



To Determine the Occurrence of Various Intra Operative Complications of Manual Small Incision Cataract Surgery from a Rural Background in a Tertiary Hospital

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Abstract

Purpose: To determine the occurrence and frequency of various Intra operative complications of manual Small Incision Cataract Surgery.

Materials and Methods: A retrospective study was conducted to find the complications that occurred after small incision cataract surgery. All the records of 990 patients who underwent small incision cataract surgery were reviewed from January 2019 to December 2019. Among the 990 patients, 89 patients had intra operative complications. The details regarding the surgical procedure was recorded in these patients, including type of surgery, intraocular lens placed, the type of complication and the remedial measures that were taken. The study was conducted as per the tenets of the Declaration of Helsinki (2008).

Results: Among the 89 patients, who had intra-operative complications, 52.8% percent were males, and 47.2% were females. The percentage of right eye surgeries was 51.7%, and that of left eye surgeries was 48.3%. The average age of the patients was 65.07 ± 9.5 years. The most common complication was a posterior capsular rent. In females, the propensity of developing complications such as zonular dehiscence and Descemet's membrane detachment were higher ($p = 0.06$). In those cases, that had a posterior capsular rupture, the most common intraocular lens placed was a retropupillary iris fixated lens ($p = 0.00$).

Conclusion: Manual small incision cataract surgery is a safe and effective surgery for the treatment of cataract, especially in a developing country. It is important to be aware of the possibility of occurrence of complications, so that preventive measures can be taken and once they do occur, appropriate steps can be taken to ensure that optimal outcomes can be obtained.

Keywords: Manual Small Incision Cataract Surgery; Complications; Posterior Capsular Rupture; Zonular Dehiscence

Abbreviations

PC: Posterior Capsule; PCO: Posterior Capsular Opacification; DMD: Descemet's Membrane Detachment; IOL: Intraocular Lens; SFIOL: Scleral Fixated IOL; ZD: Zonular Dehiscence

Introduction

Cataract is one of the leading causes of avoidable blindness in India [1]. Manual small incision cataract surgery is a popular surgical approach for cataract surgery in the Indian subcontinent, due to the fact that it is safe and economical. It is an effective alternative to the other types of cataract surgery -phacoemulsification that requires higher investment and has a steeper learning curve for surgeons [2].

Complications are an inevitable scenario that we may have to deal with while doing any surgery. Small incision cataract surgery too has its share of complications. Some complications such as premature entry, iris prolapse and posterior capsular opacification can be relatively easily salvaged. However, complications like zonular dehiscence, posterior capsular rupture require more skill to deal with, in order to make sure that the post-operative outcome is optimal [3].

Since manual SICS may be a safer initial procedure to learn for inexperienced cataract surgeons in the developing world, it is important to be aware of the possible complications and their management [4].

In this study, we endeavoured to ascertain the various types of complications that occurred in our patients after they underwent manual small incision cataract surgery. In addition, we ascertained the frequency of occurrence of the each complication among all the complications.

Materials and Methods

A retrospective study was conducted to find the complications that occurred after small incision cataract surgery. All the records of 990 patients who underwent small incision cataract surgery were reviewed from January 2019 to December 2019. Among the 990 patients, 89 patients had intra operative complications. The details regarding the surgical procedure was recorded in these patients, including type of surgery, intraocular lens placed, the type of complication and the remedial measures that were taken. The study was conducted as per the tenets of the Declaration of Helsinki (2008).

All patients were subjected to a peribulbar block, with 3.5 ml Lignocaine and 2.5 ml Bupivacaine, with Adrenaline 1 in 10000 and hyaluronidase. Under aseptic precautions, a conjunctival peritomy of 3 clock hours was done. Using a bipolar cautery, adequate cautery of conjunctival vessels was done. Scleral incision was made using a Bard parker knife with number 15 blade. The location was based on surgeon's preference- either superior or superotemporal. The length was based on the grade of the cataract. It was an approximate measure. The shape of the tunnel was trapezoid. The incision was made such that the inner lip was wider than the outer lip and the length of the inner lip was approximately 2 to 3 mm more than the outer lip. The inner lip was constructed such that it extended 1 to 2 mm into the clear cornea to have a valve effect with a tri-planar incision. Then the entry to the anterior chamber was made with a keratome. Continuous curvilinear capsulorrhexis was made either through the main incision or the side port. Wound is extended with a keratome after completing hydrodissection. The nucleus is delivered by sandwich technique after injecting adequate viscoelastic- hydroxypropyl methylcellulose, above and below the nucleus. Thorough cortical wash is done with a Simcoe cannula, and a posterior chamber intraocular lens is placed in the bag. The remaining viscoelastic was aspirated. Side port, if made, was hydrated. If the anterior chamber was formed there was no necessity of suture. In case of large wound or iris prolapse, the wound was sutured with 9.0 non-absorbable sutures. This was based on the surgeon's decision as well. The eye was closed with a double pad bandage with an ocular shield, which was placed for 18 - 24 hours.

Protocol of management of complications

- **Premature entry:** In the event of this complication, when the area was small, the surgery was continued in a different plane. If the entry was large, a separate incision at a different site was made. At the end of the surgery, wound suture (s) was placed.
- **Iris prolapse:** The surgery was continued, but wound suture (s) was placed at the end of the surgery.
- **Iridodialysis:** Depending on the size and site of the dialysis, measures were taken. In a small iridodialysis, no intervention was done. In a large iridodialysis, a suture was placed depending upon the site.
- **Zonular dehiscence:** The management depended upon the number of clock hours of involvement. When 1 - 2 clock hours were involved, a posterior chamber intraocular lens was placed. If the zonular dehiscence was larger and involved upto 4 clock hours, a capsular tension ring was placed, following which a posterior chamber intraocular lens was placed. A retropupillary iris claw lens was placed if the zonular dehiscence was larger. In addition, vitreous prolapse was managed with an anterior vitrectomy.
- **Posterior capsular rent:** When a small circular central rent occurred, a posterior chamber intraocular lens was placed in the capsular bag. In the event of a larger rent, with a good anterior capsulorrhexis margin, a posterior chamber intraocular lens was placed in the sulcus. However, when a large PCR occurred with a large capsulorrhexis/inadequate capsulorrhexis margin, a retropupillary iris claw lens/scleral fixated lens was placed, after anterior vitrectomy depending upon the surgeon's choice.
- **Descemet's membrane detachment:** An air bubble is placed as tamponade for the detached descemet's membrane, after unfolding the detached and folded descemet's membrane.
- **Primary posterior capsular opacification:** Post-operatively, an Nd YAG capsulotomy was done.

Results

Among the 89 patients, who had intraoperative complications, 52.8% percent males, and 47.2% were females. The percentage of right eye surgeries was 51.7%, and that of left eye surgeries was

48.3%. The average age of the patients was 65.07 +- 9.5 years. The occurrence of the various complications was as shown in table 1.

The occurrence of complications based on the patient’s sex is as shown in the table 2.

The occurrence of complications based on the age is as shown in table 3.

Posterior Capsular Rent	31.5%
Zonular Dehiscence	19%
Iris prolapse	19.1%
Premature entry	7.9%
Iridodialysis	2.2%
DMD	3.4%
PCO	4.5%

Table 1: Complications.

Sex	PC rent	ZD	Iris prolapse	Premature Entry	Iridodialysis	DMD	Large tunnel	PCO	Other IOL
Male	12	13	7	6	0	0	1	1	21
Female	16	4 (p = 0.06)	10	1 (p = 0.06)	2	3 (p = 0.06)	2	3	16

Table 2

Age	Large tunnel	PC rent	ZD	Iris prolapse	Premature entry	Iridodialysis	DMD	Sphincterotomy	Large tunnel	PCO	Other IOL
< 50 (4)	1	0	0	0	1	0	0	1	0	1	0
50 - 69 (54)	1	18	14	10	1	2	2	1	1	1	25
> 70 (31)	1	10	3	7	5 (p = 0.027)	0	1	1	2	2	12 (p = 0.099)

Table 3

Grade of cataract compared with complications is shown in table 4.

In cases with PC rent, 3 cases had a PCIOL placed, 23 had a retropupillary iris claw lens placed, while in 2 cases a scleral fixated intraocular lens was placed (p = 0.000).

Grade	PC rent	ZD	Iris prolapse	Premature entry	Iridodialysis	DMD	Sphincterotomy	Large tunnel	PCO	Other IOL
SIMC (76)	23	15	15	6	2	3	3	3	3	31
SMC (6)	0	1	2	1	0	0	0	0	1	1
Complicated (7)	5 (p = 0.018)	1	0	0	0	0	0	0	0	5 (0.091)

Table 4

In cases with Zonular dehiscence, the IOLs placed were as shown in table 5.

Discussion

Cataract surgery is a very commonly performed ocular surgery, with manual small incision surgery being the most commonly performed in India [5]. The outcomes of cataract surgery, including manual small incision cataract surgery have greatly improved over time [6].

In spite of the surgeries being performed by experienced surgeons, with the utmost care, complications are bound to occur. There-

Extent of ZD	PCIOL	Iris claw	SFIOL
Small ZD (12)	5	7	0
Extensive ZD (5)	0	5	0 (p = 0.023)

Table 5

fore, the surgeon should foresee complications, especially the ones that occur more commonly and require more skilled management. Tunnel related problems were seen in 1.04% in a study conducted by Kulkarni, *et al.* while in our study, 0.7% of the patients had a premature entry, 8% of all the complications being a premature entry [7].

Zawar, *et al.* found that Iris prolapse was noted in 3 (0.15%), while in our study we found 1.7% patients had an Iris prolapse. Iris prolapse formed 19% of all the complications [8].

Odayappan, *et al.* in their study found that the male to female ratio of patients with descemet's membrane detachment post cataract surgery, was 45:67. In our study, of the 89 complications, 3 had a descemet's membrane detachment, and all three were females [9].

Trikha, *et al.* found that the incidence of Zonular dehiscence was 51:60 among males and females respectively while in our study we found a male preponderance. Further studies may be required to ascertain whether there is a significant gender difference in the occurrence of Descemet's membrane detachment and zonular dehiscence [10].

In a study done by Mansoori, *et al.* 17.2% of patients requiring retropupillary iris claw lenses were those who had a zonular dehiscence. In our study, among the 17 eyes with Zonular dehiscence, 12 underwent retropupillary iris claw fixation. This is possibly so due to the extent and type of zonular dehiscence [11].

Van Zyl, *et al.* found that there was one case of PCR noted among 38 patients [12]. Kulkarni, *et al.* found Posterior Capsular Rent (2 eyes, 2.1%). We found no studies relating to gender ratio. Alhassan, *et al.* found that one patient had PCR among 66 patients. We found that 2.8% of the patients had a posterior capsular rupture. Posterior capsular rupture formed 31% of the complications. Hence, it is very important to anticipate the complications of zonular dehiscence and posterior capsular rupture, and to know how to manage them when they occur, and also to be well-versed in the placement of the appropriate lenses such as retropupillary iris claw lenses and scleral fixated intraocular lenses.

Conclusion

Manual small incision cataract surgery is a safe and effective surgery for the treatment of cataract, especially in a developing

country. It is important to be aware of the possibility of occurrence of complications, so that preventive measures can be taken, and once they do occur, appropriate steps can be taken to ensure that optimal outcomes can be obtained.

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Conflicts of Interest

There are no conflicts of interest.

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