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MORPHOLOGICAL STRUCTURE OF LAMINA CRIBROSA AND PERIPAPILLARY MICROVASCULATURE FOR GLAUCOMA DIAGNOSIS, USING DEEP-RANGE IMAGING**Rita Silva¹, Pedro Camacho¹, Diogo Cabral¹, Pedro Rodrigues¹, Manuel Marques¹, Catarina Dias¹, Joana Valadares¹, João Segurado¹, José Fernandes¹**¹*Instituto de Oftalmologia Dr Gama Pinto, Lisboa - Portugal*

Purpose: To compare the diagnostic power of lamina cribrosa depth (LCD), lamina cribrosa curve depth (LCCD) and lamina cribrosa curvature index (LCCI) with vessel density and fractal analysis in primary open-angle glaucoma (POAG) and pseudoexfoliation glaucoma (PXG).

Methods: In this cross-sectional observational study, one eye of each of 22 controlled glaucomatous patients (11 POAG and 11 PXG) and 33 healthy subjects (15 of them with nonglaucomatous pseudoexfoliation syndrome (PXS)), were enrolled. All patients underwent complete ophthalmic examination. We obtained B-scan images from swept-source optical coherence tomography (OCT) to measure LCD, LCCD and LCCI, at three locations, and OCT angiography images (protocol 4.5x4.5mm) to assess peripapillary microvasculature in superficial vascular plexus and deep-layers, in a 0.7mm circle beyond the optic disc (Topcon DRI OCT; Triton).

Results: Comparing mean values between the four groups (healthy vs PXS vs POAG vs PXG), there were no significant differences in terms of age (68.9 ± 10.5 ; $p = 0.43$), axial length (23.2 ± 1.3 ; $p = 0.78$), intraocular pressure (14.5 ± 3.2 ; $p = 0.42$) and central LCD (483.5 ± 122.5 ; $p = 0.65$). Though, we found different statistical significance in visual acuity ($p = 0.019$), RNFL ($p < 0.001$), MD ($p = 0.001$), PSD ($p = 0.023$) and optic disc excavation ($p = 0.028$) between the groups in study. We also found differences in central LCCD (125.5 ± 37.3 ; $p = 0.37$) and central LCCI (7.9 ± 2.4 ; $p = 0.35$) between healthy and PXG patients. OCT angiography criteria were also statistically different, regarding fractal dimension ($p = 0.001$ between healthy and PXG and $p = 0.003$ between PXS and PXG - in deep-layers), lacunarity ($p = 0.088$ between healthy and POAG and $p = 0.081$ healthy and PXG - in superficial layers; $p = 0.045$ between PXS and PXG - in deep-layers) and vessel density ($p = 0.036$ between healthy and POAG and $p = 0.045$ between healthy and PXG - in superficial layers).

Conclusions: Even now, there are plenty of challenges in finding improved high-sensitivity parameters that can assist and contribute to early glaucoma diagnosis. Morphological structural changes of the optic disc and decreased optic disc perfusion can be part of those parameters, but unfortunately still in an initial stage of development.