



Original Research Article

To study the correlation between type 2 diabetes mellitus and central corneal thickness

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ABSTRACT

Aim: To study the correlation between type 2 diabetes mellitus and central corneal thickness in patients coming to the outpatient department of Dr. B.R. Ambedkar Medical College and Hospital.

Materials and Methods: This prospective case control study was conducted over a period of 1 year from June 2018 to June 2019 at DR. B. R. Ambedkar Medical College and Hospital, Bangalore. A total of 120 patients were enrolled in the study. Among them, 60 patients had type 2 diabetes mellitus and 60 patients were non diabetics. Detailed ophthalmic examination was conducted in all patients and Central corneal thickness was measured using ultrasound pachymetry.

Results: In our study, 120 patients were enrolled including 60 diabetics and 60 non diabetics. The mean central corneal thickness in diabetics was $567 \pm 22 \mu$ and in non diabetics it was $520 \pm 23 \mu$. The difference between cases and control group was found to be clinically significant.

Conclusion: According to our study, the patients with type 2 diabetes mellitus were found to have thicker corneas as compared to non diabetics.

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1. Introduction

According to WHO, 422 million adults are living with diabetes in 2016. Type 2 diabetes mellitus accounts for more than 85-90% of the cases.¹ Diabetic keratopathy is an ocular complication that occurs in about 47-64% of diabetics.² Long duration of hyperglycemia in diabetics can affect the cornea in various ways like reduced corneal sensations, recurrent corneal erosions, superficial punctate keratitis, corneal edema.³

Increased serum levels of glycosylated haemoglobin predisposes impairment of corneal epithelial barrier function.⁴ Glucose can form collagen cross links with the help of advanced glycosylated end products. They increase covalent bond in corneal stroma which may lead to increased corneal thickness.⁵ According to some studies intracellular accumulation of sorbitol which acts as an osmotic agent causes corneal hydration. Reduction of Na+K+ ATPase activity inhibits the corneal endothelial

pump and can also cause increased corneal thickness.

The central corneal thickness is a sensitive indicator of corneal status and serves as an index for corneal hydration and metabolism. It can be measured by various methods like optical pachymetry, ultrasonic pachymetry, ultrasound biomicroscopy, optical coherence tomography.

2. Aim of the Study

To study the correlation between type 2 diabetes mellitus and central corneal thickness in patients coming to vitreoretinal clinic of Dr B.R. Ambedkar Medical college and Hospital.

3. Materials and Methods

The case control study was conducted over a period of 1 year from June 2018 to June 2019 at DR. B. R. Ambedkar medical college and hospital, Bangalore.

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3.1. Inclusion criteria

60 patients with type 2 diabetes mellitus previously diagnosed by physician on treatment and 60 age matched controls who are non diabetics on history and blood sugar levels were enrolled.

3.2. Exclusion criteria

1. Corneal dystrophies.
2. Contact lens users.
3. Ocular surface disorders.
4. History of previous ocular surgeries.
5. History of use of ocular medications.

Routine ophthalmic examination was done in all patients. The central corneal thickness was measured using ultrasound pachymeter using multiple reading single point mode by a single person. Average of 5 consecutive readings with standard deviation less than 0.005 mm was taken as final reading.

3.3. Statistical analysis

Statistical analysis was performed using SPSS 16.0 software. Descriptive data was presented as mean \pm standard deviation. Comparison between parameters was done using student t-test, Pearson correlation coefficient to evaluate the correlation between CCT in diabetics and non diabetics. p value less than 0.05 was considered statistically significant.

4. Results

4.1. Age distribution

The mean age of the study population was 52.4 ± 5.1 years. 40% of the subjects in both case-control groups were in the age group of 50 to 59 years.

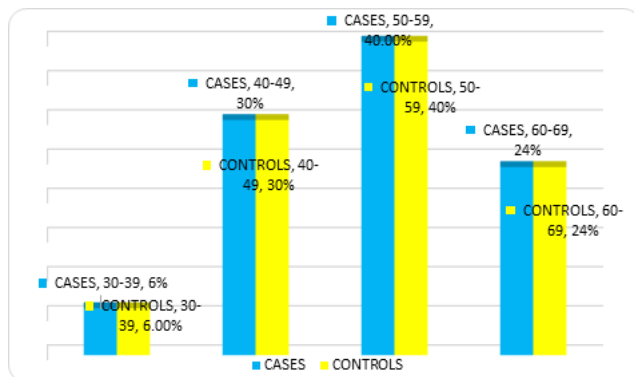


Fig. 1: Age wise distribution of patients

4.2. Sex distribution

52% were males and 48% were females.

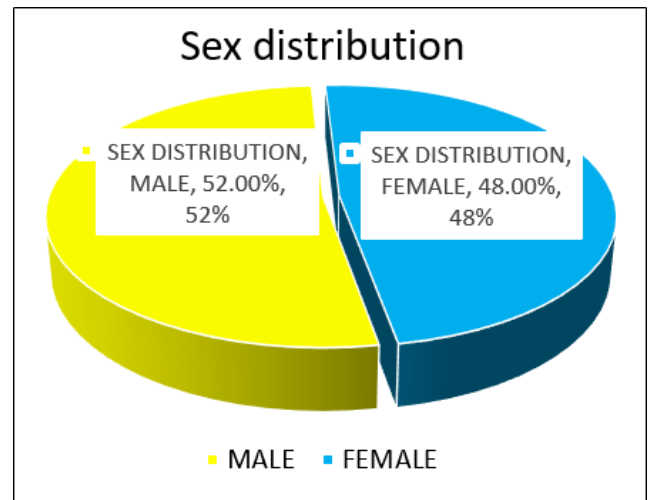


Fig. 2: Gender wise distribution of patients

4.3. Mean central corneal thickness in diabetics and non diabetics

The mean central corneal thickness in diabetics was 567 ± 22 micrometer and in non diabetics was 520 ± 23 micrometer.

Table 1: Mean central corneal thickness in cases and controls

Subjects	n	Mean CCT (μ)	SD (\pm)
Diabetics	60	567	22
Non diabetics	60	520	23

The central corneal thickness was found to be higher in patients with type 2 diabetes mellitus when compared to non diabetics. The difference between cases and control group was found to be statistically significant (p value <0.05).

5. Discussion

Changes in the lifestyle has led to an increase in the incidence of diabetes worldwide.⁶ Long term hyperglycemia has toxic effects on retina and cornea. In our study, we found that patients with Type 2 Diabetic Mellitus has a greater average central corneal thickness than non diabetics.

Study conducted by Ozdamar Y, et al. showed that mean CCT in diabetics ($564 \pm 30\mu$) was higher compared with control group ($538 \pm 35\mu$) ($P=0.001$).⁷ Claramonte PJ, et al. to conducted a study to prove the correlation between central corneal thickness and diabetes. Ultrasound pachymetry measurements were made and average central corneal thickness in diabetic patients was $571.96 \pm 26.81\mu$ and in non diabetics was $544.89 \pm 35.36\mu$.⁸

Lee et al. studied the effect of duration of diabetes on corneal thickness and reported that diabetic patients with duration of >10 years have more corneal morphological abnormalities as compared to non diabetics.⁹ Mc Namara et al. reported that there was a positive correlation between HbA1c levels in type 2 diabetes.¹⁰

6. Conclusion

According to our study, the patients with type 2 diabetes mellitus were found to have thicker corneas as compared to non diabetics. This should taken into consideration while interpreting intraocular pressure and prior to any refractive surgeries in diabetics.

7. Source of Funding

None.

8. Conflict of Interest

None.

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