

Lalloum, Franck<sup>1</sup>; Leveziel, Nicolas<sup>2</sup>; Querques, Giuseppe<sup>1</sup>; Semoun, Oudy<sup>1</sup>; Puche, Nathalie<sup>1</sup>; Zerbib, Jennyfer<sup>1</sup>; Tilleul, Julien<sup>1</sup>; Souied, Eric H.<sup>1</sup>

(1) Department of Ophthalmology, CHI CRETEIL, CRETEIL, France. (2) Department of Ophthalmology, CHU POITIERS, POITIERS, France.

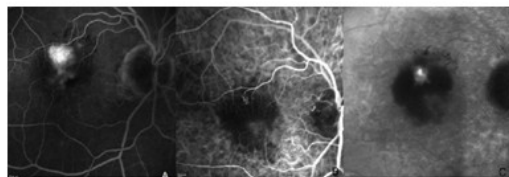


## Purpose:

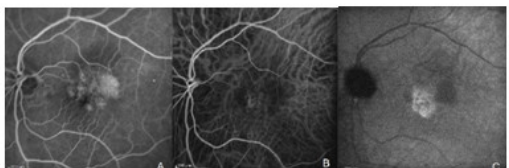
Fluorescein angiography (FA) is a major tool for the phenotypic classification of exudative age macular degeneration (AMD) and optical coherent tomography (OCT) is a major tool for monitoring the treatment and the follow-up of exudative AMD patients. The purpose of our study was to analyze the contribution of indocyanine green angiography (ICGA) in addition to FA in the diagnosis of occult (type 1) choroidal neovascularization (CNV).

## Methods:

A total of 103 eyes of 96 treatment-naïve patients affected with occult choroidal neovascularization related to AMD were prospectively included. Diagnosis of occult CNV was established on the basis of FA. A complete ophthalmologic examination was performed, including FA, OCT and confocal ICGA (Spectralis, Heidelberg, Germany).



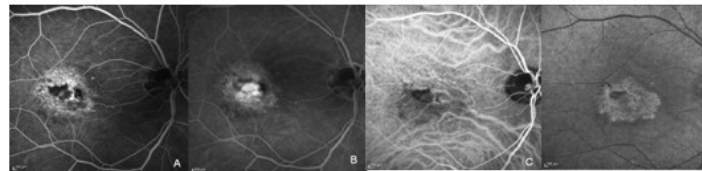
**Figure 1.** A, Fluorescein angiogram showed ill-defined hyperfluorescence on late phase. B and C, the indocyanine green angiogram showed a hot spot measuring less than an optic disk diameter in size.



**Figure 2.** A, Fluorescein angiogram showed ill-defined hyperfluorescence on late phase. B and C, the indocyanine green angiogram showed a small membrane measuring less than an optic disk diameter in size.

	"Large plaques"	Hot-spots	"Small plaques"	Polypoidal choroidal vasc ulopathy
Nb	67 (65%)	26 (21%)	8 (7,8%)	2 (1,9%)
Age	76,4 (±7,6)	80,3 (±8,7)	72,7 (±5,6)	76,5 (±21,9)
Sex ratio (M/F)	0,52	0,17	0,5	0,5

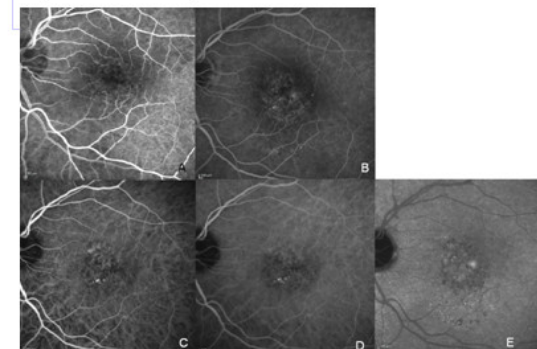
**Table 1:** Characteristics of the subjects with occult type 1 choroidal neovascularization in AMD



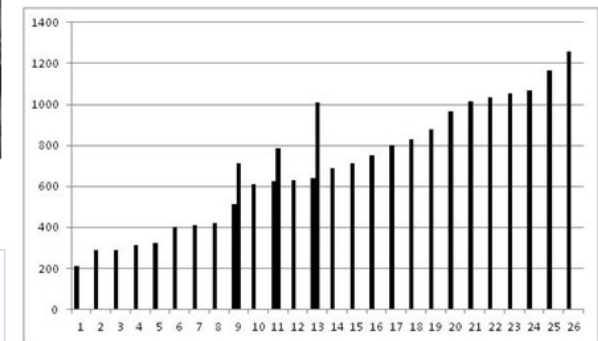
**Figure 3.** A, Fluorescein angiogram showed ill-defined hyperfluorescence on late phase and two pigment epithelial detachment. B and C, the indocyanine green angiogram showed a large plaque measuring more than an optic disk diameter in size.

## Results:

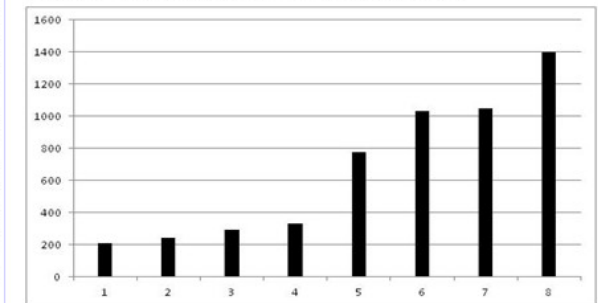
A total of 103 ICGA angiography of 96 patients (49 right eyes and 54 left eyes) with occult CNV due to AMD were analyzed. Mean age was  $77.7 \pm 7.63$  (range 55-96) and sex ratio was 32/64 (males/females). Four different morphologic subtypes of occult CNV were defined by ICGA: "large plaque" (67/103; 65%), hot-spot (26/103; 25.2%), "small membrane" (8/103; 7.8%), and polypoidal choroidal vasculopathy (2/103; 2%) Fig 1,2,3,4. Results are shown in table 1. Three eyes had two hot-spot and 4 eyes (3.8%) had a combination of hot-spot and large plaque. The distance from the hot spot to the fovea (figure 5) varied from 213  $\mu$ m to 1256  $\mu$ m with a mean value of  $685 \pm 301 \mu$ m. For 8 patients, the distance between the hot spot and the fovea was superior to 1000  $\mu$ m. Average distance between the fovea and the "small membrane" was  $665 \pm 458 \mu$ m, with a range between 208  $\mu$ m and 1396  $\mu$ m (figure 6). Three patients presented a distance superior to 1000  $\mu$ m, with a lesion accessible to a laser treatment. Distance between the fovea and the polypoidal choroidal vasculopathy was measured at 1213  $\mu$ m and 1665  $\mu$ m.



**Figure 4.** A, Fluorescein angiogram showed ill-defined hyperfluorescence on early phases in temporal papillary. B and C, the indocyanine green angiogram showed two hot spots in inferior macular corresponding polypoidal choroidal vasculopathy.



**Figure 5.** Distance ( $\mu$ m) between hot-spots and foveal avascular zone. A, Fluorescein angiogram showed ill-defined hyperfluorescence on late phase. B and C, the indocyanine green angiogram showed a hot spot measuring less than an optic disk diameter in size.



**Figure 6.** Distance ( $\mu$ m) between "small membrane" and foveal avascular zone.

## Conclusion:

In our study ICGA allowed to classify FA-detected CNV in 4 groups. Current findings support the idea that ICGA is useful in the evaluation and classification of patients diagnosed as occult CNV in AMD. Laser photocoagulation could be performed on the basis of ICGA examination in a limited number of cases.