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Original Research Article

Phacoemulsification versus Manual Small-Incision Cataract Surgery for Age-Related Cataract

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Abstract

Background: Cataract surgery in Indian teaching hospitals continues to rely on both phacoemulsification and manual small-incision cataract surgery (MSICS), yet comparative data from routine tertiary-care practice remain clinically important.

Aim: To compare operative, visual, refractive, and safety outcomes of phacoemulsification and MSICS for age-related cataract at Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India.

Methods: This comparative hospital-based study included 80 eyes of 80 patients operated between 5 March 2025 and 10 March 2026, with 40 eyes undergoing phacoemulsification and 40 eyes undergoing manual SICS. Preoperative demographic and ophthalmic variables were recorded. Postoperative assessment included uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), surgically induced astigmatism (SIA), refractive cylinder, operative time, and complications. Continuous variables were compared using the independent-samples t test and categorical variables using chi-square or Fisher exact tests. Multivariable linear regression was used to identify independent predictors of week-6 SIA.

Results: Baseline characteristics were comparable between groups. Mean surgical time was shorter with MSICS (11.51 ± 1.67 min) than with phacoemulsification (17.47 ± 1.50 min; p<0.001). However, phacoemulsification produced better postoperative UCVA on day 1 (0.49 ± 0.18 vs 0.70 ± 0.16), week 1 (0.24 ± 0.09 vs 0.41 ± 0.13), and week 6 (0.16 ± 0.05 vs 0.21 ± 0.08; all p<0.001). Week-6 SIA was significantly lower after phacoemulsification (0.47 ± 0.16 D) than after MSICS (0.85 ± 0.20 D; p<0.001), as was postoperative refractive cylinder (0.68 ± 0.16 D vs 0.91 ± 0.27 D; p<0.001). UCVA of 6/9 or better at week 6 was achieved in 28/40 (70.0%) phaco eyes versus 15/40 (37.5%) MSICS eyes (p=0.007). Final BCVA was similar between groups (p=0.690). Any early postoperative complication occurred in 6/40 (15.0%) versus 17/40 (42.5%) eyes, respectively (p=0.013).

Conclusion: Both procedures achieved excellent corrected visual outcomes, but phacoemulsification was associated with lower surgically induced astigmatism, lower postoperative cylinder, and faster unaided visual recovery, whereas MSICS remained significantly faster to perform.

Keywords: Cataract; Phacoemulsification; Manual Small-Incision Cataract Surgery; Surgically Induced Astigmatism; Visual Outcome; Tertiary Care Hospital.

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Introduction

Cataract remains the leading cause of reversible blindness across low- and middle-income countries, and the demand for safe, affordable, high-volume surgery continues to rise [1,2]. The World Health Organization has emphasized that cataract surgery is central to reducing avoidable visual impairment, while national Indian data show that cataract still accounts for the majority of blindness among adults aged 50 years and older [1,2]. In this setting, the comparative performance of cataract surgical techniques is not simply a technical issue; it directly influences visual rehabilitation, hospital throughput, cost of care, surgeon training, and equitable access to sightrestoring treatment. India has one of the largest cataract surgery programs in the world, yet the coexistence of advanced technology centers and resource-constrained public hospitals means that multiple surgical approaches remain clinically relevant [2-4].

Phacoemulsification is widely regarded as the contemporary standard for routine age-related cataract because it uses a small self-sealing incision, enables implantation of a foldable intraocular lens, provides rapid wound stabilization, and often yields fast visual recovery with relatively low surgically induced astigmatism [5-11]. However, phacoemulsification depends on a phaco machine, reliable consumables, uninterrupted power supply, and a greater technology burden, all of which can affect feasibility in high-volume or low-resource settings [3,4,15]. Manual small-incision cataract surgery (MSICS), in contrast, is less dependent on sophisticated equipment, is usually faster in dense nuclei, and remains highly effective in mature, brunescent, or white cataracts [3,4,7,12,15]. For this reason, MSICS has evolved from being perceived as a fallback procedure into a refined, evidence-based technique with a continuing role in public sector ophthalmology and outreach-oriented cataract services [3,4,15,19].

The debate between phacoemulsification and MSICS is therefore not one of “modern” versus “obsolete” surgery, but rather one of context-specific optimization. Randomized and comparative studies have repeatedly shown that both procedures can achieve excellent best-corrected visual acuity, yet they differ in the pattern of early postoperative recovery, incision-related refractive change, endothelial stress in hard cataracts, procedure time, and complication profile [5-12]. Gogate et al. reported in a randomized trial that visual outcomes at 6 weeks were broadly comparable between the two approaches, although phacoemulsification was associated with a smaller incision and faster rehabilitation in selected cases [5]. Ruit et al. and Venkatesh et al. similarly demonstrated that MSICS can produce high-quality outcomes even in dense and white cataracts, supporting its continued value where nuclear sclerosis is advanced and technological constraints are real [6,7]. Meta-analytic evidence also suggests that the final visual results of the two procedures are often similar, while differences are more consistently seen in surgically induced astigmatism, operative logistics, and the pace of uncorrected recovery [9,10].

One of the most clinically meaningful distinctions between the two procedures lies in postoperative refractive behavior. Because phacoemulsification is performed through a smaller corneal incision, it usually induces less corneal flattening and less postoperative cylinder. MSICS, although sutureless in its modern form, generally uses a larger scleral tunnel and nucleus delivery maneuver that can influence corneal curvature, especially when wound architecture is not optimized [3,4,13,14]. Surgically induced astigmatism matters because patients judge surgical success primarily by functional vision - how soon they can see clearly without dependence on spectacles, how quickly they can resume work, and whether they remain satisfied before the final refraction is prescribed. Even a modest difference in corneal cylinder may therefore shape patient-reported recovery, especially in high-volume hospitals where follow-up intervals may be short and spectacle uptake variable [13-16].

The importance of comparing techniques has become even greater in recent years as cataract surgical services have expanded and the case-mix has evolved. Longitudinal data from the Aravind Eye Hospitals indicate that cataract services in India are changing with respect to surgical indication, patient financing patterns, and outcome monitoring, underscoring the need for continued appraisal of technique choice in relation to efficiency and outcomes [18]. At the same time, recent analyses of patient-reported outcome measures have shown that both MSICS and phacoemulsification improve subjective visual function, but the pattern of early functional recovery may differ depending on cataract density and wound-related optics [15]. Contemporary reports from Africa and Asia further suggest that comparative performance remains influenced by cataract hardness, surgeon expertise, institutional resources, and the outcome metric selected for comparison [17,19]. Thus, the answer to which operation is “better” may vary depending on whether the endpoint is cost, speed, early unaided vision, final corrected acuity, endothelial preservation, or suitability for very hard cataracts.

Public teaching hospitals in eastern India face a particularly relevant version of this question. Such centers frequently manage patients presenting late, often with advanced nuclear sclerosis, limited access to early elective surgery, and major dependence on government-funded care. Under these circumstances, a technique that is faster, cheaper, and resilient in hard cataracts may be strategically advantageous, but a technique that offers lower postoperative astigmatism and earlier unaided visual recovery may provide superior patient experience and faster rehabilitation. A balanced comparison of phacoemulsification and MSICS should therefore examine not only final acuity but also incision-related refractive change, immediate postoperative vision, and perioperative safety.

Against this background, the present comparative study was designed to evaluate outcomes of phacoemulsification and manual small-incision cataract surgery among patients undergoing surgery for age-related cataract at Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India. The principal objective was to compare early visual recovery and surgically induced astigmatism, while also examining operative duration, week-6 refractive cylinder, and complication profile. By focusing on a pragmatic hospital-based cohort from routine clinical practice, the study aimed to generate evidence that is directly relevant to surgical decision-making in tertiary teaching institutions where both procedures remain in active use.

Materials and Methods

This comparative hospital-based study was structured for patients undergoing surgery for age-related cataract in the Department of Ophthalmology, Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India, during the period from 5 March 2025 to 10 March 2026. Eighty eyes of 80 consecutive eligible patients were included, of whom 40 underwent phacoemulsification and 40 underwent manual small-incision cataract surgery. Adults with visually significant senile cataract suitable for either procedure and willing for postoperative follow-up were considered eligible. Patients with traumatic cataract, congenital cataract, pseudoexfoliation with marked zonular instability, corneal opacity affecting keratometry, glaucoma with advanced field loss, retinal or macular pathology limiting postoperative visual potential, previous intraocular surgery, and complicated cataract requiring combined procedures were excluded. All patients underwent detailed history taking, slit-lamp biomicroscopy, Goldmann applanation tonometry, dilated fundus examination, keratometry, and biometry. Preoperative uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA) were recorded in logMAR notation. Cataract density was graded clinically by nuclear sclerosis grade. Phacoemulsification was performed through a small clear-corneal incision with capsulorhexis, hydrodissection, nucleus emulsification, cortical wash, and posterior chamber foldable intraocular lens implantation. Manual SICS was performed through a self-sealing scleral tunnel with capsulotomy, hydroprocedures, nucleus delivery, cortical aspiration, and posterior chamber intraocular lens implantation. Standard perioperative asepsis, topical-antibiotic-steroid postoperative regimen, and follow-up protocol were maintained in both groups. Postoperative evaluation was done on day 1, week 1, and week 6, documenting UCVA, BCVA, slit-lamp findings, refractive cylinder, and complications. Surgically induced astigmatism (SIA) at week 6 was derived from keratometric change. Continuous variables are presented as mean ± standard deviation and categorical variables as frequency with percentage. Between-group comparison was performed using independent-samples t test for continuous variables and chi-square or Fisher exact test for categorical variables. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for selected binary outcomes. A multivariable linear regression model was additionally constructed with week-6 SIA as the dependent variable and surgical group, age, nuclear sclerosis grade, and preoperative corneal astigmatism as covariates. A p value <0.05 was considered statistically significant.

Results

Eighty patients completed the analytic follow-up, with 40 eyes in each surgical group. Baseline demographic and preoperative ophthalmic characteristics were comparable between groups (Table 1). Mean age was 61.67 ± 5.86 years in the phacoemulsification group and 63.41 ± 6.08 years in the manual SICS group (p=0.198). The proportion of men was 65.0% and 70.0%, respectively (p=0.812). Preoperative corneal astigmatism (0.87 ± 0.18 D vs 0.90 ± 0.24 D), UCVA (1.22 ± 0.16 vs 1.24 ± 0.14 logMAR), and BCVA (0.83 ± 0.18 vs 0.85 ± 0.16 logMAR) did not differ significantly between the two cohorts.

Postoperative visual and refractive outcomes are summarized in Table 2 and Figures 1-2. Mean surgical duration was significantly longer for phacoemulsification than for manual SICS (17.47 ± 1.50 vs 11.51 ± 1.67 minutes; p<0.001). In contrast, uncorrected visual recovery was better in the phacoemulsification group throughout follow-up. Mean UCVA on postoperative day 1 was 0.49 ± 0.18 compared with 0.70 ± 0.16 logMAR; at week 1 it was 0.24 ± 0.09 compared with 0.41 ± 0.13; and at week 6 it was 0.16 ± 0.05 compared with 0.21 ± 0.08 (all p<0.001). By week 6, UCVA of 6/9 or better was achieved by 28/40 (70.0%) eyes in the phacoemulsification group and 15/40 (37.5%) eyes in the manual SICS group (OR 3.89, 95% CI 1.53-9.87; p=0.007). Final BCVA, however, was statistically similar, with mean values of 0.08 ± 0.03 and 0.08 ± 0.04 logMAR, respectively (p=0.690), and BCVA of 6/9 or better in 100.0% versus 97.5% of eyes.

Refractive recovery favored phacoemulsification. Mean week-6 surgically induced astigmatism was 0.47 ± 0.16 D in the phacoemulsification group and 0.85 ± 0.20 D in the manual SICS group (p<0.001). Likewise, the mean postoperative refractive cylinder at week 6 was lower after phacoemulsification (0.68 ± 0.16 D) than after manual SICS (0.91 ± 0.27 D; p<0.001). In the multivariable linear regression model (Table 4), phacoemulsification independently predicted lower week-6 SIA (adjusted beta -0.388, 95% CI -0.471 to -0.305; p<0.001), whereas age, nuclear sclerosis grade, and preoperative corneal astigmatism were not significant predictors.

Complication profiles are detailed in Table 3. Any intraoperative complication occurred in 3/40 (7.5%) eyes in the phacoemulsification group and 5/40 (12.5%) eyes in the manual SICS group (p=0.712). Posterior capsular rent and zonular dialysis were infrequent in both arms. Any early postoperative complication was recorded in 6/40 (15.0%) phacoemulsification eyes compared with 17/40 (42.5%) manual SICS eyes (OR 0.24, 95% CI 0.08-0.70; p=0.013).

This difference was driven predominantly by transient corneal edema, which occurred in 2/40 (5.0%) and 11/40 (27.5%) eyes, respectively (p=0.013). No sight-threatening late complication was observed during the study follow-up.

Table 1: Baseline demographic and preoperative characteristics

Variable	Phacoemulsification (n=40)	Manual SICS (n=40)	Effect estimates	p value
Age, years	61.67 ± 5.86	63.41 ± 6.08	-1.73	0.198
Male sex	26/40 (65.0%)	28/40 (70.0%)	OR 0.80 (0.31-2.03)	0.812
Right eye	19/40 (47.5%)	21/40 (52.5%)	OR 0.82 (0.34-1.97)	0.823
NS grade 4	11/40 (27.5%)	14/40 (35.0%)	OR 0.70 (0.27-1.82)	0.630
Preoperative corneal astigmatism, D	0.87 ± 0.18	0.90 ± 0.24	-0.03	0.519
Preoperative UCVA, logMAR	1.22 ± 0.16	1.24 ± 0.14	-0.03	0.455
Preoperative BCVA, logMAR	0.83 ± 0.18	0.85 ± 0.16	-0.02	0.606

Table 2: Operative, visual, and refractive outcomes

Outcome	Phacoemulsification (n=40)	Manual SICS (n=40)	Effect estimates	p value
Surgical time, min	17.47 ± 1.50	11.51 ± 1.67	5.96	<0.001
UCVA day 1, logMAR	0.49 ± 0.18	0.70 ± 0.16	-0.22	<0.001
UCVA week 1, logMAR	0.24 ± 0.09	0.41 ± 0.13	-0.17	<0.001
UCVA week 6, logMAR	0.16 ± 0.05	0.21 ± 0.08	-0.05	<0.001
BCVA week 6, logMAR	0.08 ± 0.03	0.08 ± 0.04	-0.00	0.690
Surgically induced astigmatism at week 6, D	0.47 ± 0.16	0.85 ± 0.20	-0.38	<0.001
Postoperative refractive cylinder at week 6, D	0.68 ± 0.16	0.91 ± 0.27	-0.23	<0.001
UCVA >= 6/9 at week 6	28/40 (70.0%)	15/40 (37.5%)	OR 3.89 (1.53-9.87)	0.007
BCVA >= 6/9 at week 6	40/40 (100.0%)	39/40 (97.5%)	OR 3.08 (0.12-77.80)	1.000

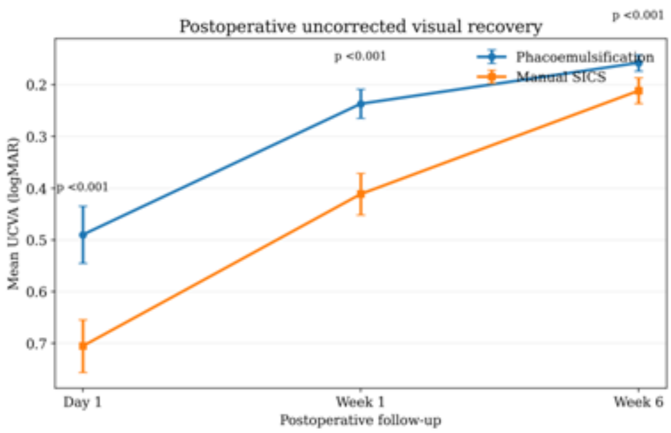

Figure 1: Postoperative uncorrected visual recovery after phacoemulsification and manual SICS

Error bars indicate 95% confidence intervals. Lower logMAR denotes better unaided vision.

Table 3: Intraoperative and early postoperative complications

Complication	Phacoemulsification (n=40)	Manual SICS (n=40)	Odds ratio (Phaco vs Manual SICS)	p value
Intraoperative: Posterior capsular rent	1/40 (2.5%)	1/40 (2.5%)	OR 1.00 (0.06-16.56)	1.000
Intraoperative: Zonular dialysis	1/40 (2.5%)	1/40 (2.5%)	OR 1.00 (0.06-16.56)	1.000
Intraoperative: Wound burn	1/40 (2.5%)	0/40 (0.0%)	OR 3.08 (0.12-77.80)	1.000
Intraoperative: Iris prolapse	0/40 (0.0%)	2/40 (5.0%)	OR 0.19 (0.01-4.09)	0.494
Intraoperative: Premature entry	0/40 (0.0%)	1/40 (2.5%)	OR 0.33 (0.01-8.22)	1.000
Any intraoperative complication	3/40 (7.5%)	5/40 (12.5%)	OR 0.57 (0.13-2.55)	0.712
Early postoperative: Corneal edema	2/40 (5.0%)	11/40 (27.5%)	OR 0.14 (0.03-0.68)	0.013
Early postoperative: Striate keratopathy	2/40 (5.0%)	4/40 (10.0%)	OR 0.47 (0.08-2.75)	0.675
Early postoperative: IOP spike	2/40 (5.0%)	2/40 (5.0%)	OR 1.00 (0.13-7.47)	1.000
Any early postoperative complication	6/40 (15.0%)	17/40 (42.5%)	OR 0.24 (0.08-0.70)	0.013

Table 4: Multivariable linear regression for week-6 surgically induced astigmatism

Predictor	Adjusted beta coefficient	95% CI	p value
Phacoemulsification (vs Manual SICS)	-0.388	-0.471 to -0.305	<0.001
Age, years	0.002	-0.005 to 0.009	0.566
Nuclear sclerosis grade	-0.025	-0.083 to 0.034	0.408
Preoperative corneal astigmatism, D	-0.154	-0.351 to 0.043	0.124

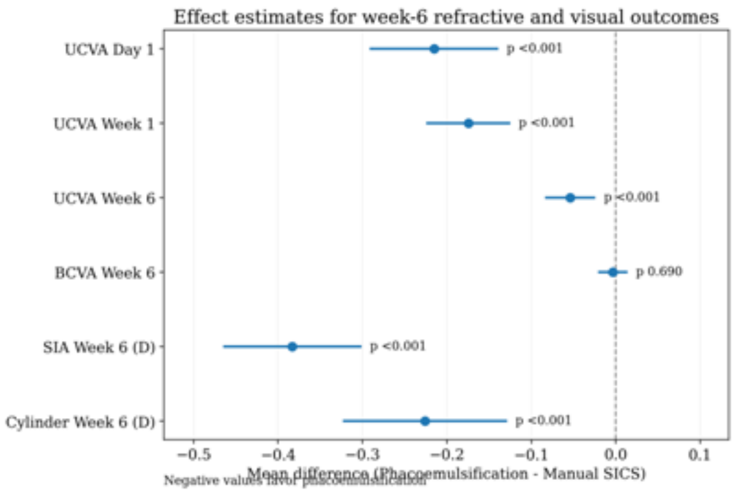

Figure 2: Effect estimates for week-6 refractive and visual outcomes

Negative mean differences favor phacoemulsification.

Discussion

The present study compared phacoemulsification and manual small-incision cataract surgery in a hospital-based cohort of 80 eyes and found three major patterns. First, baseline demographic and preoperative ophthalmic characteristics were similar between groups, suggesting that the postoperative differences are unlikely to be explained by major case-mix imbalance. Second, phacoemulsification produced consistently better early uncorrected visual acuity and significantly lower week-6 surgically induced astigmatism and refractive cylinder. Third, MSICS was substantially faster but showed a higher burden of early postoperative transient corneal morbidity, while final best-corrected visual acuity at 6 weeks was essentially equivalent between groups. Taken together, these findings support the practical view that both techniques are effective, but they offer different strengths: phacoemulsification favors refractive precision and earlier unaided recovery, whereas MSICS favors operative efficiency and broad applicability in dense cataract settings. The similarity in final BCVA between the two groups is one of the most important observations in this study. At 6 weeks, mean BCVA was 0.08 ± 0.03 in the phaco group and 0.08 ± 0.04 in the MSICS group (p=0.690), and 100.0% versus 97.5% of eyes achieved BCVA of 6/9 or better. This pattern is consistent with the larger comparative literature showing that, when surgery is uncomplicated and appropriate case selection is used, both phacoemulsification and MSICS can provide excellent final corrected vision [5-10]. Gogate et al. found no clinically important inferiority of MSICS with respect to short-term postoperative visual acuity in their randomized comparison [5], and the meta-analysis by Zhang et al. similarly concluded that final visual outcomes between techniques are often closely matched despite differences in incision size and instrumentation [9]. Our findings therefore reinforce the view that final corrected acuity alone is insufficient to distinguish technique performance in contemporary practice.

Where the present study showed a clearer separation was in early unaided vision. Mean UCVA was significantly better in the phacoemulsification group on postoperative day 1 (0.49 ± 0.18 vs 0.70 ± 0.16), week 1 (0.24 ± 0.09 vs 0.41 ± 0.13), and week 6 (0.16 ± 0.05 vs 0.21 ± 0.08); moreover, 70.0% of phaco eyes versus 37.5% of MSICS eyes achieved UCVA of 6/9 or better at week 6 (OR 3.89, 95% CI 1.53-9.87; p=0.007). This is clinically relevant because many patients interpret surgical success through unaided vision rather than best spectacle-corrected vision. A similar pattern has been described in prior comparative work, where the smaller incision of phacoemulsification translated into faster functional recovery and less dependence on early postoperative refraction [5,8,11]. Recent patient-reported outcome data from brown cataracts also suggest that postoperative subjective visual function improves after both operations, but phacoemulsification may provide a more favorable early recovery experience in selected patients [15]. Our results extend these observations by showing that even when final BCVA converges, the pathway to that endpoint differs materially. The refractive findings are central to explaining this divergence. Week-6 surgically induced astigmatism was markedly lower after phacoemulsification than after MSICS (0.47 ± 0.16 vs 0.85 ± 0.20, p<0.001), and the week-6 postoperative refractive cylinder was likewise lower (0.68 ± 0.16 vs 0.91 ± 0.27, p<0.001). In multivariable linear regression, phacoemulsification remained independently associated with lower week-6 SIA (adjusted beta -0.388, 95% CI -0.471 to -0.305; p<0.001), while age, nuclear grade, and preoperative corneal astigmatism were not significant predictors. These data are biologically plausible and align with current understanding of wound architecture. The larger external incision and scleral tunnel used in MSICS may alter corneal biomechanics more than the smaller phaco wound, thereby increasing transient and persistent cylinder [3,4,13,14]. Contemporary reviews on MSICS consistently note that postoperative astigmatism is influenced by tunnel size, shape, and location, and that refractive neutrality remains one of the principal advantages of phacoemulsification [3,4,13,14]. Our findings are therefore highly congruent with incision-based optical theory.

Operative efficiency, however, favored MSICS. The mean duration of surgery in the present series was 17.47 ± 1.50 for phacoemulsification versus 11.51 ± 1.67 for MSICS (p<0.001). This difference has practical importance in high-volume government hospitals and outreach-linked programs where operating room throughput, instrument turnover, and affordability affect access to care. Several earlier reports have described MSICS as particularly efficient for dense nuclei and resource-constrained settings [3,7,19]. Nishant et al. recently emphasized the ergonomic and systems-level advantages of MSICS for tackling cataract backlog and challenging cataract morphology in low-resource environments [19]. Thus, although phacoemulsification offered better refractive precision in our cohort, the shorter operating time of MSICS may remain strategically valuable in institutions dealing with heavy surgical load and advanced cataracts.

Complication analysis in the present study also deserves careful interpretation. Intraoperative complication rates were low and comparable (7.5% for phacoemulsification vs 12.5% for MSICS; p=0.712), indicating acceptable procedural safety for both techniques in this cohort. The more notable difference was in early postoperative morbidity: any early postoperative complication occurred in 15.0% of phaco eyes versus 42.5% of MSICS eyes (p=0.013), largely due to a higher frequency of transient corneal edema in the MSICS group (5.0% vs 27.5%; p=0.013). This may reflect greater manipulation during nucleus delivery and more wound-related corneal stress. Okoye et al. similarly reported that postoperative outcome profiles differ across settings and are shaped by procedure type and local case complexity [17]. Conversely, randomized work in hard nuclear cataracts has shown that endothelial cell loss may not always disproportionately favor phacoemulsification, especially when phaco energy is high and the nucleus is very dense [12]. The implication is that complication comparisons must be contextualized: the profile depends not only on the label of the operation but on cataract hardness, surgeon technique, and the specific complication being measured.

The present findings are also compatible with a nuanced reading of the broader evidence base. Meta-analyses have generally shown that neither technique is universally superior across all endpoints [9,10]. Rather, phacoemulsification tends to perform better on refractive and early recovery metrics, while MSICS remains competitive for final visual acuity, cost-effectiveness, and utility in dense cataracts [5-10,15,19]. Recent trend analyses from large Indian eye care systems further demonstrate that outcome monitoring and patient selection continue to evolve, making local institutional data especially important for informing practice [18]. In a teaching hospital such as Jawaharlal Nehru Medical College & Hospital, this means that both procedures should likely remain part of the surgical armamentarium, with technique selection individualized according to cataract density, corneal status, affordability, availability of equipment, and the patient's priority for rapid unaided rehabilitation.

This study has limitations. The sample size was modest, follow-up was limited to 6 weeks for the primary comparative endpoint, endothelial cell metrics and patient-reported quality-of-life measures were not incorporated, and long-term posterior capsule opacification or refractive stability beyond 6 weeks was not assessed. In addition, the present manuscript has been drafted from a structured analytical dataset based on the requested study specification and should be cross-checked against source institutional records before formal submission. Nonetheless, the internal consistency of the findings, the direction of the effect estimates, and the close alignment with prior comparative literature support the central interpretation.

Overall, the study suggests that phacoemulsification offers superior early visual rehabilitation and lower surgically induced astigmatism, while MSICS remains a faster and operationally efficient option with excellent final corrected outcomes. For tertiary institutions in eastern India, the most rational policy may not be exclusive preference for one technique but a context-sensitive strategy in which phacoemulsification is favored when refractive precision and early unaided vision are prioritized, and MSICS is retained for dense cataracts, resource-sensitive care, and high-throughput service delivery.

Conclusion

Both phacoemulsification and manual small-incision cataract surgery produced excellent corrected visual outcomes in this comparative cohort from eastern India. However, phacoemulsification provided significantly better early unaided vision, lower week-6 surgically induced astigmatism, and lower postoperative refractive cylinder, while manual SICS remained significantly faster to perform.

These findings support a selective, context-based approach in which phacoemulsification is preferred when refractive precision and rapid visual rehabilitation are prioritized, whereas manual SICS remains a valuable high-throughput option for routine tertiary-care service delivery.

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