Original article:

Corneal densitometry using Pentacam based scheimpflug imaging system: Indian rural population

Dr Nikhil Mahajan* , Prof. Swati Tomar**

**Professor,*Resident

Department of Ophthalmology, NIMS Medical College and Hospital, NIMS University, Jaipur, India

Corresponding author**

Abstract:

Introduction: New Pentacam® / Pentacam® HR software allows customizable and standardized evaluation of corneal densitometry. The main purpose of this study was to measure CSD using Visante™ OCT and its effect on the sSCL selection. The second purpose was to assess the effect of the fitting characteristics of sSCL on the cornea, and how VA is impacted by the choice of fit.

Methodology: 50 random normal participants recruited for assessment (100 eyes) . Left and right eyes considered separately Assessment using corneal densitometry analysis add-on to standard software of Oculus Pentacam Densitometry measurements obtained and expressed in standardized grayscale units(GSU)

Results: For local densitometry analysis, 12-mm diameter area subdivided into four concentric radial zones.

Conclusion: Add-on to standard imaging software allows rapid and objective assessment of corneal densitometry

Introduction:

Detailed evaluation of cataract density is essential in surgery planning in order to improve visual outcomes and to avoid possible intraoperative and postoperative complications. The Lens Opacities Classification System III (LOCS III) is a subjective evaluation method based on slit-lamp examination.1 Although this is a cost-effective grading system, interobserver and intraobserver variations influence the reproducibility of the evaluations. The main purpose of this study was to measure CSD using Visante™ OCT and its effect on the sSCL selection. The second purpose was to assess the effect of the fitting characteristics of sSCL on the cornea, and how VA is impacted by the choice of fit.

Materials & methods:

50 random normal participants recruited for assessment (100 eyes) . Left and right eyes considered separately Assessment using corneal densitometry analysis add-on to standard software of Oculus Pentacam Densitometry measurements obtained and expressed in standardized grayscale units(GSU)

Inclusion Criteria:

All patients of both sexes of age group, ≥5 years

Exclusion criteria

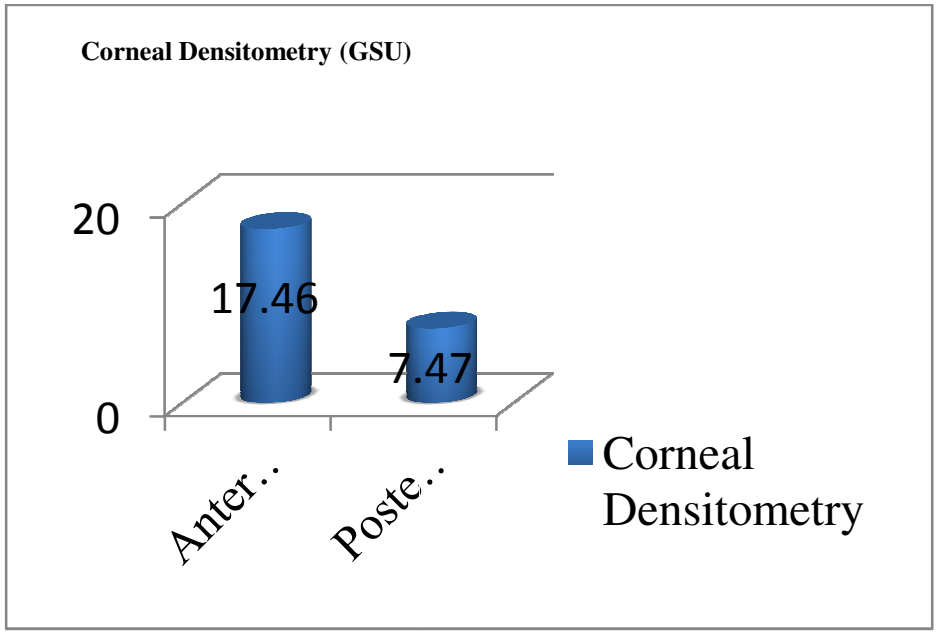
- Patients who have undergone any intraocular surgery and/or corneal surgery

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

- Patients diagnosed with corneal scarring pathology such as infections, dystrophies, trauma, and ectatic conditions like keratoconus
- Contact lens wearers
- Pregnant females
- Systemic conditions

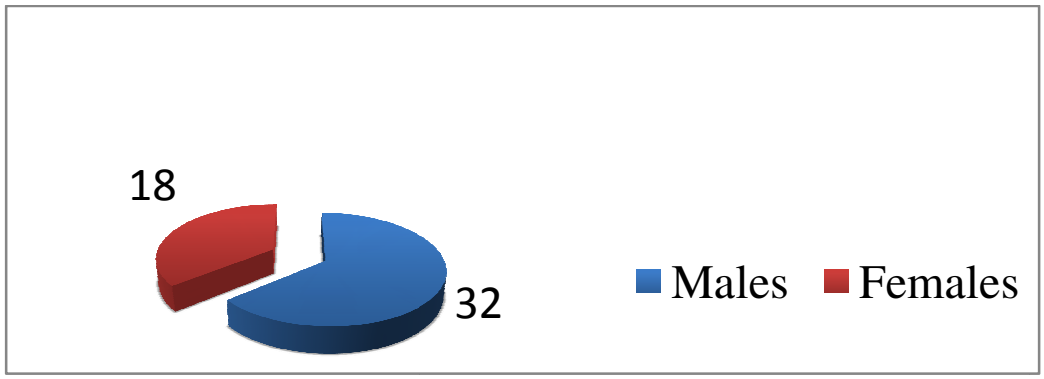
Diabetes mellitus, multiple sclerosis, uncontrolled hypertension

Results:



Mean Age = 26.32 years

Range = 5 -70 years



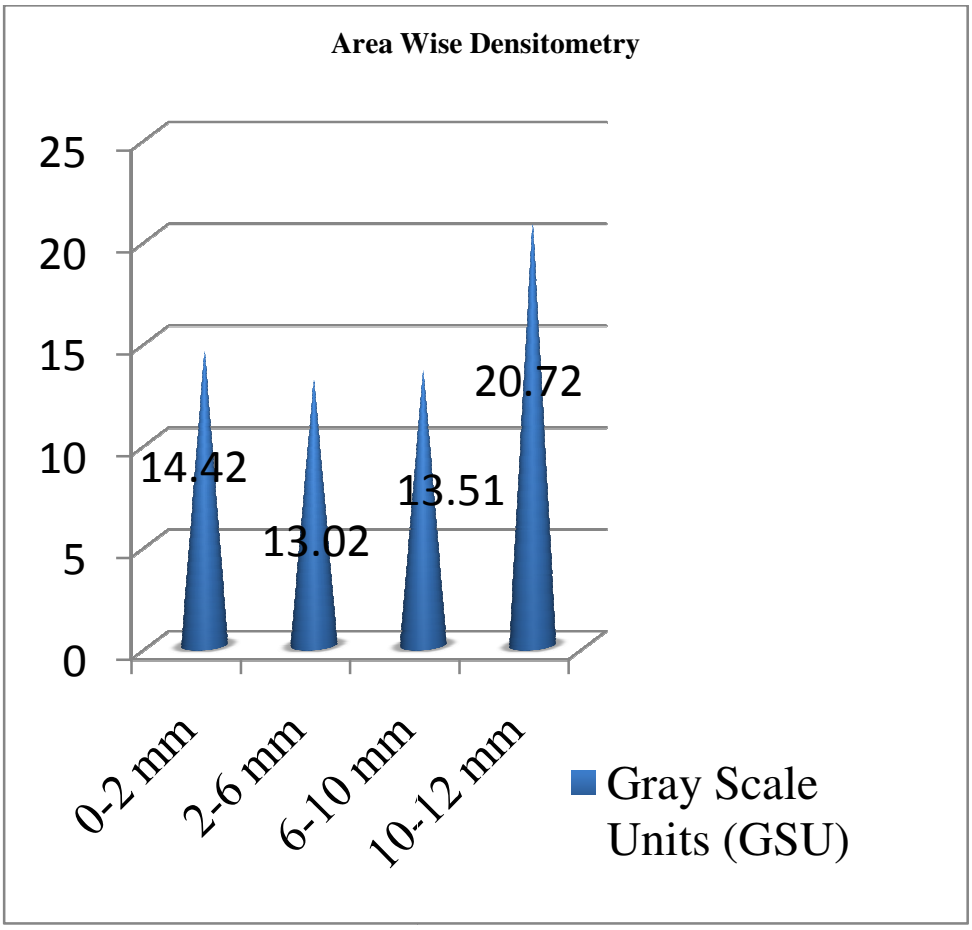
Output expressed in grayscale units (GSU)

GSU scale calibrated by proprietary software, which defines

- minimum light scatter of 0 (maximum transparency)

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

- maximum light scatter of 100 (minimum transparency)



For local densitometry analysis, 12-mm diameter area subdivided into four concentric radial zones

- First, central zone 2mm diameter and centered on apex
- Second zone extending from 2mm to 6mm diameter circle
- Third zone annulus extends from 6mm to 10mm diameter circle
- Final zone extending 10mm to 12mm diameter circle

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

	OUR STUDY	BELGIUM STUDY
Total Densitometry	14.54 ± 3.11	19.64 ± 3.82
Total Anterior Densitometry	17.46 ± 4.27	25.79 ± 5.08
Total Posterior Densitometry	7.47 ± 2.22	21.91 ± 5.65
Total Densitometry (0-2 mm)	14.42 ± 2.57	16.73 ± 1.85
Total Densitometry (2-6 mm)	13.02 ± 2.21	15.72 ± 1.91
Total Densitometry (6-10 mm)	13.51 ± 5.02	21.10 ± 6.75
Total Densitometry (10-12 mm)	20.72 ± 6.05	27.70 ± 7.49

Discussion:

Advances in diagnostic capabilities have been critical to the evolution of refractive surgery, which emerged as a new subspecialty in the early 1980s.[1] Improving imaging methods of the cornea and the anterior segment is related to the continuous need to increase the safety and effectiveness of surgical procedures.[2] Linked to a better selection of candidates for refractive surgery, the development of diagnostic technologies dramatically favored surgical planning capabilities, including personalization of laser ablation treatment and the evaluation of results and complications of these procedures.[3]This knowledge also had an impact on the selection of the type and power of the intraocular lens to be implanted in the cataract surgery.[4] In addition, the treatment of complex cases such as keratoconus, corneal dystrophies and other causes of irregular astigmatism also has developed due to advances in the imaging of the cornea and anterior segment. One of the most important applications of corneal computed tomography relates to the diagnosis of keratoconus and other ectasia diseases of the cornea

Conclusion

- Add-on to standard imaging software allows rapid and objective assessment of corneal densitometry
- Values for corneal densitometry measurements
- Standardized platform for further studies and greater use of this analysis in clinical practice and disease conditions
- Significant increase in corneal densitometry with age, was confined to peripheral cornea
- However, need to include larger cohort necessary as more finer details and conclusions can be inferred through large data.

References:

1. Chylack LT, Jr, Wolfe JK, Singer DM, et al. The Lens Opacities Classification System III. The Longitudinal Study of Cataract Study Group. Arch Ophthalmol. 1993;111:831–836.

2. Karbassi M, Khu PM, Singer DM, Chylack LT., Jr Evaluation of lens opacities classification system III applied at the slitlamp. Optom Vis Sci. 1993;70:923–928.

3. Chylack LT, Jr, Wolfe JK, Friend J, et al. Validation of methods for the assessment of cataract progression in the Roche European-American Anticataract Trial (REACT) Ophthalmic Epidemiol. 1995;2:59–75.

4. Kirkwood BJ, Hendicott PL, Read SA, Pesudovs K. Repeatability and validity of lens densitometry measured with Scheimpflug imaging. J Cataract Refract Surg. 2009;35:1210–1215.