

High resolution imaging of retinal microcirculation in patients with multiple sclerosis

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Preamble: multiple sclerosis (MS) patients' brain and retina have decreased blood flow, possibly due to chronic vascular insufficiency or by an adjustment to the reduction of the local metabolic demand. Blood flow depends strongly on microcirculation resistance and therefore of venules and arterioles inner diameter.

Objective: To analyze morphometric remodeling of retinal small vessels by a direct observation.

Methods: Prospective analysis of patients and controls aged 18 to 50 years without cardiovascular risk factors. Adaptive optics imaging (Rtx1[®], Orsay, France), a validated technology, has been used for morphometric measures of retinal vessels. Differences between measurements were compared using the paired t-test. All patients and controls signed informed consent (clinical trial: NCT03508089).

Results: Between September and December 2017, 19 patients with MS and 25 control subjects were included in the study. No statistical difference was noted between controls and patients with MS (mean \pm SD) for internal arteriolar diameter ($96.22 \mu\text{m} \pm 18.38$ vs. $100.6 \mu\text{m} \pm 10.54$; $p = 0.367$), arteriolar wall thickness ($26.2 \mu\text{m} \pm 4.6$ vs. $28.2 \mu\text{m} \pm 3.0$; $p = 0.131$), wall / lumen ratio (0.28 ± 0.04 vs. 0.28 ± 0.02 ; $p = 0.784$) and internal venule diameter ($131.2 \mu\text{m} \pm 24.45$ vs. $131.7 \mu\text{m} \pm 15.52$; $p = 0.948$).

Conclusions: In this pilot study, we did not detect any changes in the arteriole and venule diameter of the retinal vessels between MS patients and controls. These data do not support the presence of a pathological microvascular process in MS patients which could alter the local blood flow. More in-depth studies are needed, however, to confirm these preliminary data.