



A COMPARATIVE PROSPECTIVE STUDY OF EFFICACY AND VISUAL OUTCOME OF PHACOEMULSIFICATION AND SICS IN NORTH INDIAN POPULATION IN AND AROUND LUCKNOW.

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ABSTRACT

PURPOSE: To evaluate efficacy and visual outcome of manual small incision cataract surgery (SICS) and phacoemulsification. **METHODS:** A prospective, interventional, observational, follow up study was conducted on 120 patients with clinically significant senile cataract undergoing cataract surgery by either SICS or phacoemulsification, at a tertiary eye care centre in Lucknow. The follow up evaluations were carried out at post-operative day 1, 1st week, 3rd week and 6th week. **RESULTS:** On first postoperative day, there was significantly better visual outcome with phacoemulsification than SICS ($p = 0.005$) with 80% patients in SICS group and 90% patients in phacoemulsification group, had best corrected visual acuity (BCVA) better than equal to 6/18. However at 6th week, final visual recovery was similar in both the groups (BCVA 6/18 in 96.7% in SICS group and 100% in phacoemulsification group) with no statistically significant difference. There was no significant difference in overall per operative and post operative complications between SICS and phacoemulsification. SICS and phacoemulsification did not show significant difference in surgery induced astigmatism (SIA) with SIA of 0.733D and 0.775D in SICS and phacoemulsification group respectively. **CONCLUSIONS:** Phacoemulsification is superior to SICS in terms of early visual rehabilitation. But there is no significant difference in final visual outcome and complication rates between the two techniques.

KEYWORDS :

INTRODUCTION

Cataract is one of the leading cause of avoidable blindness all over the globe. Over the years from Susrutha's couching to Charles D Kelman's phacoemulsification¹, cataract surgery has witnessed a phenomenal progress. Initially cataract surgery was aimed to prevent blindness² but now it has progressed to refractive procedure that aims for post operative emmetropia³.

Phacoemulsification and SICS are the most commonly done procedures. In our country, there is a significant backlog of cataract mainly in rural and suburban areas. Both the techniques have different advocates. Phacoemulsification is considered as the gold standard for cataract surgery. But in developing country like India for various reasons, mainly socio-economic, most experts do not see phacoemulsification as the answer to the word cataract blindness^{4,5}. SICS has emerged as less expensive alternative to phacoemulsification. It may be considered a better procedure for doing mass surgeries. SIA is a common cause of poor visual outcome in SICS. Site, size and configuration of the incision influences SIA in SICS. Larger and superior incisions are observed to cause more astigmatism. With this in view, the present study was aimed to compare the efficacy and visual outcome following phacoemulsification and a cost effective procedure called small incision cataract surgery.

MATERIAL AND METHODS

The present study is a prospective, interventional, observational, follow up study conducted at a tertiary care referral centre in Lucknow. Patients with clinically significant cataract other than subluxated and dislocated cataracts, hypermature cataracts, paediatric cataracts were included. Also cases having associated corneal or pupillary abnormalities, glaucoma, macular/retinal lesions, optic nerve disease, uveitis, trichiasis and entropion were excluded.

Preoperative evaluation included: visual acuity (VA) with pin whole, intraocular pressure, syringing of lacrimal system, detailed slit lamp examination, dilated fundus examination, IOL power calculation by biometry and keratometry (K).

The study was conducted for a period of 18 months after obtaining approval from the hospital ethical committee. 120 patients were enrolled and randomly distributed in two groups with 60 patients in each. In group A, SICS with superotemporal frown incision and in group B, phacoemulsification with temporal clear corneal incision, was done with implantation of posterior chamber intraocular lens (IOL). All the patients were followed up at 1st postoperative day, the end of 1 week, 3rd week and 6th weeks. During each visit VA, BCVA, K - reading, and slit lamp examination were recorded. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) version 16.0 statistical analysis software.

RESULTS

Among 120 patients, 61 patients were male and 59 were female. Patient age ranged from 41 to 83 yrs. Mean age of patient was 60.58 yrs. The most common grade of nucleus was II, seen in 59 patients (49.17%) followed by grade III in 34 patients (28.3%). The most common per-operative complication was PCR seen in 6.7% (4 eyes) cases in SICS group and 3.3% (2 eyes) in phacoemulsification group. PCR was more common in brown cataract in both the groups.

In SICS group, the most common post-operative complication was hyphema seen in 5 cases (8.3%) whereas the most common post-operative complication in phacoemulsification was striate keratopathy seen in 4 cases (6.7%). There was no significant difference in overall per operative and post operative complications between SICS and phacoemulsification. However, hyphema was significantly seen more in SICS than phacoemulsification (p value = 0.025).

Table-1 : Analysis Of Post-operative Complications

SN	COMPLICATION	TOTAL	SICS	PHACO	p value
1.	HYPHEMA	5	5	0	0.025
2.	STRIATE KERATOPATHY	5	1	4	0.179
3.	CORNEAL OEDEMA	6	3	3	1.00
4.	DM FOLDS	2	2	0	0.157
5.	UVEITIS	4	1	3	0.317
6.	RESI. CORTEX	2	2	0	0.157

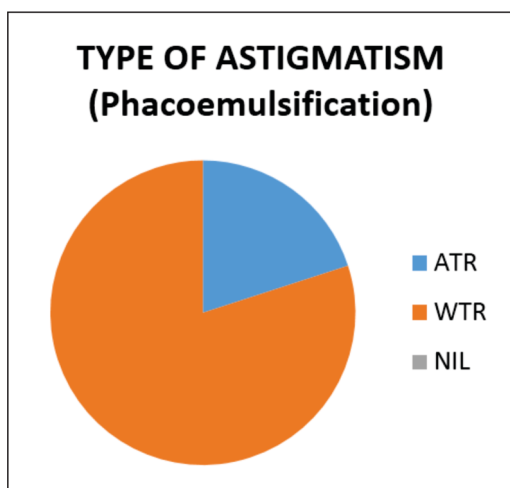
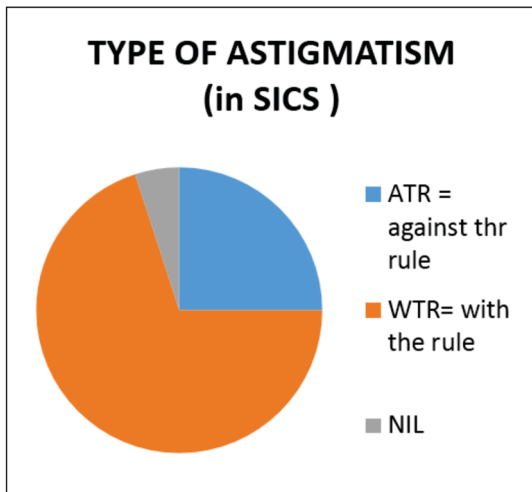
On first post operative day 48 patients (80%) in SICS group and 54 patients (90%) in phacoemulsification group, had BCVA better than equal to 6/18. At first post-operative day, there was significantly better visual outcome with phacoemulsification than SICS ($p = 0.005$). On first post-operative week, 54 patients (90%) in SICS group and 58 patients in phacoemulsification group (96.66%) had BCVA better than equal to 6/18. At 6th week final visual recovery was 6/18 in 96.7% in SICS group. In phacoemulsification, all the patients had final visual outcome better than 6/18 at 6th week. At 6th week, visual outcome of both phacoemulsification and SICS was comparable and there was no statistically significant difference.

Table: Pattern Of Visual Recovery In The Two Groups (BCVA)

POST-OPERATIVE	SICS (n=60)		PHACO (n=60)		SIGNIFICANCE OF DIFFERENCE	
	Mean	SD	Mean	SD	"t"	"p"
DAY 1	0.35	0.21	0.25	0.16	2.84	0.005
1 ST WEEK	0.21	0.20	0.19	0.14	0.57	0.56
3 RD WEEK	0.14	0.18	0.11	0.12	1.18	0.23
6 TH WEEK	0.11	0.16	0.07	0.09	1.51	0.13

At 6th week, net SIA was 0.733D and 0.775D in SICS and phacoemulsification group respectively. SICS with supero temporal incision and phacoemulsification with temporal incision did not show significant difference in induced astigmatism (p value >0.05). At 6th week, majority of the cases shifted towards with the rule (WTR) astigmatism in both the groups (70% in SICS and 80% in phacoemulsification).

Graph: Post-operative Astigmatism At 6th Week



DISCUSSION

Phacoemulsification is the preferred technique for cataract surgery in developed countries, and also to some extent in the developing countries. While phacoemulsification remains the far more advanced and technically superior method of cataract surgery, it is not always possible either from a cost perspective or the density of the cataracts involved. Both phacoemulsification and SICS achieve excellent visual outcomes with low complication rates, but SICS is significantly less expensive and requires less technology^(6,7), hence preferred by many surgeons in the developing countries.

The present study shows better visual outcomes with phacoemulsification on first post operative day which does not correlates with the study by Goel R et al⁸ and Cook C⁹. Both these studies showed no difference in BCVA on post operative day 1. In the study by Goel R et al⁸ visual outcomes were compared in subluxated cataract, which were not included in our study. Cook C⁹ showed comparable results with both the techniques on first post-operative day which could be because registrars did more of the phaco-emulsification procedures, and consultants more of the manual small-incision operations. Assuming that consultants had greater surgical expertise than residents, this could have introduced a bias favouring the outcome of the manual small-incision operations. Our study was not in correlation with the study by Ruit et al⁶ which showed vision on postoperative day 1 was better with manual SICS. This was correlated with the greater increase in corneal thickness in the phacoemulsification group. The increased corneal oedema that was seen in the phacoemulsification group was understandable, given the advanced nuclear cataracts in this patient population. But in our study this kind of difference between the patient populations in the two groups, was not there.

The present study showed no significant difference in final visual outcome between the two groups at 6th week follow up which is in correlation with the studies done by Ruit et al⁶ and Venkatesh et al¹⁰. The present study is not in correlation with the studies done by Cook C⁹ and HariPriya A et al¹¹. They showed better results with phacoemulsification in comparison to SICS. The study done by HariPriya A et al¹¹ was different from our study, as visual recovery of those cases which had undergone complication during surgery, was compared.

All the previous studies have shown surgically induced astigmatism (SIA) in the range of 0.53-1.50 D for SICS group and 0.70-1.1 D for phaco group. Our study also shows SIA in this range only. The study conducted by Hennig A et al¹² on SICS showed SIA in the higher range which is much more than SIA in our study. This is due to the fact that the incision was superior in their study, which is known to cause more astigmatism whereas incision was supero-temporal in our study.

Statistically significant difference in SIA between the two groups was not observed in our study($p=0.71$) which is in correlation with the studies done by Ruit et al⁶ and Pallavi et al¹³ and not in correlation with the study done by George et al¹⁴ and Cook C⁹. Both these studies showed less SIA with phacoemulsification in comparison to SICS. Our study differs from both these studies as in our study, SICS was done exclusively by supero-temporal incision but in those two studies even superior incisions were included in the SICS group which is known to cause more astigmatism. Our results corroborate with findings of Madhavi Madhu¹⁵ who showed that a superior incision induces more ATR in comparison to temporal incision. Temporal approach group showed uncorrected visual acuity of 20/25 or better. This was mainly due to the shift towards ATR in superior approach group and WTR in temporal group. The present study also correlates with the study done by Gokhale NS, Sahney S¹⁶. Their study concluded that the superior incision resulted in more ATR shift where as temporal incision resulted in WTR shift. Similarly in

phaco group (temporal clear corneal incision) at the end of 6th week, majority of the patients (80%) had WTR astigmatism. This correlates with the study done by Pallavi Patil et al. They found a significant change to WTR astigmatism after temporal clear corneal incision and to ATR astigmatism in the superior scleral SICS¹³.

The present study showed no significant difference in the two groups with respect to overall intraoperative complications. This is in correlation with the studies of Ruit et al⁶, Goel R et al⁸, Cook C⁹ and Haripriya A et al¹¹. Although in the present study, SICS group showed trend of more complications than phacoemulsification group, this result was not found to be statistically significant due to the smaller sample size (120). This is in correlation with the studies of Ruit et al⁶ (108 patients) and Goel R et al⁸ (60 patients).

CONCLUSIONS:

Phacoemulsification is superior to SICS in terms of early visual rehabilitation. But there is no significant difference in final visual outcome and complication rates between the two techniques.

Hence this is concluded that both Phacoemulsification and SICS combined with IOL implantation for cataract patients are effective and safe and SICS can be excellent substitute to phacoemulsification in our country.

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