Optical Coherence Tomography Angiography reproductibility and agreement of lesion size measurements in Neovascular Age Related Macular Degeneration

Oudy Semoun[1] , Sikorav, Anne [1] Francesca Amoroso[1] , Alexandra Miere[1] , Camille JUNG[1,2] , Vittorio Capuano[1] , Eric Souied[1]

1. Retina Creteil, University Paris Est Creteil, Creteil, France ; 2. Clinical research center, University Paris Est Creteil, France

Purpose To evaluate the reproducibility and interuser agreement of measurements of choroidal neovascularization in optical coherence tomography angiography (OCT-A), given that OCT-A provides a non-anatomical measurement of flow within choroidal neovascular lesions.

Methods Prospective non interventional study. Consecutive patients, presenting with neovascular age related macular degeneration (AMD), underwent two sequential OCT-A examinations (AngioVue, Optovue Inc., Freemont, California), performed by the same trained examiner. Neovascular lesion area was then measured on both examinations in the choriocapillaris automatic segmentation by two masked readers, using the semiautomated measuring software embedded in the instrument. Two measuring features were used: the first corresponding to the total manually contoured lesion area with the flow draw tool (select area) and the second to the total area of solely vessels with high flow within the lesion (vessel area). These measurements were then compared in order to assess both the reproducibility of OCT-A examination and the inter-user agreement with the embedded software.

Results : Fourty-eight eyes of 46 patients (77.4 mean age, +/- 8.2 SD, range from 62 to 95 years old, 8 males, 38 females) were included in our study. Mean choroidal neovascularization area was of 0.72 +/- 0.7 mm^2 for the first measure and 0.75 +/- 0.76 mm^2 for the second measure; mean difference between the first and the second measurement was 0.73 mm^2 (**Figure 1**). Intra-user agreement was of 0.98 (confidence interval 0.98-0.99) for both “vessel area” and “select area” features. Inter-user agreement was of 0.98 (confidence interval 0.97-0.99) for “select area” and “vessel area” features (**Figure 2, Table 1, Table 2**).

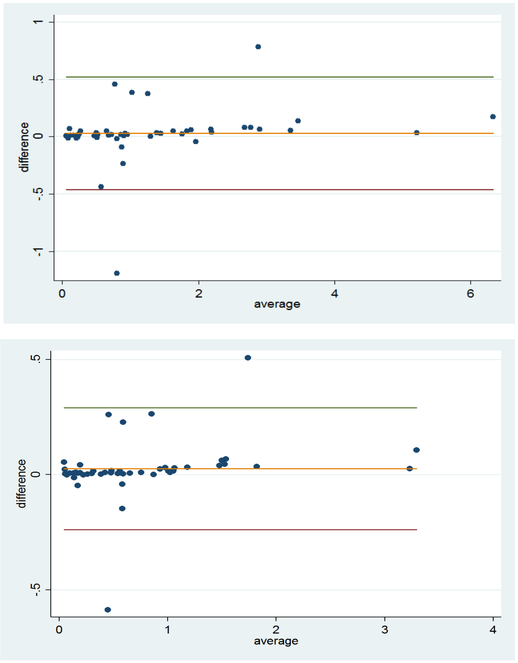

Figure 2 *:* Inter-reader agreement of select and vessel area measurements. A. Bland Altman plot showing the agreement inter-readers of the select area measures. B. Bland Altman plot showing the agreement inter-readers of the vessel area measures.

	Intra-reader		Inter-reader	
	*ICC **	*CI 95%***	*ICC**	*CI 95%***
Select area	0.98	0.98-0.99	0.98	0.97-0.99
Vessel area	0.98	0.98-0.99	0.98	0.97-0.99

Table 1 : Table 2. Intra- and inter-reader agreement for both select and vessel area measurements.
* ICC : Intraclass Correlation Coefficient ** CI 95% : Confidence Interval

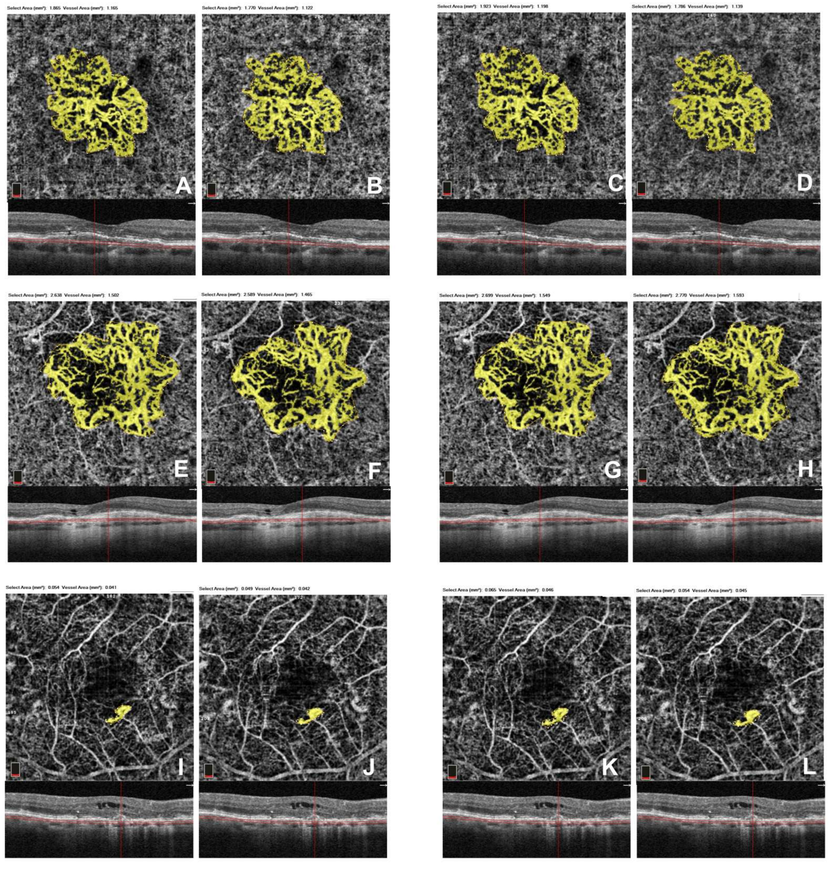

Figure 1 *:* Two consecutive measurements of the new vessel, using Select Area and Vessel Area features of AngioVue were performed independently by each examiner (A-D). Type 1 CNV, visualized at the choriocapillaris level, revealing a central feeder vessel with vessels radiating in a branching pattern in all directions from the center of the lesion. Panel E-H: Type 2 CNV, visualized at the choriocapillaris level, defined as a high flow, compact lesion, consisting of small capillary vessels. Panel I to L: Type 3 NV, visualized in the 0-30 microns around the Bruch’s membrane, harboring the aspect of a small, high flow tuft.

Table 2 Inter- and intra-reader agreement for both select and vessel area measurements for each type of neovascularization.

	Inter-reader agreement				**Intra-reader agreement**			
	Select Area		**Vessel Area**		**Select Area**		**Vessel Area**	
	ICC	***CI 95%***	***ICC***	***CI 95%***	***ICC***	***CI 95%***	***ICC***	***CI 95%***
Type 1	0.99	0.99-1	0.99	0.99-1	0.98	0.97-0.99	0.99	0.98-0.99
Type 2	0.97	0.95-0.99	0.96	0.93-0.99	0.97	0.95-0.99	0.97	0.95-0.99
Type 3	0.25	0-1.04	0.20	0-1.04	0.99	0.97-1	0.99	0.97-1
Mixte	0.98	0.93-1.02	0.97	0.91-1.03	0.98	0.95-1.01	0.97	0.89-1.04

Conclusion: Our data suggests that OCT-A is a reproducible examination for the neovascular size in the context of neovascular AMD..

Accepted in Br. J. Ophth

1. Jia Y et al. Split-spectrum amplitude-decorrelation angiography with optical coherence tomography. Opt Express 2012;20:4710-25.
2. Kuehlewein L et al. Optical Coherence Tomography Angiography of Type 1 Neovascularization in Age-Related Macular Degeneration. Am J Ophthalmol 2015;160:739-48 e2.