Original Research Paper

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Corneal Astigmatism After Phacoemulsification and Lens Implantation Through Sutureless Scleral and Corneal Tunnel Incisions

Medical Science

KEYWORDS : Corneal Astigmatism,Corneal Tunnel Incisions,keratometry,Phacoemulsification,pseudophakic correction Sutureless Scleral tunnel

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ABSTRACT

PURPOSE:*to compare surgically induced astigmatism following phacoemulsification(sutureless) with various types of incision-scleral tunnel incision and corneal tunnel incision.*

METHOD: *50 patients were examined by keratometry and pseudophakic correction on 1 week,3 week and 6 week follow up for astigmatism with post-cataract surgery visual acuity 6/18 or better.pre-existing ocular pathology,h/o prior ocular surgery,macular degeneration & posterior segment pathology were excluded.*

RESULT: *Astigmatism in corneal tunnel group at 1 week was 1.48D while in scleral group 1.51D.At 3 week astigmatism in corneal tunnel group was 1.32D while in scleral group it was 1.36D. at 6 week astigmatism in corneal tunnel group was 0.85D while in scleral group it was 0.82D.from above data ,scleral tunnel causes more induced astigmatism than corneal tunnel in immediate post operative period but later both have almost similar induced astigmatism.*

CONCLUSION: *corneal and scleral tunnel induces nearly equal astigmatism.*

INTRODUCTION:

Modern cataract surgery aims at earliest visual rehabilitationina a minimum invasive manner.every cataract surgeon knows that preoperative and induced astigmatism in a detterent to his aim of making his patients "emmetropic". over the years he has either consciously or subconsciously evolved from doing just cataract surgery to planning astigmatic phacosurgery.the evolution of phacoemulsification is largely attributable to the relative immunity the procedure provides against large shifts in astigmatism. But this immunity is not absolute.one important factor which has kept most cataract surgeons busy in the cataract wound or the cataract incision.any invasive ocular procedure ,however ,will effect corneal distortions that damage the astigmatic state of the eye there are several other facts relating wound incision to astigmatism that are well established.'the post operative changes is used to assess the levels of surgically induced astigmatism in scleral tunnel 5.1mm and 3.5mm incision, corneal tunnel 5.1mm and 3.5mm incision.

PURPOSE: to compare surgically induced astigmatism following phacoemulsification(sutureless) with various types of incisions.

-scleral tunnel incision

-corneal tunnel incision

MATERIAL AND METHOD: 50 patients were examined by keratometry and pseudophakic correction on 1 week,3 week and 6 week follow up for astigmatism with post-cataract surgery visual acuity 6/18 or better.pre-existing ocular pathology,h/o prior ocular surgery,macular degeneration & posterior segment pathology were excluded.surgical procedure : peribulbar / topical anaesthesia,lid separation with speculum.incision:various types that were used were:

Superior scleral tunnel

-limbus parallel incision

-straight incision

-frown incision

Temporal scleral incision

-limbus parallel

-straight incision

-frown incision

Superior corneal tunnel

Temporal corneal tunnel

Scleral/corneal tunnel made as described previously .side port entry made.viscoelastic material was injected through the side port incision to increase intraocular pressure and facilitate the incision.continuous curvilinear capsulorhexis was done by a bent 26 g needle. hydrodissection was performed by injecting BSS between the nucleus & cortex through 27 g cannula.the nucleus was removed by phacoemulsification by standard two handed nuclear cracking technique,residual cortex was removed by using the I & A probe,the capsular bag and AC was formed with viscoelastics. anon foldable/foldable IOL was implanted.after removal of viscoelastic,AC was filled with BSS.sub conj. Dexona+antibiotic was given,ciprofloxacin e/o patch was given.post operative topical antibiotic+steroid eye drop, systemic antibiotic,systemic NSAID was given. antibiotic+ steroid eye drops was tapered on follow up 1st week,3rd week and 6th week.on each follow up,keratometry&pseudophakic correction was done.

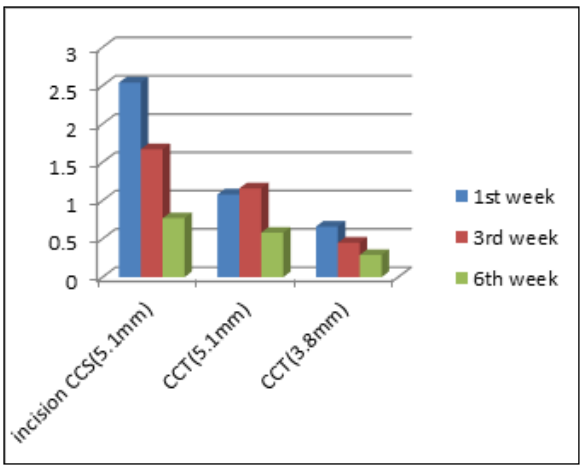
OBSERVATION & DISCUSSION:

PRE-OP ASTIGMATISM(IN DIOPTER)

tunnel	0-0.5	0.51-1.0	1.01-1.5	1.51-2.0	2.01-2.5	2.51-3.0
scleral	17	5	1	1	--	1
corneal	12	7	6	--	--	--

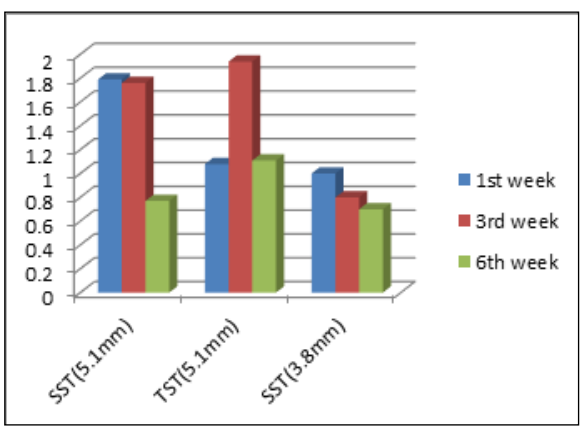
Range of pre-operative astigmatism in scleral tunnel group was 0-276D.range of pre-operative astigmatism in corneal tunnel group was 0-1.3 D

SURGICAL ASTIGMATISM WITH CLEAR CORNEAL TUNNEL (IN DIOPTER)



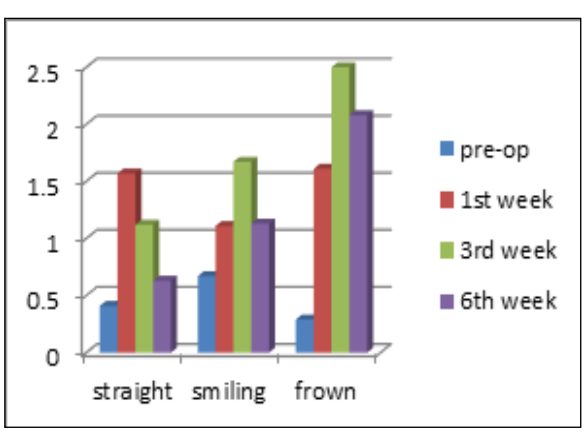
Above chart shows CCS incision causes greater induced astigmatism than CCT incision

SURGICAL ASTIGMATISM WITH SCLERAL TUNNEL (IN DIOPTER)



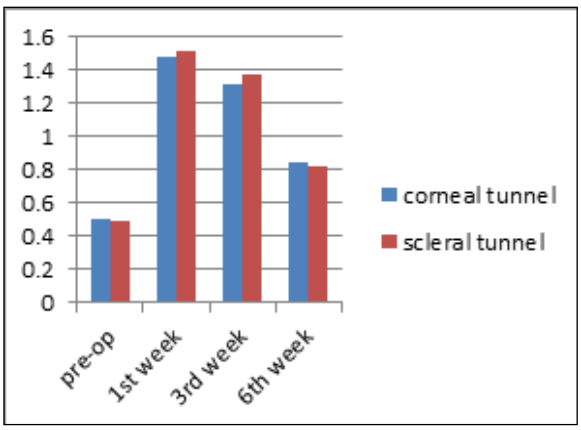
Above chart showsscleral incision produces relaxing effect in the axis of incision,SST produced ATR astigmatism while TST produced WTR astigmatism

SURGICALLY INDUCED ASTIGMATISM IN SCLERAL TUNNEL ACCORDING TO SHAPE OF INCISION



Above chart shows straight incision produced less astigmatism than smiling and frown incision.

COMPARISON BETWEEN SCLERAL & CORNEAL TUNNEL ASTIGMATISM (IN DIOPTER)



From above data it appears that scleral tunnel causes more induced astigmatism than corneal tunnel in immediate post-op period but later both have almost similar induced astigmatism.so for comparison between these two group t test was performed at all visit,$p<0.1$ for both group so this was statistically insignificant,so from all these,it is evident that corneal & scleral tunnel induces nearly equal astigmatism.

CONCLUSION:

-smaller length in corneal tunnel cases caused less induced astigmatism than the standard 5.1mm size incision.

-while in scleral tunnel cases,smaller length of incision caused earlier stability of astigmatism but amount of induced astigmatism at the end of 6th week was almost equal to that induced bu larger size scleral tunnel incisions.

-incision site affected the direction of induced astigmatism more in cases of corneal tunnel while corneoscleral tunnel were almost neutral astigmatically.

-temporal corneal incision causes WTR changes in astigmatism ,while superior corneal incision causes ATR changes in astigmatism.so the property of corneal incisons can be used as astigmatic keratotomy effect in axis of astigmatism.so post-operative astigmatism can be reduced.

-limbus parallel smiling incision induced more astigmatism then straight incision.

-complications of tunnel like premature entry and corneal wound burn lead to paradoxical rise in astigmatism as well as changes in axis of astigmatism.

-greater with the rule changes in astigmatism in scleral incision group than in corneal incision on 1st week which disappeared by 6th week.

-induced astigmatism in scleral and corneal tunnel group was almost equal.

-thus in conclusion in this study we found that the effect of surgically induced astigmatism on pre-operative astigmatism was reduced by varying the incision site and length of incision especially when clear corneal incisions were used.

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