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Variations of Central corneal thickness in diabetic patients of Jammu region as detected by Anterior segment OCT

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Abstract

Diabetes mellitus (DM) / Hyperglycaemia is the most common cause of blindness globally. Diabetes mellitus results in diabetic retinopathy which leads to blindness. Various studies have observed the thickening of central corneal thickness in patients with diabetes mellitus. Hyperglycemia leads to micro and macrovascular disorders. Diabetic retinopathy is the commonest complication of diabetes. This prospective observational study was conducted with the aim to study the central corneal thickness in diabetic patients of Jammu region by anterior segment optical coherence tomography (OCT) in the department of Ophthalmology at Acharya Shri Chander College of Medical Sciences and Hospital, Jammu, during the period January 2022 to May 2022. It was observed that the mean corneal thickness was significantly higher in diabetic group (568.51±31.35 µm) than non diabetic group (540.41±28.22 µm). It is concluded that the patients with diabetes mellitus CCT was significantly increased. Thus, the increased corneal thickness is an indicator of the risk of retinal complications in patients with diabetes mellitus.

Keywords: Diabetes Mellitus, Hyperglycemia, Corneal thickness, OCT and Ocular Complications.

Introduction

Diabetes mellitus (DM) / Hyperglycaemia is the most common cause of blindness globally. Diabetes mellitus results in diabetic retinopathy which leads to blindness.[1] This metabolic disorder alter the metabolic status (changes in blood glucose level) of cornea leads to alteration in cellular level affecting the corneal endothelial cells, which are responsible in maintaining stromal hydration by actively removing water, namely endothelial pumping mechanism which affect the corneal thickness.[2,3,4]

Various studies have observed the thickening of central corneal thickness in patients with diabetes mellitus.[5]

The corneal endothelium is a single layer of cells which maintain the optical transparency of cornea. Hyperglycemia leads to micro and macrovascular

disorders. Diabetic retinopathy is the commonest complication of diabetes.[6]

Central corneal thickness (CCT) is an important measurement for the diagnosis, treatment, and management of various ocular conditions and is a sensitive indicator for endothelial physiology and functions.[7]

Aims & objectives

To study the central corneal thickness in diabetic patients of Jammu region by anterior segment optical coherence tomography (OCT).

Material and methods

This prospective observational study was conducted in the department of Ophthalmology at Acharya Shri Chander College of Medical Sciences and Hospital, Jammu, during the period January 2022 to May 2022 after obtaining approval from the institute ethical committee.

A total of 200 patients (100 diabetic and 100 non diabetic) attending the Eye Outpatient department were involved after obtaining the informed consent from all the study participants.

Inclusion Criteria

- Diabetic and non-diabetic patients presenting in Eye OPD with complains of vision (blurred vision / cloudy vision), strain, eye discomfort, etc.
- Age group 25-75 years.
- Patients diagnosed with diabetes since 1 year or more than 1 year and on antidiabetic medicines.

Exclusion Criteria

- Study participants who were not willing to participate.
- Previous eye surgeries.
- Patient using contact lenses.
- Ocular trauma.

A detailed history was collected, ocular examination was done. Central corneal thickness was measured with optical coherence tomography (OCT) and non-fasting serum glucose and glycosylated hemoglobin (Hb A1C) was obtained from all participants.

Data was tabulated, organized, analyzed and interpreted in both descriptive and inferential statistics i.e. frequency and percentage distribution, by using statistical package for social science software (SPSS), version 17. Categorical variables were expressed as number and percentage.

Observations and results

In the present study, 200 patients (100 diabetic and 100 non diabetic) attending the Eye Outpatient department were included in the present study.

Table 1: Age Distribution

Age group	Frequency	Percentage
25-30	0	0
31-35	0	0
36-40	14	7
41-45	23	11.5
46-50	29	14.5
51-55	35	17.5
56-60	28	14
61-65	11	5.5
66-70	41	20.5
71-75	19	9.5

Table 1 depicted, the majority (20.5%) of the study participants were in the age group of 66-70 years, followed by 51-55 years (17.5%), 46-50 years (14.5%), 56-60 years (14%), 41-45 years (11.5%), 71-75 years (9.5%), 36-40 years (7%) and 61-65 years (5.5%).

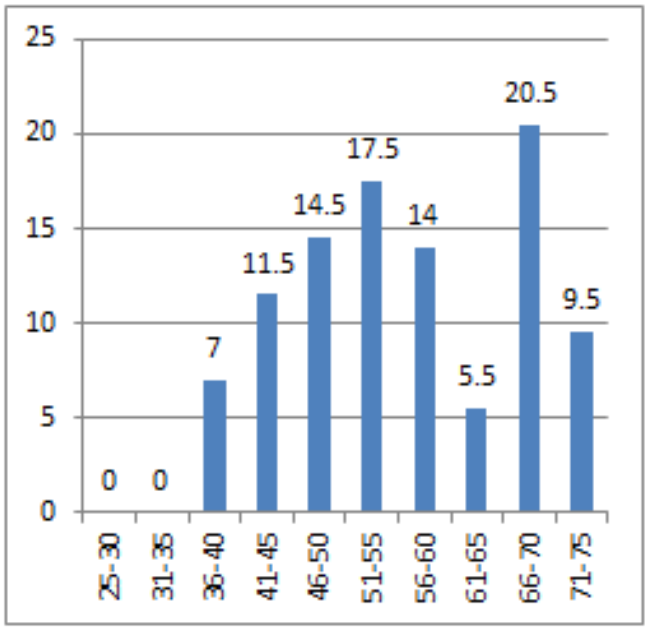

Figure 1: Age Distribution

Table 2: Gender Distribution

Gender	Frequency	Percentage
Male	93	46.5
Female	107	53.5

Table 2 represented that majority of the study participants were females (53.5%) followed by 46.5% males.

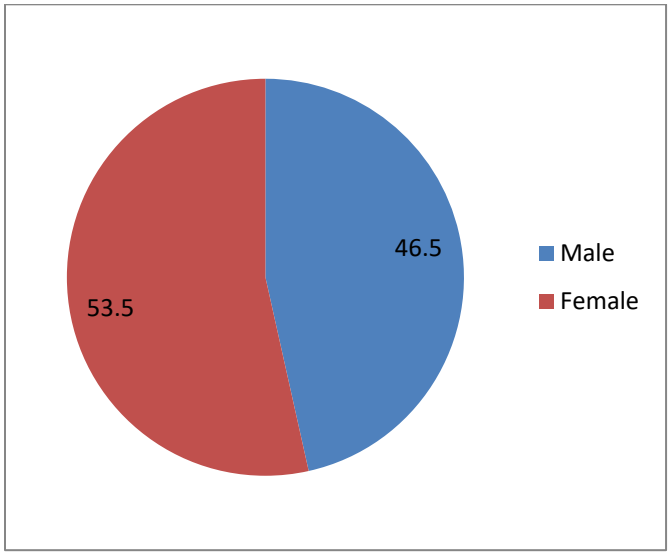

Figure 2: Gender Distribution

Table 3: Comparative findings

Findings	Diabetic group	Non-diabetic group
Duration of DM (mean±SD)	11.9±8.9 years	-----
HbA1c(mean±SD)	7.49±1.82%	------
Corneal thickness (µm)	568.51±31.35	540.41±28.22

The present study observed that the mean duration of diabetes mellitus was 11.9±8.9 years, mean HbA1c level was 7.49±1.82% among diabetic group and the mean corneal thickness was significantly higher in diabetic group (568.51±31.35 µm) than non diabetic group (540.41±28.22 µm). There was a significant difference in the central corneal thickness between the diabetic and non diabetic patients (P<0.05).

Discussion

In this study 200 patients (100 diabetic and 100 non diabetic) attending the Eye Outpatient department were included in the present study. Data was analyzed and discussed with previous literature.

In the present study the majority (20.5%) of the study participants were in the age group of 66-70 years, followed by 51-55 years (17.5%), 46-50 years (14.5%), 56-60 years (14%), 41-45 years (11.5%), 71-75 years (9.5%), 36-40 years (7%) and 61-65 years (5.5%). In similar study conducted by Canan H et al. (2020) showed that the mean age of the study participants was 58.45±10.51 (37-82) and 52.61±8.15 (37-70).[8] In another study conducted by Suraida A-R et al. (2018) reported that the mean age of the study participants was 59.24 (6.64) and 58.24 (7.5) and 57.38 (7.73).[9]

It was observed that the majority of the study participants were females (53.5%) followed by 46.5% males. In another study conducted by Suraida A-R et al.

(2018) showed that majority of the study participants were females (60%) followed by 40 % males.[9] In similar study conducted by Yusufoglu E et al. (2022) reported that majority of the study participants were females (59.02%) followed by 40.97 % males. .[10]

Further the present study revealed that the mean duration of diabetes mellitus was 11.9±8.9 years, mean HbA1c level was 7.49±1.82% among diabetic group and the mean corneal thickness was significantly higher in diabetic group (568.51±31.35 µm) than non diabetic group (540.41±28.22 µm). There was a significant difference in the central corneal thickness between the diabetic and non diabetic patients (P<0.05). In similar study conducted by Kim YJ et al. (2021), found that the mean duration of diabetes mellitus was 10.8±8.7 years, mean HbA1c level was 7.54±1.78% among diabetic group and the mean corneal thickness was significantly higher in diabetic group (551.80±34.10 µm) than non diabetic group (542.63±33.79 µm).[11] In another study conducted by Lee JS et al. (2006) observed that the mean duration of diabetes mellitus was 10.8±5.9 years and the mean corneal thickness was significantly higher in diabetic group (588.2±2.7 µm) than non diabetic group (567.8±3.8 µm).

Conclusion

This prospective observational study included 200 patients (100 diabetic and 100 non diabetic) attending the Eye Outpatient department. All the patients had OCT examination. The study concluded that the patients with diabetes mellitus CCT was significantly increased. Thus, the increased corneal thickness is an indicator of the risk of retinal complications in patients with diabetes mellitus.

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