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Clinical Correlation between Placido, Scheimpflug and LED Color Reflection Topographies in Imaging of a Scarred Cornea

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PURPOSE

To assess whether a novel multicolor LED point-source corneal topographer (Cassini) can accurately image a cornea with significant scarring from chronic HSV keratitis, compared with three established modalities:Placido-disk topography, Scheimpflug tomography, Anterior-segment OCT.

CASE OVERVIEW

A 17-year-old female with chronic herpes simplex stromal keratitis of the left eye presented with substantial corneal irregularity and stromal opacity. The right eye was normal. Visual acuity in the affected eye was 20/40 uncorrected and 20/32 best corrected. The purpose of imaging was to characterize corneal distortion after months of clinical stability.

RESULTS

- Placido Topography: Failed to register usable data. Significant mire distortion over the scarred cornea resulted in severely inaccurate curvature maps.
- Scheimpflug Tomography: Successfully imaged the anterior surface but inaccurately captured the posterior surface due to stromal opacity. Resulting pachymetry was erratic and underestimated (thinnest point 380 µm vs 480 µm)
- AS-OCT: Accurately visualized the stromal scar, corneal thinning, and epithelial remodeling. Provided more reliable pachymetry and epithelial thickness values than Scheimpflug.
- Cassini LED Color Reflection Topography: Successfully imaged the highly irregular anterior corneal surface despite central opacity. Demonstrated impressive agreement with Scheimpflug anterior elevation and curvature, but without the artifacts seen on Scheimpflug. The LED-based point-source ray-tracing system appeared less biased by surface irregularity and media opacity compared with Placido and Scheimpflug.

CONCLUSION

This case highlights that LED color reflection topography (Cassini) can provide accurate anterior corneal imaging in circumstances where Placido fails and Scheimpflug yields incomplete or distorted posterior-surface data. The technology appears to maintain higher central specificity and robustness to opacity, supporting broader clinical application in irregular corneas.