

OUTCOME OF PHACO INCISION ON STEEPEST MERIDIAN IN EYES WITH PRE EXISTING ASTIGMATISM

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ABSTRACT

Objective: To determine keratometric outcome of a 5.5mm self sealing incision on the steepest meridian in eyes with preexisting astigmatism.

Methodology: A prospective study was carried out on 35 eyes with preexisting, with or against the rule astigmatism of 1.5-3.0 D. Bimanual phaco was performed using the incisions of 1.5mm, each approximately 120 degrees apart. The IOL was implanted through a third self sealing limbal incision created on the steepest meridian, which was assessed preoperatively by keratometric readings. Postoperative automated keratometry was recorded at 12 weeks.

Results: The average reduction of pre-existing against and with the rule astigmatism was 1.15 (SD = 0.33) and 1.47 (SD = 0.32) respectively.

Conclusions: It is possible to achieve negligible or low astigmatic outcomes in eyes with pre-existing with or against the rule astigmatism by predetermining the steepest meridian and placing a third incision of around 5.5mm on the respective meridian.

KEYWORDS: Pre existing astigmatism, Keratometric outcome.

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INTRODUCTION

It is every surgeon's goal to achieve a desirable, excellent refractive outcome with minimal induction of astigmatism after cataract surgery. Some of the factors effecting the surgically induced astigmatism (SIA) are the architecture and the location of the incision,¹ the surgical skill, accuracy of biometry and to

a great extent on the preexisting astigmatism (PEA).

The advent of small incision surgery and the use of foldable IOLs has successfully managed to control/minimize the SIA, thus providing a good, rapid visual rehabilitation and alleviating the postop spectacle dependence. However postop astigmatism still remains an obstacle in eyes with significant PEA. Numerous studies have been carried out regarding the best possible location, type and width of the incision and their effect on the flattening of the cornea² in order to correct / decrease the PEA.

The purpose of our study was to see the effect of an incision placed on the steepest meridian in controlling / lowering the astigmatic outcome in eyes with significant amounts of PEA.

METHODOLOGY

In a prospective study 35 eyes had bimanual phaco surgery with implantation of rigid IOL

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of 5.5mm through a self sealing limbal incision. The mean age of the patients was 65, the range being 60 to 74 years. Twenty five eyes (77.42%) had against, whereas 10 (28.57%) had with the rule astigmatism. Eyes with irregular astigmatism were excluded from the study as were eyes with any other ocular pathology or any systemic disease. Automated keratometry was performed on all eyes preoperatively and the steepest meridian along with the PEA was noted.

Surgical technique: All operations were performed under a peribulbar anesthesia. Two limbal incisions of 1.5mm each were placed for the phaco probe and the irrigating chopper approximately 120 degrees apart. The chamber filled with a viscoelastic and capsulorhexis was performed. After hydrodissection the nucleus was sculpted and emulsified, the remaining cortex aspirated and capsular bag was filled with a viscoelastic. A third self sealing limbal incision of 5.5mm was placed on the steepest meridian and a rigid IOL of 5.5mm placed in the bag. After aspirating the viscoelastic the wound was hydrosealed.

All patients were examined one day, one week and 12 weeks postoperatively. Follow up examination included a complete biomicro-

scope examination, and visual acuity. Wound was checked for integrity. Any wound related complication was noted. Topical combination of tobramycin 0.5% and dexamethasone 0.1% was administered two hourly for the first week and was tapered off over a 4-6 week period.

RESULTS

Assessment was done one day, three weeks and six weeks post operatively. On each visit a complete slit lamp examination was carried out. Automated keratometry was recorded at 12 weeks and the amount of astigmatism noted. The astigmatic effect was calculated by noting the difference between the pre and postoperative keratometry readings

Twenty five (77.42%) eyes had a preoperative Keratometric range of preexisting against the rule astigmatism of 42.42-44.12D (mean astigmatism 1.698) and ten (28.57%) eyes had a preexisting with the rule astigmatism of 46.2-44.0 D (mean astigmatism 2.22) whereas there postoperative keratometric reading in against the rule astigmatism was 42.97-43.51D (mean astigmatism 0.54 D) and in with the rule astigmatism was 43.90-43.15 D (mean astigmatism 0.75) respectively. The results showed an average reduction of 1.15 (SD = 0.33) and 1.47

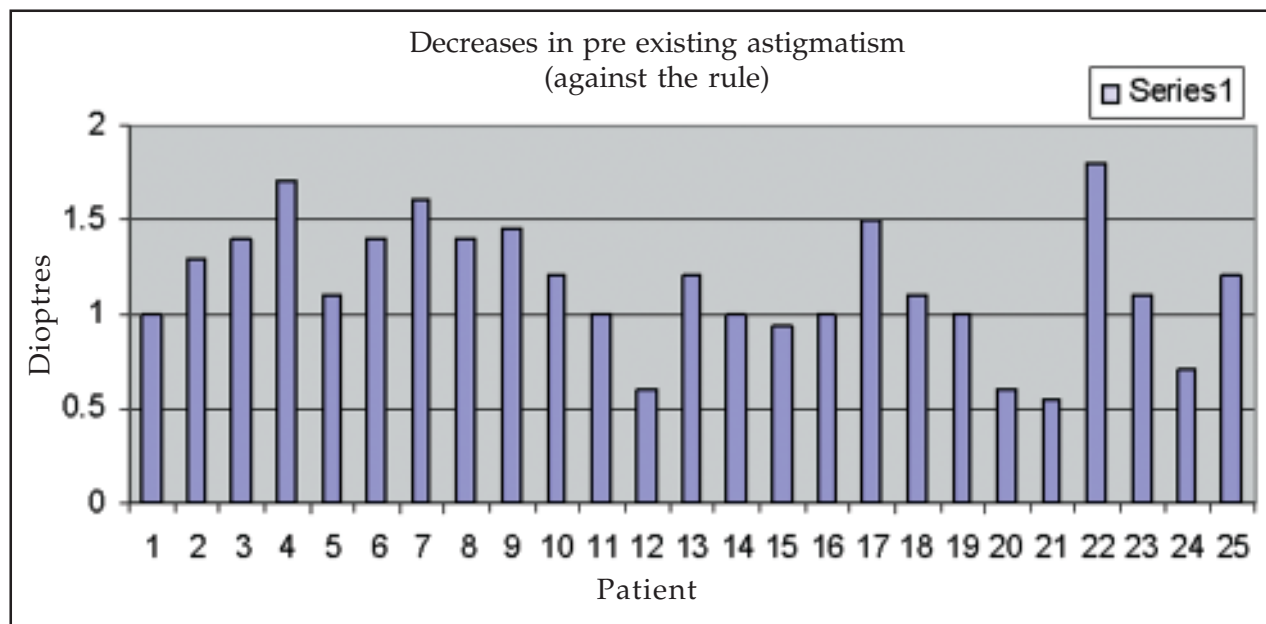


Figure-1

(SD = 0.32) in against (Fig-1) and with the rule (Fig-2) astigmatism respectively. All wounds were well sealed and no wound related complications were noted.

DISCUSSION

The aim of modern cataract surgery is to achieve a good/desirable refractive outcome postoperatively. There are various factors contributing towards such a result, the induction of minimum amount of SIA, being one of the most vital of all.

Postoperative astigmatism is dependent on factors like the site and width of the incision. In eyes with negligible amounts of PEA the surgical outcome is/can be successfully controlled by manipulating the incision. For example placing the incision in the temporal meridian induces significantly lesser amounts of astigmatism than nasal and supero temporal incisions, probably as they are located further away from the central cornea³⁻⁶ while superiorly placed incisions induce the most astigmatism as they are effected by factors like the movement of eyelids.^{7,8} Likewise clear corneal incisions minimize the SIA compared to scleral.⁹ Studies have also shown the importance of corneal relaxing incisions peroperatively, in order to minimize

the astigmatism further.¹⁰ Apart from the location and site of the incision, the width of the incision also plays a vital role in the induction of postoperative astigmatism. All incisions lead to certain degree of flattening in that meridian, which increases with the increase in the size of the incision.² 4.0-5.0mm incisions lead to greater wound related flattening compared to 3.0mm incisions (hence a greater amount of astigmatism).¹¹⁻¹³ Based on this effect 5.2mm incisions lead to greater amounts of astigmatism than 3.2mm incisions.¹⁴ Although the advent of small incision surgery using foldable IOLs has been revolutionary, the surgical outcome varies greatly with the amount of PEA¹⁵ which is still a complex hurdle.. Work has been carried out to show that no eye of more than 1.2D astigmatism preoperatively, was astigmatism free postoperatively even when a 3.2mm incision was placed in the steepest meridian unless the incision was widened or a third incision was used.¹⁶

Placing the incision on the steepest meridian leads to a significant amount of flattening in that meridian and a corresponding steepening in the opposite meridian as discussed above. We utilized this concept in eyes with PEA of 1.5 -3.0 D and placed a 5.5mm selfsealing limbal incision on the steepest meridian to assess the

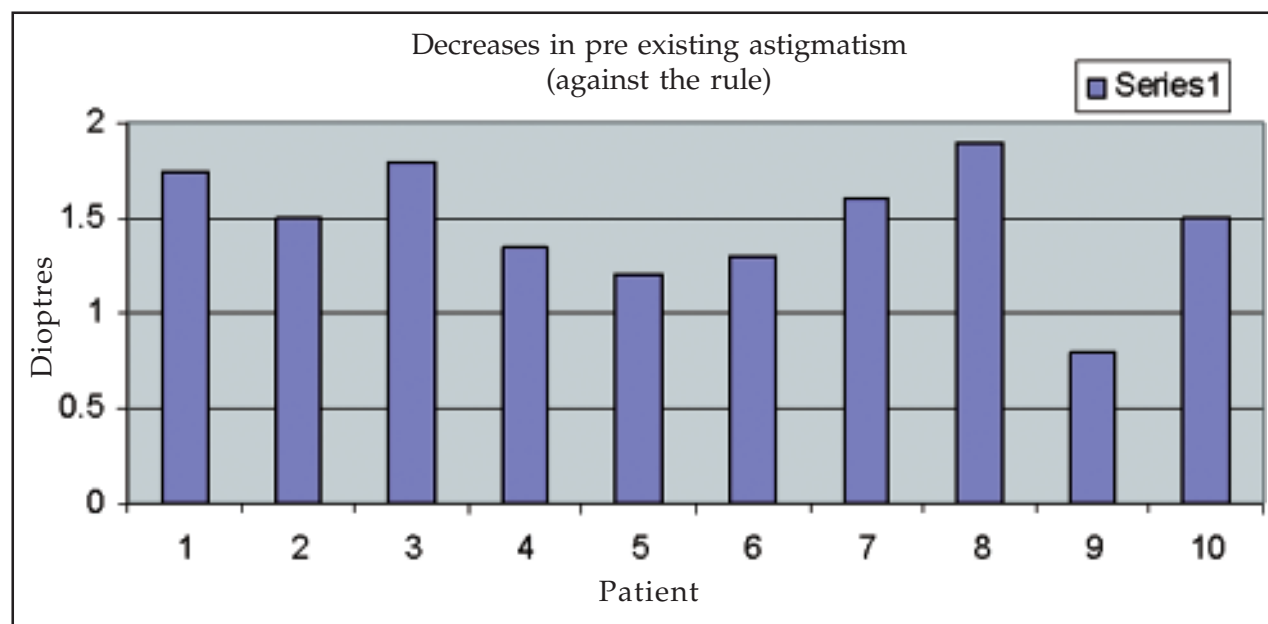


Figure-2

effect of a wide incision on neutralizing the PEA. (if additional astigmatic correcting effect could be achieved).

Our study shows that by placing a wide incision of 5.5mm on the particular steep meridian, it is possible to achieve a relatively low amount of astigmatism or even astigmatic free result post surgically in eyes with PEA of 1.5-3.0D. There was minimal wound manipulation, since it was used only for the insertion of the IOL.

We used rigid IOLs in all cases as we did not see any added advantage of using a foldable IOL and in our setup that proved very cost-effective. However, one major disadvantage of using a rigid IOL is the occurrence of posterior capsular opacification later on but the cost effectiveness of it outweighed that disadvantage. All wounds were well sealed from day one. No wound related complication was noted.

CONCLUSIONS

Our study shows that a wide selfsealing incision of 5.5mm can be used effectively to minimize/decrease the existing preoperative astigmatism of 1.5-3 D, when placed on the steeper meridian. However a long term evaluation/followup will be needed to study the stability of this astigmatic outcome.

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