Original article:

Study the visual outcome in superior scleral tunnel incision VS temporal clear corneal incisions in Phacoemulsification

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Abstract

Introduction: Most important goal of cataract surgery is to provide early visual rehabilitation and good unaided visual acuity. Cataract surgery has undergone a revolution since the 17th century from the time of Sushrutha to Intracapsular Cataract Extraction, Extracapsular Cataract Extraction, Small Incision Cataract Surgery and Phacoemulsification .

Methodology: This was a Prospective, observational and comparative hospital based study involving 60 eyes of 60 patients undergoing phacoemulsification with foldable IOL implantation for senile cataracts at the Rural Medical College and Hospital, Loni in last two years.

Results: ATR astigmatism was seen more commonly in patients in our study group as it is seen commonly in the elderly. 42(70%) had ATR astigmatism. Out of these, 20 (66.67%) were found in Group A while 22 (73.33%) in Group B. WTR astigmatism was found in 18(30%) patients out of which 10 (33.33%) and 8 (26.67%) were seen in Group A and Group B respectively.

Conclusion: We found that temporal clear corneal incision induces faster visual recovery compared to scleral tunnel and Temporal clear corneal incision in phacoemulsification produces significantly less SIA compared to a superior scleral tunnel incision.

Introduction:

Most important goal of cataract surgery is to provide early visual rehabilitation and good unaided visual acuity. Cataract surgery has undergone a revolution since the 17th century from the time of Sushrutha to Intracapsular Cataract Extraction, Extracapsular Cataract Extraction, Small Incision Cataract Surgery and Phacoemulsification[1]. The first extracapsular cataract extraction was performed by Jacques Daviel on April 8, 1747[2]. He was French ophthalmologist (1698-1762), a modern European physician to successfully extract cataracts from the eye. The greatest innovation of 20th century in cataract surgery was introduction of CCC and phacoemulsification. Phacoemulsification is the recent technique of cataract surgery. One of the most valuable and important development considered in the history of cataract surgery is the Kelman technique of reducing a cataract to minute

particles by ultrasonic vibration and aspirating them by controlled suction[3]. This is considered as the surgery of choice due to better patient compliance, earlier stabilization of refraction, improved visual acuity, minimal post-operative astigmatism and minimal complications. It enabled ophthalmologists to extract cataracts through the smallest possible incisions using an ultrasound probe or laser probe to break the lens without damaging the lens capsule. Today it has become the preferred technique for cataract removal because no sutures are required as incision is self-sealing.[4]

Methodology:

This was a Prospective, observational and comparative hospital based study involving 60 eyes of 60 patients undergoing phacoemulsification with foldable IOL implantation for senile cataracts at the Rural Medical College and Hospital, Loni in last two years.

INCLUSION CRITERIA

All patients of age 40 years & above of either sex with senile cataract undergoing phacoemulsification at Pravara Rural Hospital, Loni.

EXCLUSION CRITERIA

1. Patients with congenital & developmental cataract.
2. Complicated cataract .
3. Pre existing corneal opacity, uveitis, glaucoma & macular degeneration which independently cause limitation of vision.
4. Posterior segment anomalies.

Written informed consent was taken from each patient included in the study.

Results

Statistical analysis was done by descriptive statistics as mean, SD, percentage / proportions.

Comparison was done by applying Student's Paired and Unpaired 't' at 5%(p, 0.05) and 1%(p, 0.01) level of significance.

Comparison of qualitative variables was done was by applying Z test of difference between two proportions at 5%(p, 0.05) and 1%(p, 0.01) level of significance.

Statistical analysis software namely SYSTAT version 12 (By Cranes software, Bangalore) was used to analyze the data.

Table No.1: Comparison of mean values of Visual acuity at preoperative examination in Superior Scleral Tunnel Incision and Temporal Clear Corneal Incisionin phacoemulsification:

Visual acuity	**Pre operative**	**At day 7**	**At 1 Month**
	Mean ± SD	**Mean ± SD**	**Mean ± SD**
Superior Scleral Tunnel Incision (n=30)	0.83±0.14	0.47±0.13	0.40±0.14
Temporal Clear Corneal Incision (n=30)	0.89±0.16	0.30±0.12	0.18±0.14

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Table No.2: Comparison of Visual acuity at preoperative examination in Superior Scleral Tunnel Incision and Temporal Clear Corneal Incision in phacoemulsification:

Visual acuity	Superior Scleral Tunnel Incision			Temporal Clear Corneal Incision		
	Preoperative	At day 7	At 1 month	Preoperative	At day 7	At 1 month
1.00	9	0	0	0	0	0
0.8	16	0	0	12	0	0
0.6	5	10	5	3	0	0
0.5	0	12	12	0	8	2
0.3	0	6	8	0	10	8
0.2	0	0	0	0	12	0
0	0	2	5	15	0	20
Total	**30**	**30**	**30**	**30**	**30**	**30**

Table No.3: Comparison of mean values of SIA at preoperative examination in Superior Scleral Tunnel Incision and Temporal Clear Corneal Incisionin phacoemulsification:

SIA	At day 7	At 1 Month
	Mean ± SD	Mean ± SD
Superior Scleral Tunnel Incision (n=30)	0.60±0.41	0.75±0.33
Temporal Clear Corneal Incision (n=30)	0.40±0.33	0.33±0.25

Discussion:

Pfleger et al have shown that the surgically induced astigmatism in temporal groups varied between 0.09D to 0.44 D thus showing lesser degree of SIA in these incisions.[5] In our study we found SIA in temporal clear corneal was significantly less 0.33 D compare to 0.75 D in superior scleral tunnel group at Post-op 1 month.

Altan-Yaycioglu R et al (2007) investigated the refractive results of clear corneal incision performed at the steepest meridian of pre-existing corneal astigmatism. Performing clear corneal incision for phacoemulsification of cataract at the steep meridian resulted in small changes in temporal incisions.[6] This was similar to our study were SIA in Temporal clear corneal group was less 0.33 D compare to 0.75 D in superior scleral tunnel incision Post-operative 1 month.

Bilinska E et al (2004) evaluated the astigmatic effect after phacoemulsification depending on size and location of incision. [7]They studied the astigmatic effect of scleral tunnel incisions and clear corneal incisions in adults. The

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lowest mean postoperative corneal astigmatism of (0.71 D) was achieved in the group with the temporal clear corneal incision. They concluded that SIA can be minimized with incision at clear corneal.[8] In our study SIA in temporal clear corneal incision was (0.33D) compare to (0.75D) in superior scleral tunnel incision at 1 month post-operative.

ATR astigmatism was seen more commonly in patients in our study group as it is seen commonly in the elderly. 42(70%) had ATR astigmatism. Out of these, 20 (66.67%) were found in Group A while 22 (73.33%) in Group B. WTR astigmatism was found in 18(30%) patients out of which 10 (33.33%) and 8 (26.67%) were seen in Group A and Group B respectively.

There was no significant difference in the type of pre-operative astigmatism across both the groups. Post-operatively shift in the type of astigmatism was seen. Group A showed a significant increase in the number of patients with ATR astigmatism from 20 (66.67%) pre-operatively to 25 (83.33%) post-operatively. At the same time there was a significant decrease in the number of patients having WTR astigmatism from 10 (33.33%) pre-operatively to 4 (13.33%) post-operatively. This may be attributed to the fact that superior incision induces ATR astigmatism. Hence, it causes worsening of pre-existing ATR astigmatism. In one patient (3.34%), the pre-existing WTR astigmatism was found to be neutralised by ATR astigmatism induced by the superior incision on POD 7 and the same patient showed WTR astigmatism at 1 month once the wound stabilized.

Conclusion:

We found that temporal clear corneal incision induces faster visual recovery compared to scleral tunnel and Temporal clear corneal incision in phacoemulsification produces significantly less SIA compared to a superior scleral tunnel incision.

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