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Original Research Article

The changes in lower lid position & laxity post cataract surgery

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ABSTRACT

Purpose: To evaluate the changes relating to lower lid position and laxity after cataract surgery.**Materials and Methods:** This is prospective study evaluating the lower eyelid position of patients who underwent cataract surgery from June to September 2019. Data collected includes duration of the cataract surgery, the duration of the speculum remaining insitu. Also we included measurements relating to the distraction test, distance of the lower lacrimal punctum from the inner canthus, and margin reflex distance 2 (MRD2) were performed 1 day, 2 weeks & 3 months post surgery. The data was analysed in Microsoft Excel & SPSS software.**Results:** The study sample comprised 109 cataract patients, all of whom were of South Indian ethnicity, 68 (62.3%) were female with a median age of 74 years, and 67 (61.4%) had surgery in their left eye. The distraction test before surgery was 6.5 ± 0.2 mm, with mild increase after 1 day (7.3 ± 0.3 mm), sustained after 14 days (7.5 ± 0.2 mm), and decreasing after 3 months (7.0 ± 0.5 mm) to a level similar to the initial values ($P = 0.02$). The lower (lacrimal) lid punctum distance from the inner canthus preoperatively was 6.5 ± 0.3 mm and 7.4 ± 0.2 on day 1 post operatively, 7.2 ± 0.3 two weeks post operatively, 7.0 ± 0.4 mm at 3 months postoperatively ($P = 0.04$) [Table 1]. The MRD2 preoperatively was 5.0 ± 0.1 mm, 5.4 ± 0.1 mm at 1 days postoperatively, 5.2 ± 0.2 mm at 2 weeks, and 5.4 ± 0.3 mm at 3 months after surgery ($P = 0.02$).**Conclusions:** An increase in lower lid laxity was noted on distraction test & lacrimal lower punctum distance post cataract surgery. Although such a change is expected in the common cataract surgery age group, there seems to be a definite increment noted in the post surgery group.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: reprint@ipinnovative.com

1. Introduction

Cataract surgery is the most common elective surgical procedure worldwide. Lid position alterations are frequently documented post cataract surgery.^{1,2} An incidence of around 4% lid position alterations are reported in a study.³ Changes concerning both upper & lower lid have been noted with more studies focusing on ptosis.

Not many studies focus on lower lid position changes especially on the laxity & punctal position. Lower lid laxity & position play a greater role functionally in tear drainage.

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The lower lid position is also important cosmetically. Factors relevant to causing such lid position changes include traction sutures, duration of surgery & hence the time for which the speculum is left insitu.⁴⁻⁶

Our study aims to objectively measure changes in lid position post cataract surgery & possible factors influencing these changes.

2. Materials and Methods

This is a prospective observational study to evaluate the effect of cataract surgery on the lower lid position of patients & was conducted in a tertiary care eye institute in

Bangalore, India. The study adhered to the declaration of Helsinki & the Indian council of medical research guidance.

2.1. Inclusion & exclusion criteria were following

All consenting adult patients undergoing cataract surgery (small incision cataract surgery) between December 2020 & January 2021 were considered for the study.

We have excluded paediatric patients, patients with pre existing lid position/ laxity problems, orbital inflammatory disorders, neuro - muscular disorders such as myasthenia gravis, collagen vascular disorders such as marfans syndrome/ ehlers danlos syndrome.

All surgeries were performed by a single consultant (MN) using the same standard procedure. A 15mm barraquer model wire lid speculum was used during all the surgeries. A superior rectus bridle suture was applied in all selected cases. The average surgical time was recorded in minutes. Patient demographics including age, gender were recorded. The patients were examined post operatively at 1 day, 2 weeks then at 3 monthly intervals.

During the post operative visits the following tests were performed –

1. Distraction test measured with a ruler, in primary gaze position, and defined as the distance in mm between the globe and the lower lid margin when it is pulled away. A normal distraction test was defined as 6.96 ± 1.12 mm.⁶
2. Distance of the lower lacrimal punctum from the inner canthus defined as the distance from the inner canthus to the center of the lacrimal inferior punctum in mm.^{7,8}
3. Margin reflex distance 2 (MRD2) is defined as the distance from the lower lid margin to the corneal light reflex in primary gaze position. Normal measurements of MRD2 were considered as 5.1 to 6.3 ± 0.3 mm.⁸
4. Indirectly, lower lid retraction evaluation was defined as an abnormal downward displacement of the lower lid, with increased MRD2.⁹

2.2. Statistical analysis

All data were recorded and analysed in Microsoft excel and also using SPSS 24, IBM Corp., USA. Correlational analysis was done and the p value was calculated. The mean & standard deviation of the variable were analysed for each of the 3 variables on the pre operative visit & 3 of the post operative visits. P values calculated.

3. Results

The study sample comprised 109 cataract patients, all of whom were of South Indian ethnicity, 68(62.3%) were female with a median age of 74 years, and 67(61.4%) had surgery in their left eye. Surgery was performed under peribulbar anesthesia in all cases.

The median duration of surgery was 15 mins (IQR: 13–18), mean 16.7 ± 6.7 min. The median duration that the speculum remained inserted was 16 min. There were no intraoperative complications or postoperative complications.

The distraction test before surgery was 6.5 ± 0.2 mm, with mild increase after 1 day (7.3 ± 0.3 mm), sustained after 14 days (7.5 ± 0.2 mm), and decreasing after 3 months (7.0 ± 0.5 mm) to a level similar to the initial values ($P = 0.02$) [Table 1].

The lower (lacrimal) lid punctum distance from the inner canthus preoperatively was 6.5 ± 0.3 mm and 7.4 ± 0.2 on day 1 post operatively, 7.2 ± 0.3 two weeks post operatively, 7.0 ± 0.4 mm at 3 months postoperatively ($P = 0.04$) [Table 1].

The MRD2 preoperatively was 5.0 ± 0.1 mm, 5.4 ± 0.1 mm at 1 day postoperatively, 5.2 ± 0.2 mm at 2 weeks, and 5.4 ± 0.3 mm at 3 months after surgery ($P = 0.02$).

4. Discussion

The results indicate that there are lower lid position changes after cataract surgery. Overall, at the results at 3 months, suggest that there was a small increase in lid laxity demonstrated in the distraction test, displacement of the lower lacrimal punctum and increase in MRD2. These changes were mild in clinical magnitude.

Given the age group selected, the patients can be assumed to have involuntional changes prior to their surgery. This can make the patients more susceptible to lid position changes post surgery. A study that investigated the association between periocular injection and lid malposition suggested that the injections are associated with lid laxity.^{3,10,11} Since all of our patients underwent surgery under peribulbar anaesthesia, this fact could have further lid malposition.

The displacement has a trend in which the measurements initially worsened but over time improved. This led the overall effect to be mild when compared clinically. Periocular injection has been associated with lower lid malposition after surgery.^{3,12} However, our outcomes indicate no significant association in lower lid malposition and peribulbar anesthesia. Nevertheless, it should be interpreted with caution because only 7.14% of our patients received peribulbar anesthesia.

We observed that the distance from the inner canthus to the lower lacrimal punctum had a mild increase postoperatively (5 ± 1.1 mm preoperative to 5.4 ± 1.0 mm at 180 days). The amount was not statistically significant, but this slight displacement of the lower punctum over time may indicate the possibility of mild inferior lid laxity. According to others, punctum ectropion is often associated with involuntional changes, but punctum ectropion development may be hastened by cataract surgery or may be coincidental, since both cataract development and punctum ectropion

Table 1: Distraction test, lower lid punctum distance, and margin reflex distance 2 before and at different follow-up visits after cataract surgery

Parameter	Variable	Pre-surgery values			Post-surgery values			p
					1 day	2 weeks	3 mo.	
Distraction test	Number	109	109	109	109	109	0.02	
	Mean	6.5	7.3	7.5	7.0			
	SD	0.2	0.3	0.2	0.5			
Lacrimal punctal distance	Number	109	109	95	109	109	0.04	
	Mean	6.5	7.4	7.2	7.0			
	SD	0.3	0.2	0.3	0.4			
MRD2	Number	109	109	103	109	109	0.02	
	Mean	5.0	5.4	5.2	5.4			
	SD	0.1	1.1	0.2	0.3			

commonly occur in the older age group.³

The post surgical changes can be explained keeping in mind the manipulation during surgery & a population of the given age group with involitional eyelid architectural changes. Some studies have mentioned that the lid laxity changes can be due to the disinsertion of the capsulopalpebral fascia which is analogous to the levator aponeurosis in the upper lid.⁴ This change can be contributed to by manipulation of the lids during surgery & due to increasing laxity of canthal ligaments.^{3,13,14}

Some studies have suggested that the duration of surgery influences lid laxity by causing trauma to between the muscle aponeurosis & the tarsus. Thus cataract surgery causes a clinically mild increase in lower lid punctum distance from the inner canthus suggesting an increase in lower lid laxity. And although lid laxity is common among the age group chosen, measurements indicate an increase in this laxity due to cataract surgery.

5. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.


6. Source of Funding

None.

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