

ASSOCIATION BETWEEN AGE AND CENTRAL CORNEAL THICKNESS IN NORMAL INDIVIDUALS

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ABSTRACT

PURPOSE: Find association between central corneal thickness and age in normal individuals.

METHODS: This cross-sectional correlation study included 70 healthy subjects of both genders. The participants of this study were divided into 7 groups, each contain 10 individuals. Data was collected through self-designed proforma. Descriptive statistic test and Pearson correlation were applied. For data analysis SPSS 21.00 was used.

RESULTS: The mean age and CCT of subjects were 36.46 ± 19.48 year and $539.50 \pm 37.973 \mu\text{m}$, respectively. Moderate negative relationship was found between age and CCT (Pearson correlation $r = -0.621$).

CONCLUSION: It is concluded that age has moderate negative correlation with CCT. The CCT decreases with age.

KEYWORDS: Cornea, Central Corneal Thickness, Pachymetry

INTRODUCTION

Cornea is the transparent part of the eye and the most sensitive part of the body. It also helps eye to focus on objects and see clearly. Its major functions are to support tear film, which provide refractive surface of eye and to transfer light through its translucent tissue to the lens and then to retina. There are some pathology that affect cornea like, injuries, allergies, keratitis, dry eyes and other corneal dystrophies. There are number of abnormalities which cause corneal thinning like Keratoconus. In Keratoconus, cornea bulge out into a cone like shape and cornea becomes thin. If it left untreated disease might progress and cause visual impairments.¹ Corneal epithelium and endothelium changes with age. Age-related

changes are those that occur throughout your lifespan, not merely in senescence. They include changes in corneal curvature, corneal diameter, corneal thickness, corneal sensitivity and corneal tactile. It is proved that the ocular optics works on the base of refractive parameter of eyeball structure which changes with the age. Corneal thinning occurs in number of age. It is also affected by infections and inflammatory disorders. It can be measured by ultrasonic Pachymetry, it monitors progression of the endothelial cell count, it is very useful in patients with glaucoma.² The anterior segment of eye can be examined with the help of Pachymetry. This is the fundamental device in modern ophthalmology for diagnosis with main

purpose for analyzing thickness of the cornea.³ Diabetes mellitus is one of the most well-known metabolic disorder, globally. It is associated with many ocular complications. Firstly, diabetic retinopathy affects the retinal vessels and it is divided into two main groups one is non-proliferative diabetic retinopathy and the other one is proliferative diabetic retinopathy. Patients with diabetic mellitus have more chances to damage of all layers of the cornea.⁴ Measurement of CCT has been studied for many decades. Most studies tend to focus on adult and elderly subjects. Research on pediatric and adult population has been relatively sparse with studies either measuring CCT from toddlers or from small number of children.⁵

The measurement of central corneal thickness is very important in ophthalmology.^{6,7} It is proved that the ocular optics works on the base of refractive parameter of eyeball structure which changes with the age. Continuous flattening of anterior chamber, ocular crystalline lens thickening and CCT is the best example of ocular structural changes with increasing age.^{8,9} Tear film is important for cornea.¹⁰ There are some instruments to measure central corneal thickness these include corneal topography, ultrasound and OCT. Pachymetry is the most commonly used method to assess central corneal thickness.¹¹ It's a very sensitive technique and an expert is required for performing because it requires direct contact with cornea.¹² Central corneal thickness can also be measured by contact and noncontact method. Pachymetry is one of the important techniques for measuring CCT.¹³ Ultrasound Pachymetry is a contact method of measuring central corneal thickness. It is mostly used method for measuring central corneal thickness. Scanning slit topography, slit lamp optical coherence tomography and specular microscopy is non-contact methods for measuring central corneal thickness. CCT is also a consideration when collagen cross-linking treatment is performed for progressive

Keratoconus. It is reliable in measurement of central corneal thickness and is consider a time domain instrument.¹⁴

Assessment of central corneal thickness and corneal endothelial morphology is done by using ultrasound Pachymetry. Proper corneal thickness measurements are also useful in refractive surgery because CCT is an important parameter pre and postoperatively.¹⁵ The measurement of CCT is also vital in the diagnosis and management of certain corneal diseases such as Keratoconus and pellucid marginal degeneration as the CCT is a direct correlate of the physiological condition of the corneal endothelium.¹⁶ Cornea provides two third of refractive power of eye while rest is provided by crystalline lens. Corneal optical quality is thus responsible for clear vision of the eye. Radius of central corneal anterior surface is 7.8 mm.¹⁷ The patients with thicker CCT have raised intra ocular pressure that can cause glaucoma and loss of vision.¹⁸ Measurement of CCT has become mandatory especially in patients who develop Keratoconus after refractive surgery. The two techniques are used for corneal measurements one is ultrasound Pachymetry and the other one is ultrasound bio microscopy they are considered as the gold standard. They are used for mapping corneal thickness and volume.¹⁹

The current study was done to determine the relationship of central corneal thickness with age measured with ultrasound Pachymetry, so we can get expected quality result.

MATERIALS AND METHODS

This cross-sectional correlation study included 70 healthy subjects of both genders. The participants of this study were divided into 7 groups, each contain 10 individuals. Data was collected through self-designed proforma. Descriptive statistic test and Pearson correlation was applied. For data analysis SPSS 21.00 was used.

RESULTS

Table 1 show moderate negative relation of age and CCT (-0.621).Table 2 show the mean age and CCT of subjects. The mean age and CCT were 36.46 ± 19.48 year and 539.50 ± 37.973 μm, respectively.

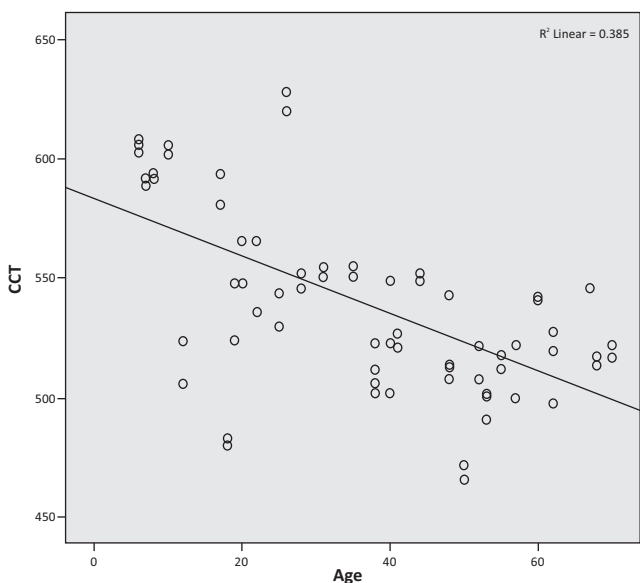
Table - 1:

| Descriptive Statistics | | | | | | |
|------------------------|-----------|-----------|-----------|-----------|------------|----------------|
| | N | Minimum | Maximum | Mean | | Std. Deviation |
| | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic |
| Age | 70 | 6 | 70 | 36.46 | 2.329 | 19.486 |
| CCT | 70 | 466 | 628 | 539.50 | 4.539 | 37.973 |

Table - 2:

| Correlations | |
|--|---------|
| | CCT |
| Age | -.621** |
| **. Correlation is significant at the 0.01 level (2-tailed). | |

Figure -1:



DISCUSSION

Ultrasound Pachymetry remains the gold standard for measuring corneal thickness; however, several non-contact methods are being used for this purpose by many clinicians. In our study, the results

show moderate negative relation of age and CCT (-0.621). Moreover, the mean age and CCT of subjects were 36.46 ± 19.48 year and 539.50±37.973 μm, respectively. Another study found significant difference between non-contact and ultrasound technique with the bias of 8.67 ± 20.83 μm (p=0.046) (95% confidence interval: -49.5 to 32.2). The mean CCT was 521.63 ± 31.943 μm and 530.29 ± 37.806 μm measured with non-contact and ultrasound technique, respectively.

A study was done to evaluate a noncontact bio meter and to compare measurements of central corneal thickness with those obtained from the pachymeter (ultrasound). The results revealed that the mean central corneal thickness was 0.557 mm ±0.36 (correlation coefficient: 0.978) for these techniques. The mean central thickness with noncontact technique was 594 ±36.4 microns and 545±38.2 microns respectively with statistically significant difference of -3.600 microns.

Both studies relate because there is no significant difference between central corneal thicknesses. Both studies have same range of central corneal thickness. Central corneal thickness decreases with age mentioned in both studies.

CONCLUSION

It is concluded that age has moderate negative correlation with CCT. The CCT decreases with age. The CCT decreases with age. The sample size of this study was small; study with larger sample size may have different result.

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