Original Research Paper

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COMPARISON OF CHANGE IN CENTRAL CORNEAL THICKNESS AFTER MANUAL SMALL INCISION CATARACT SURGERY IN DIABETIC AND NON-DIABETIC PATIENT.

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ABSTRACT

Purpose : Cataract surgery is known to cause change in central corneal thickness due to change in corneal endothelial cell density and morphology due to inflammation caused in endothelial cell due to surgery. It is known that central corneal thickness (CCT) is more in diabetic patient as compared to non-diabetic patient. In this study, we have compared the changes in CCT in diabetic and non-diabetic patient after surgery and observed that whether they follow the same pattern or not.

Method : 30 diabetic and 30 non-diabetic patients belonging to age group of 50-75 years who underwent Manual SICS were registered for the study. Preoperative, post-operative day 1, 1st week & 6th week the CCT was measured using ultrasound pachymeter Accupatch VI.

Results :Pre-operative CCT was more in diabetic as compared to non-diabetic group. The rise in CCT in diabetic patient on 1st post-operative day was significantly higher than that of non-diabetic group. Even the decrease in CCT from 1st day to 1st week post-operative was significantly more in diabetics group. But the decrease in CCT was statistically insignificant from 1st week to 6th week post-operative in both groups. The overall change in mean CCT from pre-operative to 6th week post-operative was statistically significant.

Summary: The change in CCT after Manual SICS doesn't follow the same pattern in Diabetic and Non-Diabetics. Indicating that endothelial in diabetics is under more metabolic stress and have more inflammatory changes as compared to non-diabetics.

KEYWORDS : Central corneal thickness, Manual SICS, Diabetic, Non-Diabetic

INTRODUCTION

Cataract is defined as clouding or loss of transparency of lens in the eye as a result of tissue break down and tissue clumping. Senile cataract accounts for 51% of total blindness in the world(1). In India cataract is cause for 62.6% of total blindness(2). The most common technique used for cataract surgery in developing country is Manual SICS as it is cost effective,having wider applicability, less time consuming and a short learning curve(3).

In case of diabetes mellitus there occur the changes in corneal epithelium as well as endothelium structure & function. Patient with diabetes are found to have thicker central corneal thickness & a low endothelial reserve(4).

A study done by Saini and Mittal showed that there was statically significantly lower corneal endothelial function in patients with type 2 diabetes mellitus with decompensation of endothelium after deleterious stress(5). So the endothelial damage occurs more in diabetic patient due to decompaseted endothelial function as compared to non-diabetic patient after cataract surgery which leads to chances of more corneal oedema in diabetic patient (6) and the measurement of central corneal thickness indirectly reflects the damage to endothelial cell.

Priya et al (7) in her study has showed that the central corneal thickness in diabetic patient was more than non diabetic patient preoperatively as well as post-operatively.

There occurs the change in central corneal thickness after Manual SICS in both diabetic as well as non-diabetic patient. There are many studies showing that central corneal thickness is more in diabetic patient as compared to non-diabetic patient.

In this study we would like to compare the changes in central corneal thickness at various time interval in diabetic and non-diabetic group after Manual SICS and try to find that the rise and fall in central corneal thickness, in both the group follows the same pattern or not.

AIM

To study the comparative change in central corneal thickness after Manual Small Incision Cataract Surgery in Diabetic and Non-Diabetic patients.

MATERIAL & METHODOLOGY

The study is prospective cohert study done at Dr D.Y. Patil medical college hospital & research institute Kolhapur in the department of Ophthalmology.

In this study we have observed 30 Diabetic and 30 Non- Diabetic patients undergoing Manual SICS by same surgeon.

In this study we have measured the central corneal thickness of operated eye of the patients on 1 day prior to surgery, then 1st post-operative day, 1st week & 6th week post-operative using of Pachymeter- Accupatch VI ultrasound pachymeter.

Patient of age group 50-75 years undergoing Manual SICS, the patient who are known case of diabetes were included in diabetes group and patient with no history of diabetes and normal fasting & post prandial blood sugar were included in non-diabetic group, were included in the study.

Patients with pre existing corneal disease, glaucoma, history refractive surgery, uveitis and in whom intraoperative complication had occurred, were excluded from the study.

METHODOLOGY

Complete preoperative evaluation was done for the patients undergoing Manual SICS. History was taken regarding the diabetic status of the patient, fasting & post prandial blood sugar was checked of all the patients. Patients were divided into diabetic and non-diabetic group. In both groups pre-operative central corneal thickness was measured using Pachymeter- Accupatch VI ultrasound pachymeter. Then patients underwent Manual SICS, then again the central corneal thickness was measured on 1st post operative day, 1st week & 6th week post-operatively using Pachymeter- Accupatch VI ultrasound pachymeter then the data was analysed using Analysis software R Studio 1.2.5001.

RESULTS

In a given study total 30 Diabetic & 30 Non- Diabetic samples are collected The characteristics (or variables) which are collected in this study, are represented as in Numbers (N), Percentage (%) and Means and Standard Deviations (SD). Here we have compared the mean difference between diabetic and non-diabetic samples using unpaired t-test at various time interval.

Here we have compared the aged matched samples the average age of diabetic patient is 60.93±4.80 years and that of non-diabetic is 60.51±6.49 years.

Table 1: Analysis of Mean & SD of Follow Ups.

Follow Up	Diabetic (Mean ± SD)	Non-Diabetic (Mean ± SD)
Pre-Operative	548.17 ± 28.43	541.13 ± 33.04

1st Day Post-operative	645.43 ± 31.42	615.50 ± 37.31
1st Week Post-operative	592.63 ± 29.36	588.53 ± 34.86
6th Week Post-operative	555.43 ± 28.74	547.90 ± 33.45

Table 1 shows the mean central corneal thickness of diabetic and non-diabetic group. It shows that the central corneal thickness of diabetic group is more than that of non-diabetic group on preoperative and even on 1st day, 1st week and 6th week post operative.

Table 2: Comparison of 1st Day Post-operative According Diabetic & Non-Diabetic Groups.

Diabetic Status	Mean	Standard Deviation	P-value
Diabetic	645.43	31.42	0.0014
Non-Diabetic	615.50	37.31	

From above table-2, based on Unpaired T test here we found significant mean difference. Also, the mean of CCT at 1st Day for Diabetic patients is greater than mean of CCT for Non-Diabetic patients.

Table 3: Analysis of Mean Difference of CCT between Pre-Operative & 1st Day after Surgery.

Diabetic Status	Mean Difference	Standard Deviation	P-value
Diabetic	97.27	5.26	<0.0001
Non-Diabetic	74.37	10.75	

From above table-3, based on Unpaired T test here we found significant mean difference. Also, the mean difference of CCT for Non-Diabetic patients is 23.54% lesser than mean difference of CCT for Diabetic patients.

Table 4: Analysis of Mean Difference of CCT between 1st Day after Surgery& 1st Week.

Diabetic Status	Mean Difference	StandardDeviation	P-value
Diabetic	52.8	5.83	<0.0001
Non-Diabetic	27.1	13.87	

From above table-4, based on Unpaired T test here we found significant mean difference. Also, the mean difference of CCT for Non-Diabetic patients is 48.67% lesser than mean difference of CCT for Diabetic patients.

Table 5: Analysis of Mean Difference of CCT between 1st Week & 6th Week.

Diabetic Status	Mean Difference	Standard Deviation	P-value
Diabetic	37.2	4.63	0.1428
Non-Diabetic	40.63	11.68	

From above table-5, based on Unpaired T test here we found insignificant mean difference. Also, the mean difference of CCT for Non-Diabetic patients is 8.44% greater than mean difference of CCT for Diabetic patients.

Table 6: Comparison of difference of Pre-Operative & 6th Week.

Diabetic Status	Mean	Standard Deviation	P-value
Diabetic	7.27	1.66	0.05
Non-Diabetic	6.77	2.08	

From above table-6, based on Unpaired T test here we found significant distribution of difference of Pre-Operative and 6th week. Also, the mean difference of CCT for Diabetic patients is 6.87% greater than mean difference of CCT for Non-Diabetic patients.

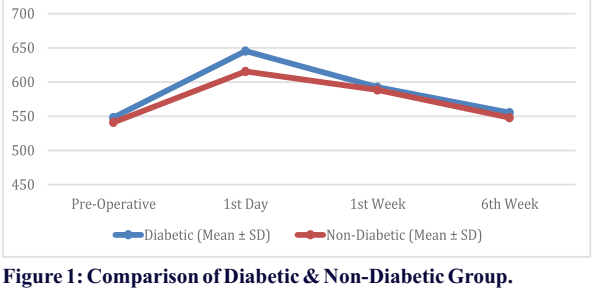

Figure 1: Comparison of Diabetic & Non-Diabetic Group.

DISCUSSION

In case of developing country like India where some times cataract surgery is done in a mass population, Manual SICS is the choice of surgery due to its cost effectiveness and less time consuming. Here in this study, we have studied that how the central corneal thickness varies after cataract surgery in case of diabetic and non-diabetic group. It is well known fact that central corneal thickness is higher in case of diabetics as compared to non-diabetics(4).

Table 1 showed that mean central corneal thickness (CCT) in diabetic is more as compared to non-diabetic patient and there occurs increase in CCT after cataract surgery in both the cases. **Priya et al** (7) in her study also showed that the CCT was more in diabetic as compared to non-diabetic patient. The highest rise in CCT was on 1st day post operatively which is similar to **Boltz M et al**(8) study and **Jacob JS**(9) study.

Table 2 shows that mean CCT of diabetic is significantly higher than non-diabetic which is also found in **Dabas R et al**(10) study and **Pandey S et al**(11) study.

In further analysis we have compared the change in CCT in both the group table 3 shows the comparison of change in CCT from pre-operative value to 1st day after cataract surgery it shows that there is 23.54% more increase in CCT in diabetic group. Table 4 shows comparison of 1st day post-operative with 1st week post-operative here the CCT value decreases and it tries to come near its preoperative value. Here the decrease in diabetic group is 48.67% more may be due to more increase in CCT on 1st pre-operative day as compared with non-diabetic group. There occurs further decrease in CCT value from 1st week to 6th week as in table 5, here the fall in value in both the groups is statistically insignificant, means fall in CCT in both the groups is similar.

Finally on comparing the overall changes in CCT due to cataract surgery in both the groups from pre-operative value to 6th week post-operatively as in table-6, it shows that there is significant difference in mean change of CCT in both the groups.

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