Longitudinal OCT assessment of retinal changes in RRMS patients treated with Ofatumumab

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INTRODUCTION AND OBJECTIVES

The retina offers a unique and accessible window into neurodegenerative and inflammatory processes in Multiple Sclerosis (MS). Optical Coherence Tomography (OCT) enables high-resolution imaging of retinal layers, providing structural biomarkers that correlate with clinical and radiological disease activity. Ofatumumab, a fully human anti-CD20 monoclonal antibody, has demonstrated strong efficacy in reducing relapse rates and MRI lesion activity in patients with relapsing-remitting MS (PwRRMS). This study aimed to **evaluate longitudinal changes in inner retinal layer thickness and volume** in PwRRMS starting treatment with ofatumumab, in parallel with **clinical and MRI markers of disease activity**.

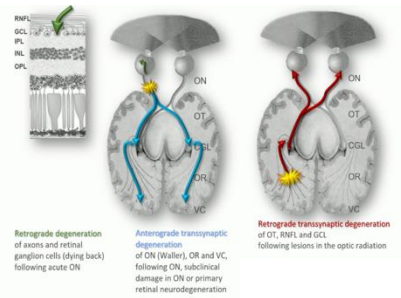

Figure 1. A model of the relation between retinal volumes and thicknesses and MS pathology.

MATERIAL AND METHODS

We conducted a prospective, longitudinal study including 55 PwRRMS patients initiating ofatumumab, 15 of whom were treatment-naïve. Retinal OCT imaging was performed at baseline and at 6, 12, and 18 months (T0- 51%, T1-100%, T2-75%, T3-40%), with acquisition protocols including peripapillary ring scans and macular volume scans (25 vertical B-scans). Data were analyzed in accordance with OSCAR-IB and APOSTEL 2.0 standards to ensure quality and consistency.

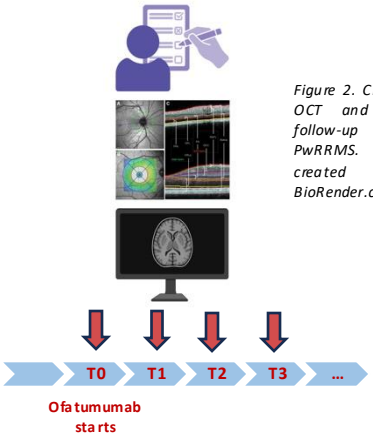

Figure 2. Clinical, OCT and MRI follow-up of PwRRMS. Image created with BioRender.com

RESULTS

Between baseline and 6 months (T0–T1), a significant decrease in peripapillary retinal nerve fiber layer (pRNFL) thickness was observed (−0.55 µm, p = 0.018; Cohen's d = −0.325). A concurrent and significant reduction in inner nuclear layer (INL) thickness was also noted (−0.01 µm, p = 0.019; d = −0.429). INL thinning persisted between 6 and 12 months (T1–T2: −0.01 µm, p < 0.001; d = −0.534). Overall, pRNFL thinning from baseline to 12 months (T0–T2) was also significant (−1 µm, p = 0.003). No meaningful changes in retinal layers were detected between 12 and 18 months (T2–T3). Throughout follow-up, no clinical relapses or new MRI lesions were reported, and EDSS scores remained stable.

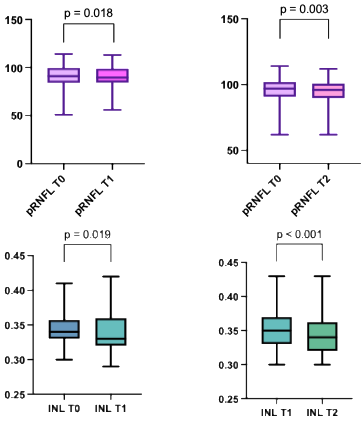

Figure 3. Significant reduction in pRNFL thickness between T0 and T1 and between T0 and T2. A significant decrease was also found in INL total volume between T0 and T1 and between T1 and T2.

CONCLUSIONS

Early reduction in pRNFL and especially INL thickness, often associated with retinal inflammation, after initiating ofatumumab, suggest OCT may serve as a rapid, non-invasive tool to monitor immunological response and disease activity in PwRRMS.

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