

# Evaluation of imaging examinations for retreatment decision in exudative age related macular degeneration

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## Purpose:

The criteria for retreatment in neovascular AMD are designed to detect signs of exudative recurrence. Fluorescein angiography (FA) is essential for the diagnosis of exudative age-related macular degeneration (AMD), but its use for treatment decision during follow-up remains questionable since the era of Spectral-Domain OCT (SD-OCT). Indeed, SD-OCT can show very subtle signs of exudation. Therefore, we wanted to know sensitivity and specificity of retreatment decision with different combinations among best-corrected visual acuity (BCVA), SD-OCT, SD-OCT with real-time eye-tracking technology and FA in exudative AMD.

## Methods:

We conducted a prospective analysis in 102 patients treated by intravitreal injections of ranibizumab on a pro-re-nata (PRN) basis and followed for at least 6 months. Decision reprocessing was analyzed at each stage of the review, sequentially. We analyzed treatment decision guided by

- BCVA alone,
- BCVA combined with SD-OCT,
- BCVA combined with SD-OCT real-time eye-tracking technology
- BCVA combined with SD-OCT real-time eye-tracking technology plus fluorescein angiography (FA).

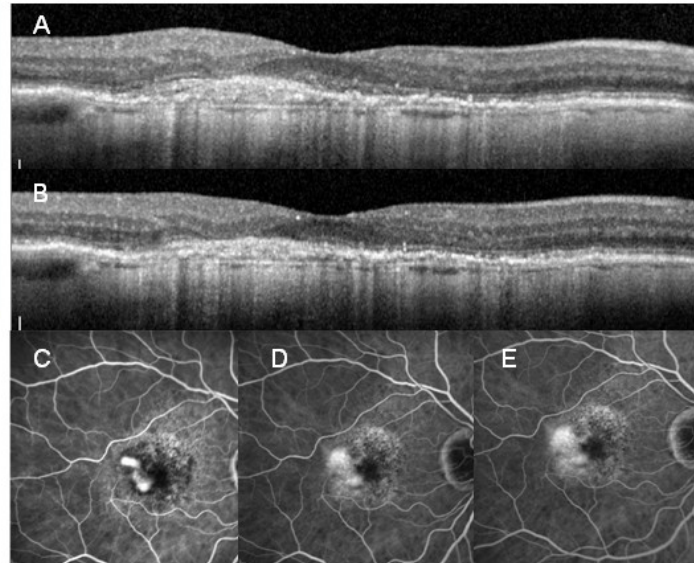
BCVA combined with SD-OCT real-time eye-tracking technology plus FA was considered as the reference, giving the final decision.

<b>Patients</b>	102
<b>Mean age</b>	78.7 +/- 7.7 yrs
<b>Sex</b>	68% W, 32% M
<b>Mean BCVA</b>	20/100 (range 20/20-20/400)
<b>Mean duration of treatment</b>	3.4 +/- 1.1 y (Range 1-6)
<b>Mean number of ranibizumab intravitreal injection</b>	13.6 +/- 8 (range 3-56).

**Table 1.** Patients Demographics and clinical characteristics Demographics of the study population. BCVA: best-corrected visual acuity; W: women; M: men; Yrs: Years CNV: choroidal neovascularization.

CNV types	Total patients	Total eyes
Type 1 CNV	78 (76,4 %)	78
Type 2 CNV	12 (11,7%)	12
Type 3 CNV	12 (11,7%)	12

**Table 2.** Choroidal neovascularization (CNV) subtypes.



**Figure 1:** A eighty-year-old woman affected with choroidal neovascularization (CNV), after 15 intravitreal injections of ranibizumab. The last injection was performed 2 months before. At the control examination, BCVA was 20/80 (it was 20/64 the month before). Retreatment was judged necessary on the basis of 5 ETDRS letters loss compared to previous examination.

The mapping SD-OCT (A) shows no obvious exudative signs. Retreatment was judged not necessary on the basis of BCVA plus SD-OCT findings. SD-OCT scan with follow-up (last month) using real time eye tracking technology (B). Real time eye tracking function shows retinal thickening associated with increased pigment epithelial detachment and apparition of poorly defined boundaries of the lesion. Retreatment was judged necessary on the basis of BCVA plus SD-OCT with real time eye tracking findings. Fluorescein angiography (FA) frames of the same patient at same treatment time point (after 15 intravitreal injections of ranibizumab). FA early phase (C) mid phase (D) and late phase (E) FA revealed obvious leakage due to active CNV. Retreatment was judged necessary on the basis of combined BCVA plus SD-OCT with real time eye tracking and FA findings.

## Results:

- BCVA as only criteria for retreatment decision showed a sensitivity of 57.1 % (95% CI: 42.2- 70.8) and a specificity of 71.7 % (95% CI: 59.2- 81.4) in taking the final decision.
- BCVA plus SD-OCT as criteria for retreatment showed a sensitivity of 90.5 % (95% CI: 77.9-96.2) and a specificity of 93.4% (95% CI: 86.3- 98.2)
- BCVA plus SD-OCT real-time eye-tracking technology as criteria for retreatment showed a sensitivity of 95.2 % (95% CI: 80.9-97.5) and a specificity of 100% (95% CI: 93.9-100).

		Final decision		P* Fisher's Exact Test
BCVA		No Retreatment	Retreatment	
No Retreatment		43	18	p=0.003
Retreatment		17	24	
Kappa statistic = 0.289				

	Final decision		P* Fisher's Exact Test
BCVA + SD OCT	No Retreatment	Retreatment	
No Retreatment	57	4	p=0.001
Retreatment	3	38	
Kappa statistic = 0.858			

	Final decision		P* Fisher's Exact Test
BCVA + SD OCT REAL TIME EYE TRACKING	No Retreatment	Retreatment	
No Retreatment	60	2	p=0.001
Retreatment	0	40	
Kappa statistic = 0.918			

**Table 3.** Summary of results on retreatment decision according to the different evaluation types/combinations

**Conclusion:** In this study, we investigated prospectively the utility of different imaging strategies for the decision of retreatment in exudative AMD.

VA changes alone is not sensitive (57%) neither specific (71%) enough to indicate disease recurrence. We demonstrated that BCVA plus SD-OCT with real-time eye-tracking technology is a useful and noninvasive combination for decision reprocessing patients with wet AMD.

We suggest that FA should be performed only in case of any doubt of exudative signs in SD-OCT after using comparative data with eye-tracking mode.

