

A Prospective Observational Assessment of the Treatment Outcome of Advanced White Cataracts with Manual Small Incision Cataract Surgery

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Conflict of interest: Nil

Abstract

Aim: To assess the complications and visual outcome of manual small incision cataract surgery in the treatment of advanced white cataracts.

Materials and methods: This prospective observational study was conducted in the Department of Ophthalmology, Bhagwan Mahavir, Institute of Medical sciences, Pawapuri, Nalanda, Bihar, India and private hospital. We included 60 eyes of 60 consecutive patients with white cataract who underwent MSICS by a single surgeon (ASM) over a period of 12 months.

Results: At 45 days postoperatively, 57 patient's had a best corrected visual acuity of 6/9.

Conclusion: Manual small incision cataract surgery proves to be a safe and effective surgical option for patients with advanced white cataracts due to its low rates of intraoperative and postoperative complications and good postoperative visual outcomes.

Keywords: white cataracts, cataract surgery, visual outcome

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Introduction

In India, there are 12.5 million blind and it is estimated that 50% to 80% [1, 2] of them are blind due to cataract. In addition to the backlog, an additional 3.8 million become blind each year due to cataract. [3] Most patients had advanced stages of cataract with intumescent, mature or hypermature lenses. Majority of these patients are socioeconomically backward and cannot afford procedures such as phacoemulsification.

Conventionally, in the last millenium Extra Capsular Cataract Extraction with

Posterior Chamber Intraocular Lens Implantation (ECCE-PCIOL) was considered an effective means of restoring visual function and improving vision related quality of life in developing countries. However, it has its own problems related to wound suturing with its associated complications and late visual rehabilitation. [4]

The National Programme for Control of Blindness (NPCB) via cataract control programmes aims at clearing the backlog of blindness due to cataract [5]. These

programmes are increasing the number of surgical facilities dispensed, most commonly manual small incision cataract surgery (MSICS), which is a technique that can be employed in suboptimal conditions and incurs a low maintenance cost as compared to phacoemulsification [6]. MSICS takes less time to perform than phacoemulsification and is more cost-effective and the most appropriate method to be performed in developing countries for high-volume cataract surgeries [7].

Manual small incision cataract surgery (MSICS) has been found to be a safe and effective technique for manual cataract extraction. [8] The nucleus of the cataract is removed directly from the scleral tunnel wound without the need for sophisticated surgical technologies. This enables a cost-effective treatment of cataract, which is particularly useful in healthcare settings that may be constrained by limited resources. [8] In addition, many studies have demonstrated comparable clinical outcomes between MSICS and phacoemulsification. [9-10] MSICS may also be useful technique to use in eyes with brunescient or intumescent white cataracts. [11] Moreover, it has the advantage of a potentially self-sealing wound that may obviate the need for suturing, thus reducing surgical-induced astigmatism compared to extra capsular cataract extraction (ECCE). [12]

This study reports the results of a prospective study conducted in our institution to assess the outcomes of manual small incision cataract surgery (MSICS) in rural patients with white cataracts.

Material & Methods:

This prospective observational study was conducted in the Department of Ophthalmology, Bhagwan Mahavir, Institute of Medical sciences, Pawapuri, Nalanda, Bihar, India and private hospital. We included 60 eyes of 60 consecutive patients with white cataract who

underwent MSICS by a single surgeon (ASM) over a period of 12 months

Exclusion criteria: (i) Patients not willing to participate in the study/ adhere to the study protocol (ii) Patients with congenital cataract, traumatic cataract, active/ old uveitis and glaucoma (iii) Patients with pre-existing corneal diseases like corneal scars, corneal degenerations or preoperative corneal edema.

All patients underwent a comprehensive preoperative evaluation of the anterior and posterior segments including intraocular pressure measurements. A preoperative biometry was done to assess the power of the intraocular lens to be implanted. All patients received preoperative antibiotic prophylaxis started from one day prior to surgery (Systemic- T. Ciprofloxacin 500mg B.D for 5 days; Topically- Moxifloxacin 0.5% eye drops 1 drop every hourly). The eye to be operated was prepped with Povidone Iodine 5% on the day of the surgery and the pupil was dilated with eye drops containing Tropicamide (0.8%) and Phenylephrine (5%). Any preoperative risk factors (e.g. poorly dilating pupil, pseudoexfoliation syndrome etc.) and grade of cataract was recorded in every patient.

MSICS with posterior chamber intraocular lens implantation was performed by following the standard surgical protocol. All the surgeries were performed under peribulbar anesthesia. Under aseptic precautions, the eye to be operated was painted and draped and eyelids were separated by a speculum and a superior rectus bridge suture was applied. A fornix based conjunctival flap was raised and hemostasis achieved using bipolar cautery. A 6.5mm sclerocorneal tunnel was made in the superior quadrant 2mm above the superior limbus. A side port incision was made at 9 o'clock position. Through the paracentesis, an air bubble was injected to form the anterior chamber and protect the corneal endothelium, followed by 0.1ml of trypan blue 0.06% below the air bubble.

After a few seconds, the dye and air bubble were removed by injecting viscoelastic agent through the paracentesis. The anterior chamber entry from the main incision was made using a 2.8mm keratome blade and enlarged on either sides.

A central circular capsulorrhexis of 6mm diameter was done using a cystitome. In cases of hypermature cataract, a small nick was made in the anterior capsule through which the liquid cortex was emptied and the CCC was completed using an Utrata capsulorrhexis forceps. If the CCC margin extended to the periphery, the capsulotomy was completed using an Utrata capsulorrhexis forceps from the opposite direction. This was followed by a gentle hydrodissection.

The nucleus was prolapsed into the anterior chamber and delivered out using a wire vectis. After a complete cortical clean-up, a single-piece Poly Methyl Methacrylate intraocular lens was implanted into the capsular bag. During each of the intraocular steps adequate viscoelastic substance (2% HPMC) was used to protect the corneal endothelium and maintain the anterior chamber. At the end of the surgery, anterior chamber was formed with balanced salt solution/air and stromal hydration was performed by injecting fluid to the side of the paracentesis. The integrity of the self-sealing scleral incision was ensured, and the cut conjunctival flap was opposed using a forceps fitted to bipolar diathermy and a sub conjunctival injection of Gentamicin with Dexamethasone was given in the inferior quadrant and the eye covered with a sterile eye pad.

The duration of the surgery, any intraoperative difficulties and complications were noted down.

On the first postoperative day, visual acuity and slitlamp evaluation of the

anterior segment and fundus examination was done in all patients and any complications were recorded and appropriately treated. All patients received a standard regimen of topical antibiotics-steroid containing eye drops used every hourly for the first 7 days and then every 2nd hourly for the next 7 days and then gradually tapered over the next 4 weeks.

The patients were reviewed on day 1, 7, 15, 30 and 45 and during each visit the best corrected visual acuity was recorded and a slit lamp evaluation, IOP assessment and fundus examination was done.

Results:

A total of 60 eyes of 60 patients were included in the study and the following observations were made.

Preoperative factors: The demographic characteristics of the study population is as depicted in Table 1.

Postoperative complications: Complications encountered on first post-operative day in our patients is as shown in Table 2. All the patients with corneal edema recovered completely by 2 weeks postop with medical therapy. The postoperative uveitis resolved completely with intensive topical steroids and cycloplegics. The secondary open angle glaucoma seen on first postop day in one patient was due to anterior segment inflammation and resolved with topical steroids and anti-glaucoma therapy by third postoperative day. The anti-glaucoma drugs were discontinued during her third postoperative visit.

Postoperative visual outcomes: The best corrected visual acuity attained by our patients on postoperative days 1, 7, 15, 30 and 45 are as shown in Table 3. At 45 days postoperatively, 57 patient's had a best corrected visual acuity of 6/9 or better and 3 patients had >6/12.

Table 1: Demographic characteristics of the study population

Characteristics	No. of patients	Percentage (%)
Age distribution of patients (in years)		
30-39	1	1.67
40-49	4	6.67
50-59	10	16.7
60-69	28	46.7
70-79	15	25
Gender distribution of patients		
Males	39	65
Females	21	35
Laterality of the operated eye		
Right	36	60
Left	24	40
Status of the lens in the other eye		
Pseudophakia	18	30
Immature cataract	37	61.7
Mature/hypermature cataract	5	8.33
Best corrected visual acuity		
Hand movements	13	21.7
Perception of light	47	78.3
Type of white cataract		
Mature cataract	39	65
Hypermature cataract	5	8.33
Intumescent mature cataract	16	26.7

Table 2: Postoperative complications on first day postop

Post-operative complications	No. of patients	Percentage (%)
Corneal edema with <10 Descemet's folds (mild striate keratopathy)	4	6.67
Corneal edema with >10 descemet's folds(severe striate keratopathy)	1	1.67
Mild postoperative uveitis	6	10
Severe postoperative uveitis with fibrinous membrane	2	3.33
Postoperative IOP spike	1	1.67

Table 3: Postoperative best corrected visual acuity (by Snellen's chart) in our patients

BCVA	Number of eyes				
	POD 1	POD 7	POD 15	POD 30	POD 45
<6/60	1	3	-	-	-
6/60-6/24	6	6	2	-	-
6/18-6/12	23	23	27	6	3
6/9-6/6	28	48	51	54	57
Total	60	60	60	60	60

Discussion:

White cataracts constitute a significant volume of cataract surgical load in developing countries like India. [13] Currently, satisfactory results have been published with respect to phacoemulsification in white cataracts. [14]

Jacob et al reports a failure of CCC with adjunct use of trypan blue in 3.85% of eyes with white cataract. This compares favorably with our results in four cases (4%). All those cataracts in which the CCC was converted to can-opener type were intumescent in nature. The incomplete CCC encountered was possibly due to increased intralenticular pressure. [15]

Cataract is one of the leading causes of blindness in India and the world. The presenting visual acuity is parallel to other studies [16]. Most studies show that in developing countries, majority of patients present to the hospital at a stage at which they are blind or almost blind in at least one eye [17-19], as opposed to developed countries where patients present earlier, with a better visual acuity. In a study conducted in Sub-Saharan Africa, the predominant (36.9%) visual acuity was hand motion close to face [17]. A study conducted in Nepal concluded that one in eight patients of the sample population operated for cataract were blind at presentation [19].

In our series of patients, we did not encounter any other intraoperative complications like zonular dialysis and posterior capsular rupture which may be commonly expected in patients with advanced white cataracts. Thus, a careful and meticulous surgery taking appropriate precautions can prevent most of the intraoperative complications during MSICS.

The final visual outcome achieved by our patients by 45 days postoperatively was good with 57 eyes attaining a best

corrected visual acuity of 6/9 or better and 3 eyes attaining 6/12. These results are consistent with the findings of other studies where phacoemulsification was done for advanced white cataracts. [20-23]

Conclusion:

Manual small incision cataract surgery proves to be a safe and effective surgical option for patients with advanced white cataracts due to its low rates of intraoperative and postoperative complications and good postoperative visual outcomes.

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