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Original Research Article

Morphological and Functional Evaluation of Corneal Endothelium Following Small Incision Cataract Surgery: Correlation with Surgical Factors and Visual Outcomes

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Conflict of interest: Nil

Abstract

Purpose: The primary objectives of this study was to study the morphological and functional status of corneal endothelial cells in pre & post-operative cataract surgery patients, to assess the relationship between nucleus grading and postoperative endothelial cell count and to determine endothelial cell status as strong predictive marker for visual outcome in cataract surgery (SICS). Secondary objective of study was to study effect of various surgical techniques in SICS on endothelial cell count and visual outcome.

Methods: This was an observational, prospective study. A total of 428 eyes from patients aged between 20 and 50 years who were treated by small incision cataract surgery (SICS) technique in a tertiary care centre in Bhopal region for a period of 18 months were included in this study. The study population was stratified into two assessment groups: preoperative baseline and postoperative evaluation intervals (postoperative day 1, week 1, and month 1). Baseline endothelial parameters, including preoperative endothelial cell density (ECD), Coefficient of variation (CV) of cell size, and central corneal thickness (CCT), were systematically evaluated and analyzed with respect to their interrelationships and comparative changes across both the preoperative and postoperative assessment time points using Rexxam SPM-700 AS non-contact specular microscope with integrated pachymeter.

Results: Out of 428 eyes, average mean age of patient is 34.6 year. This study demonstrated a progressive decline in ECD throughout the postoperative period, with mean reductions of 5.03% on postoperative day 1, 5.57% at postoperative week 1, and 5.95% at postoperative month 1 ($p<0.001$). CCT demonstrated maximal corneal edema on postoperative day 1 (increase of 3.11%), with gradual resolution approaching baseline values by postoperative month 1 (increase of 0.21%). CV exhibited a significant progressive increase, rising by 7.7% on postoperative day 1, further increasing to 11.3% at postoperative week 1, and reaching 13.6% at postoperative month 1. All observed changes in these endothelial parameters achieved statistical significance ($p<0.001$).

Conclusion: Protection of corneal endothelium is very much necessary for achieving good visual outcome after a cataract surgery. This study concluded that there was some endothelial cell loss and a transient increase in corneal thickness following SICS with subsequent progressive decrease in central corneal thickness as postoperative days progressed till 1 month follow up and returned closest to its preoperative value.

Keywords: Central corneal thickness, Coefficient of variation, endothelial cell density, small-incision cataract surgery.

Introduction

In all livings, vision is the most essential gift in their life. Cornea provides 75% of the refractive power of the eye. Cataract is the most common cause of reversible blindness [8,10]. Cornea is histo-pathologically composed of 6 tissue layers [1]. The corneal endothelial cell is single layer of polygonal, hexagonal cells [2]. Of all layers, endothelium is the most vital layer, since on its integrity depends the transparency of cornea. The mean endothelial cell count is about 2000-2500 cells/mm2 in a normal adult life [3]. The normal endothelial cell count at birth is 3000 cells/mm2 and decreases with increasing age [4]. The rate of declination of endothelial cell is 0.3-0.6% per year [4]. Reduction in corneal endothelial cell density may result from number of factors such as cataract extraction, ageing process, glaucoma, intraocular inflammation, blunt ocular trauma, and corneal endotheliopathies like fuch's endothelial dystrophy [5]. Hence, preoperative assessment of corneal endothelium as well as ruling out the existence of such conditions is important for the surgery to be successful. Cataract extraction has been reported by several studies to be one of the factors contributing to the reduction of the corneal endothelium cell density [6]. Cataract surgery damage a proportion of endothelial cells by intraoperative corneal manipulation. [7] Endothelial cells are non-replicative and their loss is compensated by enlargement, migration and increasing heterogeneity of cells [10]. The compromised pump function leads to increased corneal thickness by increased stromal hydration [11]. Morphological stability and functional integrity of corneal endothelium are necessary to maintain long-term corneal transparency after cataract surgery to achieve high quality of vision [12,13]. Therefore, in the era of faster changing techniques of cataract surgery day by day, we hope that this detailed corneal endothelial cells study will help us to counsel the patient prior surgery and for surgeon to choose safe and ideal technique for cataract surgery in order to achieve very high quality of visual recovery with less complications related to cornea [14,15]. The present study was designed to systematically evaluate morphological and functional changes in the corneal endothelium following SICS through three primary objectives- to characterize the pattern of endothelial cell loss and morphologic changes (ECD and CV) during the immediate postoperative period and through one month postoperatively, to assess the relationship between nucleus grading and postoperative endothelial cell count; and to determine the effect of various surgical techniques in SICS on endothelial cell count and visual outcome.

Methods

We conducted a hospital-based, observational, prospective study in the Department of Ophthalmology in a tertiary care centre in Bhopal region for a period of 18 months, from May 2023 to October 2024. Participants for the study were briefed about the purpose and process of the study. Prior to data collection, informed consent were taken from the studied subjects.

All participants, for the research, were also assured about the confidentiality and anonymity of the information. After approval of the study protocol by the Institutional Ethics Committee of Gandhi Medical College, Bhopal, the study was initiated under Helsinki Ethical Guidelines. Inclusion criteria were: subjects with 20–50 years of age irrespective of gender, with any grade of cataract and medically and anaesthetically fit participants for cataract surgery. Exclusion criteria comprised: Patients with pre-existing corneal pathology, complicated cataract and traumatic cataract, documented glaucoma, any posterior-segment disease (e.g., diabetic retinopathy, retinal detachment), Patients with inability or unwillingness to complete scheduled postoperative visits.

Of 428 enrolled eyes, 6 (1.4%) were from patients aged <30 years, 50 (11.6%) from the 31–40 years age group, and 372 (86.9%) from the 41–50 years age group. The cohort comprised 224 female subjects (52.3%) and 204 male subjects (47.6%).

Pre and postoperatively Morphological and functional parameters were measured and assessed by Rexxam SPM-700 AS non-contact specular microscope with integrated pachymeter and patients were called for follow-up on Day-1, Day-7 and finally 1 month after surgery. All procedures were carried out under local anaesthesia by experienced surgeons using a uniform protocol.

Intraoperative parameter like Nucleus removal technique was documented and categorized. Endothelial cell density, cell morphology (polymegathism and pleomorphism), and central corneal thickness were recorded pre-operatively and at defined postoperative intervals for comparative analysis.

Primary outcomes comprised: (1) percent change in ECD from baseline to each postoperative timepoint; (2) change in CV reflecting endothelial cell morphologic heterogeneity; and (3) change in CCT as an indicator of corneal endothelial functional status. Secondary outcome was postoperative 1 month BCVA. Correlation analyses evaluated: (1) association between cataract density (LOCS III grade) and postoperative endothelial cell loss; (2) impact of nucleus removal technique on endothelial preservation; and (3) relationship between month 1 postoperative endothelial parameters and final visual outcome.

The collected data was compiled in a Microsoft Excel sheet and was subsequently statistically analyzed. Descriptive and inferential statistical analyses were carried out in the present study. Results on continuous measurements were presented as mean ± standard deviation (SD; Min.–Max.), and results on categorical measurements were presented as number (%). The statistical software Statistical Package for the Social Sciences (SPSS) version 2.0 were used for the analysis.

Results

Demographic parameters of this study is shown in Table-1. Of 428 enrolled eyes, 6 (1.4%) were from patients aged <30 years, 50 (11.6%) from the 31–40 years age group, and 372 (86.9%) from the 41–50 years age group. The cohort comprised 224 female subjects (52.3%) and 204 male subjects (47.6%).

Table 1: Age and Gender-wise distribution of patients underwent cataract surgery

Gender			**Case (n = 428)**
Female	31-40 yrs	No. of cases (%)	26(6.7%)
	41-50 yrs	No. of cases (%)	198 (46.2%)
Male	<30 yrs	No. of cases (%)	6(1.4%)
	31-40 yrs	No. of cases (%)	24(5.6%)
	41-50 yrs	No. of cases (%)	174 (40.6%)

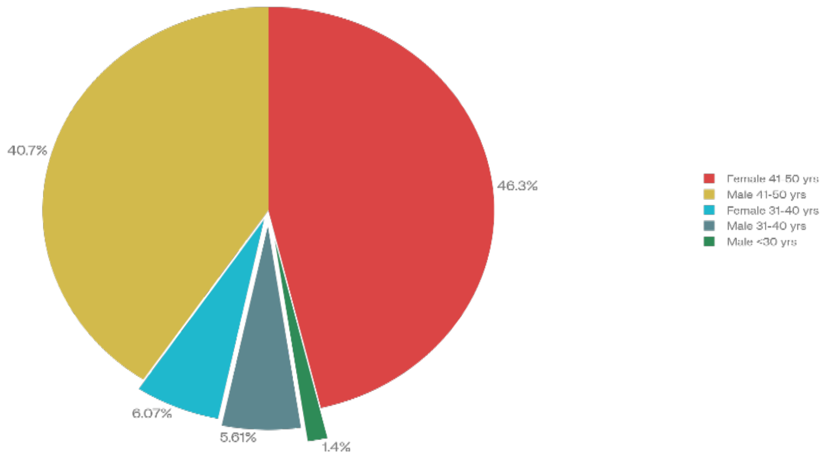

Figure 1:

Table 2 Showing Morphological changes (ECD) and functional changes (CCT) in Pre and Post-operative period on Day 1, Day 7 and 1 month in SICS. Preoperative mean ECD was 2423.26 ± 171.6 cells/mm². A progressive decline in ECD was observed throughout the postoperative period. On postoperative day 1, mean ECD decreased to 2310.33 ± 165.6 cells/mm² (5.03% reduction). This decline continued at postoperative week 1, with mean ECD of 2288.29 ± 164.8 cells/mm² (5.57% reduction). By postoperative month 1, mean ECD reached 2279.05 ± 166.6 cells/mm², reflecting a maximum cumulative reduction of 5.95%.

Preoperative mean CCT was 520.14 ± 24.8 µm. Maximal corneal edema was observed on postoperative day 1, with mean CCT of 536.3 ± 31.9 µm, (3.11% increase). At postoperative week 1, CCT partially resolved to 528.4 ± 25.2 µm (1.59% increase ;). By postoperative month 1, mean CCT returned to near-baseline values of 521.2 ± 25.7 µm, with minimal residual increase of 0.21%.

Preoperative mean CV was 44.00 ± 8.6%. A significant progressive increase in CV was observed postoperatively. On postoperative day 1, mean CV increased to 47.4 ± 10.8% (7.7% increase). This increase continued at postoperative week 1, with mean CV of 49.1 ± 55.7% (11.3% increase). At postoperative month 1, mean CV reached 50.2 ± 26.9%, reflecting a cumulative increase of 13.6%. Unlike CCT, which demonstrated recovery toward baseline, CV showed persistent progressive increase throughout the follow-up period.

Table 2:

Parameters (N=428)									
	Corneal endothelial cell density(ECD) in cells/mm²			**Central corneal thickness(CCT) in µm**			**Coefficient of variation(CV) in %**		
	Mean (+ SD)	P value	% change	Mean (+ SD)	P value	% change	Mean (+ SD)	P value	% change
Pre-operative	2423.26 (+171.6)	References		520.14(+ 24.8)	References		44.00 (+ 8.6)	References	
Post-op	2310.33+(165.6)	<0.001	↓	536.3+	<0.001	↑3.11%	47.4+	<0.001	↑7.7%

follow up Day 1			5.03%	31.9			10.8		
Post-op follow up Day 7	2288.29+(164.8)	<0.001	↓ 5.57%	528.4+ 25.2	<0.001	↑1.59%	49.1+ 55.7	<0.001	↑11.3%
Post-op follow up 1 month	2279.05+(166.6)	<0.001	↓ 5.95%	521.2+ 25.7	<0.001	↑0.21%	50.2+ 26.9	<0.001	↑13.6%

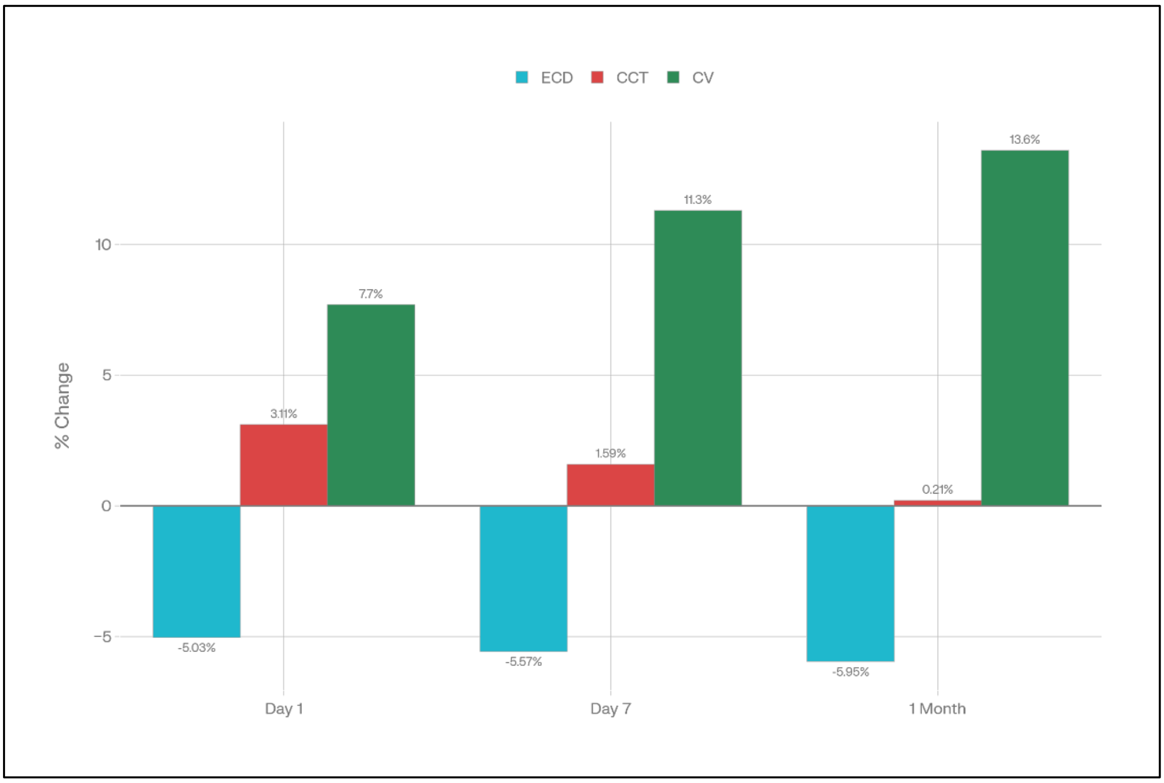

Figure 2:

Correlation of Cataract Density with Endothelial cell density and central corneal thickness is shown in Table-3

ECD Changes by Cataract Grade

In patients with cortical cataract and posterior subcapsular cataract, preoperative mean ECD was 2271.7 ± 178.7 cells/mm², with postoperative reductions of 3.52% by day 1, 4.1% by week 1, and 4.40% by month 1. In nuclear sclerotic grade 1 (NS GR 1; n=38), preoperative mean ECD was 2420.6 ± 167.2 cells/mm², declining to reductions of 3.7% by day 1, 4.3% by week 1, and 4.9% by month 1. In nuclear sclerotic grade 2 (NS GR 2), preoperative mean ECD was 2442.3 ± 172.5 cells/mm², with postoperative reductions of 4.7% by day 1, 5.1% by week 1, and 5.4% by month 1. In nuclear sclerotic grade 2 (NS GR 2), preoperative mean ECD was 2442.3 ± 172.5 cells/mm², with postoperative reductions of 4.7% by day 1, 5.1% by week 1, and 5.4% by month 1. In patients with nuclear sclerotic grade 3 or higher (NS GR 3+), preoperative mean ECD was 2371.1 ± 165.8 cells/mm², demonstrating the most significant reductions of 5.1% by day 1, 5.5% by week 1, and 5.8% by month 1 (p<0.001 for all comparisons across cataract grades).

CCT Changes by Cataract Grade

In patients with cortical and posterior subcapsular cataract, Preoperative mean CCT was 510 ± 0 µm, with increases of 2.9% on day 1, 1.9% on week 1, and 0.20% at month 1. In patients with nuclear sclerosis grade 1, preoperative mean CCT was 517.2 ± 21.8 µm, demonstrating increases of 2.9% on day 1, 2.03% on week 1, and 0.30% at month 1. In patients with nuclear sclerosis grade2, preoperative mean CCT was 523.4 ± 25.3 µm, with increases of 2.8% on day 1, 2.2% on week 1, and 0.15% at month 1. In patients with nuclear sclerosis grade 3, preoperative mean CCT was 516.3 ± 27.7 µm, showing increases of 3.87% on day 1, 2.9% on week 1, and 0.20% at month 1 (p<0.001 across all cataract grades).

Table 3:

Parameter	Grading of cataract		Pre-op (reference)	Day 1	Day 7	1 Month
CD	Cortical cataract And PSC (n=97)	Mean+SD	2271.7 +178.7	2191.7	2180.6	2170.3
	Change in %			-3.52%	-4.1%	-4.40%
	NS GR 1 (n=56)	Mean+SD	2420.6 +167.2	2329.6+153.1	2315.4+ 158.8	2301.7+ 157.4
	Change in %			-3.7%	-4.3%	-4.9%
	NS GR 2 (n=122)	Mean+SD	2442.3+172.5	2326.3+157.1	2316.2+ 152.1	2308.3 + 152.8
	Change in %			-4.7%	-5.1%	-5.4%
	NS GR 3 or more (n=153)	Mean+SD	2371.1+165.8	2249.1+162.4	2239.2+ 155.5	2232.4+ 162.6
	Change in %			-5.1%	-5.5%	-5.8%
	P value =			**<0.001**	**<0.001**	**<0.001**
CCT	Cortical cataract and PSC(n=97)	Mean+SD	510 +0	525.2+0	520.1+0	511.2 +0
	Change in %			+2.9%	+1.9%	+0.20%
	NS GR 1 (n=56)	Mean+SD	517.2+21.8	532.1+45.9	527.7+22.5	519.2+20.8
	Change in %			+2.9%	+2.03%	+0.30%
	NS GR 2 (n=122)	Mean+SD	523.4+25.3	538.6+25.6	535.1+26.3	524.2+27.2
	Change in %			+2.8%	+2.2%	+0.15%
	NS GR 3 or more(n=153)	Mean+SD	516.3+27.7	536.2+28.3	531.3+26.1	517.7+27.2
	Change in %			+3.87%	+2.9%	+0.20%
P value =				**<0.001**	**<0.001**	**<0.001**

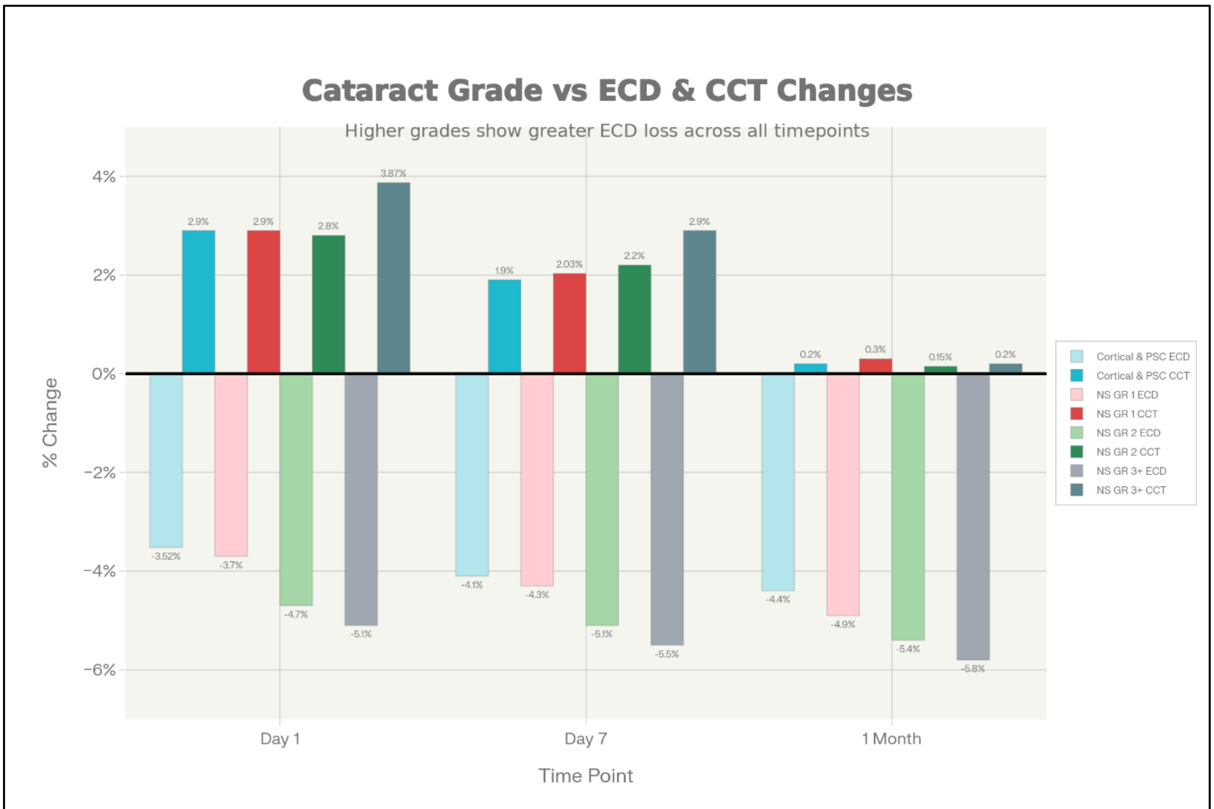

Figure 3:

Correlation of Nucleus Removal Technique with Endothelial cell density and central corneal thickness is shown in Table 4

ECD Changes by Nucleus Removal Technique: Visco-expression group: Preoperative mean ECD was 2379 ± 156.8 cells/mm², declining to 2271.4 ± 148.3 cells/mm² on day 1 (4.5% reduction), 2262 ± 147.6 cells/mm² at week 1 (4.9% reduction), and 2259 ± 156.2 cells/mm² at month 1 (5.0% reduction). Wire vectis group: Preoperative mean ECD was 2433.6 ± 172.6 cells/mm², declining to 2313.2 ± 165.7 cells/mm² on day 1 (4.9% reduction), 2306.5 ± 164.4 cells/mm² at week 1 (5.2% reduction), and 2304.4 ± 165.4 cells/mm² at month 1 (5.3% reduction; p<0.001 between techniques)

CCT Changes by Nucleus Removal Technique

Visco-expression group: Preoperative mean CCT was 520.6 ± 28.1 µm, increasing to 537.5 ± 28.5 µm on day 1 (3.2% increase), 529.4 ± 28.5 µm at week 1 (1.8% increase), and 521.5 ± 28.7 µm at month 1 (0.1% increase).

Wire vectis group: Preoperative mean CCT was 520.9 ± 24.9 µm, increasing to 539.8 ± 31.4 µm on day 1 (3.6% increase), 531.9 ± 24.7 µm at week 1 (2.1% increase), and 521.6 ± 25.3 µm at month 1 (0.3% increase; p<0.001 between techniques).

Table 4:

Parameter	Time points	Nucleus removal techniques (n=428)				P value
		Viscoexpression(n=205)		Wirevectis(n=223)		
		Mean+SD	Change in %	Mean+SD	Change in %	
CCT	**Pre-op**	**520.6+28.1 (reference)**		**520.9+24.9 (reference)**		
	Day 1	537.5+28.5	+3.2%	539.8+31.4	+3.6%	<0.001
	Day 7	529.4+28.5	+1.8%	531.9+24.7	+2.1%	<0.001
	1 Month	521.5+28.7	+0.1%	521.6+25.3	+0.3%	<0.001
CD	Pre-op	2379+156.8 (reference)		2433.6+172.6 (reference)		
	Day 1	2271.4+148.3	-4.5%	2313.2+165.7	-4.9%	<0.001
	Day 7	2262+147.6	-4.9%	2306.5+164.4	-5.2%	<0.001
	1 Month	2259+156.2	-5.0%	2304.4+165.4	-5.3%	<0.001

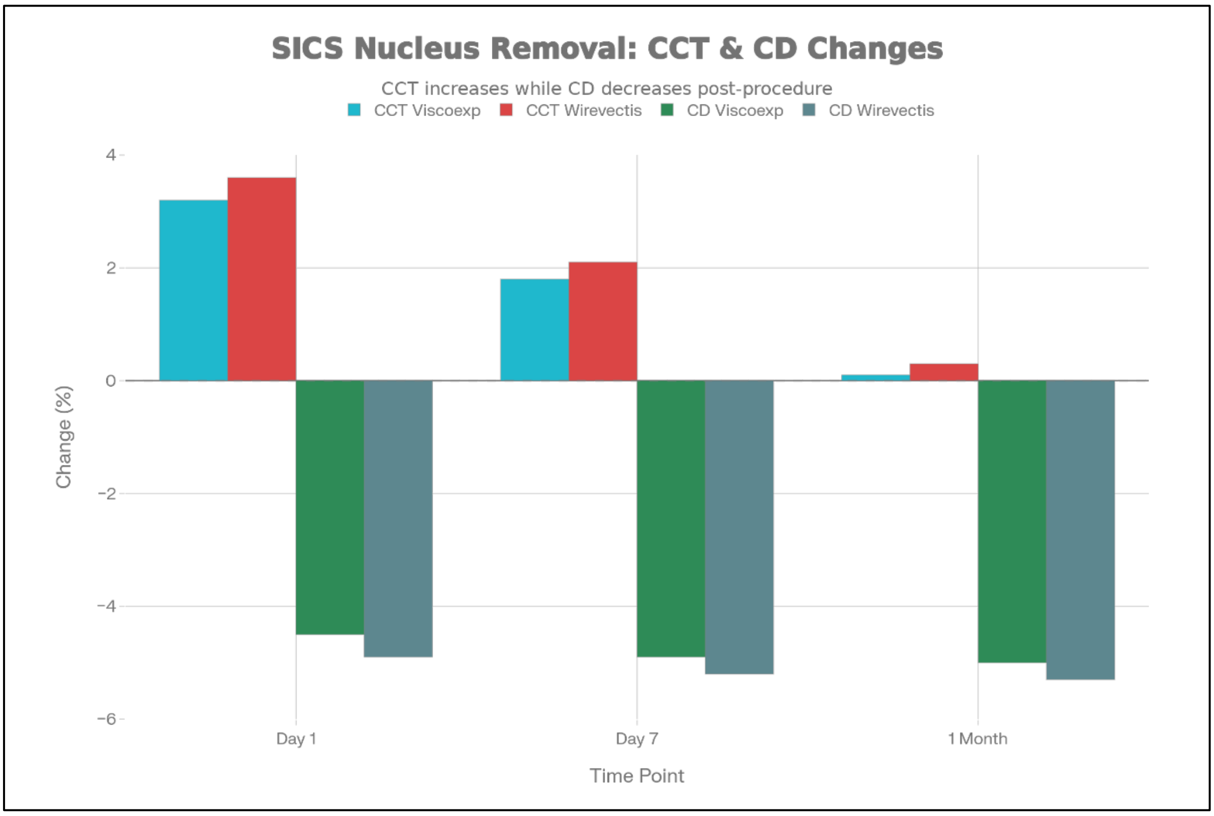

Figure 4:

Correlation between Endothelial Parameters and Visual Outcomes is shown in Table 5. Following SICS with endothelial cell preservation (mean ECD decline of 5.9%, CCT increase of 0.2% at month 1), visual outcomes were substantially improved.

At postoperative month 1, 394 patients (78.8%) achieved BCVA better than 6/12 (excellent visual acuity). Additionally, 106 patients (21.2%) achieved BCVA between 6/60–6/12. At 1 month follow up endothelial cell density of 2279 cells/mm² (5.9% reduction from preoperative. baseline) and near-complete resolution of corneal edema (CCT +0.2%), correlated with successful visual rehabilitation and elimination of severe visual impairment in the entire study cohort.

Table 5: Showing correlation between Pre and post-operative period (1 month) morphological (endothelial cell density), functional (central corneal thickness) and final visual outcome (BCVA) in cataract surgery

Surgical technique	Endothelial cell density (Mean)			Central corneal thickness (Mean)			Pre-op BCVA	Frequency	Post-op BCVA	Frequency	%
	Pre-op	Post-op	Change in %	Pre-op	Post-op	Change in %					
SICS	2423.2	2279	-5.9	520.1	521.2	+0.2%	>6/12	0	>6/12	403	94.1
							6/60-6/12	224	6/60-6/12	25	5.8
							< 6/60	204	< 6/60	0	0

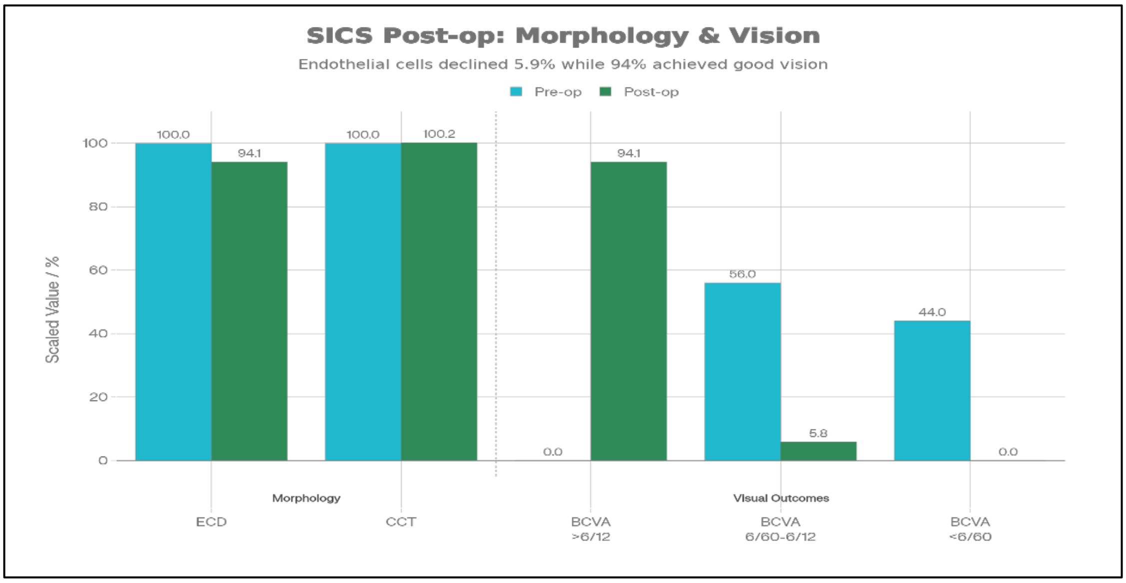

Figure 5:

Discussion

In this study, baseline endothelial parameters (like mean pre-operative endothelial cell density, coefficient of variation and central corneal thickness) were calculated. The mean endothelial cell density (CD) was 2423.26 ± 171.6 cells/mm² , the coefficient of variation (CV), reflecting cell size variability, was 44.0 ± 8.6% , Central corneal thickness (CCT) measurements showed 520.14 ± 24.8 µm. Endothelial cell density is a critical indicator of corneal health, and its changes can reflect the extent of endothelial damage caused by the cataract surgery. In present study, we observed a progressive and statistically significant decline in corneal endothelial cell density (ECD) following Small Incision Cataract Surgery (SICS). These findings have similar result to previous studies [13]. This initial sharp decline is attributed to direct surgical trauma, while subsequent losses may relate to ongoing cellular reorganization.

These results reinforce that nucleus removal techniques, when properly executed, result in predictable and acceptable levels of endothelial cell loss, maintaining corneal clarity and function and emphasizes the importance of careful surgical technique and appropriate case selection. Monitor

Central corneal thickness (CCT) is important to assess acute endothelial stress response, recovery assessment and long term outcome prediction. Pre-operative assessment of CCT is to establish a baseline and identify at-risk patients. Assessment of increased CCT on post-op Day 1 to detect early edema and decline of CCT near-baseline at 1 month is sign of full recovery and corneal health .In this study, in small incision cataract surgery (SICS) Central corneal thickness (CCT) peaking on postoperative Day 1 (↑3.11%), followed by a gradual decline toward baseline by one month (↑0.21%). The transient nature of CCT elevation is attributed to intraoperative endothelial stress and fluid shifts, which typically resolve as the corneal endothelium recovers its pump function. These findings have similar result to previous studies [12].

Overall, observed CCT changes confirming that SICS is associated with a temporary, self-limiting increase in corneal thickness that resolves within one month. This supports the safety and efficacy of SICS in preserving corneal function.

The coefficient of variation (CV) is a key indicator of endothelial cell morphological variability, reflecting polymegathism and cellular stress after cataract surgery. In our study, patients underwent Small Incision Cataract Surgery (SICS) there is increase in CV significantly by ↑7.7% on Day 1, further rise to ↑11.3% by Day 7, and ↑13.6% at day 30 changes were statistically significant ($p<0.001$), indicating progressive endothelial cell polymegathism following surgery. This pattern of increasing CV reflects the corneal endothelium's adaptive response to surgical trauma, as surviving cells enlarge and become more variable in size to compensate for cell loss.

Monitoring both endothelial cell density and CCT in relation to cataract grade helps optimize patient outcomes, minimize complications, and improve visual recovery after SICS. In our study, Patients with cortical or posterior sub capsular cataracts (PSC) experienced a mean ECD reduction of 4.4% at 1 month. This loss increased progressively with higher NS grades: 4.9% in NS Grade 1, 5.4% in NS Grade 2, and 5.8% in NS Grade ≥3.

These findings are statistically significant ($p<0.001$). Functionally, Cortical/PSC cases showed a minimal CCT increase of 0.2% at 1 month, while NS Grade 1, Grade 2, and Grade ≥3 cases exhibited increases of 0.3%, 0.15%, and 0.2%, respectively. These findings have similar result to previous studies [12]. These changes, though statistically significant, suggest that the cornea's functional recovery is robust even in higher-grade cataracts, with CCT returning close to baseline by 1 month postoperatively. Cataract grading is a significant determinant of both endothelial cell density loss and CCT changes after small incision cataract surgery. The present findings confirming that denser cataracts are at greater risk for endothelial trauma and transient corneal edema, but that modern surgical techniques allow for effective recovery and comparable long-term outcomes across all grades.

Selecting a nucleus removal technique that minimizes endothelial trauma is crucial for preserving corneal clarity and visual outcomes. In present study, findings showing comparable outcomes between the techniques, with viscoexpression showing slightly lower endothelial cell loss (5.0%) compared to wire vectis (5.3%), and minimal differences in CCT changes (0.1% vs. 0.3%) at one month postoperatively. This difference, though statistically significant ($p<0.001$), is clinically minimal, suggesting that both techniques are comparably safe for the corneal endothelium The choice of technique can be chosen according to the surgeon's expertise and intraoperative considerations, ensuring optimal patient outcomes without significant risk of differential endothelial compromise.

Ultimate goal of any cataract surgery is achieve best vision postoperatively. In our study, Small Incision Cataract Surgery (SICS) have been shown to achieve comparable postoperative visual outcomes, with best-corrected visual acuity (BCVA) of better than 6/12 achieved in 94.1% of eyes after SICS. After this study we came to know that healthy corneal endothelial cells after cataract surgery depends on preoperative corneal endothelial cell status, type of cataract surgery, cataract nucleus grading, cataracts extraction technique. Understanding these correlations allows for evidence –based decision making, improved patient safety and better visual outcomes following cataract surgery. Our study has proven and revealed many facts about morphological changes in endothelial cell and central corneal thickness.

Conclusion

The greatest challenge in our field is a large backlog of cataract blindness in developing countries. SICS and phacoemulsification are the two commonly performed cataract surgeries.

Significant endothelial cell loss following cataract surgery can lead to corneal decompensation and loss of corneal transparency and hence affect the vision. Thus protection of corneal endothelium is very much necessary for achieving good visual outcome after a cataract surgery.

Our main aim of study was to know that various intra and post-operative factors which can affect corneal endothelial cells during and after cataract surgery. This study highlights that different technique of cataract surgery have own limitation and advantage. This study concluded that there was some endothelial cell loss and a transient increase in corneal thickness following surgery with subsequent progressive decrease as postoperative days progressed till 1 month follow up and returned closest to its preoperative value. This study revealed that grading of cataract have impact on corneal endothelial cells after cataract surgery. We found that with increasing grading of cataract, there was more corneal endothelial cell loss and more increase in CCT. Our study demonstrates that in small incision cataract surgery removal of nucleus by wire vectis method causes more damage to endothelial cells than visco-expression technique. In our study BCVA after 1 month was significantly very good after 1 month follow-up. However only 1 month follow-up is limitation of our study. SICS achieved excellent visual outcomes with low complication rates with no significant difference. SICS is significantly faster, less expensive, less technology dependent, can deal with all types of cataract, is relatively safe, and is more suitable for advanced cataracts in the developing world.

Consent: As per international standards or university standards written participant consent has been collected and preserved by the authors.

Ethical Approval: As per international standards or university standards written ethical permission has been collected and preserved by the author(s).

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