

Corneal confocal microscopy is efficient, well-tolerated, and reproducible

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Summary

Purpose

To evaluate the efficiency of corneal confocal microscopy (CCM) using the Rostock Cornea Module of the Heidelberg Retina Tomograph 3 (HRT 3) as a fast and well-tolerated screening tool in diabetic neuropathy. Development of a protocol for assessing corneal innervation by determining the nerve fiber length (NFL) or tortuosity coefficient (TC). Identifying and defining the required number of images in different positions on the cornea to reach best reliability.

Methods

Eleven healthy subjects were examined on both eyes with the Rostock Cornea Module of the HRT 3. On the left eye a grid of fixation targets was used to obtain images of five standardized locations of the cornea, while the right eye was examined centrally only. To evaluate the nerve fiber layer the best single image of each location was taken. The quantification of the corneal innervation was done by a blinded technician and with the analytical software CCMetrics. The relationship between the image location and the NFL and TC was determined. To evaluate the reproducibility of the examination the procedure was repeated after 1-4 weeks.

Discussion

The analysis of NFL showed that maximal reproducibility can be reached with images from four or more locations, or one central image from each eye. For the assessment of TC it is recommended to average the data of five images from a single eye to yield maximal reproducibility.

There was no variation of the nerve fiber length and the tortuosity coefficient as well as their reproducibility across the regions in the sampled central corneas. The procedure was rapid and well-tolerated. The results of the study emphasize the benefit of corneal confocal microscopy with the Rostock Cornea Module of the HRT 3 in neuropathy diagnostics.

Conclusion

- The Rostock Cornea Module of the HRT 3 is a rapid and reproducible method for the assessment of corneal innervation.
- “The convenience and ease of image acquisition and participant tolerance suggest CCM could be used as a neuropathy screening tool, particularly in diabetic patients, for whom yearly retinopathy screening is current standard of care.”

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