

## Manual small-incision cataract surgery under topical anesthesia for post-uveitis complicated cataract

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**Purpose:** Cataract development is a common sequelae associated with uveitis. Despite phacoemulsification being the popular method of cataract surgery today, manual small-incision cataract surgery (MSICS) may still be a safe and effective alternative because of several inherent benefits. There is not much literature and studies on the efficacy and safety of MSICS under topical anesthesia in complicated cataract in patients with uveitis. We aimed to study the safety and visual outcome of MSICS under topical anesthesia for post uveitis complicated cataract. **Methods:** This was a retrospective observational study. The electronic medical records of adult patients who underwent MSICS under topical anesthesia for post uveitis cataract were reviewed. The records were reviewed and analyzed for preoperative clinical characteristics and visual acuity, intraoperative complications and postoperative visual acuity, and complications. **Results:** A total of 71 eyes of 59 patients were taken for final analysis. The average age of patients was 59.9 years. There was improvement in the best corrected visual acuity by 0.7 logMAR ( $P$  value  $<0.0001$ ). Average follow-up period was 9.8 months. The mean gain in visual acuity in eyes that received preoperative steroids was 0.6 logMAR compared to the eyes that did not receive steroids (0.71 logMAR). The difference was not statistically significant ( $P = 0.407$ ). Complications seen during long-term follow-up were recurrence (15.5%), cystoid macular edema (7%), Epiretinal membrane (8.5%), and posterior capsular opacification (5.5%). **Conclusion:** With proper technique and precautions, MSICS can be safely and comfortably performed under topical anesthesia even in complicated cataracts with excellent visual and safety outcomes.

**Key words:** Cataract surgery in uveitis, complicated cataract, MSICS in uveitis, post uveitis cataract, topical small-incision cataract surgery

Cataract development is a common sequelae associated with uveitis. Early development and rapid progression of cataract can occur in eyes with uveitis, secondary to inflammation as well as long-term use of steroids. Cataract surgery is the most common indication for surgical intervention in uveitis.<sup>[1]</sup> A substantial visual improvement has been reported after cataract surgery in such eyes.<sup>[2-4]</sup>

Cataract surgery in post uveitis eyes becomes challenging because of their inherent risk of intraoperative and postoperative complications.<sup>[5]</sup> Anterior chamber (AC) view may be compromised because of band-shaped keratopathy and endothelial deposits. Presence of peripheral anterior synechiae (PAS) and posterior synechiae, shallow AC, poorly dilating pupil, weak zonules, pupillary membranes, hypotony, secondary glaucoma, etc., may make the cataract extraction challenging. Weakness of the lens capsule and zonules may pose difficulty in proper placement of intraocular lens (IOL). Posterior segment inflammation and macular pathologies may affect the final visual outcomes in such patients. Postoperative inflammation and intraocular pressure (IOP) control becomes prudent in such cases. Uveitis eyes have increased risk of

certain postoperative complications, such as posterior capsular opacification (PCO)<sup>[6-8]</sup> cystoid macular edema (CME),<sup>[9]</sup> epiretinal membrane (ERM),<sup>[10]</sup> pupillary membranes, etc. Careful case selection, hence, becomes utmost important to determine the final visual outcome.

Many types of cataract surgeries have been used for post uveitis complicated cataract, including extra capsular cataract extraction, manual small-incision cataract surgery (MSICS), phacoemulsification, and pars plana lensectomy. Phacoemulsification has been reported to have a favorable visual outcome in such eyes.<sup>[6,11]</sup>

Despite phacoemulsification being the popular method of cataract surgery today, MSICS may still be a safe and effective alternative because of several inherent benefits. While phacoemulsification is mostly performed under topical anesthesia, MSICS is traditionally being done under local injectable anesthesia. During the past decade, MSICS is being performed under topical anesthesia supplemented by intracameral lignocaine when needed. Topical anesthesia has

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been reported to be effective for MSICS in terms of patient comfort and surgical outcomes.<sup>[12,13]</sup>

There is not much literature and studies on the efficacy and safety of MSICS under topical anesthesia in complicated cataract in patients with uveitis.

## Methods

### Study design

This was a retrospective observational study. The electronic medical records (EMR) of 114 patients who underwent MSICS under topical anesthesia for uveitis cataract from 2019 to 2022 were reviewed. All the EMR files were reviewed by a single observer.

### Patient selection

Patients who had undergone MSICS under topical anesthesia for post uveitis complicated cataract were included in the study. The exclusion criteria included age less than 18 years, eyes with previous intraocular surgery such as glaucoma surgery, vitrectomy, etc., less than 3 months of follow-up, past history of trauma, lens-induced uveitis, patients needing cataract surgery combined with other surgical intervention, such as glaucoma, vitrectomy or keratoplasty, etc., and eyes with phacodonesis or subluxation of lens.

43 eyes were excluded on the basis of exclusion criteria and 71 eyes of 59 patients were taken for final analysis. Informed consent was taken from all the patients.

### Data collection

Data collected included age at surgery, gender, type of uveitis, etiology of uveitis, and preoperative findings, such as best corrected visual acuity (BCVA) (using Snellen chart), IOP, anterior segment and fundus findings. Uveitis was classified according to the International Uveitis Study Group classification.<sup>[14]</sup>

Preoperative medications were noted. Surgical notes were reviewed for the presence of intraoperative complications and additional procedures. Postoperative findings for day 1, 7, 1 month, and between 3 and 6 months were noted. IOP and BCVA at 1 month postoperative follow-up, last follow-up, and any recurrences till the last follow-up were recorded. For the purpose of analysis, the visual acuity was later converted from Snellen to LogMAR visual acuity. Degree of AC cells was graded as defined by Standardization of Uveitis Nomenclature working group classification.<sup>[15]</sup>

All eyes were operated after adequate control of intraocular inflammation for  $\geq 3$  months. Topical antibiotics and non-steroidal anti-inflammatory (NSAID) eye drops were started 2 days before the surgery. Preoperative topical steroids were started in 15 eyes, whereas three patients were given oral steroids as well. One patient was on methotrexate orally. Postoperatively, all patients received topical antibiotic and steroid eye drops 2 hourly for first 3 days, followed by titration depending on the inflammation. Topical NSAID eye drops were given for 1 month. Anti-glaucoma medication (AGM) was added for eyes with high IOP.

### Surgical technique

All eyes underwent MSICS using topical with intracameral anesthesia. All surgeries were performed by a single experienced surgeon.

Pupil was dilated with tropicamide and phenylephrine eye drops. Povidone iodine 5% and proparacaine eye drops were instilled before the surgery. Eyelids and surrounding skin were disinfected with 5% povidone iodine solution. About 0.5% povidone iodine in Ringer's lactate wash of conjunctival sac was performed. Sterile disposable drapes were applied.

Sclero-corneal tunnel was made using a 2.8-mm keratome, starting from the sclera 1 mm away from blue limbus after raising a conjunctival flap. The tunnel location was in the temporal quadrant, preferably on the steep corneal axis, and avoiding pinguicula or major scleral vessels if any. If the retinal reflex was poor or pupil was poorly dilated, the anterior capsule was stained with trypan blue dye, under a bubble of air. Trypan blue was irrigated-aspirated with Simcoe cannula and viscoelastic was injected into the AC. Capsulorhexis was performed with a 26G cystitome inserted into the AC by puncturing the floor of the tunnel at the limbus. This keeps the tunnel closed during rhexis, and is of great use in shallow chambers, mature cataracts, etc. Tunnel was then extended with a 5.2-mm keratome. Capsular separating hydrodissection was performed. Nucleus was rotated into AC and bisected with the shaft of a 25 G cannula or in harder cataracts, using the cystitome. A mini wire vectis supports the nucleus while bisecting it. Heminuclei were delivered under continuous visco infusion for maximum endothelial protection. After complete cortical aspiration and capsular polishing, IOL was implanted inside the capsular bag. The AC was irrigated and aspirated with Balanced Salt Solution (BSS) through the cataract tunnel. In eyes with PAS and posterior synechiae, the synechiae were released by doing visco-dissection. Non-dilating pupils were managed by doing either small sphincterotomy or stretch pupilloplasty using a standard and a "Y" dialer in opposite directions. Iris hooks were not used in any of the eyes.

## Results

### Patient demographics

The average age of patients was 59.9 years (range 18–86, median 60 years) with 33 (46.4%) male and 38 (53.5%) female patients. There were 32 (45%) right and 39 (55%) left eyes. The mean preoperative BCVA was  $0.87 \pm 0.39$  logMAR and mean preoperative IOP was 15 mmHg.

### Anatomical and etiological classification

Anterior uveitis was present in 57 (80%) eyes out of which 12 eyes had co-existing intermediate (9, 12.6%) and posterior (3, 4.2%) uveitis. There were four (5.6%) cases of intermediate uveitis. The etiological diagnosis was possible in 16 (22.5%) eyes of which Fuch's heterochromic iridocyclitis (8.4%) was the most common. Other causes included tuberculosis, sarcoidosis, seronegative arthritis, juvenile idiopathic arthritis, and rheumatoid arthritis [Table 1].

### Clinical characteristics

Seventeen (24%) eyes had posterior subcapsular cataract, 10 (14%) eyes had total or mature cataract, whereas 44 (62%) eyes had combined form of cataract. The various anterior segment findings included posterior synechiae, PAS, non-dilating pupil, peripheral iridotomy, and poor pupillary dilatation [Table 2].

Fundus examination was normal in 47 (66%) eyes. Fundus details were not visible in 10 eyes because of dense cataract.

**Table 1: Etiology of uveitis**

Etiology for uveitis	No. of eyes	%
Unknown	55	77.46
FUCH	6	8.45
Tuberculosis	3	4.23
Sarcoidosis	2	2.82
Seronegative arthropathy	3	4.23
Juvenile idiopathic arthritis	1	1.41
Rheumatoid arthritis	1	1.41

**Table 2: Anterior segment findings**

Anterior segment findings	No. of eyes	%
Posterior synechiae	38	53.52
Poor pupillary dilatation	15	21.13
Secondary glaucoma	2	2.82
Steroid-induced glaucoma	6	8.45
Peripheral iridotomy	5	7.04
Membrane	2	2.82

Other fundus findings reported were ERM (5, 7%), chorioretinal scar (2, 2.8%), CME (1, 1.4%), and vitreomacular traction (VMT) (3, 4.2%).

### Surgical procedure

During surgery, synechiolysis was performed in three eyes, stretch pupilloplasty in five eyes and membranectomy in one eye. Posterior capsular rent occurred in two eyes where IOL was placed in ciliary sulcus. Two eyes had zonular dialysis where in the bag implantation was performed and IOL was found to be stable. Acrylic foldable IOL was put in all the eyes of which five were multifocal IOLs.

### Postoperative period and complications

During the postoperative period, 23 (32.2%) eyes showed increased inflammation on day 1 and 9 (12.6%) eyes at 1 week. Inflammation was managed with topical steroids, whereas three (9%) eyes needed oral steroids. Corneal edema occurred in eight (11.2%) eyes that subsided over 1 week. Spike of IOP was seen in two eyes that needed addition of topical AGM. The average postoperative IOP at 1 month was 14.7 mmHg.

Postoperative BCVA was  $0.18 \pm 0.06$  logMAR. There was improvement in the BCVA by 0.7 logMAR that was statistically significant ( $P$  value  $< 0.0001$ ). The improvement in visual acuity was comparable ( $P = 0.488$ ) in eyes with anterior uveitis (0.7 log MAR) and eyes with intermediate and posterior uveitis (0.6 logMAR). The mean gain in visual acuity in eyes that received preoperative steroids was 0.6 logMAR compared to the eyes that did not receive steroids (0.71 logMAR). The difference was not statistically significant ( $P = 0.407$ ).

Average follow-up period was 9.8 months (range 6–36 months) of which 53 eyes completed follow-up for 6 or more months. Complications seen during long-term follow-up were recurrence (11, 15.5%), CME (5, 7%), ERM (6, 8.5%), and PCO (4, 5.5%). CME developed postoperatively in five eyes (7%). CME was treated with topical steroids along with intravitreal

triamcinolone acetonide (IVTA) in two eyes and posterior sub-tenon triamcinolone (PST) in one eye. Two eyes developed chronic CME.

Recurrence of inflammation occurred in 11 (15.5%) eyes after an average of 7.1 months from surgery (range 2–12 months), which were all treated with topical steroids.

## Discussion

Cataract is a common complication of uveitis and can occur in all age groups. Various techniques for cataract surgery have been used in eyes with complicated cataract. Although phacoemulsification is a very popular and effective technique for cataract surgery, small-incision cataract surgery (SICS) holds an important place because of several advantages, particularly because of its low flow, low-pressure technique, and ability to manage complications known to occur with uveitis. To this date, there is scarcity of literature regarding the safety and outcome of SICS in post uveitis cataract with no reported data on MSICS under topical anesthesia in complicated cataract. In our literature search (Medline), we found no studies reporting topical SICS results for post uveitis cataract.

In our study, 74.6% eyes improved to equal to or better than 20/40 (0.2 logMAR), which is comparable to the results reported in a meta-analysis of cataract surgery outcomes in uveitis (70%).<sup>[2]</sup> The visual improvement was not affected by the anatomic classification of uveitis as well as use of preoperative steroids. This finding is similar to other reported studies.<sup>[16,17]</sup> The postoperative inflammation was well controlled with topical steroids in most cases and 9% of eyes needed oral steroids for control of inflammation.

The incidence of CME has been reported ranging from 6 to 33% in various studies.<sup>[18]</sup> Ram *et al.* have reported 21.3% incidence for CME and Estafanous *et al.* reported 33%, following phacoemulsification.<sup>[6,19]</sup> In our study, we found CME in 7% of eyes that was less than the previously reported incidence for SICS in uveitic cataract by Hazari and sangwan (11.7%) and Bhargava *et al.* (14.8%).<sup>[18,19]</sup> The common causes for postoperative poor visual outcome ( $< 20/40$ ) were ERM, CME, pre-existing macular scar, and PCO formation.

In our experience, we found that SICS allows successful removal of cataract in post uveitis eyes despite of the presence of other anterior segment complications such as posterior synechiae, poor mydriasis, membrane, shallow AC, etc. Because the AC is not subjected to a high positive pressure and nucleus bisection is done in AC, it minimizes stress on the posterior capsule and zonules. We had posterior capsule (PC) rent in two eyes in which IOL was implanted in sulcus. Rest all the eyes underwent in the bag IOL implantation. Bhargava *et al.* have also reported SICS to be a safe and effective alternative to phacoemulsification for patients with uveitis, with no significant difference in complications and final visual outcomes.<sup>[18]</sup>

The unique feature of our study is that all surgeries were done under topical and intracameral anesthesia there by allowing more patient comfort and faster rehabilitation. Till now, we did not find any literature contributing toward safety and outcome of topical SICS surgery in post uveitis eyes.

The limitation of the study was the retrospective nature, variable follow-up and relatively small sample size. A prospective study can add to the data regarding patient comfort as well as long-term follow-up results.

## Conclusion

Although phacoemulsification might be a preferred technique for cataract surgery, MSICS still holds an important place in management of cataract. With proper technique and precautions, SICS can be safely and comfortably performed under topical anesthesia even in complicated cataracts with excellent visual and safety outcomes.

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## Conflicts of interest

There are no conflicts of interest.

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