

CLINICAL STUDY OF VARIOUS TYPES OF INCISIONS IN SMALL INCISION CATARACT SURGERY IN RELATION TO THEIR ASTIGMATISM OUT COME

Sindhura Reddy¹, P. Venkateswarlu², P. Sudhakar Rao³, Balla Vidya Sagar⁴

HOW TO CITE THIS ARTICLE:

Sindhura Reddy, P. Venkateswarlu, P. Sudhakar Rao, Balla Vidya Sagar. "Clinical Study of Various Types of Incisions in Small Incision Cataract Surgery in Relation to their Astigmatism out Come". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 50, June 22; Page: 8716-8719, DOI: 10.14260/jemds/2015/1262

ABSTRACT: AIM: To evaluate the surgically induced astigmatism¹ with different types of incisions in manual small incision cataract surgery over a period of one week, two weeks, four weeks and six weeks post-operative period. As the incision is the major cause for surgically induced astigmatism and this effect is directly related to the length, shape, location and depth of the incision. **METHODS:** Prospective analysis of the medical records of a total of 100 patients who underwent manual small incision cataract surgery with various types of incisions with SIA.

KEYWORDS: Manual Sics, Srk2, Temporal (or) Superior Frown Incisions, Pmmaiol, SIA (Surgically Induced Astigmatism), Keratometric Astigmatism.

INTRODUCTION: Senile cataract is the most important cause of reversible blindness in India and in other developing countries. It has evolved from couching in ancient times to modern Small Incision Cataract Surgery and Phaco emulsification.

In order to obtain advantages of a self-sealing sutureless incision at low cost, Ophthalmologists in India are performing Manual Small Incision Cataract Surgery as an alternative to Phaco emulsification which is in addition to need a well-trained personnel and machine dependent.

A number of studies in past years have shown that surgically induced astigmatism, is one of the leading causes of poor uncorrected visual acuity. Hence refinements in surgical techniques are needed to reduce or eliminate the problems of surgically induced astigmatism.

As various factors that are important in understanding the cause for astigmatism include incision, sutures, wound healing, cautery, position, configuration, nutrition, age and eye lid action. The incision is a major cause for these shifts. This effect is directly related to the length, shape, location and depth of the incision.

The aim of this study has been done to evaluate the Surgically Induced Astigmatism with different types of incisions in Manual Small Incision Cataract Surgery and to observe the difference in astigmatism over a period of one week, two weeks, four weeks and six weeks post-operative period.

METHODOLOGY: This is a prospective study of 100 patients, assigned into four groups. About 25 patients with Against The Rule astigmatism were allotted to group A to undergo a temporal incision and the rest of the patients were randomly allotted into group B, group C, and group D assigned to undergo superior frown incision, straight incision and smile incision respectively.

Study was done from Jan 2012 to October 2013 at Regional Eye Hospital, Kurnool. The surgeries were done by professors and Head of the department.

In this study patients undergoing Manual Small Incision Cataract Surgery aged between 50 – 80 years having Grade 1, 2, 3, and 4 cataracts, patients with good fixation and patients with keratometric astigmatism of < 3D in post-operative period. In pre-operative evaluation as a routine

ORIGINAL ARTICLE

cataract surgery along with Keratometry which was done using TOPCON Auto Refractometer. Axial length was measured with a Sonomed A scan unit and the Intra Ocular Lens Power was calculated using SRK 2 formula. Other local and systemic investigations were done.

SURGICAL TECHNIQUES: All cases were done under local peribulbar anaesthesia, under all aseptic precautions eye to be operated was painted with 10% povidone iodine (for skin) and spirit and was draped.

After application of a wire speculum, a superior rectus bridle suture was placed and secured. And a fornix based conjunctival flap was made at the chosen incision location. The incision site was marked with a 6mm calipers so that the length of the incision remains same in all groups to avoid the astigmatism which occurs due to difference in length of the incision.

The distance of the apex of the incision from the limbus is kept constant of about 1.5mm in all patients to minimize astigmatism which occurs due to the distance from the mid limbus.

In patients grouped under group A, a temporal incision was given, in group B, a superior straight incision was given and in group C a superior frown incision was given and in group D, a superior smile incision was given with a no. 11 bard parker blade.

A funnel shaped corneo scleral tunnel was then created with a crescent knife extending upto 1mm of clear cornea. Anterior chamber was then entered at the anterior limit of the sclero corneal tunnel with a 3.2 mm keratome and the incision was extended parallel to the limbus with an enlarger blade. Visco elastic was then injected to form the anterior chamber. Anterior capsulotomy was then performed in a continuous curvilinear capsulorrhexis with a cystitome. Hydro procedures were then performed and the nucleus prolapsed into the anterior chamber and lens expression was then performed by the sandwich technique. Left over cortical matter was aspirated using a classic simcoe two way cannula. A 6mm PMMA IOL was then Implanted into the capsular bag after maintaining the anterior chamber throughout the procedure with a visco elastic. The IOL is then dialed into position and the left over visco elastic was aspirated and the anterior chamber was formed with ringer lactate solution. Then the incision is sealed by stromal hydration and the incision was checked for water and air tightness.

Later the conjunctiva and tenons were repositioned back by a wet cautery and a sub conjunctival injection of gentamycin and dexamethasone was given. Pad and bandage was applied.

Antibiotic and steroid eye drops were administered 6 times daily and then tapered gradually over a period of 6 weeks post operatively.

A detailed post-operative examination was carried in all patients at the end of 1 week, 4 weeks and 6 weeks post operatively. Their refraction was carried out and their readings noted using an auto refractive keratometer.

The amplitude of their pre-operative and post-operative astigmatism was noted. The amplitude of Surgically Induced Astigmatism was also calculated from the pre-operative and 6 weeks post-operative astigmatism using the simple subtraction technique.

OBSERVATIONS AND DISCUSSION: A total of 100 patients were taken for the study allotted to four groups each consisting of 25 patients. The surgically induced astigmatism² was calculated from the pre-operative and post-operative astigmatism values by the simple subtraction technique. The drift in astigmatism was studied by detailed post-operative examination over a post-operative period of 6 weeks.

ORIGINAL ARTICLE

The observations of our study are shown in tabular forms based on age distribution, sex distribution, amplitude and axis of the induced astigmatism³ in the four groups, the final visual acuity (BCVA), comparison of the induced astigmatism in four groups at the end of 6 weeks, drift in astigmatism noted in four groups over 6 weeks post-operative period.

SUMMARY: This study was performed at Regional Eye Hospital, Kurnool to assess the amount of net induced astigmatism⁴ with various types of incisions in manual small incision cataract surgery using automated refractometer.

The study was conducted between Jan 2012 and October 2013, consisting of 100 patients.

The patients were divided into four groups. Patients with against the rule astigmatism were allotted to group A and rest of the patients were randomly allotted into other three groups, each group consisting of 25 patients to undergo small incision cataract surgery.

Group A underwent SICS with a temporal incision.

Group B underwent SICS with a superior frown incision.

Group C underwent SICS with a superior straight incision.

Group D underwent SICS with a superior smile incision.

The results of this study showed at the end of 6 weeks post-operative period were:

The mean induced cylinder in,

Group A: 0.662

Group B: 0.718

Group C: 0.8356

Group D: 0.8816

Although the mean induced cylinder in group A with temporal incision was lower than the mean induced cylinder in group B with a superior frown incision, there was no statistical significance (p value=0.36), whereas the mean induced cylinder was lesser in group A and was seen to be statistically significant when compared to group C with a superior straight incision (p value=0.07) and group D with a superior smile incision (p value=0.00).

Thus we finally arrived at the conclusion that:

1. Temporal incision induces least amount of net cylinder. In superiorly placed incisions, frown incision induces lesser net cylinder when compared to superior straight and superior smile incisions.
2. There was no statistically significant difference between group A and B. Smile incision induces a larger net cylinder of all the observed incisions. Therefore to avoid a high surgically induced astigmatism in small incision cataract surgery, a temporal incision or a superior frown incision are the best preferred incisions.
3. Surgery performed with a temporal incision showed an early stabilization of the induced cylinder and visual acuity when compared to other incisions.
4. Temporal and superior frown incisions showed a higher incidence of the With the Astigmatism post operatively whereas superior smile incision induced an Against the Rule type of Astigmatism post operatively.

RESULTS: The surgically induced astigmatism in Manual Small Incision Cataract Surgery was calculated from the different incisions from pre-operative and post-operative astigmatism⁵ values by

ORIGINAL ARTICLE

the single subtraction technique. The difference in astigmatism was measured by detailed post-operative examinations over a period of 6 weeks post operation.

CONCLUSION: Our study shows that in Manual Small Incision Cataract Surgery with different incisions, the temporal incision induces least amount of net cylinder when compared to other types of incisions.

Therefore to avoid a high surgically induced astigmatism⁶ in Manual Small Incision Cataract Surgery, a temporal incision or a superior frown incisions are the best preferred incision.

BIBLIOGRAPHY:

1. Meek KM, Newton RH. Organisation Of collagen fibrils in the corneal stroma in relation to mechanical properties and surgical practice. J Refract Surg 1999; 15: 695-699.
2. Wishart MS, Wishart PK, Gregor ZJ Corneal astigmatism following cataract extraction. Br J Ophthalmol 1986; 70: 825-830.
3. Thrasher BH, Boerner CF. Control of Astigmatism by wound placement. Am Intraocular Implant Soc. J 1984; 10: 176-179.
4. Koch Ps. Structural analysis of cataract incision construction. J cataract Refract Surg 1991; 17(Suool): 661-667.
5. Merriam JC, Zheng L, Urbanowicz J, Zaider M. Change On the horizontal and vertical meridians of the cornea after cataract surgery. Cravy TV. Routine use of a lateral approach to cataract extraction to achieve rapid and sustained stabilization of postoperative astigmatism. J cataract Refract Surg. 1993; 17: 414-423.
6. Cravy TV. Long term corneal astigmatism related to elastic, monofilament non absorbable sutures. J Cataract Refract Surg. 1989; 15: 61-69.

AUTHORS:

1. Sindhura Reddy
2. P. Venkateswarlu
3. P. Sudhakar Rao
4. Balla Vidya Sagar

PARTICULARS OF CONTRIBUTORS:

1. Senior Resident, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh.
2. Assistant Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh.
3. Retired Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

4. Assistant Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Balla Vidya Sagar,
Assistant Professor,
Reh Kurnool-518002,
Andhra Pradesh.
E-mail: drvidyasagar@gmail.com

Date of Submission: 19/05/2015.
Date of Peer Review: 20/05/2015.
Date of Acceptance: 13/06/2015.
Date of Publishing: 20/06/2015.