

Corneal Complications after Manual Small-Incision Cataract Surgery – A Clinical Study in a Tertiary-Based Hospital

Vijayta Gupta, Ridham Nanda

Senior Resident, Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India

Abstract

Aims and Objectives: The aim is to study the different corneal complications after manual small-incision cataract surgery (MSICS) and their implication on the final visual outcome in the patients.

Design: It is a prospective, hospital-based observational study.

Materials and Methods: The present study was done among 100 patients who underwent MSICS with implantation of posterior chamber intraocular lens implantation. Study was conducted over a period of 3 months between March 2018 and May 2018 in Government Medical College, Jammu. All patients with clinically significant visual cataract admitted in Ophthalmology Department of Government Medical College, Jammu, during the study period were included. The post-operative corneal complications and best corrected visual acuity (BCVA) of the enrolled patients were reviewed on the 1st, 7th, 15th, 30th, and 45th post-operative day.

Results: 100 eyes of 100 patients consisting of 69 males and 31 females who underwent MSICS with intraocular lens implantation in the Department of Ophthalmology were studied. Majority of the patients belonged to the 60–69 years age group which constitutes 35 of the total patients. Out of 100 patients, 26 had corneal complications. 24 patients had striate keratopathy – out of whom 16 patients had mild grade striate keratopathy (<10 Descemet's membrane folds [DMF]) and 8 patients had severe grade striate keratopathy (>10 DMF). 1 patient had microcystic corneal edema, and 1 patient had Descemet's membrane detachment. After 6 weeks of post-cataract surgery, it was found that 89 patients achieved a BCVA of 6/9 or better.

Conclusions: Corneal complications such as striate keratopathy are transient and resolve usually by the end of 2 weeks. Therefore, it was concluded that detailed pre-operative planning and careful surgery can prevent most of these complications.

Key words: Descemet's membrane detachment, Manual small-incision cataract surgery, Microcystic corneal edema, Striate keratopathy

INTRODUCTION

Manual small-incision cataract surgery (MSICS) is a cost-effective cataract surgery and equally efficacious as compared to phacoemulsification.^[1,2] The two main concerns in cataract surgery, with respect to cornea, are protection of corneal endothelium and minimal distortion of anterior corneal surface. The

complications that can result from these two factors include endothelial cell loss, post-operative corneal edema, infection and epithelial down-growth, and astigmatism.^[3] The advances in recent cataract surgery have reduced most of these complications. In developing world, due to cost-constraints and lack of special equipment, MSICS is still in use. The studies evaluating the corneal complication of phacoemulsification are numerous in western and Indian literature.^[3-5] However, very few studies have planned the corneal complication following MSICS from our part of the world.^[6] Thus, this study was undertaken to determine the incidence of corneal complication following MSICS, to identify pre-operative and intra-operative risk factors predisposing to corneal complications and assess the final visual outcome in patients with such complications.

Access this article online



www.ijss-sn.com

Month of Submission : 01-2019
Month of Peer Review : 02-2019
Month of Acceptance : 02-2019
Month of Publishing : 06-2019

Corresponding Author: Dr. Ridham Nanda, Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India. E-mail: ridznanda@gmail.com

MATERIALS AND METHODS

This prospective hospital-based study was done in 100 patients who underwent MSICS with implantation of posterior chamber intraocular lens implantation. Study was conducted over a period of 3 months between March 2018 and May 2018 in Government Medical College, Jammu. All patients with clinically significant visual cataract admitted in Ophthalmology Department of Government Medical College, Jammu, during the study period were included in the study. Exclusion criteria were previous intraocular surgery, ocular trauma, pre-existing corneal dystrophies or corneal decompensation, corneal scar, pre-operative corneal edema, and post-operative hyphema. Patients not willing to participate in the study protocol, patients with congenital cataract, traumatic cataract, active/old uveitis, and glaucoma were also excluded from the study.

Detailed history was taken from the patients on the day of admission. Visual acuity and best corrected visual acuity (BCVA) were recorded for each patient. Complete slit-lamp examination with grading of cataract status after dilatation of pupil was done. Pre-operative risk factors predisposing to corneal complications which were noted are phacomorphic glaucoma, hard nucleus, history of diabetes, and pseudoexfoliation. All patients were given antibiotic prophylaxis started from 1 day before surgery, i.e., tablet ciprofloxacin 500 mg B.D for 5 days and topically moxifloxacin 0.5% eye drops 1 drop every hourly. The pupil was dilated with eye drops containing tropicamide (0.8%) and phenylephrine (5%), and the eye to be operated was draped with povidone iodine 5% before the surgery. Standard steps of MSICS were being followed. Peribulbar anesthesia was given before cataract surgery. Under aseptic precautions, the eye to be operated was painted with betadine. Post-operative complications and BCVA were reviewed on day 1st, 7th, 14th, 30th, and 45th post-operative day. On the 1st post-operative day, visual acuity and slit-lamp examination were done in all patients, and corneal complications were recorded. All patients received a standard regimen of topical antibiotics steroid-containing eye drops for 6 weeks. Patients who developed corneal complications were given cycloplegics (homatropine), hyperosmotic agent (5% sodium chloride eye drops 4 times a day and 6% ointment at hidradenitis suppurativa), and antiglaucoma medications if the intraocular pressure was found to be increased.

RESULTS

100 patients were included in study consisting of 69 males and 31 females who underwent MSICS with intraocular lens implantation in the Department of Ophthalmology. As shown in Table 1, majority of the

patients belonged to the 60–69 years age group which constitutes 35 of the total patients. Pattern of cataract among patients has been described in Table 2, whereas in Table 3, pre-operative visual acuity of the enrolled patients has been mentioned. Out of 100 patients, 26 had corneal complications. 24 patients had striate keratopathy – out of whom 16 patients had mild grade striate keratopathy (<10 Descemet's membrane folds [DMF]) and 8 patients had severe grade striate keratopathy (>10 DMF) Table 4. 1 patient had microcystic corneal edema and 1 patient had Descemet's membrane detachment. The most common corneal complication encountered in the study was striate keratopathy of a mild grade which resolved with treatment by the 7th post-operative day in all the 16 patients. A severe grade of striate keratopathy resolved by the 1st post-operative week in 4 patients and by 2 weeks in the rest of the 4 patients. One patient developed microcystic corneal edema as a result of increased intraocular pressure, which solved after institution of anti-glaucoma therapy by the 1st post-operative day. None of our patients developed corneal decompensation. On the 1st post-operative day, majority of the patients had BCVA of 6/18–6/12. By the 45th post-operative day, 89 patients had attained a best corrected visual acuity of >6/9.

Table 1: Age and sex distribution

Age (in years)	Male	Female
<40	2	1
40–49	6	1
50–59	14	5
60–69	22	13
70–79	17	7
>80	8	4
Total	69	31

Table 2: Type of cataract

Type of cataract	No. of patients
Nuclear cataract grade I-II	3
Nuclear cataract grade III-IV	23
Mature cataract	26
Hypermature cataract	8
Cortical cataract	16
Posterior subcapsular cataract	24
Total	100

Table 3: Pre-operative visual acuity

Pre-operative visual acuity	No. of patients
>6/60	11
>1/60–6/60	59
Hand movements close to face	30

Table 4: Corneal complications observed in surgery

Corneal complications	1 st post-operative day	7 th post-operative day	15 th post-operative day	30 th post-operative day	45 th post-operative day
Striate keratopathy (mild)	16	–	–	–	–
Striate keratopathy (severe)	8	4	–	–	–
Microcystic corneal edema	1	–	–	–	–
Descemet's membrane detachment	1	–	–	–	–
No complications	74	96	100	100	100

DISCUSSION

In developing countries like India, where cataract backlog is still a socioeconomic problem, procedures like phacoemulsification seem to be an expensive option for the treatment of cataract. MSICS has gained widespread popularity as a safe method of cataract surgery. MSICS has been encouraged among the poor patients in the developing countries due to its low cost, fair speed, cheap machinery and maintenance, shorter learning curve, and appropriateness for mature and brunescant cataracts. However, MSICS has also been associated with various corneal complications such as endothelial damage, Descemet's membrane detachment, epithelial toxicity and disruption, infections, sterile corneal ulceration and stromal melt, vitreous touch with damage to the endothelium, and epithelial ingrowth.^[7] Our study has mainly focus on the corneal complications such as corneal edema, striate keratopathy, and Descemet's membrane detachment. In our study, striate keratopathy was seen in 26 patients which resolved within 8 days with medical treatment. However, in other studies, percentage of striate keratopathy in MSICS are 13% – Venkatesh *et al.* in 2005,^[8] 7.3% – Sudhakar *et al.* in 1989,^[9] National survey study – 9.5%,^[10] and Alhassan *et al.* – 44.6%.^[11] Different percentage of corneal complications could be due to various risk factors which are pre-operative and intra-operative factors. Intumescent mature cataract, hard nucleus, poorly dilating pupil, and pseudoexfoliation syndrome were the pre-operative factors associated with increased corneal complications. Intraoperative factors such as pre-mature entry during tunnel formation, Descemet's membrane detachment, posterior capsule rupture, retained viscoelastic in anterior chamber (AC), increased manipulation in AC while handling the hard nucleus, use of blunt instruments during surgery, and prolong duration of the surgery. The incidence of corneal edema and striate keratopathy has been seen maximum with MSICS compared to conventional extra capsular cataract extraction and phacoemulsification in various studies.

Taking adequate precautions intraoperatively such as reduced surgical time, use of ample amount of viscoelastic

substance to protect the corneal endothelium, and use of good quality instruments can help in preventing most of the post-operative corneal complications, especially in patients with pre-existing risk factors. On the 1st post-operative day, majority of the patients had BCVA of 6/18–6/12. By the 45th post-operative day, 89 patients had attained a best corrected visual acuity of >6/9. Thus, timely and appropriate management of the corneal complications yields good post-operative visual outcomes.

The main drawbacks of our study are (i) small sample size and (ii) lack of equipment to assess corneal endothelial status in the pre-operative and post-operative periods in our hospital.

CONCLUSION

Corneal complications like striate keratopathy are transient and resolve usually by the end of 2 weeks. Assessment of pre-operative risk factors, meticulous surgery, and active management of these complications with regular follow-up of patients can reduce the incidence of the same.

REFERENCES

1. Muralikrishnan R, Venkatesh R, Prajna NV, Frick KD. Economic cost of cataract surgery procedures in an established eye care centre in Southern India. *Ophthalmic Epidemiol* 2004;11:369-80.
2. Gogate P, Deshpande M, Nirmalan PK. Why do phacoemulsification? Manual small-incision cataract surgery is almost as effective, but less expensive. *Ophthalmology* 2007;114:965-8.
3. Green WT, Muir MG. Corneal complications of cataract surgery. *Curr Opin Ophthalmol* 1994;5:98-104.
4. Hwang DG, Smith RE. Corneal complications of cataract surgery. *Refract Corneal Surg* 1991;7:77-80.
5. Sharma N, Singhal D, Nair SP, Sahay P, Sreeshankar SS, Maharana PK, *et al.* Corneal edema after phacoemulsification. *Indian J Ophthalmol* 2017;65:1381-9.
6. Gogate PM. Small incision cataract surgery: Complications and mini-review. *Indian J Ophthalmol* 2009;57:45-9.
7. Hardten DR, Lindstrom RL. Corneal complications of cataract extraction and intraocular lens implantation. *Curr Opin Ophthalmol* 1993;4:99-105.
8. Venkatesh R, Das M, Prashanth S, Muralikrishnan R. Manual small incision cataract surgery in eyes with white cataracts. *Indian J Ophthalmol* 2005;53:173-6.
9. Sudhakar J, Ravindran RD, Natchiar G. Analysis of complications in

- 1000 cases of posterior chamber intra ocular lens implantation. Indian J Ophthalmol 1989;37:78-9.
10. Desai P, Minassian DC, Reidy A. National cataract surgery survey 1997-8: A report of the results of the clinical outcomes. Br J Ophthalmol 1999;83:1336-40.
11. Alhassan MB, Kyari F, Achi IB, Ozemela CP, Abiose A. Audit of outcome of an extracapsular cataract extraction and posterior chamber intraocular lens training course. Br J Ophthalmol 2000;84:848-51.

How to cite this article: Gupta V, Nanda R. Corneal Complications after Manual Small-Incision Cataract Surgery – A Clinical Study in a Tertiary-Based Hospital. Int J Sci Stud 2019;6(10):111-114.

Source of Support: Nil, **Conflict of Interest:** None declared.