Association of retinal layer thinning with intrathecal inflammation in early Multiple Sclerosis

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OBJECTIVES/AIMS

To explore the connection between cerebrospinal fluid (CSF) inflammatory markers present at diagnosis and subsequent retinal layer thinning.

MATERIALS

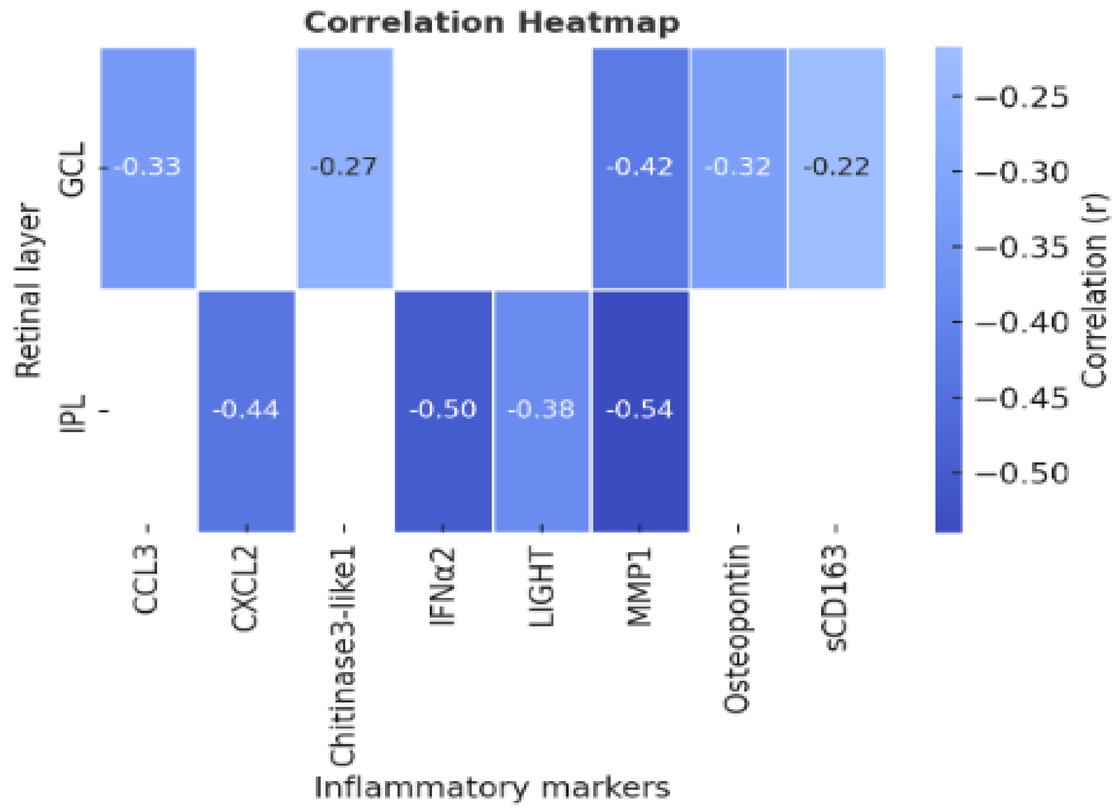
Forty-eight patients from a single referral centre (the University of Verona) affected by RRMS, who did not have a clinical episode of optic neuritis or other ocular pathologies were included in the study.
Spectralis SD-OCT (Heidelberg Engineering, Heidelberg, Germany, dilated pupils, eye tracking) was employed. We use a macular volume scan (25°×30°, 61 B-scans, 768 A-scans per B-scan, 12≤ART≤15) to quantify the retinal volume. Data on average pRNFL, superior sector, temporal sector, inferior sector, nasal sector (um), GCL and IPL (mm3) were collected.
For analysis, the OCT values of the right eye were included.We measured CSF levels of 68 inflammatory molecules.

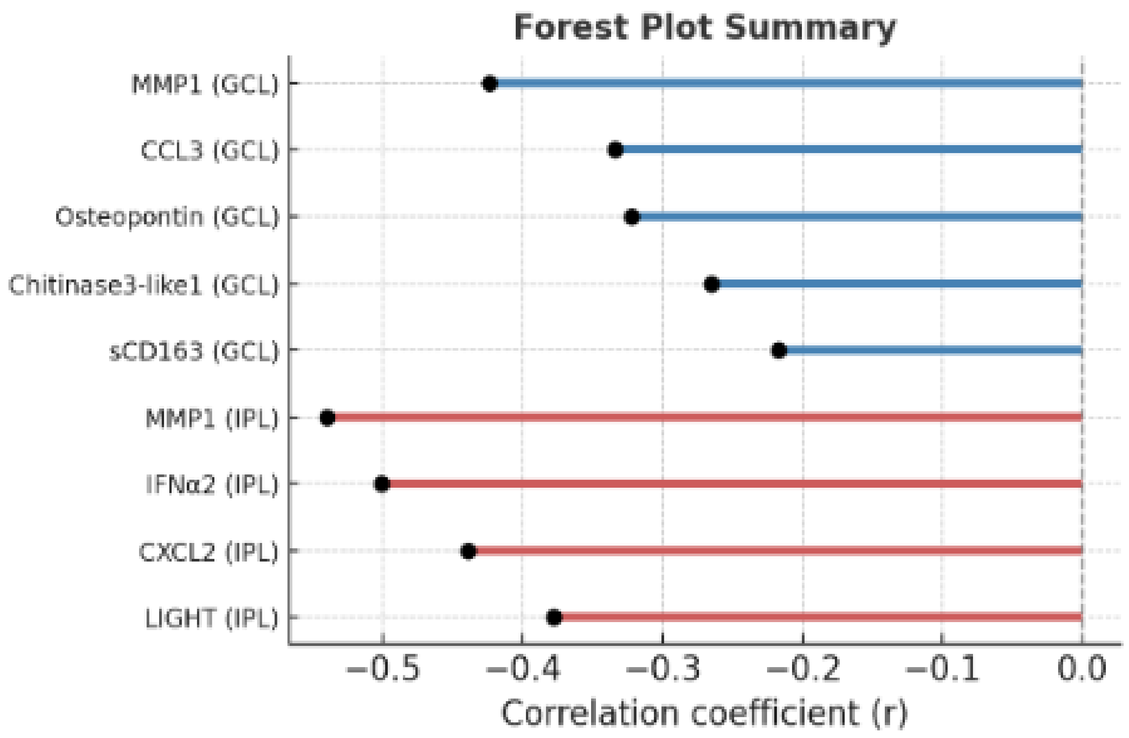
METHODS

For measurement of the peripapillary retinal nerve fibre layer thickness (RNFL), we used a ring scan around the optic nerve head (12°, 1536 A-scans, 16≤ Automatic Real-Time (ART) averaging ≤100) using the device-internal segmentation module 6.0.14.0. Macular retinal volume was segmented to obtain data on single layers, in particular ganglion cell layer (GCL) and inner plexiform layer (IPL) volume were obtained. Inflammatory molecules were evaluated with multiplex technology at the time of diagnosis.

RESULTS

Of the 48 patients enrolled, 35 (73%) were female. The median EDSS was 3 (range 0-4), and the mean age was 37.5 ± 14 years. A lower GCL was significantly associated with higher levels of inflammatory markers, including MMP1 (r = -0.424, p = 0.035), Osteopontin (r = -0.322, p = 0.048), and CCL3 (r = -0.334, p = 0.040). Furthermore, a trend towards a negative correlation was observed with several markers of smoldering disease activity, such as sCD163 (r = -0.217) and Chitinase3-like1 (r = -0.265). Similarly, a lower IPL was associated with increased values of MMP1 (r = -0.540, p = 0.005), IFN\alpha2 (r = -0.501, p = 0.041), and CXCL2 (r = -0.439, p = 0.036), and slightly associated with LIGHT levels (r = -0.378).





DISCUSSION

This study investigated the relationship between retinal structural integrity (assessed by OCT) and intrathecal inflammatory markers in a cohort of early-stage Relapsing-Remitting Multiple Sclerosis (RRMS) patients. Our results suggest that OCT parameters, performed at diagnosis, could serve as reliable early biomarkers of intrathecal inflammatory processes in RRMS.

CONCLUSIONS

Diagnostic OCT may help as a reliable marker for intrathecal inflammation occurring in early multiple sclerosis.

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DISCLOSURES

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