



DOES INCISION SITE IN PHACOEMULSIFICATION HAS AN IMPACT ON INTRAOCULAR PRESSURE?

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ABSTRACT **PURPOSE:** To study the intraocular pressure changes following clear corneal phacoemulsification (CCP) in superior versus temporal clear corneal incisions.

MATERIALS & METHODS: 104 eyes of patients were divided into 2 groups, in which 52 patients underwent superior approach (S) and 52 patients temporal approach (T) clear corneal phacoemulsification surgery. Intraocular pressure (IOP) measurement was done by Non-contact tonometry on day before the surgery and on days 7, 15 & 30 after surgery in both groups.

RESULTS: A total of 104 patients were included in this study. The mean IOP before surgery was 2.98 ± 13.34 mmHg and 3.71 ± 15.40 mmHg in S and T groups respectively. The MD of postoperative IOP on days 7th, 15th and 30th is 2.66 ± 13.80 mmHg, 2.32 ± 12.86 mmHg and 2.37 ± 12.47 mmHg in S group and 3.31 ± 15.26 mmHg, 3.44 ± 14.90 mmHg and 2.71 ± 13.96 mmHg respectively.

CONCLUSION: In conclusion, our study showed significant reduction of IOP in both the study groups.

KEYWORDS : Intraocular pressure, Clear corneal Phacoemulsification, Cataract.

INTRODUCTION:

Age-related cataracts represent most common cause of blindness in the world. At present 2 million cataract operations are being performed per year. At the beginning of 21st century, modern cataract. IOL surgery has become one of the safest, most frequently performed day care.

Small incision cataract surgery using phacoemulsification through clear corneal self-sealing incisions avoids cauterization & suturing. Numerous studies have reported that cataract surgery played a key role in the reduction of intraocular pressure in both glaucoma & non-glaucoma patients.^[1,2] Phacoemulsification seems to lower IOP more than the manual ECCE. Many other factors such as pressurization at the time of surgery, immediate postoperative medication & viscoelastic type contribute to short term IOP fluctuation following surgery.

Cataract extraction surgery, independent of the technique used, induces variations in intraocular pressure (IOP). Although an elevation of the IOP in the early postoperative stage may be noted, many studies have reported a reduction in IOP. Some studies have reported that cataract extraction widens the angle, deepens the anterior chamber and leads to a significant reduction of IOP, particularly in eyes with narrow angles. The purpose of this study was to examine changes in IOP after uneventful clear corneal phacoemulsification (CCP) with variations in the incision site. This study helps in measuring the intraocular pressure changes following phacoemulsification in superior versus temporal incision.

IOP:

Is the pressure exerted by the intraocular contents on the coats of the eyeball. Normal IOP is 10-21 mmHg.

MATERIALS & METHODS

In our study, we included 104 patients undergoing phacoemulsification cataract surgery and divided them into 2 groups, superior incision (S) group and temporal incision (T) group.

Study duration: 6 months.

Study type: prospective type of study.

Sample size: 104 eyes of patients

Place of study: Department of Ophthalmology

Alluri Sitaramaraju college of Medical Sciences

SELECTION OF PATIENTS:

INCLUSION CRITERIA:

1. All patients who are willing to undergo phacoemulsification type of cataract surgery.
2. Patients who had uneventful phacoemulsification surgery.
3. All patients who are willing to give written consent.

EXCLUSION CRITERIA:

1. Uncontrolled systemic disease.

2. H/O any topical medication use.
3. H/O of glaucoma.
4. H/O previous ocular surgeries, like trabeculectomy.
5. General anesthesia during surgery.
6. Patients under the age of 18 yrs.

PROCEDURE:

The study is conducted in the department of ophthalmology at ASRAM'S for duration of 6 months. The study was approved by the ethical and research committee, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, west Godavari. After finding the suitability as per inclusion & exclusion criteria patients were selected for the study and briefed about the nature of the study, and written informed consent was obtained. Further descriptive data of the participants like name, age, sex, detailed history were obtained and necessary investigations were recorded. Complete ocular examination of the patient was done using slit lamp & dilated funduscopy was done.

METHODS:

A valid consent is taken from the patient before starting ophthalmic evaluation. All the patients were divided into 2 groups. A superior incision (S) group & temporal incision (T) group and following tests were done.

1. Snellen's chart for visual acuity.
2. IOP measurement before & after the surgery on day 7, 15 & 30th.
3. Slit lamp Bio-microscopy both preoperative and postoperatively.
4. Routine cataract surgery work up.

STATISTICAL ANALYSIS:

IOP obtained in a quantitative data, statistical test like Z-test & ANOVA were used to calculate results. Z-test revealed no significant difference between the means in between both the groups

(P-value > 0.05).

SURGICAL TECHNIQUE:

All surgeries were performed by the same surgeon.

All the patients underwent surgery under peri-bulbar anesthesia using Lidocaine.

A 3.2 mm superior clear corneal incision given, inject viscoelastic material into the anterior chamber, a well centered continuous curvilinear capsulorhexis of 5 mm done, hydrodissection performed, in the bag phacoemulsification using phaco-chop technique, cortex aspiration done, additional injection of viscoelastic material and insertion of foldable hydrophobic intraocular lens (IOL) in the capsular bag. The viscoelastic material removed. The corneal incision was closed using stromal hydration.

Postoperatively, all patients were treated with topical prednisolone 1% and Moxifloxacin 5% eyedrops for four weeks.

RESULTS:

Figure 1:

SEX:

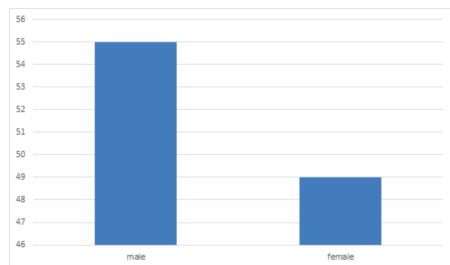


Table 1: PREOPERATIVE IOP:

INCISION SITE	SD
S group (n=52)	2.977 (n=13.34)
T group (n=52)	3.714(n=15.40)

Table 2: POSTOPERATIVE IOP:

INCISION	SD (DAY 7)	SD (DAY 15)	SD (DAY 30)
S group	2.65 (n=13.8)	2.31 (n=12.86)	2.36 (n=12.4)
T group	3.31 (n=15.26)	3.44 (n=14.9)	2.71 (n=13.96)

DISCUSSION:

The various studies of change in intraocular pressure after cataract surgery showed variable results with some confirming a reduction in intraocular pressure although other showing no improvement at all. However, these results vary because of differences in surgical technique.^[1]

Numerous studies have shown that cataract surgery by phacoemulsification with PCIOL induces a long term lowering of IOP.^[1,2] Although elevation in IOP may occur in the immediate post-operative period due to retained viscoelastic material, the IOP is known to normalize with 2-4 hrs. IOP decrease after clear corneal phacoemulsification in normal patients has been demonstrated by *tong & muller*^[3].

In our study males, n=55 and females, n=49. The S & T groups had 52 patients in each group. The pre-operative IOP for S & T group SD is 2.97 & 3.7 respectively. The post-operative IOP for S & T group on day 7, 15, 30th was found to be 2.65, 2.31 & 2.36 and for temporal group was 3.37, 3.44 & 2.73. The p value was significant for both the groups and values found to be 7th day=0.0028, 15th day=0.0034, 30th day=0.00057 in our study respectively.

The exact mechanism by which cataract surgery improves IOP is not clear. Many hypotheses have been shown in the literature such as hypo-secretion of aqueous humor secondary to ciliary body irritation.^[7] (CCP produces free radicals that may act as inflammatory mediators causing break down of the blood-aqueous barrier), 2) increased outflow of aqueous humor (CCP increases endogenous prostaglandins secretion rate that may augment uveoscleral outflow and consequently lower IOP), ultrasound stimulates the production of interleukins 1 α by trabecular meshwork, increasing outflow facility and it may also be that the irrigation during

phacoemulsification flushes the trabeculum, thereby decreasing outflow resistance and finally 3) improvement of aqueous outflow facility by widening effect of lens extraction on angle of AC.

IOP reduction has been shown to be more prominent after CCP than after phacoemulsification with sclera-corneal tunnel^[5]. However *tong and miller* found no significant difference in IOP changes between CCP and sclera-corneal phacoemulsification. We are unable to comment on the effect of sclera-corneal incision as this technique was not employed by us in this study.

Clear corneal phacoemulsification (CCP) produces free radicals that act as inflammatory mediators, causing breakdown of blood aqueous humor. CCP increases endogenous prostaglandin secretion rate that augments uveo-scleral outflow and lower IOP. Improvement of aqueous outflow facility by widening effect of lens extraction on angle of anterior chamber.

Cekic et al,^[4] reported the size of CCR had an effect on IOP after phacoemulsification. They showed that a capsulotomy of 4mm had a greater IOP lowering effect than a 6mm.

Studies on patients with open angle glaucoma have demonstrated a pressure lowering effect of CCP.^[6] In eyes with narrow angles CCP increases the ACD & can permanently normalize IOP. In eyes with primary angle closure, cataract surgery attenuates the anterior positioning of the ciliary processes leading to significant widening of the angle. Corneal phacoemulsification has been recommended as an appropriate surgical procedure in a compliant glaucoma patient on 1 or 2 medications preoperatively with otherwise stable visual fields and optic nerve morphology.

This study showed that there is no significant difference in the reduction of intraocular pressure with the change in the incision site.

LIMITATIONS:

1. In this study, we did not record IOP changes over long term.
2. IOP may vary regionally, our study included set of patients belonging to particular region where the study was conducted.
3. Central corneal thickness (CCT) has not been included in this study.

CONCLUSION:

In conclusion, our study showed significant reduction of intraocular pressure (IOP) in both the study groups but the superior incision group showed a comparatively higher reduction of IOP during initial follow up but both the groups had almost similar IOP reduction by the end of the study period.

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