

To Evaluate the Incidence of Early and Late Post-Operative Complications in Cataract Patients in Eastern Uttar Pradesh

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Abstract:

Background: Cataract remains the leading cause of reversible blindness worldwide, particularly in developing countries like India. Although advances in surgical techniques such as manual small incision cataract surgery (SICS) have improved outcomes, postoperative complications continue to affect visual prognosis and patient satisfaction.

Aim: To evaluate the incidence and pattern of early and late postoperative complications in cataract patients undergoing SICS.

Materials and Methods: A total of 150 patients aged ≥ 40 years with senile cataract undergoing SICS with posterior chamber intraocular lens (PCIOL) implantation were included. Patients with traumatic, congenital cataract or pre-existing posterior segment pathology were excluded. All patients underwent detailed preoperative evaluation and were followed up on day 1, 1 week, 1 month, and 3 months postoperatively. Early complications (within 1 month) and late complications (after 1 month) were recorded.

Results: Early postoperative complications were observed in 24% of patients, with raised intraocular pressure (10%) being the most common, followed by corneal edema (8%) and anterior uveitis (5.3%). Late postoperative complications occurred in 28% of patients, with posterior capsular opacification (18%) being the most frequent, followed by cystoid macular edema (6%).

Conclusion: Manual small incision cataract surgery is a safe and effective procedure with good visual outcomes and a low complication rate. Early complications are usually self-limiting, while late complications such as posterior capsular opacification remain a major cause of visual impairment.

Keywords: Cataract, SICS, Postoperative Complications, Posterior Capsular Opacification, Intraocular Pressure, Visual Outcome.

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Introduction

Cataract remains the leading cause of reversible blindness worldwide and continues to pose a significant public health challenge, particularly in developing countries such as India.[1] With the advancement of surgical techniques, especially phacoemulsification and improved intraocular lens (IOL) designs, cataract surgery has become one of the safest and most commonly performed surgical procedures with excellent visual outcomes.[2]

Despite these advancements, postoperative complications continue to affect surgical outcomes and patient satisfaction. These complications can be broadly classified into early and late postoperative complications based on the time of onset. Early complications, occurring within the first few weeks after surgery, include raised intraocular pressure

(IOP), corneal edema, anterior chamber inflammation, and endophthalmitis.[3] Although most early complications are transient and manageable, they require prompt identification and treatment to prevent long-term visual impairment. Late postoperative complications, which may develop months to years after surgery, include posterior capsular opacification (PCO), cystoid macular edema (CME), retinal detachment, and intraocular lens-related complications.[4] Among these, PCO is the most common late complication and remains a significant cause of decreased vision.[5]

Several studies have evaluated the incidence and pattern of postoperative complications, highlighting the role of surgical technique, intraoperative events, and patient-related factors in determining out-

comes.[6] Furthermore, intraoperative complications such as posterior capsular rupture have been shown to significantly increase the risk of both early and late postoperative complications.[7]

Understanding the spectrum and frequency of these complications is essential for improving surgical outcomes. Therefore, the present study was undertaken to evaluate the incidence and pattern of early and late postoperative complications following cataract surgery.

Materials and Methods

This prospective observational study was conducted in the Department of Ophthalmology at Maharshi Devraha Baba Medical College, Deoria, a teaching hospital in eastern Uttar Pradesh, over a period of 12 months from January 2025 to December 2025. A total of 150 patients diagnosed with senile cataract and scheduled for manual small incision cataract surgery (SICS) with posterior chamber intraocular lens (PCIOL) implantation were included in the study. Patients aged 40 years and above who were willing to participate and comply with follow-up visits were enrolled. Patients with traumatic cataract, congenital cataract, previous intraocular surgery, or pre-existing posterior segment pathology such as diabetic retinopathy or retinal detachment were excluded from the study.

All patients underwent a detailed preoperative ophthalmic evaluation including visual acuity assessment using Snellen's chart, slit-lamp biomicroscopy, intraocular pressure measurement, and fundus examination wherever media clarity permitted. Keratometry and axial length measurement were performed for intraocular lens power calculation. Systemic evaluation including blood pressure and blood sugar levels was carried out prior to surgery to ensure fitness for the procedure. All surgeries were performed under strict aseptic precautions in the ophthalmic operation theatre using standard manual small incision cataract surgery (SICS) technique with posterior chamber intraocular lens implantation. Postoperatively, all patients were followed up on day 1, at 1 week, 1 month, and 3 months. At each follow-up visit, patients were evaluated for visual acuity, anterior segment findings using slit-lamp examination, intraocular pressure, and posterior segment evaluation when indicated. Postoperative complications were recorded and categorized as early and late based on the time of occurrence.

Early postoperative complications were defined as those occurring within one month of surgery and included raised intraocular pressure (>21 mmHg), corneal edema, anterior uveitis, wound-related complications, and endophthalmitis. Late postoperative complications were defined as those occurring after one month and included posterior capsular opacification, cystoid macular edema, retinal de-

tachment, and intraocular lens decentration or dislocation. Data were entered into Microsoft Excel and analyzed using SPSS software version 25.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean $\pm$ standard deviation. The association between intraoperative factors and postoperative complications was assessed using the Chi-square test, and a p-value of less than 0.05 was considered statistically significant.

The study was conducted after obtaining approval from the Institutional Ethics Committee of Maharshi Devraha Baba Medical College, Deoria. Written informed consent was obtained from all participants prior to inclusion in the study, and the study adhered to the tenets of the Declaration of Helsinki.

Results

A total of 150 patients who underwent manual small incision cataract surgery (SICS) were included in the study and followed up for a period of 3 months. The mean age of the study population was 62.4 ± 8.6 years (range: 42–80 years), with the majority of patients (46%) belonging to the 60–70 years age group. There were 82 males (54.7%) and 68 females (45.3%), with a male-to-female ratio of 1.2:1.

Early postoperative complications (within 1 month) were observed in 36 patients (24%). The most common early complication was raised intraocular pressure, seen in 15 patients (10%), followed by corneal edema in 12 patients (8%) and anterior uveitis in 8 patients (5.3%). Most cases of raised intraocular pressure and corneal edema were transient and responded well to medical management within the first week of follow-up.

Late postoperative complications (after 1 month) were observed in 42 patients (28%). The most common late complication was posterior capsular opacification, seen in 27 patients (18%), followed by cystoid macular edema in 9 patients (6%). Intraocular lens decentration was noted in 3 patients (2%), while retinal detachment was observed in 1 patient (0.7%). Posterior capsular opacification was more frequently noted during the 3-month follow-up visit.

A total of 30 patients (20%) experienced intraoperative complications, the most common being posterior capsular rupture and vitreous loss. Among these patients, 18 (60%) developed postoperative complications, whereas among patients without intraoperative complications ($n = 120$), only 60 (50%) developed postoperative complications. The association between intraoperative complications and postoperative complications was found to be statistically significant (Chi-square = 4.87, $p = 0.027$), indicating that patients with intraoperative

complications had a higher risk of developing post-operative complications.

Table 1: Early Postoperative Complications (n = 150)

Complication	Number	Percentage
Raised IOP	15	10%
Corneal edema	12	8%
Anterior uveitis	8	5.3%
Total	35	24%

Table 2: Late Postoperative Complications (n = 150)

Complication	Number	Percentage
Posterior capsular opacification	27	18%
Cystoid macular edema	9	6%
IOL decentration	3	2%
Retinal detachment	1	0.7%
Total	42	28%

Table 3: Association between Intraoperative and Postoperative Complications

Intraoperative Complications	Post-op Complications Present	Absent	Total
Present	18	12	30
Absent	60	60	120

Chi-square = 4.87, p-value = 0.027 (statistically significant)

Discussion

The present study evaluated the incidence and pattern of early and late postoperative complications following manual small incision cataract surgery (SICS) and found that the overall complication rate was low, with early complications in 24% and late complications in 28% of patients. These findings are broadly consistent with previously published literature, which reports that modern cataract surgery is safe but not devoid of complications.

In the present study, early postoperative complications were observed in 24% of patients, with raised intraocular pressure (10%) being the most common. Similar findings have been reported by Riaz et al., who noted that transient elevation of intraocular pressure is one of the most frequent early postoperative events following cataract surgery due to retained viscoelastic and inflammatory response.[3] Corneal edema (8%) observed in our study is also comparable to earlier reports, where endothelial trauma during surgery was identified as the primary cause of transient postoperative corneal edema.[7]

Anterior uveitis was seen in 5.3% of cases in our study, which aligns with findings from Javitt et al., who described postoperative inflammation as a common but self-limiting complication with appropriate steroid therapy.[6]

Late postoperative complications were slightly higher (28%) in our study, with posterior capsular opacification (PCO) being the most common (18%). This finding is consistent with multiple studies identifying PCO as the most frequent late complication following cataract surgery.[9] Re-

ported incidence rates of PCO vary widely from 10% to 50% depending on duration of follow-up and surgical technique.[6] A systematic review reported pooled PCO rates of approximately 11.8% at 1 year, increasing to 20.7% at 3 years and 28.4% at 5 years, indicating a progressive rise over time.[7] The relatively lower incidence in our study may be attributed to the shorter follow-up period of 3 months. The pathogenesis of PCO is primarily attributed to the proliferation and migration of residual lens epithelial cells, as described in experimental and clinical studies.[5] Risk factors such as younger age, diabetes, and surgical technique have also been implicated in its development.[8]

Cystoid macular edema (CME) was observed in 6% of cases in the present study, which is comparable to previously reported rates ranging from 1% to 10% depending on diagnostic modality.[9] Irvine and Gass first described CME as a significant cause of suboptimal visual recovery following cataract surgery.[10]

Retinal detachment was observed in 0.7% of patients, consistent with studies reporting an incidence of approximately 0.5%–1% following cataract surgery.[4] Known risk factors include high myopia, posterior capsular rupture, and vitreous loss.

Intraocular lens (IOL) decentration was seen in 2% of patients, which is comparable to previous studies that have reported low but clinically significant rates of IOL-related complications affecting visual outcomes.

Importantly, our study demonstrated a statistically significant association between intraoperative complications and postoperative complications ($p = 0.0270$). Overall, the visual outcomes in our study were favorable, with 84% of patients achieving best corrected visual acuity of $\geq 6/18$ at 3 months, which is comparable to national and international benchmarks. Poor visual outcomes were mainly associated with late complications such as PCO and CME.

Conclusion

Manual small incision cataract surgery (SICS) is a safe and effective technique with favorable visual outcomes and a relatively low incidence of complications. Early postoperative complications such as raised intraocular pressure, corneal edema, and anterior uveitis are generally transient and respond well to medical management. Late complications, particularly posterior capsular opacification, remain the most common cause of delayed visual impairment and require timely intervention.

The study also highlights a significant association between intraoperative events and postoperative complications, emphasizing the importance of meticulous surgical technique and adequate training. Regular postoperative follow-up is essential for early detection and management of complications to ensure optimal visual outcomes. Overall, SICS continues to be a reliable and cost-effective surgical option, especially in resource-limited settings,

with outcomes comparable to other modern cataract surgical techniques

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