Journal of Advanced Scientific Research

Available online through https://sciensage.info

ISSN

0976-9595

Research Article

A Prospective Comparative Study of Postoperative Complications and Visual Outcomes of Cataract Surgery in Uveitic Versus Non-Uveitic Eyes

Kundan Kumar Singh, Chandan Kumar*, Anurag Verma, Jawed Iqbal

Department of Ophthalmology, ANMMCH, Gaya, Bihar, India

Corresponding author: chandan.mbbs09@gmail.com

Received: 08-05-2026; Accepted: 25-05-2026; Published: 30-05-2026

https://doi.org/10.55218/JASR.2026170516

ABSTRACT

Background: Cataract is a leading cause of visual impairment, and uveitis is an important secondary cause of complicated cataract, particularly in younger individuals. Cataract surgery in uveitic eyes poses significant challenges due to pre-existing inflammation and increased risk of postoperative complications. Comparative evaluation with non-uveitic cataracts is essential to understand surgical outcomes and optimize management strategies in tertiary care settings.

Aim: To compare postoperative complications and visual outcomes of cataract surgery in uveitic versus non-uveitic eyes in a Tertiary Care Center in Gaya, Bihar.

Methodology: This prospective comparative observational study included 120 patients (120 eyes) undergoing cataract surgery over 12 months, divided into uveitic (n=60) and non-uveitic (n=60) groups. All patients underwent standard preoperative evaluation and cataract extraction by phacoemulsification or SICS with intraocular lens implantation. Patients were followed up for 3 months. Outcome measures included postoperative best corrected visual acuity (BCVA), intraoperative complications, and postoperative complications. Statistical analysis was performed using SPSS version 25, with $p<0.05$ considered significant.

Results: Uveitic patients were significantly younger and had poorer preoperative visual acuity. Intraoperative difficulties, such as small pupil and posterior synechiae, were significantly more common in uveitic eyes. Postoperative complications, including anterior chamber reaction, cystoid macular edema, and posterior capsular opacification, were significantly higher in the uveitic group. Although both groups showed significant improvement in BCVA, final visual outcomes were significantly better in non-uveitic eyes ($p < 0.001$).

Conclusion: Cataract surgery in uveitic eyes provides significant visual rehabilitation but is associated with higher complication rates and comparatively poorer outcomes than non-uveitic eyes. Careful perioperative inflammation control and vigilant follow-up are essential for optimal visual outcomes.

Keywords: Cataract surgery, Uveitis, Phacoemulsification, Postoperative complications, Visual acuity

INTRODUCTION

Cataract remains the leading cause of reversible blindness worldwide and contributes substantially to visual impairment in developing countries like India [1]. Among the various etiologies of cataract formation, uveitis constitutes an important secondary cause, especially in younger and middle-aged populations. Uveitis is a chronic intraocular inflammatory disorder that often leads to structural complications such as posterior synechiae, band keratopathy, glaucoma, and cataract formation due to persistent inflammation and prolonged corticosteroid therapy [2]. Cataract surgery in uveitic eyes is therefore uniquely challenging, as it involves managing both the mechanical effects of the cataract and the underlying inflammatory milieu.

Modern cataract surgery techniques such as phacoemulsification and small-incision cataract surgery (SICS) have significantly improved visual outcomes in uveitic patients. Studies have reported that postoperative visual acuity improves in the majority of cases, with nearly 79–90% of eyes achieving functional visual recovery after surgery [3,4]. However, despite these advancements, uveitic cataract surgery continues to be associated with a higher risk of intraoperative and postoperative complications compared to non-uveitic cataract cases. Common complications include uveitis flare, cystoid macular edema (CME), posterior capsular opacification (PCO), epiretinal membrane formation, glaucoma, and intraocular lens-related issues [3,5].

The inflammatory status of the eye at the time of surgery is one of the most critical determinants of outcome. Studies demonstrate that a longer duration of preoperative quiescence is associated with a reduced risk of postoperative flare and improved visual prognosis

[3]. Additionally, the type and chronicity of uveitis influence surgical outcomes; chronic and intermediate uveitis and those with ppre-existingmacular edema tend to have poorer postoperative visual acuity [6]. Similarly, surgical factors such as synechiolysis, iris manipulation, and intraoperative pupil expansion are frequently required in uveitic cataracts and may contribute to intraoperative complexity [7].

In contrast, cataract surgery in non-uveitic eyes is generally associated with predictable outcomes and lower complication rates. The differences in postoperative inflammation, risk of CME, and posterior capsular opacification between uveitic and non-uveitic cataract surgery underscore the need for comparative evaluation. Comparative prospective studies allow a better understanding of risk factors and help develop standardized perioperative protocols for managing uveitic cataracts.

Bihar is one of the most populous states in India and has a significant burden of preventable blindness, with cataract being the predominant cause. Tertiary care centers in Bihar act as major referral hubs for complicated ocular conditions, including uveitis-associated cataracts. Patients are often referred from rural and semi-urban regions where delayed presentation, inadequate control of uveitis, and irregular follow-up are common challenges. These factors may adversely affect surgical outcomes and increase complication rates.

Furthermore, the pattern of uveitis in the Indian subcontinent differs from Western populations, with a higher prevalence of infectious uveitis (e.g., tuberculosis-related uveitis) and HLA-B27-associated anterior uveitis. These etiological differences may influence postoperative inflammation and visual recovery after cataract surgery. However, there is a relative paucity of prospective comparative studies evaluating outcomes of cataract surgery in uveitic versus non-uveitic eyes in eastern India, particularly in Bihar.

Hence, there is a strong need for a prospective comparative study to evaluate and compare postoperative complications and visual outcomes of cataract surgery in uveitic versus non-uveitic eyes in the Bihar population.

The aim of the study was to evaluate and compare postoperative complications and visual outcomes following cataract surgery in uveitic versus non-uveitic eyes at a tertiary care center in ANMMCH Gaya, Bihar.

MATERIALS AND METHODS

The present study was conducted in the Department of Ophthalmology of ANMMCH, Gaya, Bihar, India, which functions as a major referral center for cataract and uveitis patients from both urban and rural populations. The institute receives a large volume of patients with complicated cataracts, including those associated with intraocular inflammatory disorders. All diagnostic and surgical facilities, including slit-lamp biomicroscopy, applanation tonometry, indirect ophthalmoscopy, optical coherence tomography (OCT), B-scan ultrasonography, and standard phacoemulsification and small-incision cataract surgery (SICS) setups, are available at the center.

This is a hospital-based prospective comparative observational study conducted over a period of 12 months. The study Compares postoperative complications and visual outcomes of cataract surgery in uveitic eyes (study group) versus non-uveitic eyes (control group). The study population were included patients presenting to the Ophthalmology Outpatient Department (OPD) with visually significant cataract and planned for cataract surgery.

Patients were categorized into two groups: Group A (Study Group): Patients diagnosed with cataract associated with uveitis and Group B (Control Group): Patients with age-related cataract without any history of uveitis.

The sample consists of randomly selected patients reporting to the OPD over the study period who fulfill the eligibility criteria and consent to participate in the study.

Based on feasibility and patient load at the tertiary care center, a minimum sample of 120 eyes (60 in each group) were included in the study to allow adequate comparison of outcomes and complications.

Inclusion Criteria

For uveitic group (Group A)

Patients aged ≥18 years. Diagnosed case of anterior, intermediate, posterior, or panuveitis with cataract. Inactive or controlled intraocular inflammation for at least 3 months prior to surgery. Patients are willing to undergo cataract surgery with intraocular lens (IOL) implantation. Patients provide written informed consent.

For non-uveitic group (Group B)

Patients aged ≥18 years. Diagnosed with senile or presenile cataract without any history of uveitis. No active ocular inflammation. Willing to undergo cataract surgery and follow-up. Provided informed consent.

Exclusion criteria (Both Groups)

History of previous intraocular surgery in the same eye. Presence of corneal opacity precluding visualization of intraocular structures. Advanced glaucoma or optic atrophy affects visual prognosis. Diabetic retinopathy with macular involvement. Retinal detachment or significant posterior segment pathology. Traumatic cataract. Pediatric cataract patients (<18 years). Patients unwilling or unable to complete the follow-up schedule.

METHODOLOGY

Preoperative Evaluation

All patients has undergone a detailed ophthalmic examination, including: Best corrected visual acuity (BCVA) using Snellen's chart. Slit-lamp biomicroscopy for anterior segment evaluation. Intraocular pressure (IOP) measurement using Goldmann applanation tonometry. Posterior segment evaluation using indirect ophthalmoscopy. Optical coherence tomography (OCT) to detect macular edema where indicated. B-scan ultrasonography in cases with dense cataract.

For uveitic patients, a detailed history regarding type, duration, etiology, and treatment of uveitis was recorded. Preoperative control of inflammation was ensured using topical and/or systemic corticosteroids and immunosuppressive therapy as required. Routine preoperative investigations such as blood sugar, blood pressure, and systemic fitness for surgery were conducted.

Surgical Procedure

All surgeries has performed under aseptic precautions by experienced ophthalmologist. Phacoemulsification with posterior chamber intraocular lens (PCIOL) implantation is the preferred technique. In cases where phacoemulsification is not feasible, manual small incision cataract surgery (SICS) is performed. In uveitic eyes, additional procedures such as synechiolysis, pupil expansion techniques, or capsular staining is performed when required. Intraoperative events such as posterior capsular rupture, zonular dialysis, iris trauma, and vitreous loss are documented.

Postoperative Management and Follow-up

All patients has received standard postoperative treatment, including Topical antibiotics. Topical corticosteroids in tapering doses, Cycloplegics where indicated. Uveitic patients received additional systemic or periocular steroids as required to control inflammation.

Patients were followed up at: Day 1, 1 week, 1 month, 3 months postoperatively.

At each follow-up visit, the following parameters were assessed: Best corrected visual acuity (BCVA), anterior chamber reaction (cells and flare grading), intraocular pressure, presence of complications such as posterior capsular opacification, cystoid macular edema, persistent uveitis, glaucoma, or IOL deposits.

Outcome measures- primary outcomes

Postoperative visual acuity improvement at 3 months. Incidence of postoperative complications.

Secondary Outcomes

Intraoperative complications. Degree of postoperative inflammation. Need for additional medical or surgical intervention.

All collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Quantitative variables (age, visual acuity, IOP) were expressed as mean ± standard deviation (SD). Qualitative variables (complications, gender distribution) were expressed as frequency and percentages. An independent t-test was used for comparison of continuous variables between the two groups. Paired t-test was used for preoperative and postoperative visual acuity comparison within groups. Chi-square test was used for categorical variables. Multivariate logistic regression analysis will be used to identify risk factors associated with poor visual outcome. A *p-value* <0.05 was considered statistically significant.

RESULTS

A total of 120 eyes of 120 patients were included in the study, with 60 eyes in the uveitic group (Group A) and 60 eyes in the non-uveitic group (Group B). All patients completed the 3-month follow-up and were included in the final analysis.

The uveitic group had a significantly younger mean age compared to the non-uveitic group (p <0.001). Preoperative visual acuity was worse in uveitic eyes (logMAR 1.36 vs 1.12), which was statistically significant (p = 0.002). There was no significant difference in gender distribution, laterality, or baseline intraocular pressure between the two groups [Table 1].

Intraoperative complexity was higher in the uveitic group, with significantly more cases of small pupil and posterior synechiae (p <0.01). Although posterior capsular rupture, zonular dialysis, and vitreous loss were more frequent in uveitic eyes, the differences were not statistically significant [Table 2].

The uveitic group demonstrated a higher incidence of postoperative inflammatory complications, including anterior chamber reaction and persistent uveitis (p = 0.01). The occurrence of cystoid macular edema and posterior capsular opacification was also significantly higher in uveitic eyes. Raised intraocular pressure was more frequent in uveitic patients but did not reach statistical significance.

Both groups showed significant improvement in postoperative visual acuity; however, visual outcomes were significantly better in the non-uveitic group. A higher proportion of non-uveitic patients achieved BCVA ≥6/12 (90 *vs* 70%). Poor visual outcomes were more frequent in uveitic eyes, mainly due to macular edema and persistent inflammation [Table 3].

Table 1: Baseline demographic and clinical characteristics

Variable	*Uveitic group (n=60)*	*Non-uveitic group (n=60)*	*p-value*
Mean age (years)	46.3 ± 12.5	59.7 ± 10.2	<0.001
Male: Female	32 : 28	30 : 30	0.71
Laterality (Right Eye %)	53.3%	50.0%	0.68
Preoperative BCVA (logMAR)	1.36 ± 0.42	1.12 ± 0.38	0.002
Preoperative IOP (mmHg)	15.8 ± 3.2	14.9 ± 2.8	0.11

Table 2: Intraoperative findings and complications

Intraoperative parameter	*Uveitic group (n=60)*	*Non-uveitic group (n=60)*	*p-value*
Small pupil requiring intervention	18 (30%)	6 (10%)	0.006
Posterior synechiae present	22 (36.7%)	0 (0%)	<0.001
Posterior capsular rupture	5 (8.3%)	2 (3.3%)	0.24
Zonular dialysis	3 (5.0%)	1 (1.7%)	0.31
Vitreous loss	4 (6.7%)	2 (3.3%)	0.40

Table 3: Postoperative complications (Up to 3 months)

Postoperative complication	*Uveitic group (n=60)*	*Non-uveitic group (n=60)*	*p-value*
Anterior chamber reaction (>Grade 1)	20 (33.3%)	8 (13.3%)	0.01
Cystoid macular edema (CME)	8 (13.3%)	2 (3.3%)	0.04
Posterior capsular opacification	14 (23.3%)	6 (10%)	0.05
Elevated IOP (>21 mmHg)	10 (16.7%)	5 (8.3%)	0.17
Persistent uveitis	6 (10%)	0 (0%)	0.01

Table 4: Visual outcomes at 3 months

Visual outcome	*Uveitic group (n=60)*	*Non-uveitic group (n=60)*	*p-value*
Mean postoperative BCVA (logMAR)	0.34 ± 0.22	0.18 ± 0.15	<0.001
BCVA ≥ 6/12	42 (70%)	54 (90%)	0.006
BCVA ≥ 6/18	50 (83.3%)	58 (96.7%)	0.02
Poor outcome (<6/60)	5 (8.3%)	1 (1.7%)	0.09

Uveitic cataract patients were significantly younger and had worse baseline visual acuity. Intraoperative surgical difficulty was higher in uveitic eyes due to a small pupil and synechiae. Postoperative inflammatory complications such as CME and persistent uveitis were significantly more common in uveitic patients. Although visual acuity improved in both groups, final visual outcomes were significantly better in non-uveitic eyes [Table 4].

Overall, the study demonstrates that cataract surgery in uveitic eyes is associated with higher complication rates and comparatively reduced visual outcomes, though satisfactory vision can still be achieved in the majority of patients with proper perioperative management.

DISCUSSION

The present prospective comparative study evaluated postoperative complications and visual outcomes of cataract surgery in uveitic versus non-uveitic eyes at Anmmch Gaya, in Bihar. The results demonstrate that although modern cataract surgery provides substantial visual improvement in both groups, uveitic eyes have significantly higher intraoperative difficulty, postoperative inflammation, and comparatively inferior visual outcomes. These findings are consistent with recent evidence from contemporary ophthalmic literature.

In the current study, the mean age of patients in the uveitic group was significantly lower than in the non-uveitic group. This reflects the natural history of uveitis, which tends to affect individuals in the younger and middle-aged population and leads to cataract formation due to chronic inflammation and prolonged corticosteroid use. Similar demographic trends have been reported by Bajraktari et al. and Al-Ani *et al.*, who observed that uveitic cataract patients present at a younger age compared to senile cataract patients [1,2].

Preoperative visual acuity was significantly poorer in the uveitic group, which may be attributed to coexisting posterior segment involvement such as macular edema, epiretinal membrane, or vitreous inflammation. Jevnikar *et al.,* reported that the presence of pre-existing macular pathology is a major predictor of suboptimal visual recovery in uveitic cataract surgery [3]. The poorer baseline visual status in our study aligns with these findings.

Intraoperatively, uveitic eyes demonstrated significantly higher rates of small pupil and posterior synechiae, necessitating additional maneuvers such as synechiolysis and pupil expansion. This finding is consistent with previous studies, which report that chronic inflammation leads to iris fibrosis and poor pupillary dilation, increasing surgical complexity [4]. Although posterior capsular rupture and vitreous loss were more frequent in uveitic eyes in our study, the difference was not statistically significant, possibly due to careful surgical technique and experienced surgeons at the tertiary center. Bhargava *et al.,* similarly reported that with modern phacoemulsification techniques, intraoperative complication rates in uveitic cataract surgery can be minimized [5].

Postoperatively, our study found a significantly higher incidence of anterior chamber reaction, cystoid macular edema (CME), posterior capsular opacification (PCO), and persistent uveitis in the uveitic group. These findings are in agreement with multiple studies demonstrating that uveitic eyes remain at a higher risk of postoperative inflammatory complications despite adequate preoperative control [1,6]. CME is one of the most important causes of suboptimal visual outcomes in uveitic cataract patients, with reported incidence ranging from 10–30% [6]. Our observed CME rate of 13.3% is within this reported range.

Posterior capsular opacification was also significantly higher in the uveitic group. Chronic inflammation promotes lens epithelial cell proliferation and fibrosis, contributing to increased PCO formation [7]. Advances in intraocular lens material and design have reduced but not eliminated this risk.

Raised intraocular pressure was more common in uveitic patients, though not statistically significant. This may be attributed to steroid response or inflammatory trabeculitis, as supported by earlier reports [8].

Visual outcomes in the present study showed significant improvement in both groups; however, non-uveitic eyes achieved superior final visual acuity, with 90% attaining BCVA ≥6/12 compared to 70% in uveitic eyes. These findings are consistent with previous prospective studies demonstrating that while good visual outcomes are achievable in uveitic cataracts, they are still inferior to outcomes in routine age-related cataract surgery [2,5]. The major causes of poor visual outcome in uveitic eyes in our study were

macular edema and persistent postoperative inflammation, similar to findings reported by Al-Ani *et al.*,[2].

One of the important determinants of successful surgical outcome in uveitic cataract is adequate preoperative control of inflammation. Current guidelines recommend a minimum of 3 months of quiescence prior to surgery, which was followed in this study. This practice has been shown to significantly reduce postoperative inflammatory complications and improve visual prognosis [6,9].

The present study has particular relevance in the Bihar population, where tertiary care centers serve as referral hubs for complicated uveitis cases. Delayed presentation, irregular follow-up, and infectious etiologies of uveitis (such as tuberculosis-associated uveitis) are more prevalent in this region and may contribute to poorer outcomes compared to developed settings. Therefore, region-specific data such as from this study are essential to formulate tailored management strategies.

Strengths of the present study include its prospective design, standardized surgical protocol, and complete follow-up of all patients. However, certain limitations must be acknowledged. The sample size was modest, and the follow-up period was limited to 3 months; longer follow-up would better assess late complications such as PCO and glaucoma. Additionally, subgroup analysis based on type of uveitis and etiology could provide deeper insights into prognostic factors.

Cataract surgery in uveitic eyes provides significant visual rehabilitation but is associated with higher intraoperative complexity and postoperative inflammatory complications compared to non-uveitic eyes. With meticulous preoperative inflammation control, careful surgical technique, and close postoperative monitoring, satisfactory visual outcomes can be achieved in the majority of patients.

CONCLUSION

Cataract surgery in uveitic eyes yields meaningful visual improvement but carries higher risks of intraoperative difficulty and postoperative inflammation compared to non-uveitic eyes. Strict preoperative inflammation control, meticulous surgical technique, and vigilant follow-up are essential to achieve optimal outcomes in these patients.

REFERENCES

1. World Health Organization. Global data on visual impairment 2010. Geneva: World Health Organization; 2012. Available from: https://www.iapb.org/wp-content/uploads/GLOBALDATAFINALforweb.pdf
2. Bajraktari G, Jukić T, Kalauz M, Oroz M, Radolović Bertetić A, Vukojević N. Early and Late Complications after Cataract Surgery in Patients with Uveitis. Medicina (Kaunas). 2023 Oct 23;59(10):1877. doi: 10.3390/medicina59101877. PMID: 37893595; PMCID: PMC10608233.
3. Al-Ani HH, Sims JL, Niederer RL. Cataract Surgery in Uveitis: Risk Factors, Outcomes, and Complications. Am J Ophthalmol. 2022 Dec;244:117-124. doi: 10.1016/j.ajo.2022.08.014. Epub 2022 Aug 21. PMID: 36002071.
4. Bajraktari G, Jukić T, Kalauz M, Oroz M, Bertetić AR, Vukojević N. Evaluation of postoperative outcomes after cataract surgery in patients with Juvenile Idiopathic Arthritis-Associated Uveitis. Eur J Ophthalmol. 2025 May;35(3):1109-1116. doi: 10.1177/11206721241290272. Epub 2024 Oct 15. PMID: 39403026.
5. Bhargava R, Pandey K, Mehta B. Long-term outcomes of small-incision cataract surgery in patients with uveitis. Indian J Ophthalmol. 2022 Nov;70(11):3927-3932. doi: 10.4103/ijo.IJO_1571_22. PMID: 36308129; PMCID: PMC9907274.
6. Jevnikar K, Počkar S, Umek L, Rothova A, Valentincic NV. Prognostic factors of cataract surgery in patients with uveitis. Int Ophthalmol. 2023 Dec;43(12):4605-4612. doi: 10.1007/s10792-023-02860-6. Epub 2023 Sep 12. PMID: 37697081; PMCID: PMC10724088.
7. Shekhar M, Chaudhary S, Pai A, Rajesh V, Balakrishnan L, Nagu K, Wijesinghe HK. Visual outcomes and risk factors of uveitis cataract eyes after phacoemulsification and manual small-incision cataract surgery. J Cataract Refract Surg. 2024 Mar 1;50(3):257-263. doi: 10.1097/j.jcrs.0000000000001354. PMID: 37885121; PMCID: PMC10878458.
8. Bhargava R, Kumar P, Sharma SK, Kumar M, Kaur A. Phacoemulsification versus small incision cataract surgery in patients with uveitis. Int J Ophthalmol. 2015 Oct 18;8(5):965-70. doi: 10.3980/j.issn.2222-3959.2015.05.20. PMID: 26558210; PMCID: PMC4630994.
9. Scagnellato L, Cozzi G, Lorenzin M, Poncina G, Rizzetto S, Ramonda R. Long-term outcomes of JIA-associated uveitis: a systematic review and meta-analysis. RMD Open. 2025 Nov 27;11(4):e006071. doi: 10.1136/rmdopen-2025-006071. PMID: 41314670; PMCID: PMC12666193.
10. Lin L, Liang Y, Jiang G, Gan Q, Yang T, Liao P, Liang H. Global, regional, and national burden of cataract: A comprehensive analysis and projections from 1990 to 2021. PLoS One. 2025 Jun 23;20(6):e0326263. doi: 10.1371/journal.pone.0326263. PMID: 40549768; PMCID: PMC12185006.w

HOW TO CITE THIS ARTICLE: Singh KK, Kumar C, Verma A, Iqbal J. A Prospective Comparative Study of Postoperative Complications and Visual Outcomes of Cataract Surgery in Uveitic Versus Non-Uveitic Eyes. *J Adv Sci Res*. 2026;17(5): 76-80 **DOI:** 10.55218/JASR.2026170516