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Research Article

**A PROSPECTIVE COMPARATIVE STUDY TO KNOW
CENTRAL CORNEAL THICKNESS RELATION WITH
INTRAOCULAR PRESSURE AND ITS EFFECTS ON IOP**¹Dr. Muhammad Ehtisham Yousaf, ²Dr. Dawood Zafar, ³Dr. Tabinda Noreen¹Punjab Medical College Faisalabad²Shalamar Medical College³Gangaram Hospital Lahore**Abstract:**

Purpose: To investigate the association between the central corneal thickness (IOP) and intraocular pressure (IOP) to make recommendations for future research and clinical application.

Study Design: Aprospective comparative study.

Place and Duration: In the Ophthalmology Department, Unit II of Lahore General Hospital for 6 months' duration from March 2017 to August 2017.

Methods: In five hundred eyes of 250 adults who come to the ophthalmology ward for six months were selected. All patients were subjected to a comprehensive evaluation after consent was taken including history and medical and eye evaluation. Ultrasonic pachymeter was used for CCT and for Intraocular pressure (IOP) Goldmann Applanation Tonometer was used.

Findings: 530 ± 34.06 was the average CCT in males with range 438-619 μm and 525.1 ± 32.93 (443-623 μm) in women. 12.80 ± 3.05 was the average IOP with range 8-20 mmHg in males and 12.98 ± 2.39 (8-20 mmHg) in females. For normal subjects, there was a strong relation between IOP and CCT ($r = 0.14$, $p = 0.023$ Pearson's correlation coefficient). However, there was no significant statistical association between age and CCT ($p = 0.101$).

Conclusion: CCT is an important indicator of IOP. Thin corneas lead to overestimation of the intraocular pressure, a disdain and thick cornea. In our study, the Pakistani population has relatively thin corneas compared to African, Americans and Caucasian. However, there is a need to work further with a sample size large enough to verify and validate the original values.

Key Words: Central corneal thickness, Intra Ocular Pressure, Pakistani population.

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INTRODUCTION:

10 to 20 mmHg of intraocular pressure is the normal range. For measuring intraocular pressure, the gold standard tool is Goldmann applanation tonometry. It works for the ideal, thin-walled sphere and dry, according to the IMBERT Fick principle, the pressure inside surface is equal to the straightening force required to level the area. A pachymetry is a tool that uses ultrasound to detect corneal thickness at any given area. 490-560 is the normal CCT. Central corneal thickness the clinical use measures have become so valuable that it affects directly the glaucoma treatment master plan in 15% of patients. Several studies of the world have been conducted to examine the importance of the CCT and glaucoma measuring glaucoma treatment. We want to do a same study to know the relation between intraocular pressure and CCT in Pakistani population.

MATERIALS AND METHODS:

This was a prospective comparative study involving 501 eyes of 251 adults who participated in the outpatient department for a period of 6 months was held in the Ophthalmology Department, Unit II of Lahore General Hospital for 6 months duration from March 2017 to August 2017. We use an example of unwanted comfort. Since the sample is a descriptive study, the sample size is not calculated. The inclusion criteria ranged from 40 to 60 regardless of sex. patients with systemic disease or systemic or topical medication are excluded in patients with previous ocular pathologies, contact lenses, intraocular surgery history, laser or trauma, 3 diopters with a history of use of larger corneal astigmatism. All patients after

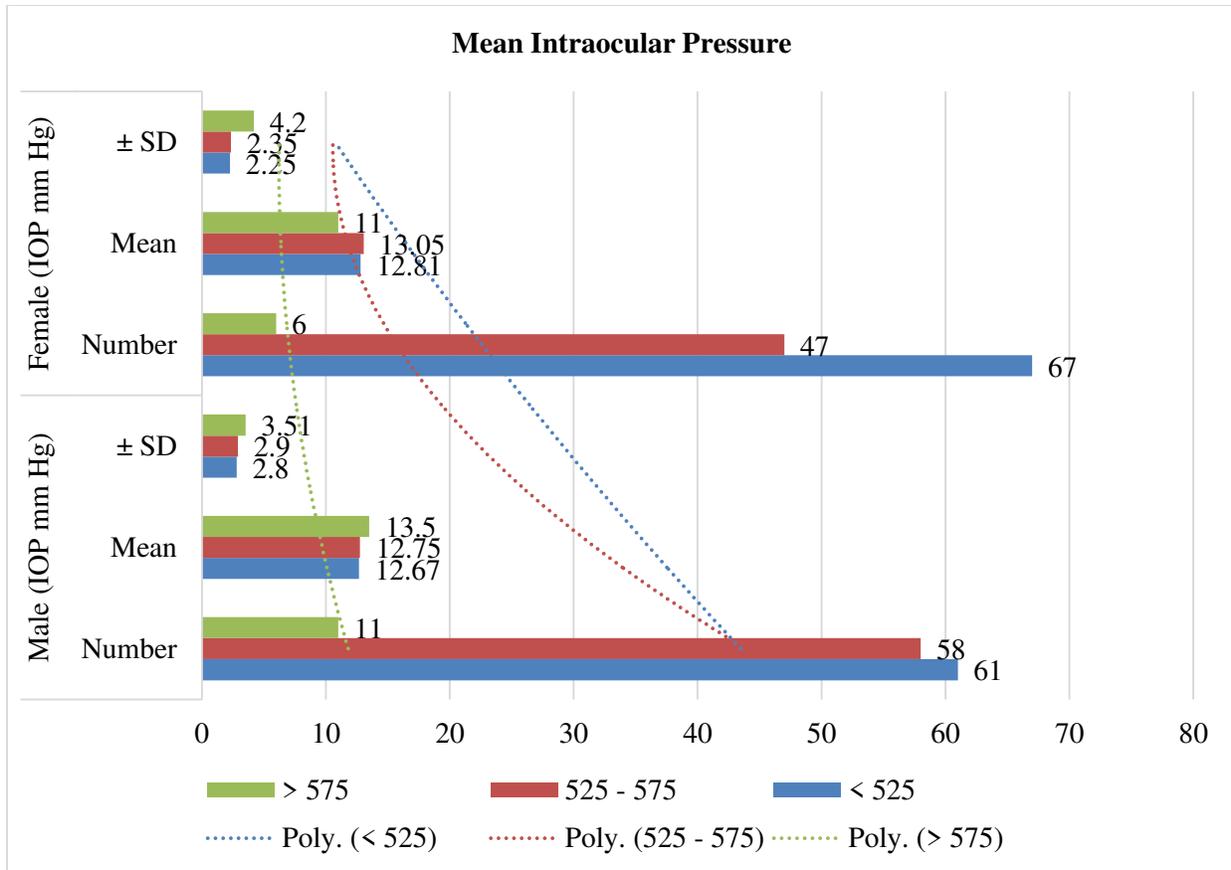
given informed consent were made up of a comprehensive ophthalmologic evaluation of fracture defects, glaucoma, topical steroids, contact lens use, refractive surgical history, or laser history. an examination of the anterior segment to exclude pathologies followed by a slit lamp, visual acuity, corneal diseases, infections have been obtained. After topical use eye anaesthesia with 0.5% proparaine and strips, using 2% fluorescein, Goldmann applanation tonometry is measured intraocular pressure in both eyes. We examined all the patients at 9:00. and it's 12:00. We recorded 3 readings consecutively and noted the average. With an ultrasonic pachymeter, CCT was recorded (Pac Scan 300p digital biometric rule). At the everyday beginning calibration of Ultrasonic pachymetry was done according to the instructions manual. After considering corneal anaesthesia with topical 0.5% proparaine and patient's position in the primary gaze position, the pachymetry probe was placed in the centre of the cornea. Each eye 5 measurements were recorded and the mean was used for the analysis. Into MS Excel, the data was entered and using SPSS v. 10.0 data was analyzed and cleaned.

RESULTS:

130 patients (53%) were male and 121 (49%) were female. Eighty-three of the patients (33.2%) belonged to the 40 – 44 age group. In males, the average CCT was 530 ± 34.06 (438-619 μm) and 525.1 ± 32.93 (443-623 μm) in women. In males, the average intraocular pressure was 12.84 ± 3.05 (range 9-20 mmHg) and 13.0 ± 2.40 (range 9-20 mmHg) in males.

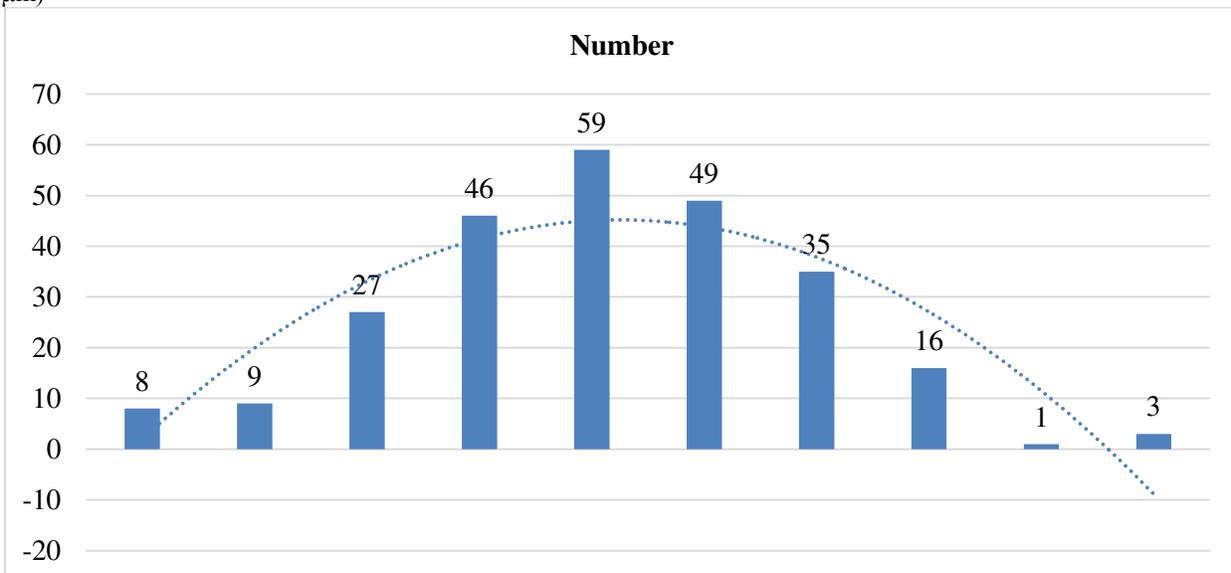
Table: For both genders Mean Intraocular Pressure according to the corneal thickness (250)

CCT (μm)	Male (IOP mm Hg)			Female (IOP mm Hg)		
	Number	Mean	\pm SD	Number	Mean	\pm SD
< 525	61	12.67	2.8	67	12.81	2.25
525 - 575	58	12.75	2.9	47	13.05	2.35
> 575	11	13.5	3.51	6	11	4.2



There was a strong relation between normal intraocular pressure and central corneal thickness ($r = 0.14, p = 0.023$ Pearson correlation coefficient).

Figure: Central Corneal Thickness Distribution is given in figure (Mean \pm SD range 527 ± 3.5 , Range $438 - 623 \mu\text{m}$)



There was no obvious statistically relation between age and central corneal thickness. ($p = 0.104$).

DISCUSSION:

It is an important factor that has an important effect on the diagnosis and follow-up of patients with intraocular pressure, ocular hypertension and glaucoma. For this reason, it is important to know the validity of information about central corneal thickness and intraocular pressure measurements. To our knowledge, to determine the impact of the CCT on IOP in Pakistani people this is the 2nd hospital(LRBT) doing work on it. Dueker and colleagues suggest that ultrasonically measured pachymetry CCT is a authentic measure of advancement from ocular hypertension to glaucoma. There was mixed evidence of CCT for glaucoma presence, so the measurement of CCT as a measurement tool for glaucoma screening seems unimportant. The corneal thickness is a risk factor for glaucoma progression as described by the Ocular Hypertension Treatment Study (OHTS). According to Kass's opinion, OHTS showed that median IOP falls were preserved and maintained during a mean follow-up of 72 months⁷. In a section of the OHTS, Brandt and his colleagues decided to determine whether the CCK was involved in the race. In 1301 patients CCT was recorded with increased intraocular pressure. All models use the same brand and model ultrasonic pachymeters. Mean CaP was 573 μm in Caucasians and 555.7 μm in American-African subjects. Surveys have shown that American-African subjects have more thin corneas than white subjects. coronary glaucoma, increased glaucoma, increased glaucoma, blacks were suspected or controlled (n = 56), and Caucasian populations (n = 51) were statistically significant (n = 56) and Caucasian (PIO) optic nerve damage. It has been suggested that African-Americans have discovered that thin corneas can cause fine flattening, intraocular pressure measurements, and disregard of the true level of intraocular pressure. The first study to assess the results of this study of ocular hypertension study treatment, corneal thickness, was glaucoma as a risk factor for corneal swelling. Ophthalmologic evaluation of glaucoma suspicion at the American Academy of Ophthalmology preferred practice samples assessed the measurement of the corneal thickness of suspected glaucoma. In our study, 250 patients had 500 eyes. The CCT mean was 530 ± 34.06 in males and 525.1 ± 32.93 in females. In contrast, in the previous studies, the mean white CCS was 573 microns and African-Americans 555,7 μm . Table – II shows the normal Gaussian curve for CCT distribution in our patients. Most patients display an average of 525 microns SCC, which is smaller than other ethnic groups. Our work has the following limitations. For this reason, the findings are

unpredictable for the general population of Pakistan. Third, our hospital is a charity hospital and disadvantaged community groups of our patients, i.e. our findings, etc. may be distorted by factors such as occupation, socioeconomic status, exposure to sunlight

CONCLUSION:

As a result, thin corneas causes increase in intraocular pressure. CCT is an important indicator of IOP. The Pakistani people has relatively thin corneas when differentiate to African, Caucasians and Americans. However, more research work is needed to confirm this finding and with a size of sample large enough to be of value in the treatment of glaucoma.

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