Abstract

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Evaluation of Corneal confocal microscopy images in patients with type 1 diabetes and diabetic polyneuropathy: a stereological reappraisal

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Introduction: Corneal confocal microscopy (CCM) is a non-invasive clinical method to analyse and quantify corneal nerve fibres in vivo and thereby small fibre neuropathy (SFN), e.g. diabetic polyneuropathy. The CCM-technique is in constant progress, but there are methodological limitations in terms of sampling of images and objectivity of the nerve quantification. We have previously developed and described a new randomized sampling method in an adjusted area dependent image analysis of the CCM-images assessing these limitations. Compared to the most common, but subjective used sampling method, this new method found a reduction in nerve fibre length density. This diversity indicates the importance of clear guidelines for the image sampling and the importance of improving the analysis of the CCM images. The gold standard of assessing SFN is the skin punch biopsy. The aim of this study was to test the new sampling method and adjusted volume calculation, on already published data on CCM and skin biopsy from diabetic polyneuropathy patients and healthy controls.

Methods: All ccm-images from 26 control subjects and 63 patients with type 1 diabetes from an already published article were included. The images were randomly selected using the new method and corneal nerve fibre length density (CNFL), corneal nerve fibre branch density (CNBD) and corneal nerve fibre density (CNFD) were determined in both a manual and automatic manner. The CCM measures between the two methods were compared and correlational analysis between the CCM measures and skin biopsies was performed.

Results: The study is still ongoing, but preliminary data suggest a reduction in CNFL, CNBD and CNFD using the new sampling method compared with the common used method. Results on skin biopsy are not yet analyzed. The final results will be presented at the meeting.

Conclusion: The preliminary results suggest that using more objective sampling and area-adjusted analysis of CCM images results in lower measures and therefore an overestimation when using the common sampling method.