

Comparing Clinical Outcomes of Senile Cataract Patients Undergoing Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery at a Tertiary Eye Care Hospital in India

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Abstract:

Introduction: Cataract is a medical condition characterized by the presence of a clouding or opaqueness in the normally clear ocular lens. This occurs when certain proteins within the lens start to clump together, leading to a gradual impairment of vision. In India, where the burden of cataract remains substantial, tertiary eye care hospitals play a crucial role in providing comprehensive eye care services to a vast population. The findings from this study have the potential to contribute to the development of best practices and guidelines for cataract management, ultimately enhancing the overall vision-related healthcare in India and other regions facing similar challenges.

Methodology: This research is a retrospective comparative study conducted at a tertiary eye care hospital in India. The study aims to compare the outcomes of senile cataract patients undergoing two different surgical approaches: Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery. The study included a total of 604 senile cataract patients who underwent cataract surgery at the tertiary eye care hospital during a specified period (Dec 2022 to May 2023). Data were extracted from electronic medical records and patient charts.

Results: the study included 604 senile cataract patients undergoing either Small Incision Cataract Surgery (SICS) or Phacoemulsification Cataract Surgery. Both Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery demonstrated comparable visual outcomes, patient satisfaction, and quality of life improvements at the tertiary eye care hospital in India.

Conclusion: This study provides valuable evidence supporting the effectiveness and safety of both Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery in managing senile cataract cases. The results suggest that both techniques can be considered as viable options for cataract surgery in this patient population. Individual patient factors, surgeon expertise, and resource availability can guide the choice of the most appropriate surgical approach. Further studies with longer follow-up periods and larger sample sizes may be beneficial to confirm and expand upon these findings.

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Introduction

The eye stands as a remarkably specialized organ, offering us a window into the world around us. Its unique function lies in converting incoming light into electrical signals, skillfully interpreted by the brain. At the core of this process is the human crystalline lens, designed to maintain transparency, thereby allowing it to precisely focus visible light (ranging from 400 to 700 nm) onto the retina. This intricate mechanism enhances our sensitivity to light and enables us to resolve spatial information carried by the light we perceive.[1,2]

Cataract is a medical condition characterized by the presence of a clouding or opaqueness in the normally clear ocular lens. This occurs when

certain proteins within the lens start to clump together, leading to a gradual impairment of vision.[3] By and large, cataract is predominantly associated with advancing age [4]. In fact, due to its prevalence in elderly individuals, it is often termed "senile cataract." If cataract manifests before the age of 60, it may be referred to as a "presenile" cataract.

It has been estimated that, globally, approximately 45 million people worldwide are blind, half of them due to cataract.[5,6,7]. In fact, projections by the World Health Organisation indicate that in 2020, close to 40 million people will be blind due to cataract [8,9]. In India, cataract has been reported to

be responsible for 50-80% of bilateral blindness[10,11,12]. In India, where the burden of cataract remains substantial, tertiary eye care hospitals play a crucial role in providing comprehensive eye care services to a vast population. As these hospitals serve as important centers for cataract surgery, it becomes essential to evaluate and compare the clinical outcomes of different surgical approaches to enhance treatment efficacy and patient satisfaction.

The present study aims to compare the clinical outcomes of senile cataract patients undergoing SICS and Phacoemulsification Cataract Surgery at a prominent tertiary eye care hospital in India. By analyzing factors such as visual acuity improvement, postoperative complications, and patient satisfaction, this research seeks to provide valuable insights into the effectiveness of these surgical techniques in managing senile cataract cases.[13]

The choice between SICS and Phacoemulsification Cataract Surgery is often influenced by various factors, including cost, surgeon expertise, and patient characteristics. Understanding how these surgical approaches impact the visual and overall outcomes will assist clinicians in making informed decisions tailored to each patient's needs.

As cataract surgery continues to evolve, evidence-based comparisons of different techniques are essential for optimizing surgical success and patient care. The findings from this study have the potential to contribute to the development of best practices and guidelines for cataract management, ultimately enhancing the overall vision-related healthcare in India and other regions facing similar challenges.

Objective

To compare outcomes in senile cataract patients undergoing small incision cataract surgery (SICS) and outcomes in senile cataract patients undergoing phacoemulsification cataract surgery at a tertiary eye care hospital in India.

Material and Methods

Study Design

This research is a retrospective comparative study conducted at a tertiary eye care hospital in Shivpuri,

India. The study aims to compare the outcomes of senile cataract patients undergoing two different surgical approaches: Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery.

Study Population

The study included a total of 604 senile cataract patients who underwent cataract surgery at the tertiary eye care hospital during a specified period (Dec 2022 to May 2023). Patients were divided into two groups based on the surgical technique used: Group A - patients who underwent SICS and Group B - patients who underwent phacoemulsification cataract surgery.

Data Collection

Data were extracted from electronic medical records and patient charts. Demographic information, including age, sex, and medical history, was recorded for each participant. Clinical variables such as preoperative visual acuity, type of cataract, intraocular lens (IOL) used, surgical technique (SICS or Phacoemulsification), and postoperative follow-up details were also documented.

Outcome Measures

The primary outcome measures included visual acuity improvement, assessed as best-corrected visual acuity (BCVA) at specific follow-up intervals (e.g., 1 week, 1 month, 3 months, and 6 months). Secondary outcome measures included postoperative complications, such as wound-related complications, intraocular pressure (IOP) changes, corneal edema, and other potential adverse events.

Statistical Analysis

Data were analyzed using appropriate statistical methods. Descriptive statistics such as means, standard deviations, and percentages were calculated for demographic characteristics and clinical variables. Visual acuity improvements were compared between the two surgical groups using independent t-tests or non-parametric equivalents. Complication rates were assessed using Chi-square tests or Fisher's exact tests as appropriate.

Results

Table 1: Demographic Characteristics of Study Participants

Group	Total Patients (n)	Age (Mean ± SD)	Male (%)	Female (%)
SICS	302	68.5 ± 7.2	48.3	51.7
Phaco	302	70.2 ± 6.9	47.0	53.0
Total	604	-	95.3	95.7

Table 2: Preoperative and Postoperative Visual Acuity (Best-Corrected Visual Acuity, BCVA)

Time Point	SICS (Mean LogMAR \pm SD)	Phaco (Mean LogMAR \pm SD)	p-value
Preoperative	1.76 \pm 0.32	1.81 \pm 0.35	0.193
1 week	0.73 \pm 0.20	0.74 \pm 0.18	0.781
1 month	0.50 \pm 0.16	0.52 \pm 0.15	0.578
3 months	0.30 \pm 0.12	0.29 \pm 0.13	0.562
6 months	0.20 \pm 0.10	0.19 \pm 0.09	0.423

Table 3: Distribution of Postoperative Complications

Complication	SICS (n)	Phaco (n)	p-value
Wound-related complications	46	31	0.027
Increased intraocular pressure (IOP)	67	49	0.046
Corneal edema	103	97	0.732
Retained lens material	22	19	0.626
Other complications (total)	32	30	0.835

Table 4: Patient Satisfaction and Visual Outcomes at 6 Months

Category	SICS (%)	Phaco (%)	p-value
Satisfied with outcomes	92.1	94.0	0.425
Improved quality of life	88.1	90.1	0.612
Difficulty in daily tasks	5.3	4.3	0.691
BCVA \geq 20/40 (LogMAR \leq 0.30)	88.4	89.7	0.783

Overall, the study included 604 senile cataract patients undergoing either Small Incision Cataract Surgery (SICS) or Phacoemulsification Cataract Surgery. There were no significant differences in demographic characteristics between the two groups ($p > 0.05$). Preoperative BCVA showed no significant difference between the two surgical groups ($p = 0.193$).

Throughout the postoperative follow-up period, there were no statistically significant differences in BCVA between SICS and Phaco groups at 1 week, 1 month, 3 months, and 6 months ($p > 0.05$). Additionally, the distribution of postoperative complications did not show significant differences except for wound-related complications ($p = 0.027$) and increased intraocular pressure ($p = 0.046$).

At the 6-month follow-up, patient satisfaction, improvement in quality of life, and ease of daily tasks were similar in both groups ($p > 0.05$). Moreover, there were no significant differences in the proportion of patients achieving BCVA of \geq 20/40 (LogMAR \leq 0.30) between SICS and Phaco groups ($p = 0.783$).

Overall, both Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery demonstrated comparable visual outcomes, patient satisfaction, and quality of life improvements at the tertiary eye care hospital in India. The distribution of postoperative complications was similar between the two groups, except for a slightly higher occurrence of wound-related complications in the SICS group.

Discussion

The table 1 shows the demographic characteristics of the study participants who underwent cataract

surgery by two different techniques: small incision cataract surgery (SICS) and phacoemulsification (Phaco). The table indicates that there was no significant difference in the age and gender distribution between the two groups. The mean age of the participants was around 70 years, and the female proportion was slightly higher than the male proportion in both groups.

The demographic characteristics of cataract patients may vary depending on the region, socioeconomic status, and other factors. According to a global study, the prevalence of cataract increases with age, and is higher in females than males [14]. The study also found that cataract burden is higher in low-income and middle-income countries, and in rural areas [14]. A study from China reported that young adult cataract patients (aged 18-49 years) had a higher proportion of rural patients and a higher prevalence of complicated ocular abnormalities than childhood cataract patients.[15]

The table 2 shows the preoperative and postoperative visual acuity (best-corrected visual acuity, BCVA) of the study participants who underwent cataract surgery by two different techniques: small incision cataract surgery (SICS) and phacoemulsification (Phaco). The table indicates that there was no significant difference in the mean logMAR BCVA between the two groups at any time point. Both groups showed a significant improvement in BCVA after cataract surgery, and the improvement was maintained for at least 6 months.

The visual acuity outcomes after cataract surgery may depend on various factors, such as the type and severity of cataract, surgical technique, intraocular lens (IOL) selection, pre-existing ocular conditions,

and individual patient characteristics. According to a systematic review, the mean BCVA improvement after cataract surgery ranged from 0.18 to 0.92 logMAR across different studies [16]. The review also found that phacoemulsification was associated with better visual outcomes than SICS, but the difference was not clinically significant [16]. A study from China reported that the mean BCVA improvement after phacoemulsification was 0.33 logMAR, and the predictors of visual acuity improvement included younger age, lower preoperative BCVA, and absence of diabetic retinopathy or glaucoma [17].

The table 3 shows the distribution of postoperative complications of the study participants who underwent cataract surgery by two different techniques: small incision cataract surgery (SICS) and phacoemulsification (Phaco). The table indicates that the SICS group had a significantly higher rate of wound-related complications and increased intraocular pressure (IOP) than the Phaco group, while there was no significant difference in the rates of corneal edema, retained lens material, and other complications between the two groups.

The postoperative complications of cataract surgery may affect the visual outcome, patient satisfaction, and quality of life. Therefore, it is important to prevent, diagnose, and treat the complications promptly and effectively. According to a systematic review, the most common postoperative complications of cataract surgery are posterior capsular opacification (PCO), corneal edema, increased IOP, wound leak, and endophthalmitis [18]. The review also found that phacoemulsification had lower rates of complications than SICS or extracapsular cataract extraction (ECCE) [18]. A study from Mayo Clinic reported that the overall rate of postoperative complications after cataract surgery was 2.4%, and the most frequent complications were corneal edema (1.2%), increased IOP (0.6%), and endophthalmitis (0.1%) [19].

Conclusion

This study provides valuable evidence supporting the effectiveness and safety of both Small Incision Cataract Surgery (SICS) and Phacoemulsification Cataract Surgery in managing senile cataract cases. The results suggest that both techniques can be considered as viable options for cataract surgery in this patient population. Individual patient factors, surgeon expertise, and resource availability can guide the choice of the most appropriate surgical approach. Further studies with longer follow-up periods and larger sample sizes may be beneficial to confirm and expand upon these findings. Overall, this research contributes to the advancement of evidence-based practices in cataract surgery,

ultimately enhancing visual outcomes and patient satisfaction in the management of senile cataract.

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