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A CLINICAL STUDY TO COMPARE CENTRAL CORNEAL THICKNESS BETWEEN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS AND AGE MATCHED GENERAL POPULATION—A RESEARCH ARTICLE.

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ABSTRACT

Aims and Objectives : To measure and compare the central corneal thickness (CCT) in primary open angle glaucoma (POAG) patients and age matched general population.

Materials and Method : 200 eyes of 100 normal patients and 92 eyes of 70 POAG patients were included in this study. A detailed ocular and medical history was taken and a thorough ocular examination was done. Corneal thickness was measured with ultrasound pachymeter.

Results: No specific association of CCT with age well as with sex could be detected. While comparing the mean CCT in POAG patients with the normal subjects, there was no statistically significant difference and the mean CCT in POAG patients was found to be 501.3±54.3µm and 490±46µm in normal subjects.

Conclusion: Mean CCT in POAG patients was found to be almost similar to that in normal subjects and the difference is not statistically significant.

KEYWORDS : POAG, CCT, Pachymetry

INTRODUCTION:

Anatomical integrity of the cornea ia a significant factor for its optical function . The measurement of the central corneal thickness is an important factor in the evaluation and management of glaucoma suspects and glaucoma patients and the measurement of the intraocular pressure by applanation tonometry is affected by central corneal thickness .Central corneal thickness seems to be an independent variable and unrelated to other ocular dimensions.[1] It has been found that CCT is positively correlated to applanation tension and not to other variables such as depth of anterior chamber, thickness of lens and axial length, except for the ocular rigidity which is found to be significantly higher in the ocular hypertension group.[2]

Goldman discussed the influence of variation of CCT on IOP measured by applanation tonometer. However, he believed that significant variations in CCT occurred only rarely and he assumed a CCT of 520µm.[1]

Over the last couple of years it has become much easier to measure corneal thickness and it has now become apparent that there is a wide variation in corneal thickness. The cornea is now measured with a small ultrasound probe that gently touches the corneal surface and can accurately measure the corneal thickness in a very short time. This instrument is called an ultrasound pachymeter. Corneal pachymetry is now widely used by both glaucoma researchers and specialists to better diagnose and detect early cases.

There is a wide variation in corneal thickness in general population. Corneal pachymetry is clinically helpful in estimating IOP, determining the risk of visual loss, and establishing a target pressure.[3]

MATERIALS AND METHODS :

This study was conducted in a tertiary care hospital for a period of one year. 200 eyes of 100 normal patients and 92 eyes of 70 POAG were included in this study.

Study population:

a) Primary open angle glaucoma patients (both male and female) attending OPD or admitted in the indoor ward.
b) Age matched general population (both male and female) in OPD or indoor ward.

Informed and written consent was obtained from each of the patients after explaining the purpose of the study design.

INCLUSION CRITERIA:

1. Diagnosed cases of POAG.
2. Normal eyes.

EXCLUSION CRITERIA:

1. Patient with ocular disease other than POAG.
2. Patients with myopia or hypermetropia of more than 3 diopters.
3. Astigmatism of more than 1D.
4. Patients wearing contact lenses.
5. Patients who had ocular surgery.
6. Patients with corneal disease.
7. Dilated pupil.

A detailed ocular and medical history was taken .A thorough Ocular examination including visual acuity ,IOP, slit lamp biomicroscopy, direct and indirect ophthalmoscopy, indirect gonioscopy using Zeiss four mirror, visual field analysis by using automated perimetry technique, OCT were done. Central corneal thickness (CCT) was measured by ultrasonic pachymeter mounted on a slit lamp were done.

Instrument Pacscan 300AP (Sonomed digital biometric ruler, A-Scan and Pachymetersound) was used to measure corneal thickness. The most common method of pachymetry is achieved by ultrasonic means. The cornea is applanated and sound waves are bounced off tissues that form echoes, which are used to measure the corneal thickness.

RESULTS AND OBSERVATIONS:

Studies carried out in different categories were as follows:

1. Age specific CCT in normal population.
2. Sex specific CCT in normal population.
3. CCT distribution between right and left eyes.
4. CCT variation in normal and POAG patients.

Various data in population included in the study.

DATA	NORMAL POPULATION	PRIMARY OPEN ANGLE GLAUCOMA
NO. OF PATIENTS	100	70
NO. OF EYES	200	92
AGE GROUP	35-75	35-80
MALE	66(66%)	45(64%)
FEMALE	34(34%)	25(36%)

Age distribution chart in normal population.

AGE	TOTAL POPULATION	MALE	FEMALE
35-45	58(58%)	40(68.97%)	18(31.03%)
46-55	25(25%)	16(64%)	9(36%)
56-65	13(13%)	9(69.23%)	4(30.77%)
66-75	4(4%)	1(25%)	3(75%)

1.age Specific Cct Distribution In Normal Population:

TABLE-1: Age specific mean CCT Mean±SD.

AGE (YRS)	RANGE(µm)	MEAN±SD
35-45	460-532(58)	496±36

46-55	462-532(25)	497±35
56-65	444-536(13)	490±46
66-75	464-530(4)	497±33

Values in parenthesis are the number of subjects.
No specific association of CCT with age was found.

2.sex Specific Cct Distribution In Normal Population:

TABLE-2: Sex specific mean CCT Mean±SD

AGE(yrs)	MALE RANGE(µm)	FEMALE RANGE(µm)	MALE MEAM±SD	FEMALE MEAN±SD
35-45	460-532(40)	478-532(18)	496±36	505-±27
46-55	462-532(16)	472-532(9)	497±35	502±30
56-65	444-536(9)	462-524(4)	490±46	493±31
66-75	490-494(1)	464-530(3)	492±2	497±33

Values in parenthesis are the number of subjects.
No specific association of CCT with sex was found.

3.cct Distribution Between Right And Left Eyes In Normal Population: (age And Sex Specific)

TABLE-3: Age and sex specific mean CCT between right and left eyes (Mean±SD)

AGE (yrs)	MALE (MEAN±SD) µm		FEMALE (MEAN±SD)µm	
	RIGHT EYE	LEFT EYE	RIGHT EYE	LEFT EYE
35-45	495±35	498± 34	505± 27	505± 27
46-55	497± 35	500 ±32	502± 30	501± 25
56-65	483.5± 39.5	491 ±45	490 ±28	495± 29
66-75	490± 0	494± O	492.5± 28.5	497 ±33

The difference in CCT measurement between right and left eyes was not significant in both genders.

4.cct Variation In Normal And Poag Patients.

Table-4: CCT variation in normal and POAG patients.

AGE(yrs)	NORMAL POPULATION (µm)		POAG PATIENTS (µm)	
	MEAN	RANGE	MEAN	RANGE
35-80	490± 46	444-536 (200)	501.3± 54.3	447-555.6 (92)

Values in parenthesis are the number of subjects.

CCT in POAG eyes ranged from 447-555.6µm, with the mean CCT being 501.3µm. CCT in the normal population ranged from 444-536µm with the mean CCT being 490µm. There was no significant difference in the mean CCT between normal population and POAG patients. (by unpaired t-test, p=0.668 which is not significant, t=1.840)

DISCUSSION:

Age Specific Distribution In Normal Populatio: In this study the age of normal subjects included ranged from 35 -75 years and maximum number of patients was in the 35-45 years group. The mean CCT was found to be highest in two groups (497± 35µm) in the 46-55 years age group and (497±33µm) in the 66-75 years of age group and there was no age related decrease of corneal thickness.

Roger CW Wolfs[4], Siu A[5] repoted no significant association of CCT with age. Velten IM et al [6] also reported similar findings.

SEX SPECIFIC CCT IN NORMAL POPULATION:

Out of the 100 normal individuals 66 were male and 34 were female. Male showed a mean CCT of 490±46µm, whereas females had a slightly higher CCT i.e. 497±35µm.

No significant difference in CCT between the genders was detected in our study, which matches with that of Mongolian population. In male Mongols, the mean CCT was502± 32µm and in female Mongols, it was 505±31µm.[7] Eghosasere Iyamu & Ebi Osuobeni,[8] reported that gender had no significant effect on CCT among normotensive Nigerian adults. Rotterdam study[4] found no differences in CCT between sexes.

CCT distribution between right and left eyes:

Our study found that mean CCT for the right eye was 488±44µm and for the left eye was 491±45µm. No significant differences in CCT found between right and left eyes. Thus our study results were similar to the study in Mongolian population. [7]

CCT variation in normal and POAG patients:

Our study included 70 POAG patients with 92 diseased eyes and 200 eyes of 100 normal subjects.

In the POAG eyes, mean CCT was found to be 501.3±54.3µm, which was almost similar to the mean CCT in the normal population i.e. 490±46µm. This difference was not statistically significant.

Rene-Pierre Copt et al [9] reported patients with POAG and controls had equivalent mean corneal thickness measurement.

Shah et al[10] , Herndon et al [1], and the Rotterdam study [3] showed similar findings like our study.

CONCLUSSION:

From our study we have derived the conclusion that there is no specific association of CCT with age, no correlation between CCT with sex was found, and in POAG patients , mean CCT is found to be almost similar to that in normal subjects and the difference is not statistically significant

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