

Analysis of retinal layers using SS-OCT registries for diagnosing multiple sclerosis

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Introduction: The objective of this work is to investigate the diagnostic capacity of multiple sclerosis (MS) in early stages of the disease from the analysis of the thickness of several layers of the retina, obtained with swept-source optical coherence tomography (SS-OCT).

Methods: The OCT registers from the right eye of 18 MS patients (M:F =2:16; 49,11±12,52 years) with no history of optic neuritis and 31 controls (M:F=8:23; 58,87± 10,14 years) are analyzed. The registers were obtained using a Deep Range Imaging-OCT Triton (Topcon Corporation, Tokyo, Japan), with the wide protocol which covers an area between macula and optic nerve using a 45x60 cube-grid. Thickness measurements of the retinal nerve fiber layer (RNFL) (between the inner limiting membrane (ILM) to the ganglion cell layer boundaries), ganglion cell layer GCL+ (between RNFL to the inner nuclear layer boundaries), GCL++ (between ILM to the inner nuclear layer boundaries), and retinal thickness (from the ILM to the retinal pigment epithelium boundaries) are analyzed. AUC (area under the ROC curve) values are obtained in square 5x5 regions, which are used to identify the region with the most discriminating power.

Results: the following values constitute the best discriminating capacities (highest AUC) for each layer: $AUC_{RNFL}=0.76$, $AUC_{RETINA}=0.82$, $AUC_{GCL+}=0.88$ and $AUC_{GCL++}=0.87$. Each layers' thickness are shown in table 1.

Table 1. Values in the highest AUC zone.

| Layer | Thickness (μm): Control subjects | Thickness(μm): MS patients |
|--------|--|--|
| RNFL | 80,48 ± 31,62 | 61,11 ± 11,77 |
| Retina | 288,18 ± 13,90 | 272,45 ± 9,93 |
| GCL+ | 76,07 ± 6,74 | 63,23 ± 9,70 |
| GCL++ | 97,60 ± 8,24 | 83,52 ± 9,29 |

Conclusion:

This study determines that the most differentiated zone is the GCL+ layer, followed closely by the GCL++ layer. In all layers there was a significant thickness difference between controls and patients recorded.