MULTI MODAL IMAGING IN WET AMD
ACTIVITY DETECTION

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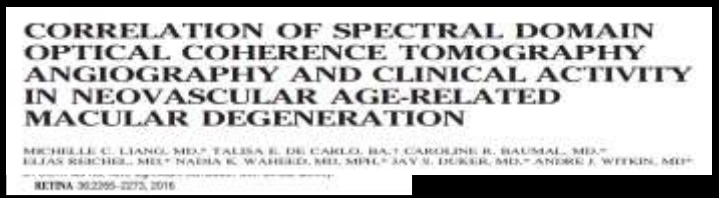
INTRODUCTION

- Choroidal neovascularization (CNV) is the hallmark of (wet) neovascular age –related macular degeneration (AMD). It Can be Classified into 3 types:

  - Type I (choroidal vasculature under RPE) **Occult**.
  - Type II (choroidal vasculature extend through the RPE in to the sub retinal space) **Classic.**
  - Type III (involves the neovascularization that starts in the retinal vasculature) **RAP.**



CORRELATION OF SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY AND CLINICAL ACTIVITY IN NEOVASCULAR AGE-RELATED MACULAR DEGENERATION

MICHELLE C. LIANG, MD,* TALISA E. DE CARLO, BA,† CAROLINE R. BAUMAL, MD,*
ELIAS REICHEL, MD,* NADIA K. WAHEED, MD, MPH,* JAY S. DUKER, MD,* ANDRE J. WITKIN, MD*

RETINA 36:2395–2273, 2016

HOW TO EVALUATE?

CLINICAL EVALUATION

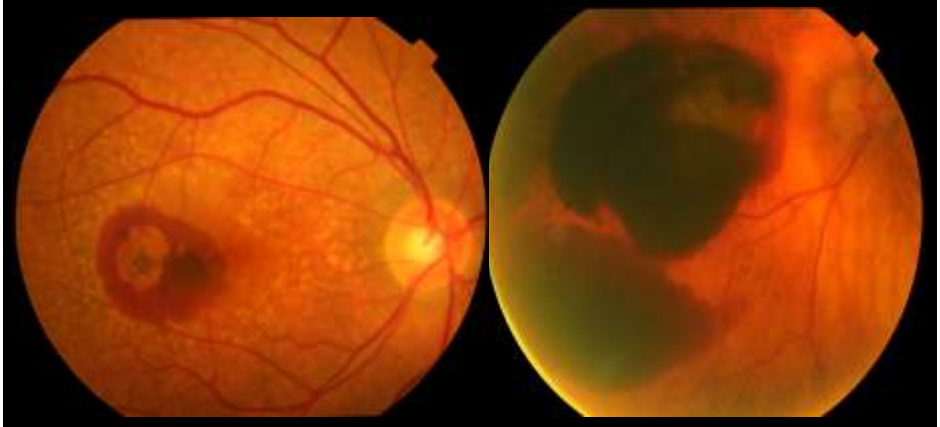
Examination.

Neo-vascular ARMD

CLINICAL EVALUATION

Examination.

Neo-vascular ARMD

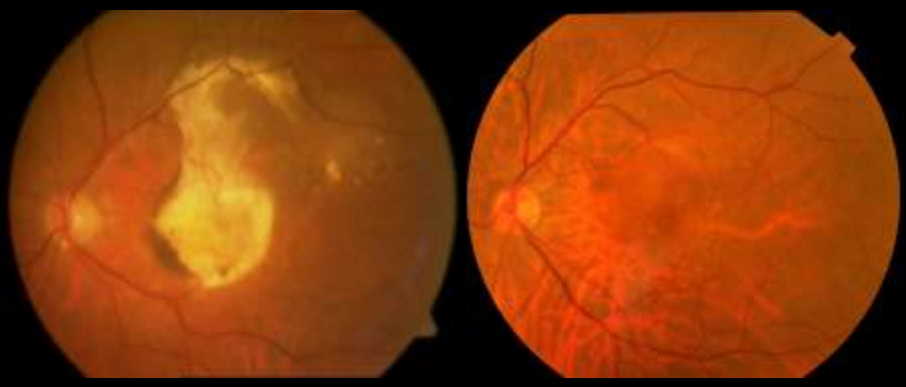


CLINICAL EVALUATION

- Examination.

Fibrosis

ACTIVE OCULT



MULTI MODAL IMAGING

MULTI MODAL IMAGING

- It is an integrated data analysis superimposed from different types of investigation &
- It is usually the clue in cases of uncertainty.


ARCHIVOS DE LA SOCIEDAD ESPAÑOLA DE OFTALMOLOGÍA

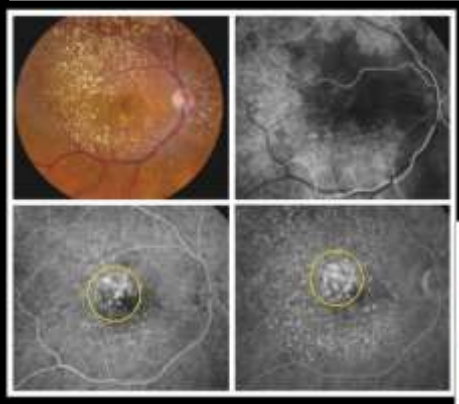
Oftalmología en Imágenes

Imagen multimodal en degeneración macular asociada a la edad neovascular

Multimodal imaging in neovascular Age-Related Macular Degeneration

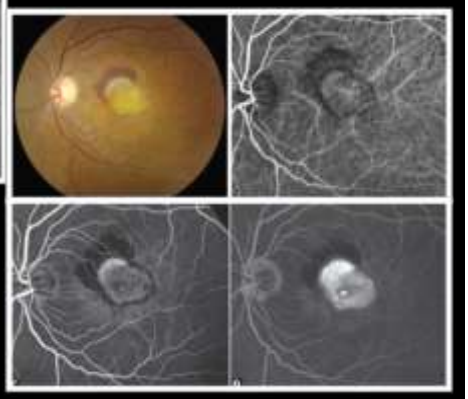
R. Gallego-Pinazo, M. Andreu-Fenoll, N. García-Marín y R. Dolz-Marco

FUNDUS FLUORESCEIN ANGIOGRAPHY (FFA)

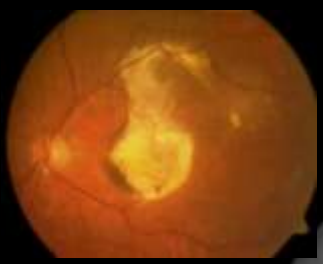


Type 1 CNV

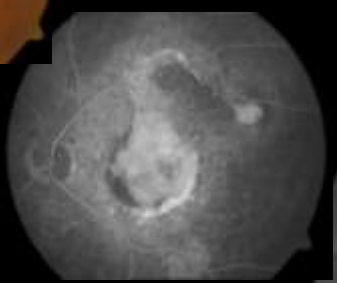
Type II CNV

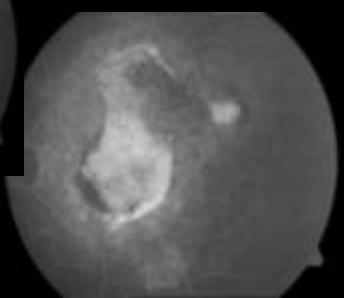


FUNDUS FLUORESCEIN ANGIOGRAPHY (FFA)

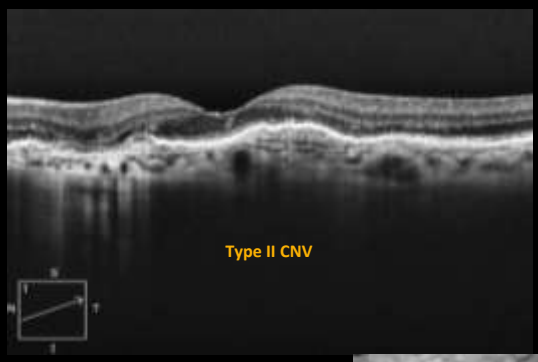


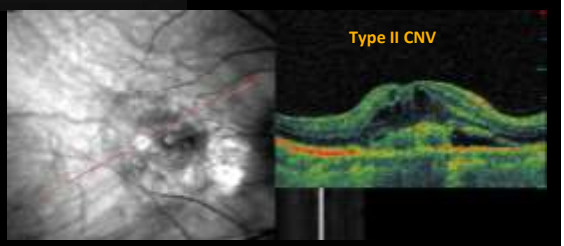
Staining





Optical coherence tomography(OCT)

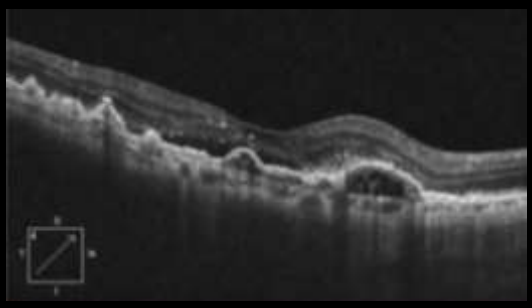




Optical coherence tomography(OCT)

Type 3 CNV

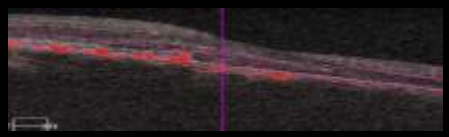
Optical coherence tomography(OCT)

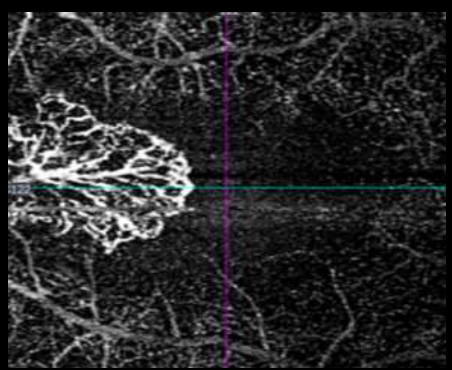


Type ?? 4 CNV

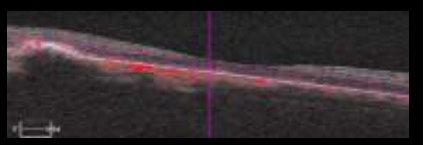
OCT ANGIOGRAPHY (OCTA)

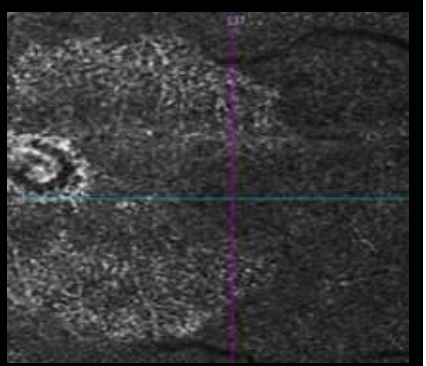
Active CNV



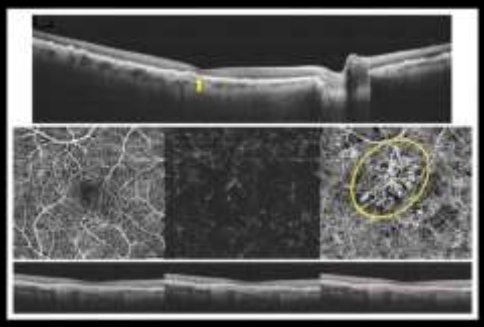


Inactive CNV



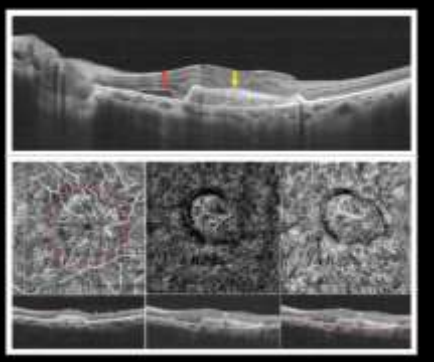


OCT ANGIOGRAPHY (OCTA)



Type I CNV

Type II CNV

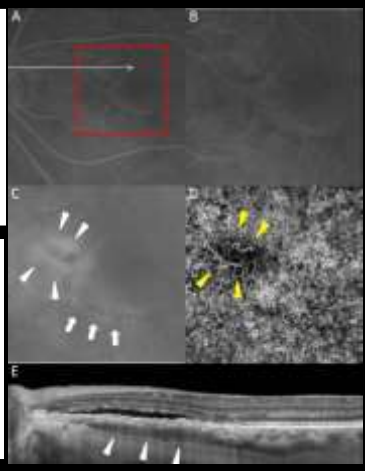


MULTI MODAL IMAGING

A Comparison Between Optical Coherence Tomography Angiography and Fluorescein Angiography for the Imaging of Type 1 Neovascularization

Maiko Inoue,[1–3] Jesse J. Jung,[1,2,4,5] Chandrakumar Balaratnasingam,[1,2] Kunal K. Dansingani,[1,2] Elona Dhrami-Gavazi,[1,2,4] Miloko Suzuki,[1,2] Talisa E. de Carlo,[6,7] Alvin Shahlaee,[8] Michael A. Khan,[9,10] Adil H. Mahfoudi,[11] Jay S. Duker,[6] Allen C. Ho,[8] Maddalena Quaranta-El Maftouhi,[11] David Sarraf,[9,10] and K. Bailey Freund[1,2,12]; for the COFT-1 Study Group

Results. A total of 105 eyes were diagnosed with type 1 NV using the reference. Of these, 90 (85.7%) could be detected using en face OCTA and structural OCT. The sensitivities of FA data alone and en face OCTA data alone for visualizing type 1 NV were the same (66.7%). Significant factors that precluded visualization of NV using en face OCTA included the height of pigment epithelial detachment, low signal strength, and treatment-naïve disease ($P < 0.05$, respectively).



MULTI MODAL IMAGING

Multimodal imaging

The use of optical coherence tomography angiography for detecting choroidal neovascularization, compared to standard multimodal imaging

Taha Soomro and James Talks

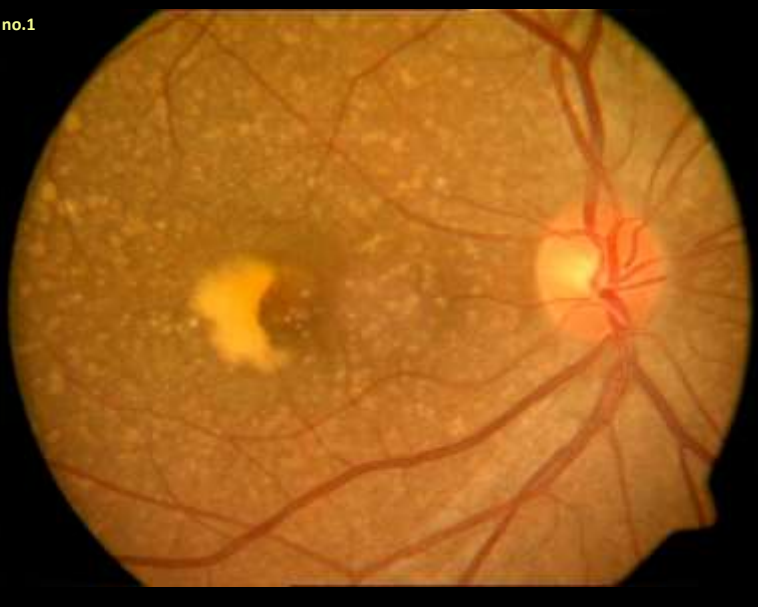
Eye (2018) 32, 661–672

www.nature.com/eye

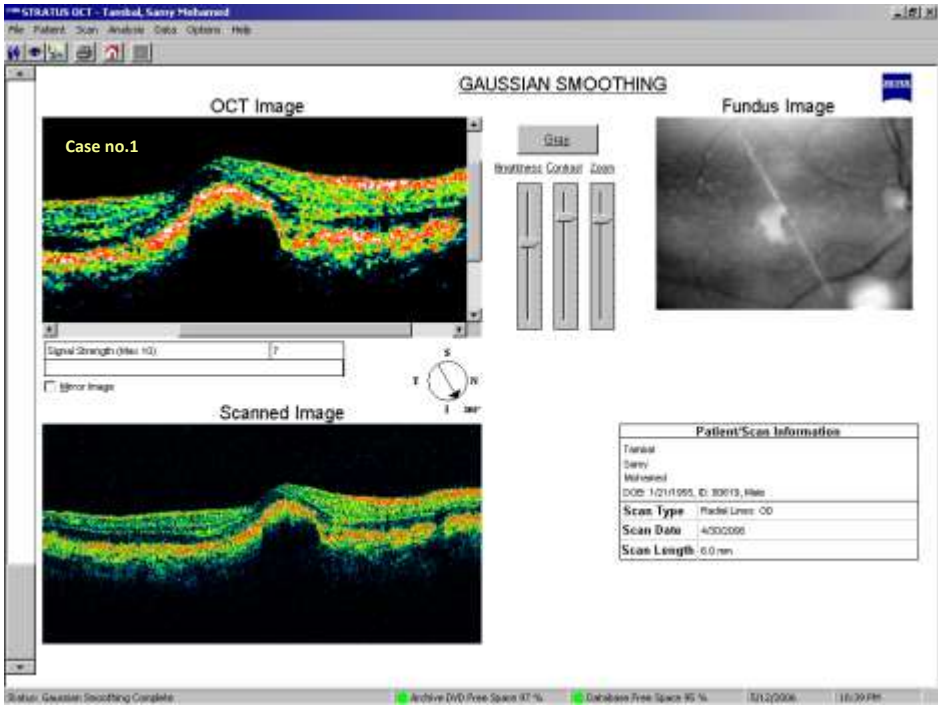
OCTA was better than FFA at defining a vascular network overall, when OCT was suspicious (59% *vs* 49%).

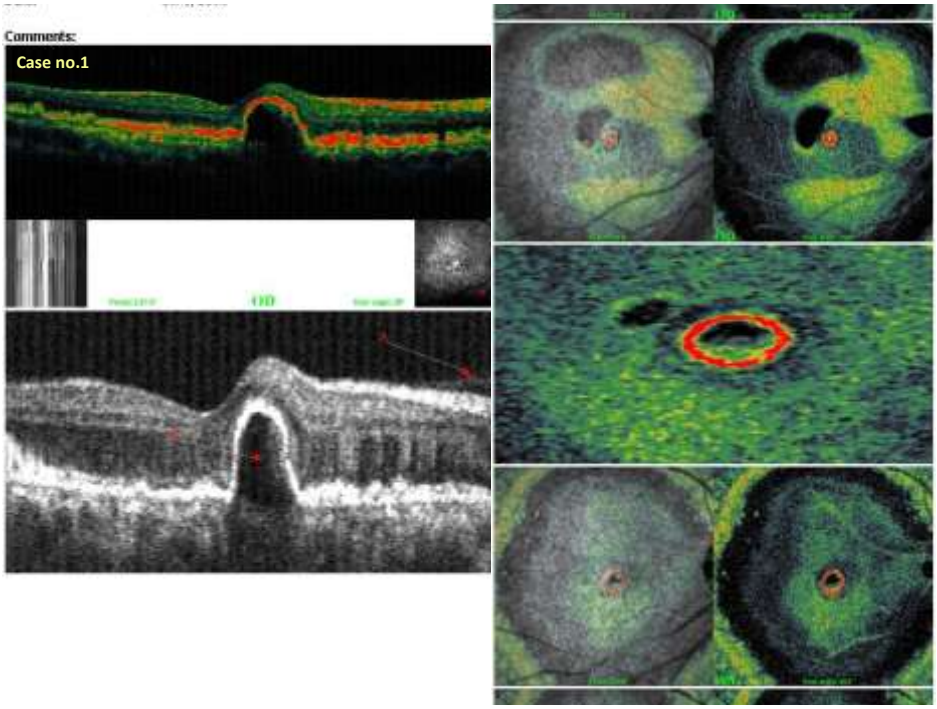
MULTI MODAL IMAGING: AN INTEGRATED ANALYSIS

Case no.1

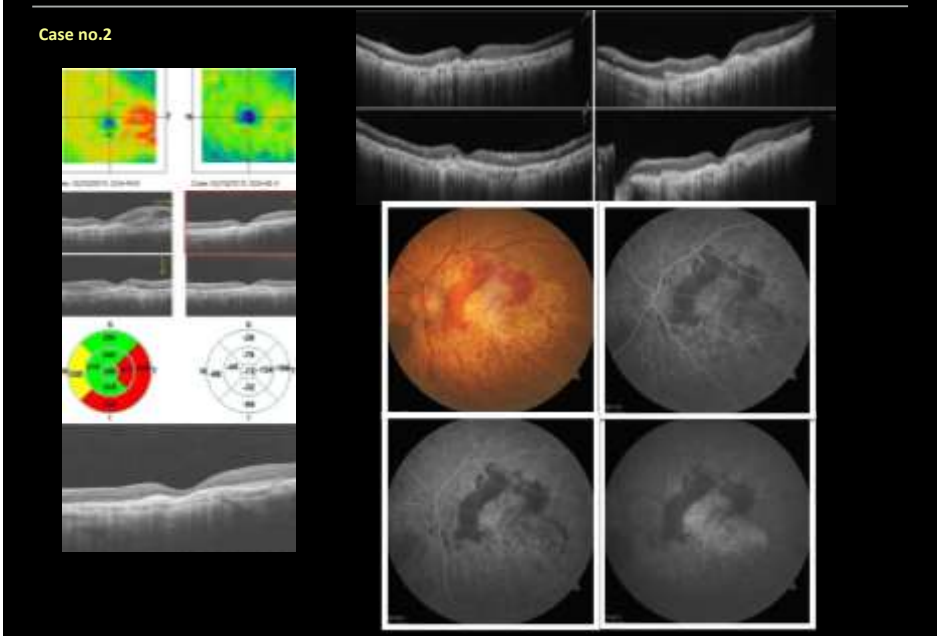



Case no.1


GAUSSIAN SMOOTHING
OCT Image
Case no.1
Fundus Image
Scanned Image
Patient/Scan Information
Scan Type
Scan Date
Scan Length

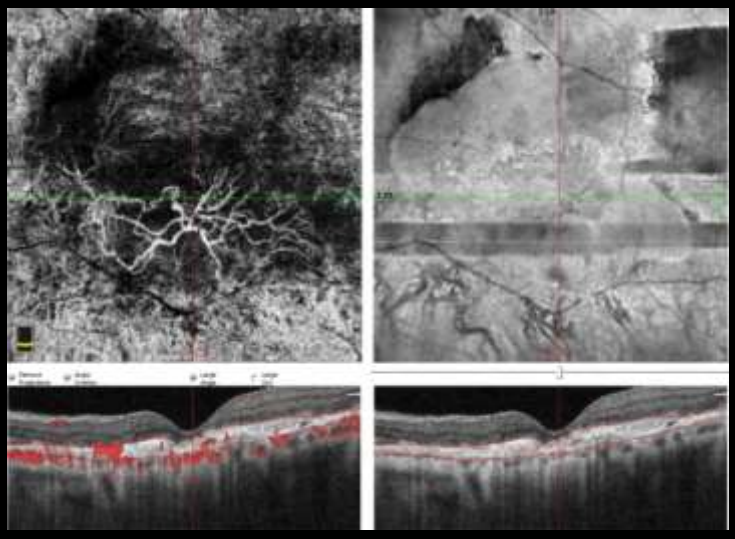


MULTI MODAL IMAGING: THE ROLE OF OCTA



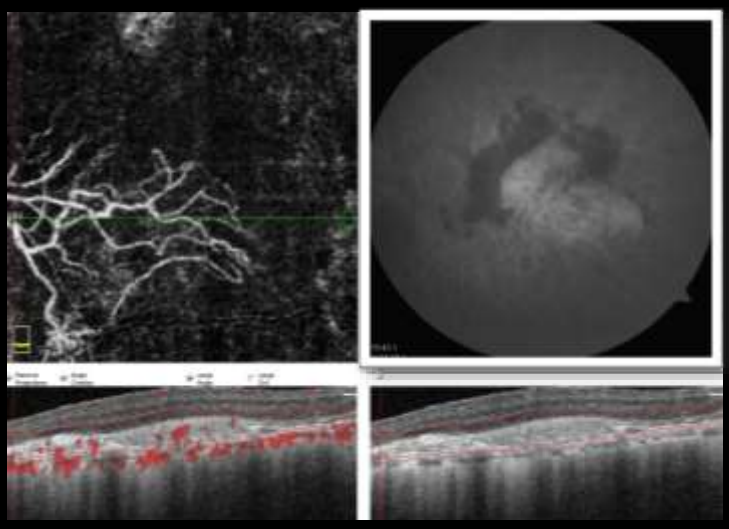
MULTI MODAL IMAGING: THE ROLE OF OCTA

Case no.2



MULTI MODAL IMAGING: THE ROLE OF OCTA

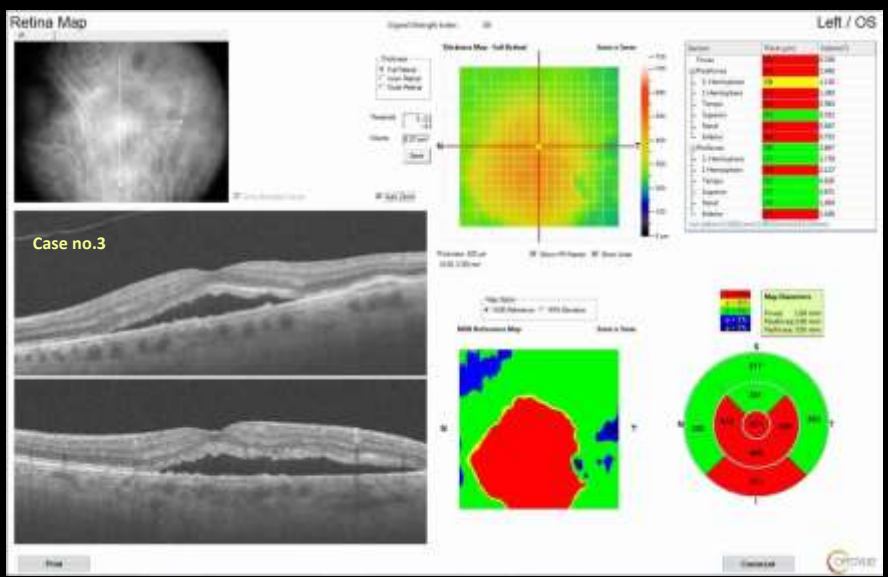
Case no.2



MULTI MODAL IMAGING: TYPE I CNV

Case no.3

MULTI MODAL IMAGING: TYPE I CNV



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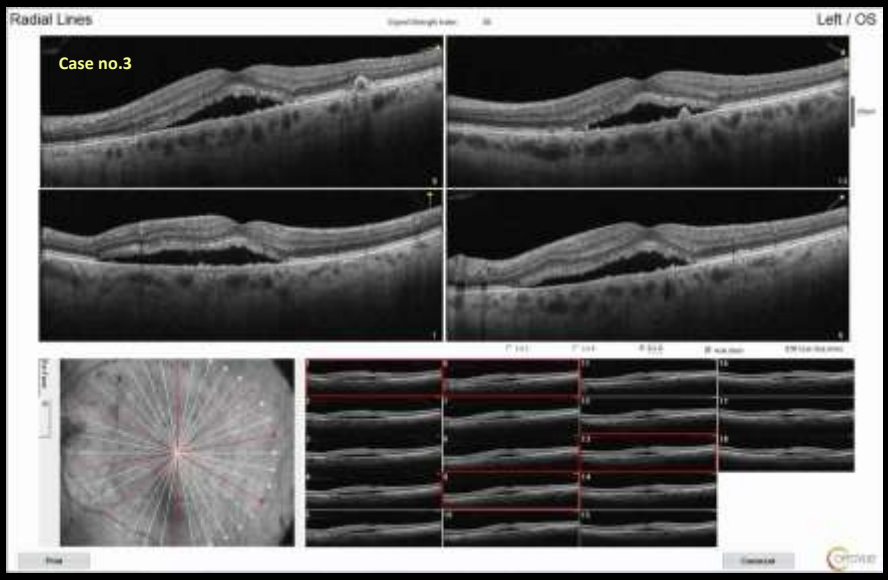

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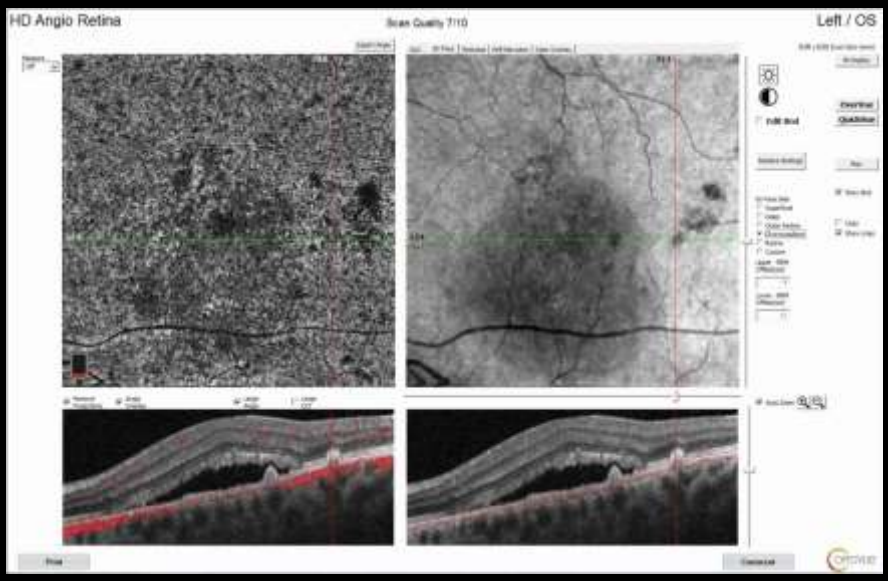

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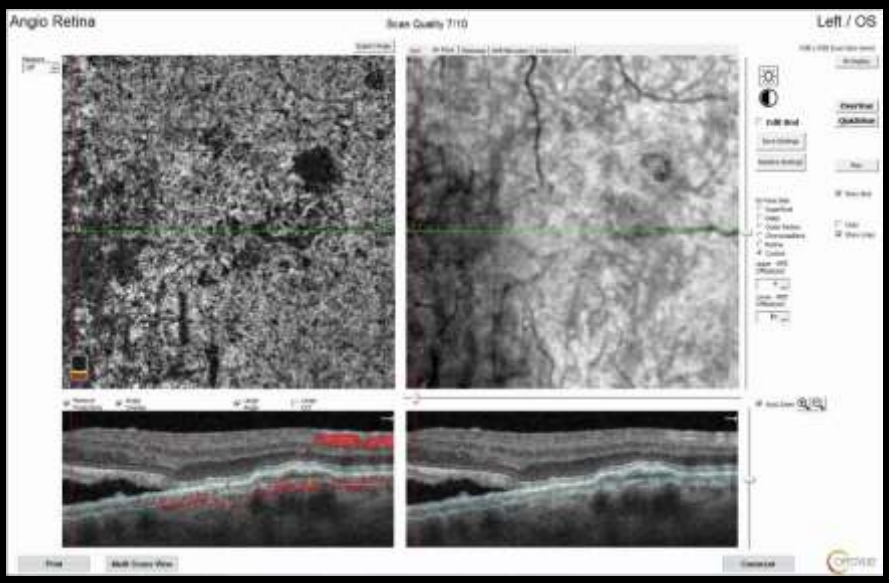
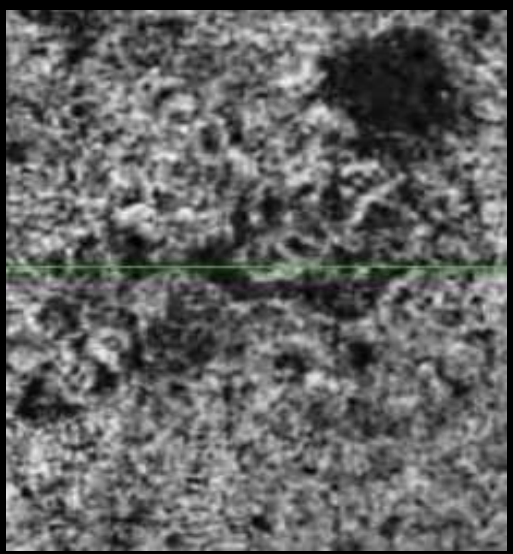


MULTI MODAL IMAGING: TYPE I CNV

Case no.3

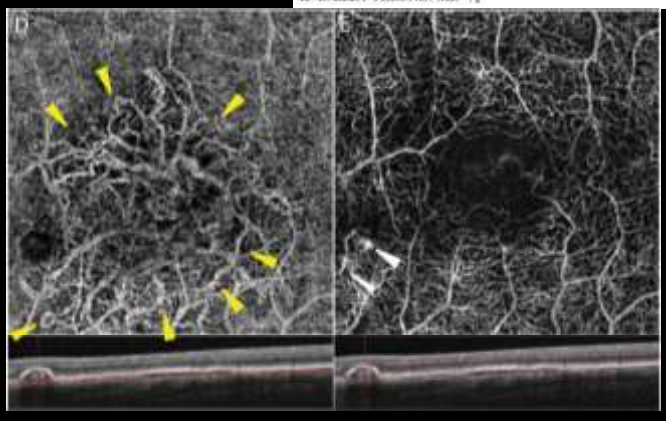


MULTI MODAL IMAGING: PCV

- **OCTA: PCV**

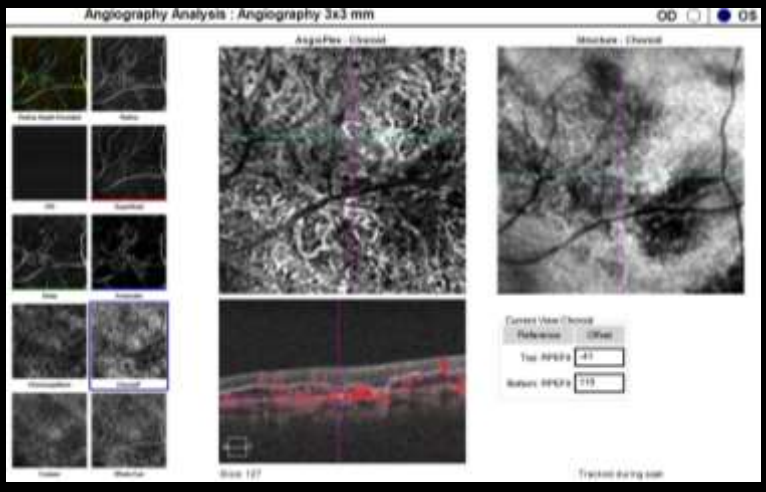
OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY OF POLYPOIDAL CHOROIDAL VASCULOPATHY AND POLYPOIDAL CHOROIDAL NEOVASCULARIZATION

MAIKO INOUE, MD,*†‡ CHANDRAKUMAR BALARATNASINGAM, MD, PhD,*†‡
K. BAILEY FREUND, MD*†¶



MULTI MODAL IMAGING: PCV

PCV.



ARTIFICIAL INTELLIGENCE

MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE

Theranostics 2019, Vol. 9, Issue 1 232

IVYSPRING

Theranostics

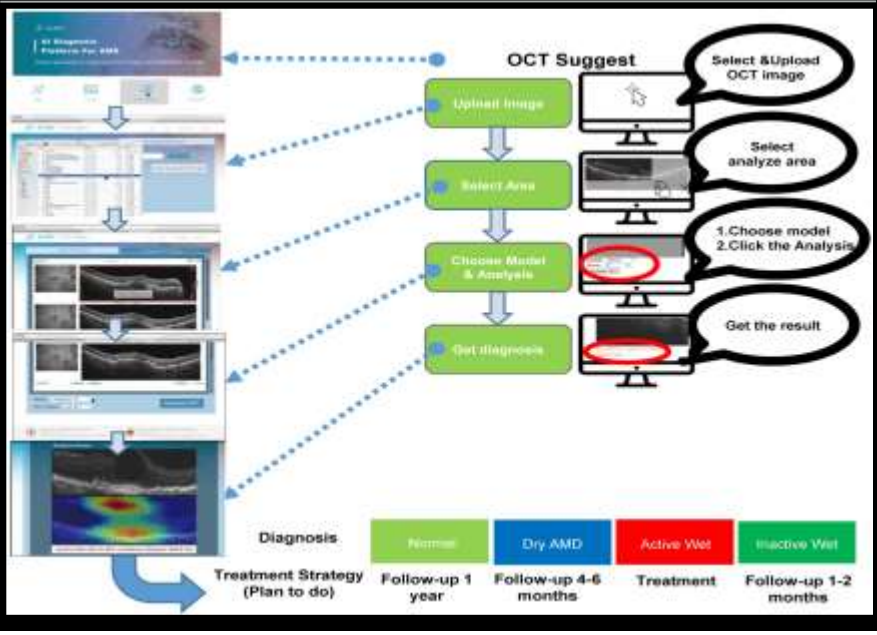
2019; 9(1): 232-245. doi: 10.7150/thno.28447

Research Paper

Artificial intelligence-based decision-making for age-related macular degeneration

De-Kuang Hwang[1,2,3*], Chih-Chien Hsu[1,4,5*], Kao-Jung Chang[6*], Daniel Chao[6], Chuan-Ho Sun[6], Yung-Chun Jheng[6,7], Abdulsamit A. Yarmishyn[1], Jau-Chang Wu[1,8], Chung-Yao Tsai[1,7], Meng-Lien Wang[1,2,3], Chi-Hsien Peng[9], Ke-Hung Chien[10,11], Chung-Lan Kao[2,3,12], Tai-Chi Lin[1,2,3], Lin-Chung Woung[6,7], Shih-Jen Chen[1,8*], Shih-Hwa Chiou[1,2,3,12,13]

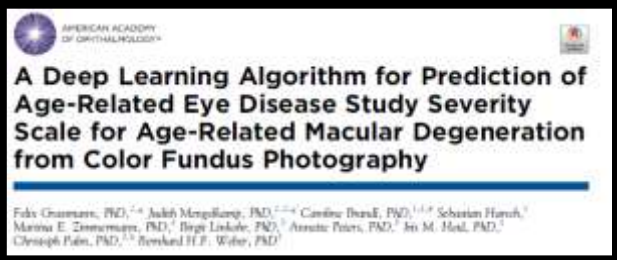
MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE



MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE

Machine Learning to Analyze the Prognostic Value of Current Imaging Biomarkers in Neovascular Age-Related Macular Degeneration

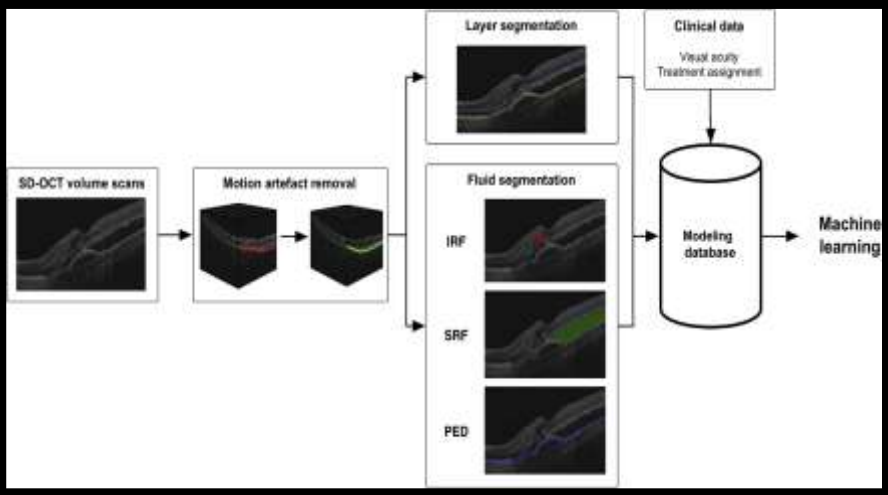
Ursula Schmidt-Erfurth, MD,[1] Hrvoje Bogunovic, PhD,[1] Amir Sadeghipour, PhD,[1] Thomas Schlegl, MSc,[1] Georg Langs, PhD,[1] Bianca S. Gerendas, MD,[1] Aaron Osborne, MBBS,[1] Sebastian M. Waldstein, MD, PhD[1]



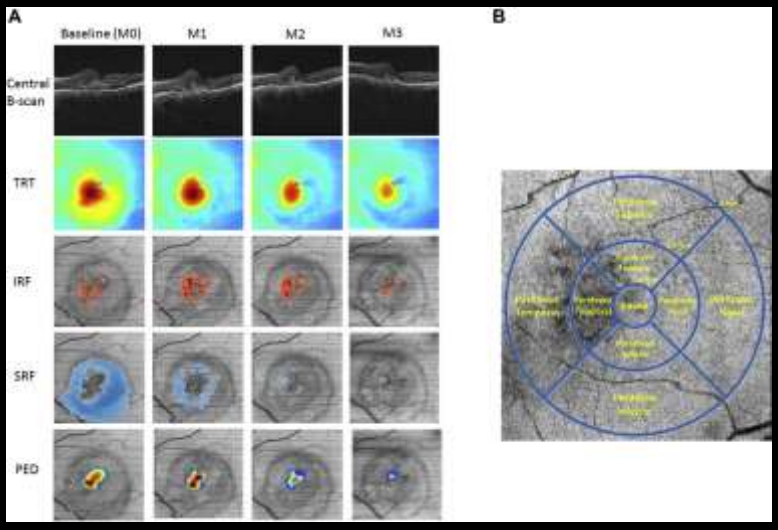
A Deep Learning Algorithm for Prediction of Age-Related Eye Disease Study Severity Scale for Age-Related Macular Degeneration from Color Fundus Photography

Felix Grassmann, PhD,[1,2] Judith Mengelkamp, PhD,[2,3,4] Caroline Brandl, PhD,[1,2,5] Sebastian Harsch,[1] Martina E. Zimmermann, PhD,[1] Birgit Linkohr, PhD,[3] Annette Peters, PhD,[3] Iris M. Heid, PhD,[1] Christoph Palm, PhD,[2,3] Bernhard H.F. Weber, PhD[1]

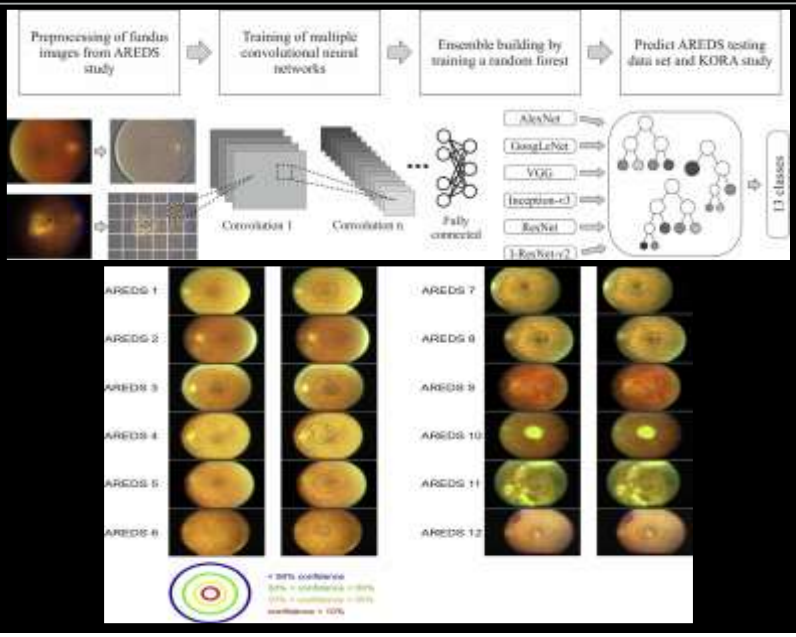
MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE



MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE



MULTI MODAL IMAGING: ARTIFICIAL INTELLIGENCE



CONCLUSION

- Clinical examination still the most important way for diagnosis & management of neo-vascular AMD.
- Multimodal imaging using an integrated data analysis superimposed from different types of investigation is the clue in cases of uncertainty.
- Artificial intelligence using the multimodal imaging data analysis is the upcoming technology for diagnosis & decision making in Neovascular ARMD.


THANK YOU