ophthalmic units in the country.^[1] An estimated 4 million people become blind because of cataract every year, which is added to a backlog of 10 million operable cataracts in India, whereas only 5 million cataract surgeries are performed annually in the country.^[3] Techniques of Cataract Surgery has come a long way from ICCE through ECCE, MSICS to phacoemulsification. Conventional extracapsular cataract surgery (ECCE) with a large corneal section requiring sutures has declined in popularity. Its main disadvantages were the delay in visual rehabilitation due to the induction of corneal astigmatism as well as the need to remove corneal sutures following surgery^[4]. Furthermore, sulcus IOL placement, makes the actual post-operative IOL position, and hence refraction, less predictable^[5]. Manual small incision cataract surgery (MSICS) is the most popular surgical management option for cataracts in developing countries. This is mainly because of the low cost, short surgical time, reduced dependence on technology, and equivalent visual outcome to phacoemulsification. There is now growing need for good refractive outcome in developing countries.^[6,7]

This study emphasizes on the refractive error profile of the patients following uncomplicated MSICS. The outcome of the study may help improve postoperative visual acuity (VA) and reduce the spectacle burden on the low-income patient.

Aims and Objectives

- Assessment of refractive outcome following manual small incision cataract surgery with Rigid PCIOL at a tertiary health center.

Materials & Methods

The present study was a single-center, Cross sectional observational Study conducted on patients admitted with small incision cataract surgery (SICS) with PCIOL implant, irrespective of treatment and in the department of Ophthalmology Rajarajeshwari Medical College and Hospital, Bangalore from January 2021 to June 2022. Prior initiation of the study obtained Ethical and Research Committee clearance from Rajarajeshwari Medical College and Hospital, Bangalore (Annexure B). During present study total 300 incision cataract surgery (MSICS) with PCIOL implant, Patients were reviewed in ophthalmology department, among 200 patients were enrolled into the study according present study inclusion criteria and 100 patients were excluded according exclusion criteria. Patients were included in the study based on the inclusion and the exclusion criteria as mentioned below.

Inclusion Criteria

- a) Patients who give consent for the study.
- b) Patients who underwent small incision cataract surgery only.
- c) Patients whose surgery was uneventful.
- d) Patients on whom Rigid PCIOL was implanted.

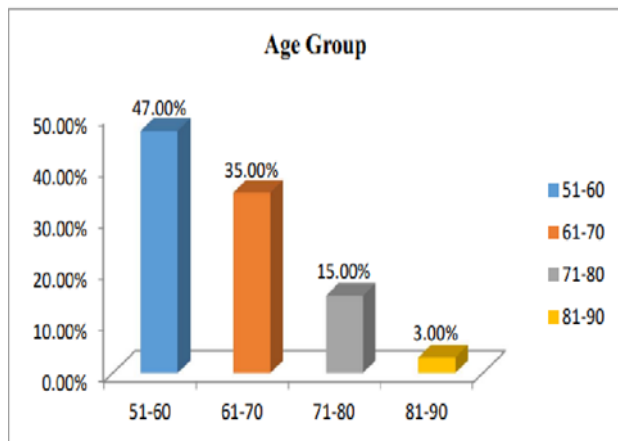
Exclusion Criteria

- a) Patients who did not give their consent.
- b) Patients who had complications during surgery.
- c) Patients with any pre-existing ocular pathology and psychiatric abnormalities.
- d) Patients who underwent MSICS with foldable IOLs, Phacoemulsification, ECCE, ICCE.

Results

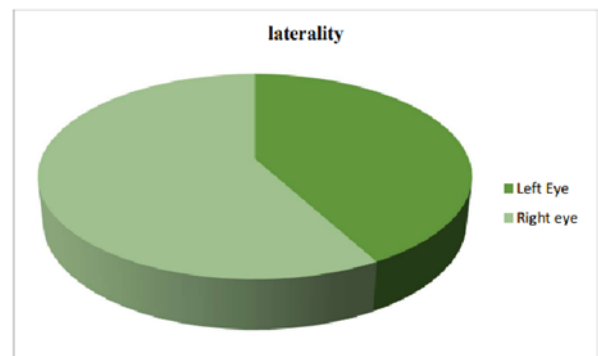
In the present study, the patients were categorized into four age groups. More patients were found in the age group of 51-60 years, 94 (47.00%); followed by 70 (35.00%) in 61-70 years age group; 30 (15.00%) in the 71 - 80 years age group and finally 6 (3%) in 81-90 years age group.

Age Group	Frequency	Percentage
51-60	94	47.00%
61-70	70	35.00%
71-80	30	15.00%
81-90	6	3.00%
Total	200	100
Mean ±SD	62.87±8.5	



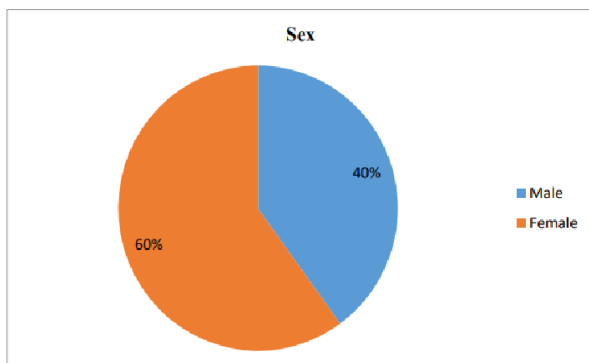
The below table represents laterality wise distribution of patients. It was found that most patients undergoing MSICS procedures in their right eye is 116 (58%) compared with those in left eye 84 (42%).

lity	Frequency	Percentage
Left Eye	84	42%
Right eye	116	58%
Total	200	100



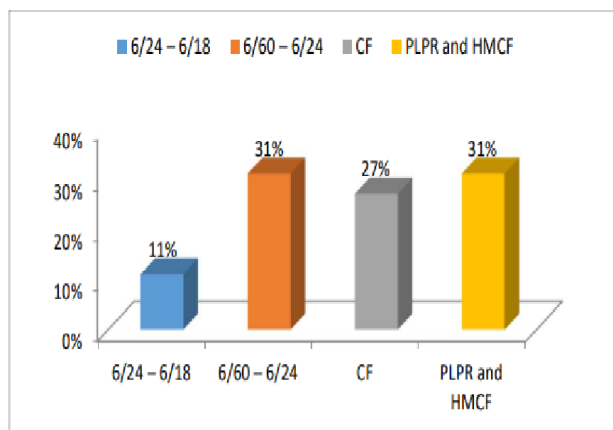
Majority of the study participants were females (60%) with males contributing for 40% of study participants.

Sex	Frequency	Percentage
Male	80	40%
Female	120	60%
Total	200	100



The below table represents distribution of patients according to Pre-operative visual acuity. It was found that most patients undergoing MSICS procedures had PLPR and HMCF, i.e., 62 (31%); followed by 62 (31%) with acuity ranging from 6/60 – 6/24; followed by CF differences 54 (27%) and lastly 22 with acuity ranging from 6/24 – 6/18 (11%). The p-value calculated was 0.32 indicating no significant difference between the groups in terms of pre-operative visual acuity.

Diagnosis	Frequency	Percentage	Value
6/24 – 6/18	22	11%	0.32
6/60 – 6/24	62	31%	
CF	54	27%	
PLPR and HMCF	62	31%	
Total	200	100	

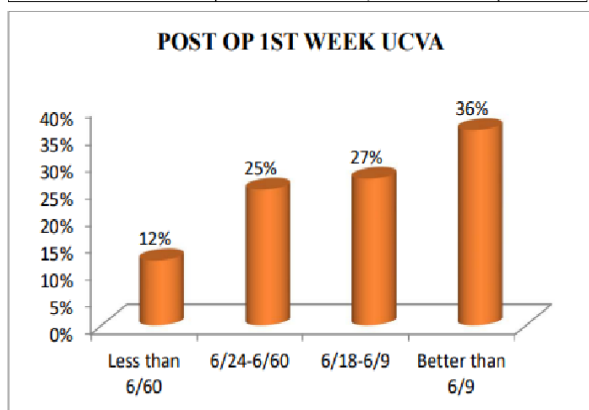
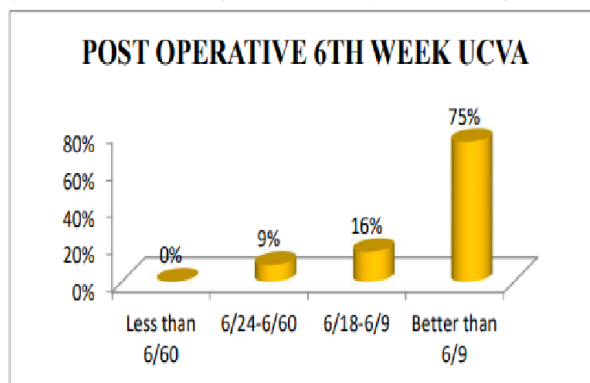


The below table represents distribution of patients according to Post-operative visual acuity at 1st week. It was found that most patients underwent MSICS procedures had visual acuity scores of better than 6/9, i.e., 72 (36 %); followed by 54 in the range of 6/18-6/9 (27 %); 50 patients were in the range of 6/24-6/60 (25%) and finally 24 in the range of visual acuity less than 6/60 (12%). The p-value calculated was 0.21 indicating no significant difference between the groups in terms of post-operative visual acuity at 1st week.

The below table represents distribution of patients according to Post-operative visual acuity at the end of 6th week. It was found that most patients underwent MSICS procedures had visual acuity scores of better than 6/9, i.e., 150 (75 %); followed by 32 in the range of 6/18-6/9 (16 %); 18 patients were in the range of 6/24-6/60 (9%) and no patients were in the range of visual acuity less than 6/60 (0 %). The p-value calculated was 0.21 indicating no significant difference between the groups in terms of post-operative visual acuity at 6th week.

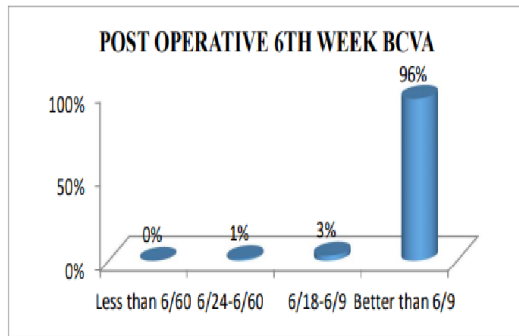
UCVA	Frequency	Percentage	-Value
Less than 6/60	0	00%	0.21
6/24-6/60	18	9%	
6/18-6/9	32	16%	
Better than 6/9	150	75%	
Total	200	100	

UCVA	Frequency	Percentage	-Value
Less than 6/60	24	12%	0.21
6/24-6/60	50	25%	
6/18-6/9	54	27%	
Better than 6/9	72	36%	
Total	200	100	



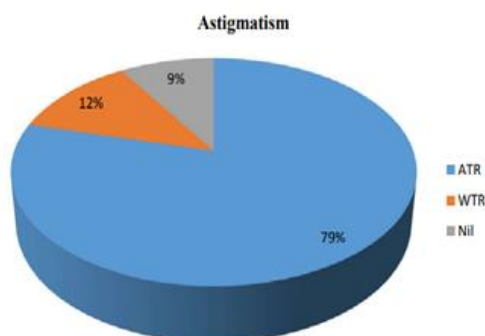
The below table represents distribution of patients according to BCVA at the end of 6 weeks. It was found that most patients underwent MSICS procedures had visual acuity scores of better than 6/9, i.e., 192 (96 %); followed by 6 in the range of 6/18-6/9 (3 %); 2 patients were in the range of 6/24-6/60 (1 %) and no patients were in the range of visual acuity less than 6/60 (0 %). The p-value calculated was 0.21 indicating no significant difference between the groups in terms of post-operative visual acuity at the end of 6th week.

BCVA	Frequency	Percentage	p-Value
Less than 6/60	0	00%	0.21
6/24-6/60	2	1%	
6/18-6/9	6	3%	
Better than 6/9	192	96%	
Total	200	100	



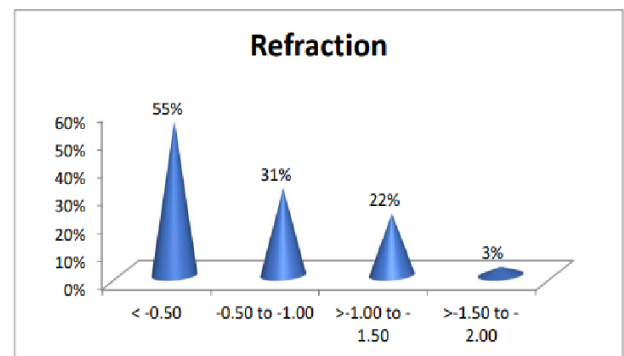
The below table represents distribution of patients according to the type of astigmatism they experience. Most patients had against the rule (ATR) astigmatism, i.e., 158 (79 %); followed by 24 with with-the-rule (WTR) astigmatism (12 %) and 18 patients had nil astigmatism (9 %). The p-value calculated was 0.21 indicating no significant difference between the groups in terms of astigmatism.

Astigmatism	Frequency	Percentage	p-Value
ATR	158	79%	0.21
WTR	24	12%	
Nil	18	9%	
Total	200	100	



The below table represents distribution of patients according to refraction. Most patients were in the refraction range of < -0.50, i.e., 110 (55 %); followed by 62 in the range of -0.50 to -1.00 (31 %); 22 were in the range of > -1.00 to -1.50 (22 %) and 6 were in the range of > -1.50 to -2.00 (3 %). The p-value calculated was 0.21 indicating no significant difference between the groups in terms of refraction.

Refraction	Frequency	Percentage	p-Value
< -0.50	110	55%	0.21
-0.50 to -1.00	62	31%	
> -1.00 to -1.50	22	22%	
> -1.50 to -2.00	6	3%	
Total	200	100	



Discussion

- In India 62.619 million people are visually impaired. 544 million has low vision and 8.075 million people are blind accounting for 20.5% of the global blindness burden. India is second only to china in the high prevalence of visual impairment and blindness.^[5]
- Cataract is the most common cause of curable bilateral blindness due to increasing age.^[11] It is irreversible opacification of lens or capsule due to denaturation of lens proteins.
- It causes gradual, painless progressive diminution of vision & if left untreated, can

lead to various complications like lens induced glaucoma and uveitis.

- MSICS involves instruments to remove cataractous lens from the eye through a small incision.^[1]
- Several studies have shown that despite phacoemulsification surgery being popular in developed countries it is not suitable for developing countries^[7] that has a significant backlog of patients requiring surgery, as the technique is associated with high costs including the cost of phaco machine, maintenance, staff wages and the cost of consumables.^[8,9,10]
- Driven by the need for more cost effective options, an increasing trend in developing countries is the use of manual suture less MSICS, which some have claimed is comparable to phacoemulsification in terms of obtaining excellent visual outcome being faster, less costly, less technology dependent and less learning curve.
- The present study was on 200 patients with cataract irrespective of type of cataract with no other ocular pathology. All the patients were undergoing Manual Small Incision Cataract Surgery with Rigid PC- IOL (MSICS). Patients were followed at 1st week, 2nd week, 6th week and at the end of 6th week. We observed the UCVA in all the follow up visits. We also checked for surgically induced astigmatism following MSICS.
- In our study it was found that most patients underwent MSICS procedures had visual acuity scores of better than 6/9, i.e., 36%; followed by 27% in the range of 6/18- 6/9 ; 25% patients were in the range of 6/24-6/60 and finally 12% in the range of visual acuity less than 6/60, i.e., 51 %; followed by 30% in the range of 6/18-6/9 ; 19% patients were in the range of 6/24-6/60 and no patients (0%) were in the range of visual acuity less than 6/60.

- Gogate et al^[12] compared the efficacy, safety, and astigmatic change after Cataract surgery by phacoemulsification and MSICS via a randomized control trial. The authors found that at week 1, there were 68.2% patients in the phacoemulsification group and 61.25% patients in the MSICS group that had UCVA better than or equal to 6/18.

Conclusion

- From our study we conclude that the uncorrected visual acuity of cataract patients improved in the early and late post-operative weeks, after undergoing Manual Small incision Cataract Surgery with Rigid PCIOL (MSICS) to a great extent.
- The best corrected visual acuity was at the end of 6th week.
- MSICS induced astigmatism post-operatively can be corrected later to obtain patients with good vision at the end of 6 weeks.
- MSICS being cost effective, low technology dependent and less learning curve needed can be accepted as an alternative to phacoemulsification in developing countries like India.

Acknowledgement: Nil

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