



Swept Source Optical Coherence Tomography Angiography: Characteristic Findings in Type 3 Macular Neovascularization

Tomographie en Cohérence Optique Angiographie en Swept Source: Aspect Caractéristique de la Néovascularisation Maculaire de Type 3

Khaled El Matri, Yousra Falfoul, Ahmed Chebil, Rim Bouraoui, Asma Hassairi, Leila El Matri

Service B- Institut Hédi Rais d'ophtalmologie de Tunis, Université Tunis El Manar, Faculté de médecine de Tunis

RÉSUMÉ

Nous présentons une illustration typique d'un cas de néovascularisation maculaire de type 3 explorée par OCT-Angiographie en Swept Source (SS-OCT-A), chez un patient Caucasien âgé de 70 ans et qui présente une dégénérescence maculaire liée l'âge exsudative.

SS-OCT-A en face a pu détecter la lésion néovasculaire de manière non-invasive. Elle a montré la lésion sous forme d'une petite « touffe » à flux vasculaire élevé, visible au niveau du plexus capillaire profond et de la rétine externe, en continuité vers la choriocapillaire avec un halo sombre péri-lésionnel et associée à des logettes maculaires (sans flux) au niveau du plexus capillaire profond. SS-OCT-A en face a aussi permis de mettre en évidence une dilatation capillaire télangiectasique au niveau du plexus capillaire superficiel, à l'origine de la prolifération néovasculaire intra-rétinienne. La lésion était de très petite taille avec une superficie de 0.07 mm².

SS-OCT-A en coupe transversale a détecté un flux vasculaire linéaire et vertical intra-lésionnel important au sein de la lésion néovasculaire hyper-réfléctive, avec un « signe de l'entonnoir » (kissing sign) typique et associée à la présence de liquide sous-rétinien et intra-rétinien.

Mots-clés : OCT-Angiographie ; Néovascularisation maculaire de type 3 ; Imagerie rétinienne

SUMMARY

We report a typical illustration of Swept source OCT-Angiography (SS-OCT-A) findings in type 3 macular neovascularization (MNV) or retinal angiomatous proliferation (RAP). This is a case of a 70-year-old Caucasian male patient presenting with an exudative type 3 neovascular age-related macular degeneration.

En face SS-OCT-A could non-invasively detect a tiny perifoveal circular "clew-like" high-flow neovascular lesion, visible in the deep capillary plexus, the outer retina and communicating with the choriocapillaris, with a perilesional dark halo and associated to no-flow macular cysts in the deep capillary plexus slab. En face SS-OCT-A could also highlight the presence of a telangiectatic capillary dilation in the superficial capillary plexus appearing to be at the origin of the retinal neovascularization. Cross-sectional SS-OCT-A showed an intra-retinal vertical high vascular flow within the hyper-reflective neovascular lesion, with a typical hyperreflective "kissing sign" and associated to subretinal and intraretinal fluid.

In conclusion, en face OCT-A is useful tool to diagnose type 3 MNV or RAP non-invasively and associated cross-sectional OCT-A scan is very helpful highlighting the linear vascular high-flow within the retinal neovascularization.

Key words: OCT-Angiography; Type 3 macular neovascularization; Imaging retina

Correspondance

Khaled El Matri

Service B-Institut Hédi Rais d'ophtalmologie de Tunis / Université Tunis El Manar / Faculté de médecine de Tunis

khaled.elmatri@gmail.com

INTRODUCTION

Type 3 macular neovascularization (MNV), also called retinal angiomatous proliferation (RAP), is a subtype of neovascular age-related macular degeneration (AMD) that is characterized by retinal-retinal or retinal-choroidal anastomosis(1)infiltrate the neurosensory retina, and communicate with the retinal circulation in what has been referred to as a retinal-choroidal anastomosis (RCA).

Optical coherence tomography angiography (OCT-A) is a relatively new imaging technique allowing non-invasive high-resolution visualization of retinal and choroidal vasculature. It showed great interest detecting non-invasively choroidal neovascularization, including type 3 MNV (2,3)also known as retinal angiomatous proliferation, have been well described clinically, as well as with fluorescein angiography (FA).Our aim is to report a typical illustration of Swept source OCT-A (SS-OCT-A) findings of type 3 MNV in a patient with exudative neovascular AMD

CASE PRESENTATION

A 70-year-old Caucasian male patient presenting to ophthalmology emergency unit complaining about blurred vision and metamorphopsia in his left eye. Best-corrected visual acuity was 0.3 in his left eye.

En face SS-OCT-A (DRI OCT Triton, Topcon, Japan)could non-invasively detect a tiny perifoveal circular “clew-like” high-flow neovascular lesion, visible in the deep capillary plexus (DCP), the outer retina (OR) and communicating with the choriocapillaris (CC) with a perilesional dark halo and associated to no-flow macular cysts in the DCP. En face SS-OCT-A could also highlight the presence of a telangiectatic capillary dilation in the superficial capillary plexus (SCP) appearing to be at the origin of the retinal neovascularization. The lesion size was 0.07 mm². Cross-sectional SS-OCT-A showed a distinctive vertical intra-retinal high vascular flow within the hyper-reflective neovascular lesion, with a typical hyperreflective “kissing sign” and associated to subretinal and intraretinal fluid (Figure 1).

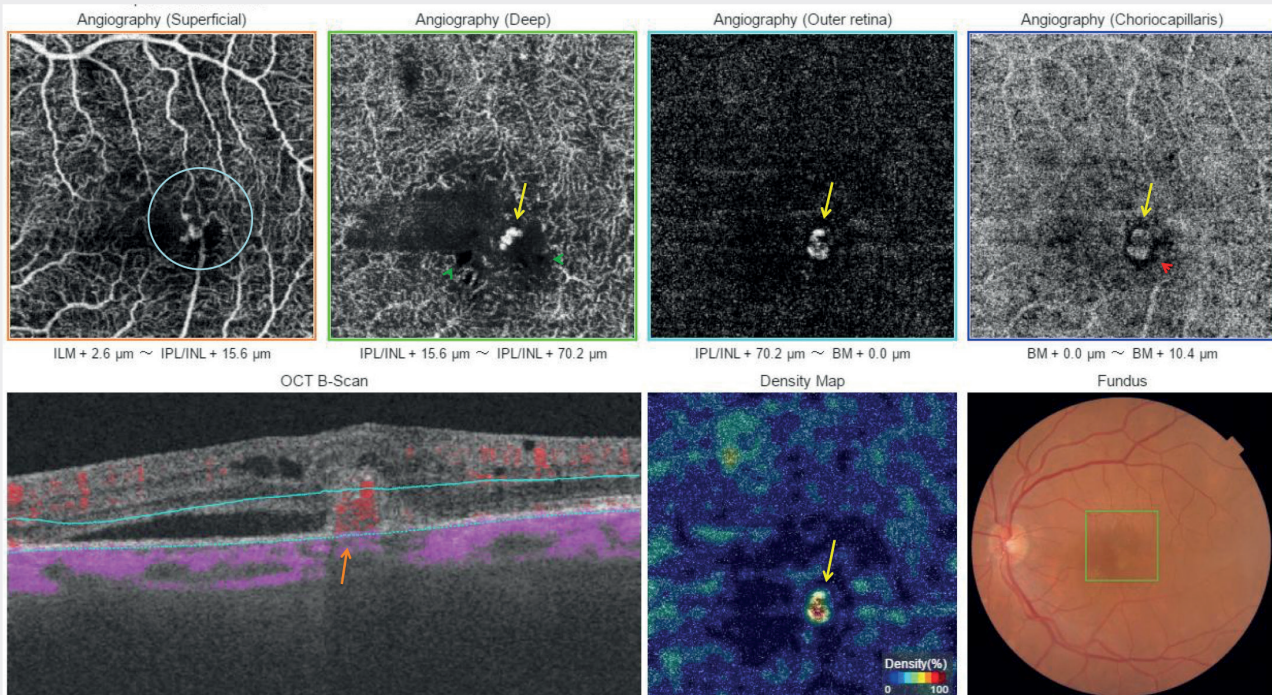


Figure 1: Swept Source OCT-A of type 3 macular neovascularization

En face OCT-A: Telangiectatic capillary dilation in superficial capillary plexus (blue circle). Small circular “clew-like” high-flow vascular lesion in deep capillary plexus, outer retina and choriocapillaris slabs (yellow arrows) + perilesional dark halo (red arrowhead). No-flow macular cysts in deep capillary plexus (green arrowheads).

Cross-sectional OCTA: “Kissing sign” with vertical high-flow within the hyper-reflective lesion (orange arrow). Subretinal and intraretinal fluid.

Patient was treated with 3 monthly intravitreal injections of anti-vascular endothelial growth factor (Bevacizumab) and then followed and treated on a "Treat & Extend" regimen.

DISCUSSION

We reported a case of exudative type 3 MNV secondary to AMD. SS-OCT-A could easily and non-invasively detect the tiny neovascular lesion with precise high definition images, without using the gold standard invasive fluorescein angiography and avoiding any risk of anaphylactia.

Dansingani et al. (2) also known as retinal angioma-tous proliferation, have been well described clinically, as well as with fluorescein angiography (FA first described in 2015 the interest of OCT-A detecting Type 3 MNV (RAP) in 2 patients with neovascular AMD.

Kuehlewein et al. (4) studied 29 eyes with active type 3 MNV using spectral domain OCT-A and found a 34% sensitivity detecting this neovascular lesion. However, Ahmed et al. (3) found a 81.8% sensitivity detecting type 3 MNV, using swept source OCT-A with a great interest for this particular technology.

Our case showed a typical illustration of OCT-A findings in type 3 MNV. En face SS-OCT-A could detect a high-glow vascular "clew-like" vascular lesion at the level of DCP and OR and communicating with the CC. Associated cross-sectional OCT-A scan showed a linear vertical flow within the hyper-reflective neovascular lesion and a typical hyperreflective "kissing sign" (5).

In Dansingani et al. study (2) also known as retinal angioma-tous proliferation, have been well described clinically, as well as with fluorescein angiography (FA, a careful and precise manual segmentation could highlight a complex of high-flow dilated capillaries in the DCP, not detectable on classical dye-using angiography, suggesting the potential origin of the neovascular lesion. Kuehlewein et al. (4) detected a connection between the DCP and small intraretinal neovascular complexes using OCT-A. Telangiectasia adjacent to type 3 MNV was recently described as one of the early features of RAP (6).

In our case, en face SS-OCT-A automated segmentation could also highlight the presence of a telangiectatic capillary dilation in the SCP appearing to be at the origin of the retinal neovascularization and the supporting the hypothesis of the retinal origin of a category of type 3 MNV.

In conclusion, en face OCT-A is useful tool to diagnose type 3 MNV or RAP non-invasively. In our cases, it could identify tiny intraretinal neovascular complex in a case RAP secondary to AMD. Cross-sectional OCT-A was very helpful, highlighting the linear vascular high-flow within the retinal neovascularization.

DISCLOSURE: This case was presented as a poster at "MACULART" meeting 2019 in Paris. Its abstract has been posted online on 2019.macular-art-meeting.com.

REFERENCES

1. Yannuzzi LA, Negrao S, Iida T, et al. Retinal angioma-tous proliferation in age-related macular degeneration. *Retina*. 2001; 21: 416-34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11642370>
2. Dansingani KK, Naysan J, Freund KB. En face oct angiography demonstrates flow in early type 3 neovascularization. *Eye*. 2015; 29: 703-6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25744441>
3. Ahmed D, Stattin M, Graf A, et al. Detection of treatment-naïve choroidal neovascularization in age-related macular degeneration by swept source optical coherence tomography angiography. *Retina*. 2018; 38: 2143-9. Available from: <http://insights.ovid.com/crossref?an=00006982-900000000-96785>
4. Kuehlewein L, Dansingani KK, De Carlo TE, et al. Optical coherence tomography angiography of type 3 neovascularization secondary to age-related macular degeneration. *Retina*. 2015; 35: 2229-35. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26502007>
5. Querques G, Atmani K, Berboucha E, et al. Angiographic analysis of retinal-choroidal anastomosis by confocal scanning laser ophthalmoscopy technology and corresponding (eye-tracked) spectral-domain optical coherence tomography. *Retina*. 2010; 30: 222-34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19952987>
6. Querques G, Souied EH, Freund KB. How has high-resolution multimodal imaging refined our understanding of the vasogenic process in type 3 neovascularization? *Retina*. 2015; 35: 603-13. Available from: <https://insights.ovid.com/crossref?an=00006982-201504000-00001>