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"A Prospective Comparative Clinical Study of Endothelial Cell Count Following Small Incision Cataract Surgery And Phacoemulsification"

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ABSTRACT

BACKGROUND AND OBJECTIVES: Cataract, a leading cause of preventable blindness worldwide, is characterized by the opacification of the crystalline lens, resulting in visual impairment[1].Surgical intervention remains the mainstay of treatment for cataracts, with the primary goal of improving visual acuity and quality of life[2],Over the years, cataract surgery techniques have evolved significantly, with Phaco and SICS emerging as the most widely practiced methods[3].The aim of this study is to Compare the changes in ECC after SICS versus Phaco and To compare the CCT after SICS versus Phaco.

METHODS: Prospective interventional clinical study was conducted at the Department of Ophthalmology, BMC&RC, Ballari, India, between August 1, 2022, and January 31, 2024.

60 patients were included in this study.

RESULTS :30 patients underwent SICS and 30 patients Phaco. Study observed that in the group-A male cases were 46.7% and in group-B male cases were 56.7% and female cases in group-A were 53.3% and group-B were 43.3%. Present study the ECC pre operative mean between the two groups the difference observed 19.2(0.83%). The difference between the endothelial loss day1, 1week, and 6 months statistically no significant difference of mean endothelial cell count at pre operative, post op 1week and post op 6 months between group A and group B. The mean CCT in Group-A a day before surgery was 502.70 ± 33.53µm; this increased by 12.73µm (515.43 ± 40.85µm) a day after surgery, these differences were found to be statistically significant (P<0.05)**.** And by 1 week, it has reduced to 503.83 ± 36.73µm. And by 6 months it has reduced to 502.36 ± 32.89. These differences were found to be statistically not significant (P>0.05). In Group-Bmean baseline CCT of patients a day before surgery was 503.53 ± 40.17µm; this increased by 38.67µm (542.20 ± 46.20µm) a day after surgery and by 1 week, it has reduced to 523.83 ± 39.73µm these differences were found to be statistically significant (P<0.001)**.** And by 6 months it was reduced to 507.80± 35.55. These differences were found to be statistically not significant (P>0.05).

CONCLUSION: There was no statistically significant ECC and CCT between SICS and Phaco. As SICS less dependent on technology, can be safe option in the developing world. Proper case selection, diligent surgery, and adequate postoperative care are essential to maintain a clear cornea

Key words: SICS, PCIOL, CCT, ECC, PHACO

I. INTRODUCTION

Cataract, a leading cause of preventable blindness worldwide, is characterized by the opacification of the crystalline lens, resulting in visual impairment[1][Surgical intervention remains the mainstay of treatment for cataracts, with the primary goal of improving visual acuity and quality of life[2].Over the years, cataract surgery techniques have evolved significantly, with phacoemulsification (phaco) and small incision cataract surgery (SICS) emerging as the most widely practiced methods[3].

Phacoemulsification, introduced in 1967 by Charles Kelman, employs ultrasonic energy to emulsify the cataractous lens, allowing for its removal through a small incision[4]. This technique has gained popularity due to its smaller incision size, faster recovery, and improved postoperative outcomes[5]. On the other hand, SICS, developed as an alternative to phaco, involves manual

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extracapsular cataract extraction through a slightly larger scleral tunnel incision[6]. SICS has been favored in developing countries due to its cost-effectiveness and reduced dependence on advanced technology[7].

While both phaco and SICS have demonstrated excellent visual outcomes, they differ in their impact on the corneal endothelium. The corneal endothelium, a monolayer of hexagonal cells on the inner surface of the cornea, plays a crucial role in maintaining corneal transparency by regulating corneal hydration[8]. Endothelial cell density (ECD) and morphology are key indicators of corneal health and function. Cataract surgery, irrespective of the technique employed, can lead to endothelial cell loss, which may result in corneal decompensation and visual impairment [9]

Numerous studies have investigated the impact of phaco and SICS on corneal endothelial cell loss, with varying results. Some studies have reported a higher endothelial cell loss following phaco compared to SICS[10], while others have found no significant difference between the two techniques[11]. The discrepancies in these findings can be attributed to factors such as surgical skill, technique variations, and differences in study designs and patient populations.

Given the importance of preserving corneal endothelial health and the ongoing debate regarding the comparative impact of phaco and SICS on ECD, there is a need for well-designed prospective studies to provide further evidence. This article presents a prospective comparative clinical study aimed at evaluating the endothelial cell count following SICS and phaco. By employing a standardized surgical protocol and a robust study design, this study seeks to contribute to the existing body of knowledge and guide clinical decision-making in cataract surgery.

The findings of this study are expected to provide valuable insights into the relative impact of SICS and phaco with PMMA IOL implantation on corneal endothelial health, aiding ophthalmologists in selecting the most appropriate surgical technique based on individual patient characteristics and available resources. Furthermore, this study may help identify potential risk factors for increased endothelial cell loss, enabling the development of targeted strategies to minimize corneal endothelial damage during cataract surgery.

II. METHODOLOGY

1.SOURCES OF DATA :

This prospective interventional clinical study was conducted at the Department of Ophthalmology, Ballari Medical College and Research Centre Ballari, India, between August 2022, and January 2024. The study protocol was approved by the Institutional Ethics Committee, and informed consent was obtained from all participants.

2. METHODS OF COLLECTION OF DATA

A) STUDY DESIGN: Prospective hospital based interventional study

B) STUDY PERIOD: August 2022 to January 2024

C) PLACE OF STUDY: Department of ophthalmology, BMC and RC, Ballari.

D) SAMPLE SIZE: 30 SICS and 30 PHACOEMULSIFICATION

E) Inclusion Criteria

1. Patients aged 40 years and above with cataract (nuclear sclerosis grade 3 or below according to LOCS 3 classification)
2. Patients presenting to the ophthalmology department and enrolled for SICS with intraocular lens implantation or phacoemulsification during the study period

F) Exclusion Criteria

1. Presence of corneal opacity
2. Endothelial layer disorders
3. Preexisting ocular diseases other than cataract
4. Traumatic or complicated cataract
5. History of refractive surgeries
6. Monocular patients
7. Intraoperative complications such as vitreous loss
8. Patients declining participation in the study

STUDY METHODOLOGY:

During the above said period patients satisfying the inclusion criteria were selected at BMC and RC, Ballari

Informed and written consent was taken from the all patients for the study.

PREOPARATIVE ASSEMENT

Preoperative:

- Eliciting appropriate history
- Visual acuity testing using Snellen chart
- Refraction
- Slit lamp examination and biomicroscopy
- Cataract work up

* IOP measurement (Schiotz tonometer / Non-contact tonometer)
* Lacrimal sac syringing
* Keratometry using Bausch and Lomb
* Ultrasound biometry using A scan
* Gonioscopy and B scan in relevant cases
* IOL power calculation using SRK II formula

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* PCIOL used in this study is Polymethyl methacrylate (PMMA) lens

- Specular microscopy (Endothelial cell density and CCT)

Surgical Techniques

All surgeries were performed by a single experienced surgeon. In the SICS group, a scleral tunnel incision was made at steeper axis, followed by manual extracapsular cataract extraction and posterior chamber intraocular lens implantation. In the phacoemulsification group, a clear corneal incision was made, and sclerocorneal incision[5.5mm] made at steeper axis to implant PMMA [rigid] IOL. The cataractous lens was emulsified using ultrasonic energy before implanting a rigid posterior chamber intraocular lens.

Post-operative assessment:

Postoperative follow-up examinations were conducted at 1 day, 1 week and 6 months after surgery. During each visit, visual acuity, slit-lamp examination, intraocular pressure, and specular microscopy were performed. Any postoperative complications were recorded and managed accordingly.

Outcome Measures

The primary outcome measure was the change in corneal endothelial cell count from the preoperative value to the postoperative values at various time points (1 day, 1 week, and 6 months) in both the SICS and phacoemulsification groups. Secondary outcome measures included visual acuity, complication rates, and the relationship between preoperative factors (age, cataract density) and postoperative endothelial cell loss.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics (version 26). Descriptive statistics were used to summarize the data. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The independent samples t-test or Mann-Whitney U test was used to compare continuous variables between the two groups, depending on the normality of the data distribution. The chi-square test or Fisher's exact test was employed to compare categorical variables. Repeated measures ANOVA or Friedman's test was used to assess changes in endothelial cell count over time within each group. A p-value < 0.05 was considered statistically significant.

SAMPLE SIZE ESTIMATION

Sample Size and Sampling Method

The sample size was calculated using the following formula:

$N1 = 2S2(Z1 + Z2)2 / (M1 - M2)2$

Where:

M1 = Mean test intervention = 2247.80

M2 = Mean control intervention = 2018.80

S1 = Standard deviation of M1 = 353.8

S2 = Standard deviation of M2 = 290.45

S = Pooled SD = 323.679

1-α = Set level of confidence (0.95)

1-β = Set level of power of test (0.8)

Z1 = Z value associated with alpha = 1.64485

Z2 = Z value associated with beta = 0.84162

The minimum sample size was calculated to be 25 cases per group. However, to account for possible dropouts and to increase the study's power, 30 cases were included in each group (small incision cataract surgery [SICS] and phacoemulsification). Patients were selected using a consecutive sampling method.

III. RESULTS

Table No.2: Groups wise distribution of cases

Groups	Number of cases	Percentage
Group-A: Small incision cataract surgery with intraocular lens implantation	30	50.0
Group-B: Phacoemulsification	30	50.0
Total	**60**	**100.0**

In the study; Out of 60 sample cases were divided in to two groups, **Group-A = Small incision cataract surgery with intraocular lens implantation** were randomly divided 30 (50.0%) sample cases and **Group-B = Phacoemulsification**were randomly divided 30 (50.0%) of sample cases

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Fig no 12: Pie diagram represents group's wise distribution of cases

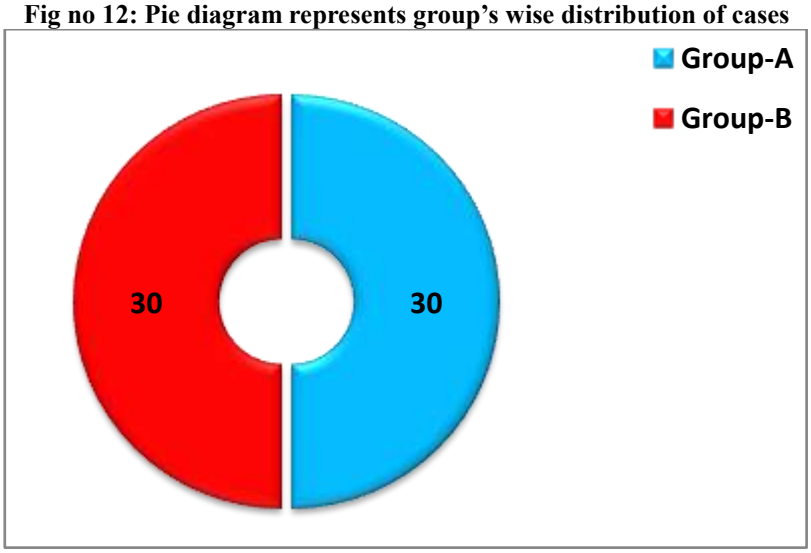

Table No.3: Age wise distribution of cases

Age in years	Group-A (Sics)		Group-B (Phacoemulsification)		Total	
	No.	%	No.	%	No.	%
41—50	4	13.3	4	13.3	8	13.3
51—60	12	40.0	14	46.7	26	43.3
61—70	11	36.7	5	16.7	16	26.7
71—80	3	10.0	7	23.3	10	16.7
Total	**30**	**100.0**	**30**	**100.0**	**60**	**100.0**
Mean ± SD	**60.80 ± 9.45**		**60.20 ± 10.87**		**60.50 ± 10.32**	
t-test & P-value	**t = 0.228 P = 0.820 NS**					

NS= not significant, S=significant, HS=highly significant

Study observes that, maximum number of patients in the two groups 26 (43.3%) cases were belongs to the age group of 51—60 years, followed by 16 (26.7%) were belongs to 61—70 years and 10 (16.7%) cases were belongs to the age groups of 71-80 years. Minimum age of the patient was 41 years and maximum age was 80 years. But there was statistically no significant difference of mean age between the groups Group-A and Group-B (P>0.05)

Fig no 13: Multiple bar diagram represents age wise distribution of cases

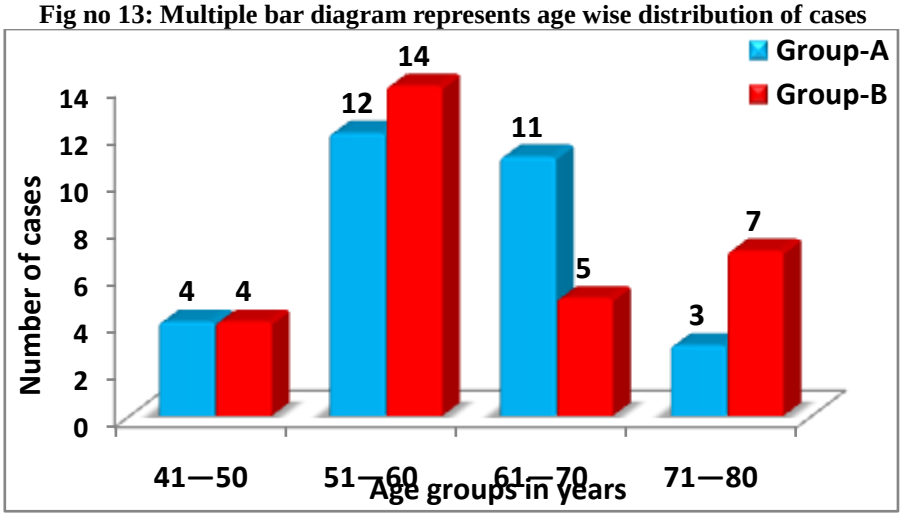

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Table No.4: Gender wise distribution of cases

Gender	Group-A (Sics)		Group-B (Phacoemulsification)	
	No.	%	No.	%
Males	14	46.7	17	56.7
Females	16	53.3	13	43.3
Total	50	100.0	50	100.0
$\chi 2$ –Test value, P-value	$\chi 2 = 0.601$, P = 0.438, NS			

NS= not significant, S=significant, HS=highly significant

Study observed that; in the Group-A Male cases were 14 (46.7%) and in Group-B male cases were 17 (56.7%) and Female cases in Group-A were 16 (53.3%) and Group-B were 13 (43.3%). There was statistically no significant difference of distribution of gender between the Groups-A and Group-B (P>0.05)

Fig no 14: Bar diagram represents gender wise distribution of cases

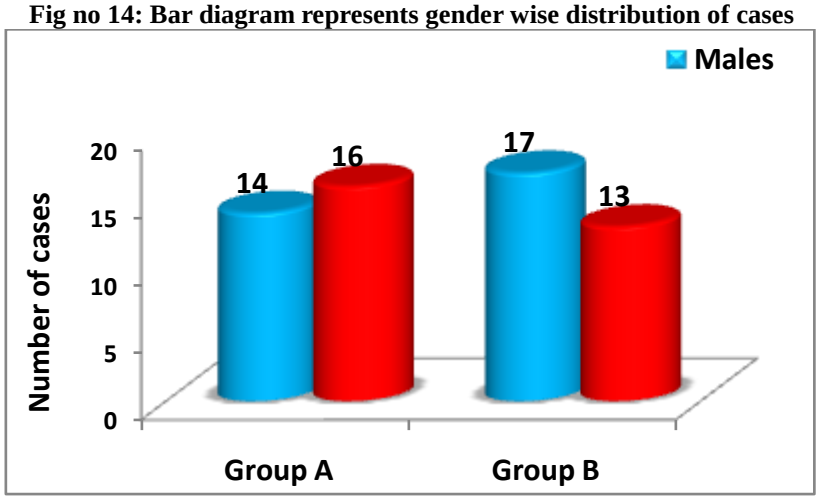

Table No.5: Diagnosis wise distribution of cases

Gender	Group-A (SICS)		Group-B (Phacoemulsification)	
	No.	%	No.	%
NS1with PSC	6	20.0	5	16.7
NS1 with PSC with CO	2	6.7	0	0.0
NS2	0	0.0	2	6.7
NS2 with CO	0	0.0	2	6.7
NS2 with PSC	11	36.6	11	36.6
NS2 with PSC with CO	3	10.0	5	16.7
NS3	2	6.7	0	0.0
NS3 with PSC	6	20.0	5	16.7
Total	50	100.0	50	100.0
Fisher exact test	P = 0.849, NS			

NS= not significant, S=significant, HS=highly significant

Study observed that; There was statistically no significant difference of distribution of diagnosis between the Groups-A and Group-B (P>0.05)

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Fig no 15: Multiple bar diagram presents diagnosis wise distribution of cases

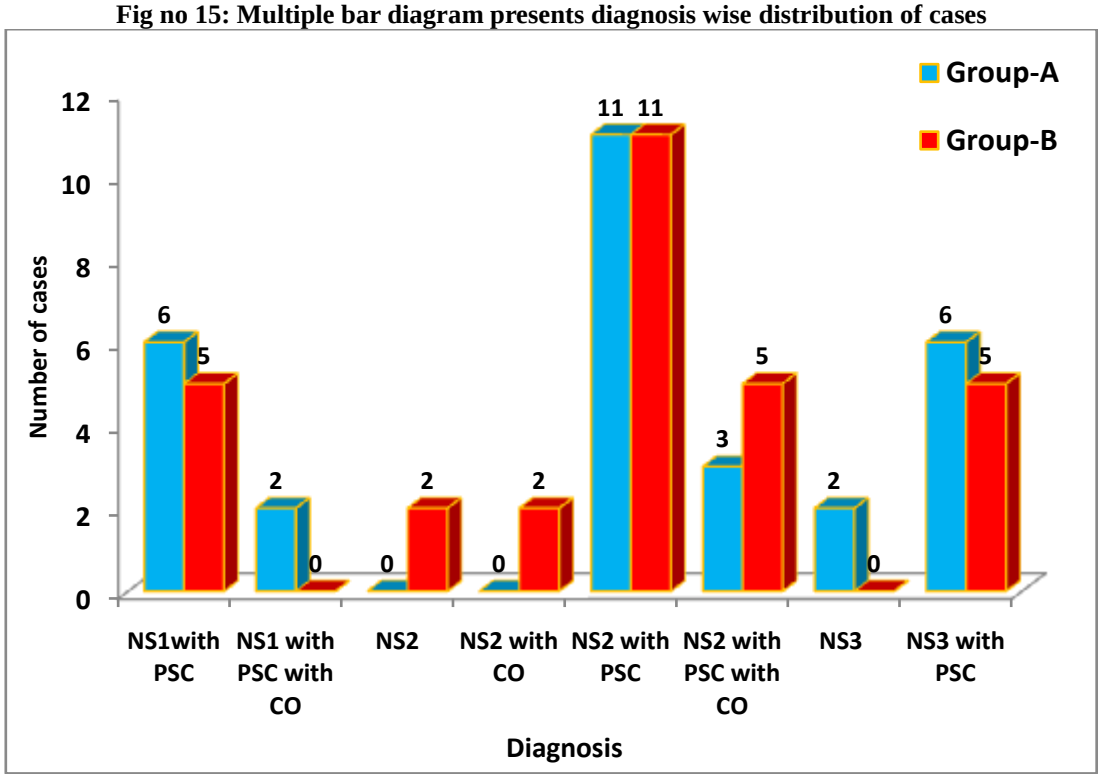

Table No.6: Comparison of endothelial cell count with different time intervals between the groups

Groups	Preoperative mean endothelial cell count (cells/mm2)	Postoperative mean endothelial cell count and mean endothelial cell loss (cells/mm2)		
		Day 1	1 Week	6 Months
Group-A (Sics)	2555.23 ± 200.58	2505.14 ± 216.44	2523.92 ± 217.21	2512.70 ± 239.95
Group-B (Phacoemulsification)	2536.03 ± 310.87	2282.76 ± 409.83	2419.30 ± 390.14	2425.06 ± 313.13
Difference	19.2 (0.83%)	222.38 (9.74%)	113.62 (4.69%)	87.64 (3.61%)
P-value	t = 0.284, P = 0.777, NS	t = 2.473, P = 0.017, S	t = 1.284, P = 0.204, NS	t = 1.209, P = 0.232, NS

Study reveals that; there was statistically no significant difference of mean endothelial cell count at preoperative, postoperative at 1 week and post-OP at 6 months between Group-A (Small incision cataract surgery) and Group-B (Phacoemulsification) (P>0.05) were as there was statistically significant difference of mean endothelial cell count postoperative at 1 day between Group-A (Small incision cataract surgery) and Group-B (Phacoemulsification) (P<0.05) n the group-B (Phacoemulsification) post-operative day 1 mean endothelial cell count was significantly low as compare to Group-A (Sics)

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Fig no 16: Bar diagram presents comparison of endothelial cell count with different time interval between the groups

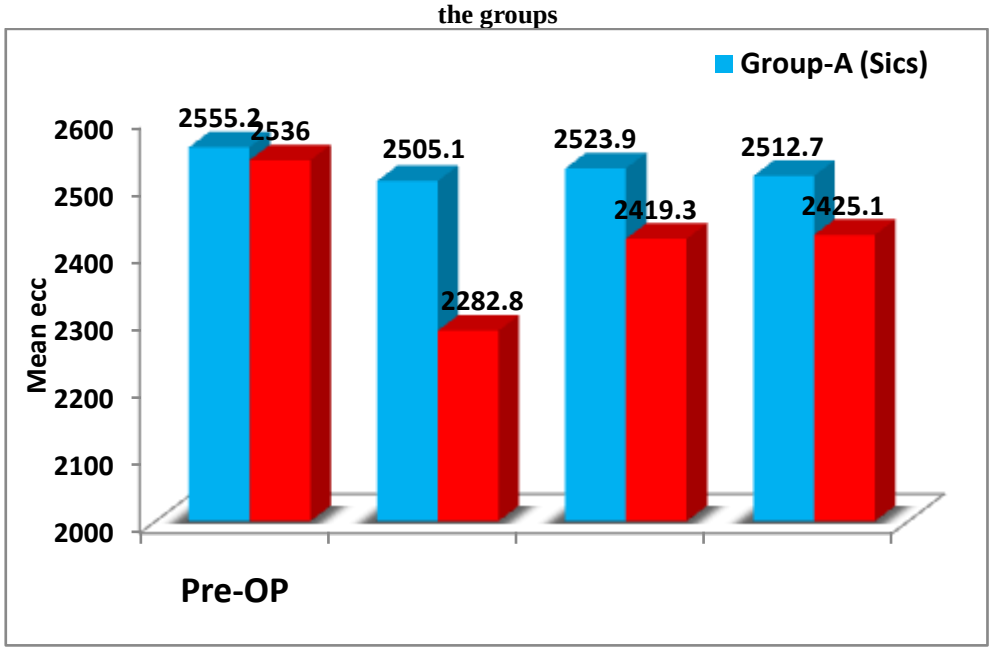

Table No.7: Comparison of central corneal thickness with different time intervals between the groups

Groups	Preoperative mean central corneal thickness (micron)	Postoperative mean central corneal thickness and mean central corneal thickness changes (micron)		
		Day 1	1 Week	6 Months
Group-A (SICS)	502.70 ± 33.53	515.43 ± 40.85	503.83 ± 36.73	502.36 ± 32.89
Group-B (Phacoemulsification)	503.53 ± 40.17	542.20 ± 46.20	523.83 ± 39.73	507.80 ± 35.55
Difference	0.83 (1.60%)	26.77 (5.20%)	20.0 (3.98%)	5.44 (1.08%)
P-value	t = 0.087, P = 0.931, NS	t = 2.377, P = 0.021, S	t = 2.024, P = 0.048, S	t = 0.614, P = 0.541, NS

Study reveals that; there was statistically no significant difference of mean central corneal thicknessat preoperative and postoperative at 6 months between Group-A (Small incision cataract surgery) and Group-B (Phacoemulsification) (P>0.05)

Where asthere was statistically significant difference of mean central corneal thickness Postoperative at 1 day and at 1 week between Group-A (Small incision cataract surgery) and Group-B (Phacoemulsification) (P<0.05)

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Fig no 17: Bar diagram presents comparison of central corneal thickness with different time interval between the groups

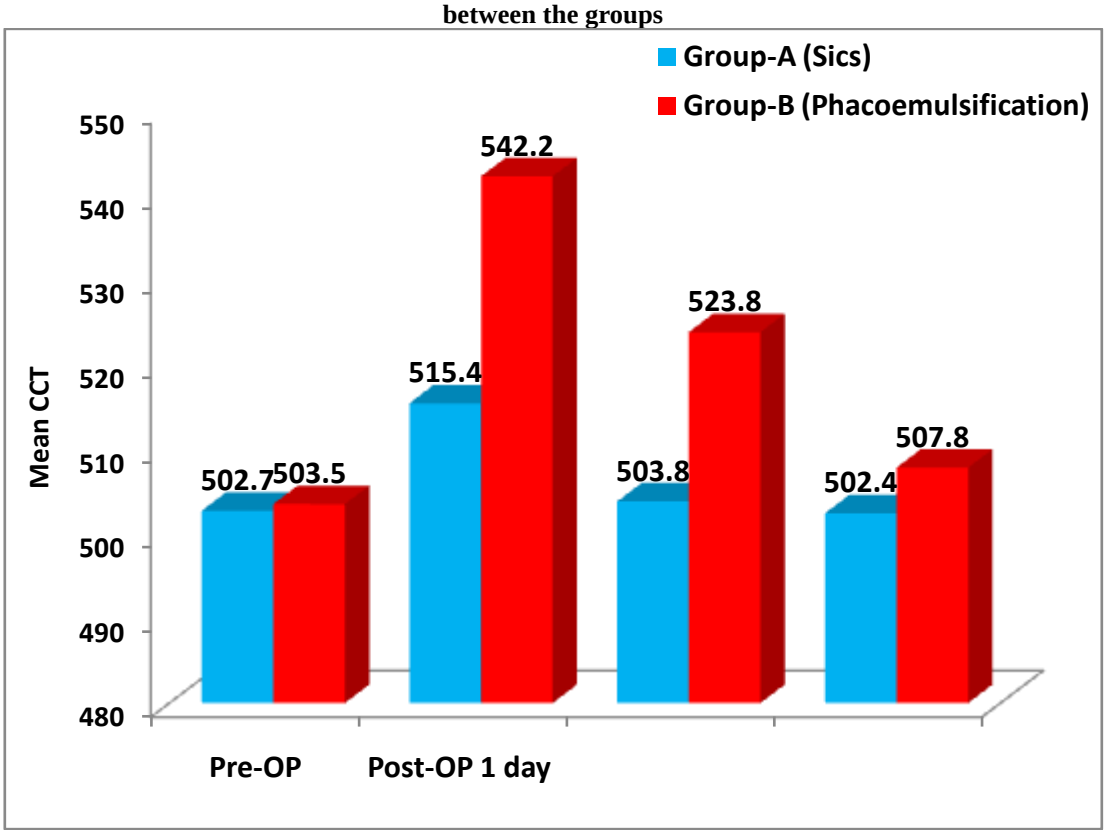

Table No.8: Comparison of central corneal thickness with different time intervals within the group-A (SICS)

Time Interval	CCT Mean ± SD	CCTon (day 0–various time sets)	P-value*	Confidence interval (95%)
Pre-OP	502.70 ± 33.53	--	----	
Post-OP 1 day	515.43 ± 40.85	-12.73 (2.53%)	t = 3.027, P= 0.000, HS*	-21.33 – 4.12
Post-OP 1 week	503.83 ± 36.73	-1.13 (0.23%)	t = 0.344, P= 0.733, NS	-7.87 – 5.60
Post-OP 6 months	502.36 ± 32.89	0.34 (6.7%)	t = 0.203, P= 0.841, NS	-3.02 – 3.69

Study reveals that; **In Group-A (SICS);** the mean baseline CCT of patients a day before surgery in the un-operated eye was 502.70 ± 33.53µm; this increased by 12.73µm (515.43 ± 40.85µm) a day after surgery, these differences were found to be statistically significant (P<0.05)**.** And by 1 week, it has reduced to 503.83 ± 36.73µm. And by 6 months it has reduced to 502.36 ± 32.89. These differences were found to be statistically not significant (P>0.05)

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Fig no 18: Bar diagram presents comparison of central corneal thickness with different time intervals within the group-A (SICS)

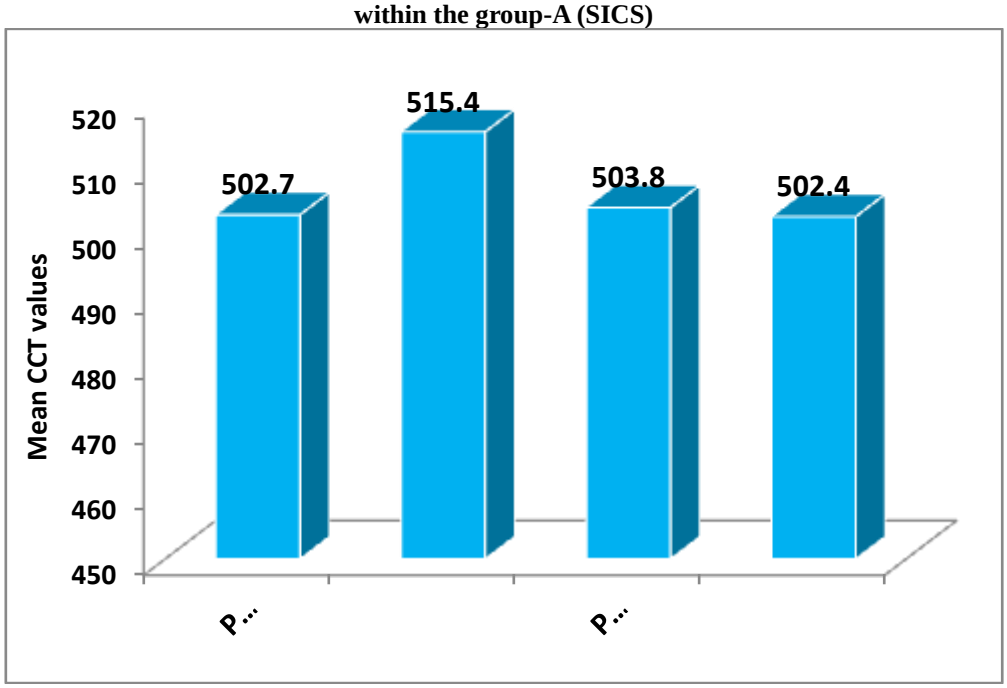

Table No.9: Comparison of central corneal thickness with different time intervals within the group-B (Phacoemulsification)

Time Interval	CCT Mean ± SD	CCTon (day 0–various time sets)	P-value*	Confidence interval (95%)
Pre-OP	503.53 ± 40.17	--	----	----
Post-OP 1 day	542.20 ± 46.20	-38.67 (7.68%)	t = 6.546, P= 0.000, HS*	-50.74 – -26.58
Post-OP 1 week	523.83 ± 39.73	-20.3 (4.03%)	t = -3.517, P= 0.001, HS*	-7.87 – 5.60
Post-OP 6 months	507.80 ± 35.55	4.27 (0.84%)	t = 1.127, P= 0.269, NS	-12.00 – 3.47

Study reveals that; **In Group-B (Phacoemulsification);** the mean baseline CCT of patients a day before surgery in the un-operated eye was 503.53 ± 40.17µm; this increased by 38.67µm (542.20 ± 46.20µm) a day after surgery and by 1 week, it has reduced to 523.83 ± 39.73µm these differences were found to be statistically significant (P<0.001)**.** And by 6months it has reduced to 507.80± 35.55. These differences were found to be statistically not significant (P>0.05)

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Fig no 19: Bar diagram presents comparison of central corneal thickness with different time intervals within the group-B (Phacoemulsification)

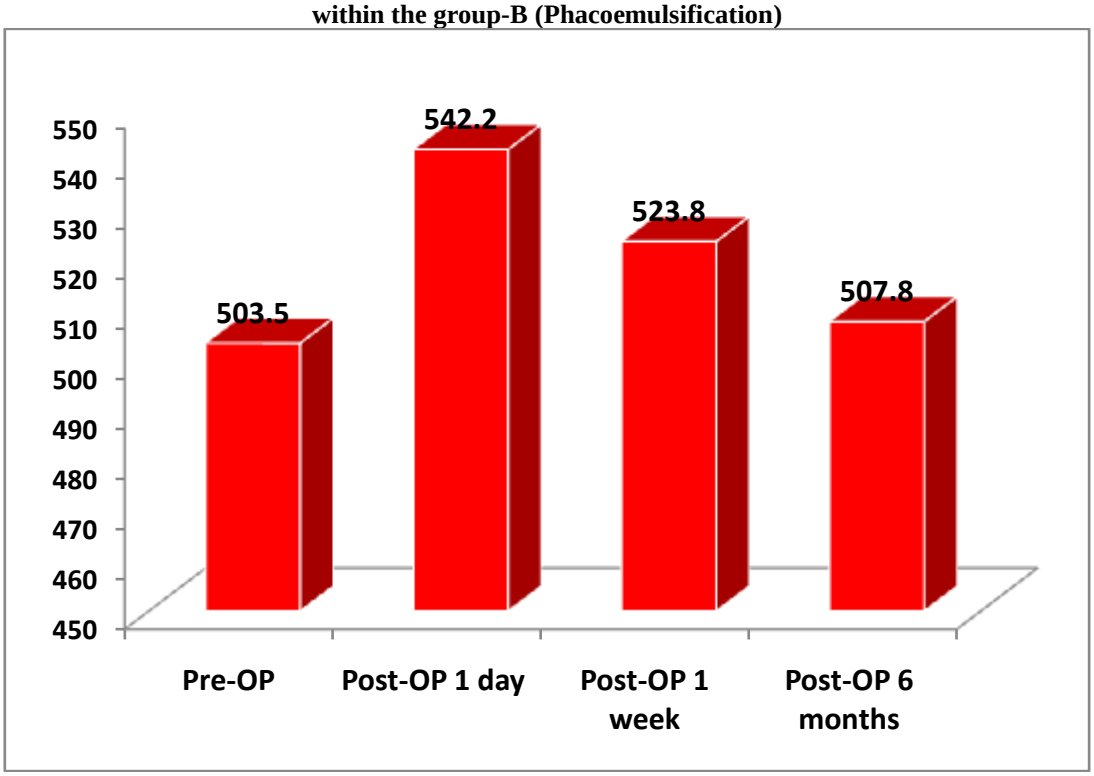

Table No.10: Comparison of endothelial cell count with different time intervals within the group-A (SICS)

Time Interval	ECC Mean ± SD	ECCon (day 0–various time sets)	P-value*	Confidence interval (95%)
Pre-OP	2555.23 ± 200.58	--	----	
Post-OP 1 day	2505.14 ± 216.44	**50.23 (2.01%)**	**t = 2.754, P= 0.015,S***	**14.31 – 98.57**
Post-OP 1 week	2523.92 ± 217.21	**31.31 (1.22%)**	**t = 1.823, P= 0.086, NS**	**-1.59 – 64.13**
Post-OP 6 months	2512.70 ± 239.95	**42.53 (1.49%)**	**t = 1.862, P= 0.081, NS**	**-2.74 – 87.81**

Study reveals that; **In Group-A (SICS);** the mean baseline ECC of patients a day before surgery in the un-operated eye was 2555.23 ± 200.58 (cells/mm2); this significantly decreased by (2505.14 ± 216.44) a day after surgery this difference was found to be statistically significant (P<0.05)**.** By 1 week, it has increased to 2523.92 ± 217.21 and by 6 months it has reduced to 2512.70 ± 239.95, these differences were found to be statistically significant (P>0.05)**.**

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Fig no 20: Bar diagram presents comparison of endothelial cell count with different time intervals within the group-A (SICS)

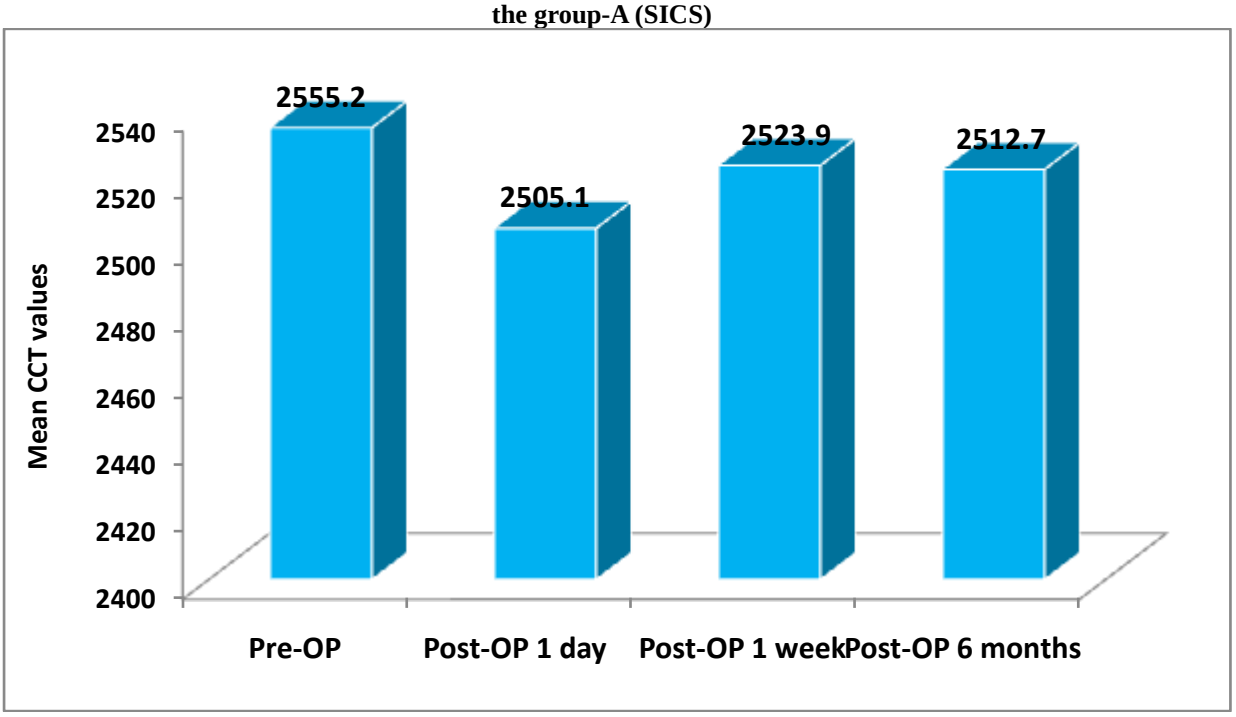

Table No.11: Comparison of endothelial cell count with different time intervals within the group-B (Phacoemulsification)

Time Interval	ECC Mean ± SD	ECCon (day 0–various time sets)	P-value*	Confidence interval (95%)
Pre-OP	2536.03 ± 289.13	--	----	----
Post-OP 1 day	2282.76 ± 409.83	253.27 (11.09%)	t = 3.681, P= 0.001, HS*	102.71 – 364.9
Post-OP 1 week	2419.30 ± 390.14	116.73 (4.60%)	t = 2.210, P= 0.038, S*	11.06 – 222.4
Post-OP 6 months	2425.06 ± 313.13	108 (4.25%)	t = 1.904, P= 0.064, NS	10.21 – 201.4

Study reveals that; the mean baseline ECC of patients a day before surgery in the un-operated eye was 2536.03 ± 289.13 (cells/mm2); this highly significantly decreased by (2282.76 ± 409.83) a day after surgery, by 1 week, it has increased to 2419.30 ± 390.14 these differences were found to be statistically significant (P<0.001)and (P<0.05) respectively. And by 6 months it has increased to 2425.06 ± 313.13, this difference was found to be statistically not significant (P>0.05).

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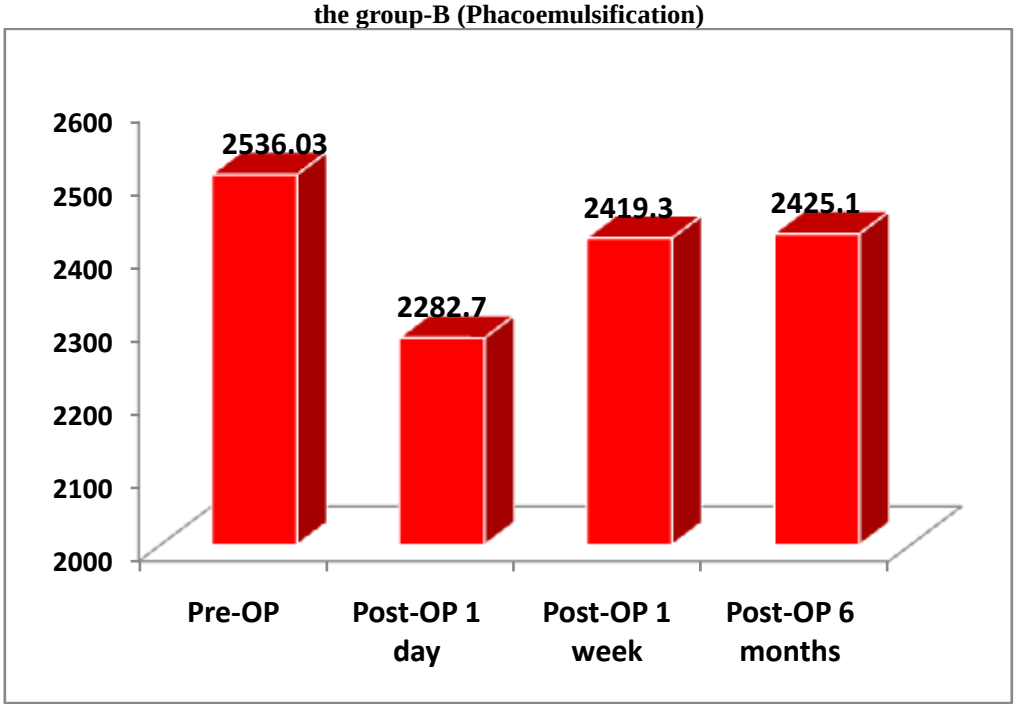
Fig no 21: Bar diagram presents comparison of endothelial cell count with different time intervals within the group-B (Phacoemulsification)



IV. DISCUSSION

In this study conducted in a tertiary care hospital 60 patients who fulfilled the above mentioned inclusion and exclusion criteria considered. All of them underwent SICS (group A) and Phacoemulsification (group B).

30 Patients underwent SICS with PCIOL implantation and 30 phacoemulsification with PCIOL implantation, all the patients underwent specular microscopy before the surgery and post op Day1, post op 1 week and 6 months.

Demographic characteristics of the patients were studied and most of the patients were elderly, reemphasizing the aging process as the commonest etiology of uncomplicated cataract in the study population.

Study observed that; in the Group-A Male cases were 14 (46.7%) and in Group-B male cases were 17 (56.7%) and Female cases in Group-A were 16 (53.3%) and Group-B were 13 (43.3%). It is similar to Ramkumar et al (UP), Radhika et al.This observation also corelates with Reshma Balan K T in which there were 54.54% and 57.89% of the female patient in SICS and phacoemulsification group.

In our study SICS [Group A] out of 30 patients 06(20%) were of NS1 with PSC,02(6.7%) NS1 PSC with CO,11(36.6) were of NS2 PSC, 03(10%) were NS2 with PSC with CO, 02(6.7%)were NS3,06(20%) were NS3 with PSC. In phacoemulsification out of 30 patients 05(16.7%) were NS1 with PSC,02(6.7%) were NS2 , 02(6.7%) were NS2 with CO,11(36.6%) were NS2 with PSC,05(16.7%) were NS2 with PSC with CO ,05(16.7%). The grading of Cataract was done using LOCS 3 it is similar to study conducted by Kumar et al (UP).

The mean pre operative endothelial cell count in the study population between the two groups 2000 -2600 (cells/mm2) in the present study the endothelial cell counts pre operative mean is 2555.23+/-200 and 2536.03+/- 310.87 between the two groups the difference observed 19.2(0.83%). The post operative mean endothelial cell count and mean endothelial cell loss was 2505.14+/-216.44(day 1), 2282+/- 409.83(day1),2523.92+/-217.21(1week), 2419.30+/-390.14(1week),2512.70+/-239.95(6 months),2425.06+/-313.13(6 months) endothelial loss observed both the group A and group B at day1, 1week and 6 months respectively. The difference revealed pre operative 19.2(0.83%) between the two groups. The difference between the endothelial loss were day1, 1week, and 6 months was222.38(9.74%),113.62(4.69%),87.64(3,61%) respectively there was statistically no significant difference of mean endothelial cell count at pre operative, post op 1week, and post op 6 months between group A(SICS) and group B(phacoemulsification), a study by Rupert et al which compared the cell loss in

phacoemulsification and ECCE showed 10% reduction in the both the groups. The study by George et al[11] showed 4.72%,4.21% and 5.41% of endothelial cell loss after conventional ECCE, MSICS and phacoemulsification. Our study similar to the Radhika et al[5]endothelial cell loss 13.3% and 14.6% at1 week and 6 weeks post operatively.

The mean CCT Study reveals that; **In Group-A (Sics);** The mean baseline CCT of patients a day before surgery was 502.70 ± 33.53µm, this increased by 12.73µm (515.43 ± 40.85µm) a day after surgery, these differences were found to be statistically significant (P<0.05)**.** And by 1 week, it has reduced to 503.83 ± 36.73µm. And by 6 months it was reduced to 502.36 ± 32.89. These differences were found to be statistically not significant (P>0.05).

Study reveals that; **In Group-B (Phacoemulsification):** The mean baseline CCT of patients a day before surgery was 503.53 ± 40.17µm; this increased by 38.67µm (542.20 ± 46.20µm) a day after surgery and by 1 week, it has reduced to 523.83 ± 39.73µm these differences were found to be statistically significant (P<0.001)**.** And by 6 months it was reduced to 507. 80± 35.55. These differences were found to be statistically not significant (P>0.05).It is similar to Shrikant Deshpande et al showed that in MSICS, the mean CCT on day 7th postoperative increased from 509.098 baseline CCT to 528.9608 and on day 30th was 514.1569. Whereas in phaco the mean CCT on postoperative day 7th increased from 518.46 baseline CCT to 533.78. And on postoperative day 30th was 524.9.

Various studies have been published comparing the change in corneal thickness and the endothelial cell dysfunction. Cheng et al. also found a significant linear correlation between the increase in corneal thickness in the immediate postoperative period and percentage of cell loss, 1 and 6 months after surgery. The results suggested that corneal thickness could be a useful clinical indicator of endothelial cell loss. Lundberg et al. through their study concluded that the central corneal swelling at postoperative day 1 is strongly correlated with the central corneal endothelial cell loss at 3 months and that the difference in pachymetry at postoperative day 1 is a useful way to assess the effects on the corneal endothelium exerted by the phaco procedure. Mencucci et al.studied corneal endothelial changes after Phaco versus a bimanual microincision cataract surgery technique. He concluded that there was no difference in corneal thickness, corneal endothelial cell loss, or endothelial morphology between the groups at the end of 1 and 3 month. Michaeli et al. compared CCT and endothelial cell loss after phaco with clear cornea and scleral tunnel incisions. They found that corneal thickness increased significantly in all measurements postoperative and returned to baseline by 3 months and there was no difference in the pachymetry change between the two study groups. Ganekal and Nagarajappa et al compared the morphological and functional endothelial changes after phaco versus MSICS and found that at the end of 6 weeks the endothelial changes were not statistically significant between the two groups. They concluded that the function and morphology of endothelial cells were not affected despite an initial reduction in endothelial cell number in MSICS. Hence, MSICS remains a safe option in the developing world

V. CONCLUSION

Significant loss of endothelial cell in any cataract surgery can lead to corneal decompensation and loss of corneal clarity, therefore it was necessary to know which surgical technique will be safer in view of endothelial cell loss and visual acuity.

Our study concludes that there was some endothelial cell loss and a transient increase in corneal thickness following surgery with subsequent progressive decrease as the postoperative day progressed till 1 week, overall it took 6 month to return to near preoperative value.

The mean endothelial cell loss at 6 month was less with SICS less than phacoemulsification87.64 cells/mm2(3.61%)], but they do not have a direct bearing on final visual acuity.

There was a significant improvement in BCVA, but overall, it was similar for both phacoemulsification and SICS, As large incision 5.5mm was taken for rigid IOL

(PMMA) implantation in phacoemulsification. Incision was taken in the steeper axis in both SICS and phacoemulsification, hence post operative astigmatism was similar in both.

In our study at 6month postoperative period there was no statistically significant difference in endothelial cell loss or visual acuity between phacoemulsification and manual SICS.

SICS is significantly faster, less technology dependent, can deal with all types of cataract is relatively safe, and is more suitable for advanced cataracts in the developing world. It may be the appropriate surgical procedure for treatment of cataract in the developing world.

Thus, it can be concluded that SICS is safer for corneal endothelium as compared to phacoemulsification surgery.

SOURCE OF INTEREST: NONE
CONFLICT OF INTEREST: NONE

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