Optical Coherence Tomography Angiography in Punctate Inner Choroidopathy

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Background: Punctate inner choroidopathy (PIC) is a rare form of posterior uveitis of unknown etiology that is included in the group of „white dot syndromes“.[1] Predominantly young myopic women are affected. The patients complain about loss of visual acuity, photopsia, and scotomas.[2] The disease is characterized by the presence of multiple, small, round, well-defined, yellowish-white punctate lesions in the absence of signs of intraocular inflammation. The most common complication is development of choroidal neovascularisation (CNV) membrane that can lead to progressive vision loss.[3]

Aim: To characterize vascular changes on multimodal imaging techniques in eyes with PIC.

Methods: In this single-centre-study, 40 eyes of 20 subjects with PIC underwent imaging with spectral-domain spectral domain optical coherence tomography (OCT), fluorescein angiography, indocyanine green angiography, fundus autofluorescence, and optical coherence tomography angiography (OCT-A) [Figure 1,2].

Results: In total, 31 (78%) eyes were affected of which 8 (20%) eyes revealed isolated typical punctate lesions. CNV had been verified in 24 (60%) eyes. A recurrence of active CNV in 5 (21%) eyes and a residue of fluid in 3 (13%) eyes were detected, while 16 (67%) eyes were defined as stable course. On OCT-A, CNV was classified in “lacy wheel”, “pruned large-trunk”, and “dead tree aspect” vessel shapes with or without areas of nonperfusion.[4] “Lacy wheel” shapes were identified with intraretinal fluid, while “dead tree aspect” shapes did not show any intraretinal fluid (p=0.0256). The CNV types on OCT revealed a significant correlation with vessel shape (r=0.5187, p=0.0112), and as well with disease activity (r=0.523, p=0.0087) [Table 1].

Conclusion: OCT-A adds new insights in a multimodal imaging approach of microvascular imaging in PIC. This imaging technique can be an useful tool to characterize CNV and and thus the disease activity. We were able to correlate CNV types with vessel shape and disease activity.

[1]Levinson et al. Choroidal neovascularisation on optical coherence tomography angiography in punctate inner choroidopathy and multifocal choroiditis. Br J Ophthalmol. 2017;101(5):616-622.
[2]Watzke RC et al. Punctate inner choroidopathy. Am J Ophthalmol. 1984;98(5):572-84.
[3]Amer R et al. Spectral-domain optical coherence tomographic features of choroidal neovascular membranes in multifocal choroiditis and punctate inner choroidopathy.
[4]Graefes Arch Clin Exp Ophthalmol. 2015;253(6):949-57.
[4]Coscas GJ et al. Optical Coherence tomography angiography versus traditional multimodal imaging in assessing the activity of exsudative age-related macular degeneration: A new Diagnostic chanllange. Retina. 2015; 35(11):2219-28.

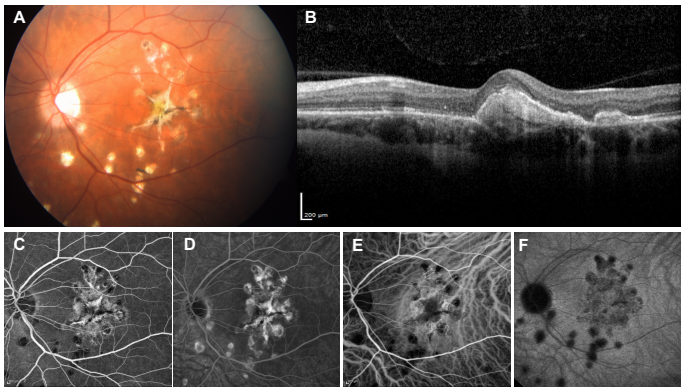

Figure 1. Images of fundus photograph, spectral domain optical coherence tomography (SD-OCT), fluorescein angiography (FA), and indocyanine green (ICGA) of a 34 years old, myopic woman. (A) Fundus picture reveals a yellow, greenish subfoveal choroidal neovascularization membrane. **(B)** SD-OCT showing hyperfluorescent material under retinal pigment epithelium (RPE). **(C)** The intermediate and **(D)** late phase of FA shows fluoresceine staining, whereas **(E)** the intermediate and **(F)** late phase of ICGA shows corresponding hypofluorescent areas.

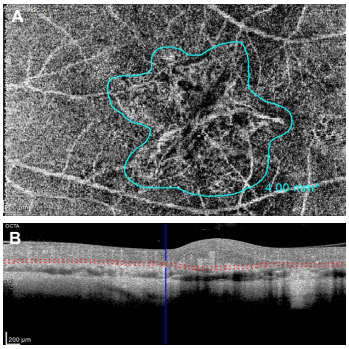

Figure 2. Image of optical coherence tomography angiography (OCT-A) (SPECTRALIS®, Heidelberg Engineering, Heidelberg, Germany) of a 34 years old, myopic woman. (A) OCT-A provides the information about the blood flow and shows an abnormality of capillary network in the outer retina. The presented choroidal neovascularisation membrane corresponding to the images in Figure 1 reveals a shape of “dead tree aspect with small and large vessels”. **(B)** OCT-A corresponding B-scan.

Table 4. Classification of Disease Activity

Clinical assessment N = Eyes (%)	OCT-A	SD-OCT	FA
Recurrence N = 5 (21)	Hypoperfusion with Lacy wheel shape 3 (60) Pruned large-trunk vessel 1 (20) One filamentous vessel 1(20)	Intraretinal fluid 4 (80) Hyperreflective material above RPE 5 (100)	Leakage 4 (80)*
Residue of Fluid N = 3 (13)	Hypoperfusion with Lacy wheel shape 2 (67) Pruned large-trunk vessel 1 (33)	Intraretinal fluid 2 (67) Hyperreflective material above RPE 3 (100)	Leakage 1 (33) Staining 2 (67)
Stable N = 16 (67)**	Dead tree aspect 9 (60) Pruned large-trunk vessel 2 (13) Lacy wheel shape 2 (13) Hypoperfusion, no vessels 2 (13)	Intraretinal fluid 2 (13) Hyperreflective material 1) above RPE 7 (44) 2) below RPE 5 (31) 3) 1) + 2) 4 (25)	Staining 16 (100)

FA=Fluorescence Angiography; OCT-A=Optical coherence tomography angiography; SD-OCT=Speactral domain OCT; *No FAG in one patient; ** No OCT-A in one eye;

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