Geographic Atrophy in Age-related Macular Degeneration

Outer Retinal Tubulation as a Predictor of the Growth Rate of Geographic Atrophy

Purpose: To determine whether the presence of outer retinal tubulation (ORT) predicts the growth of geographic atrophy (GA) lesions in eyes with age-related macular degeneration (AMD).

Methods: The MAHALO study (NCT01229215) enrolled 143 subjects into a Phase Ib/II multicenter, randomized, single-masked, sham-injection controlled clinical trial of the safety, tolerability and evidence of activity of lampalizumab in patients with GA associated with AMD. Spectral domain optical coherence tomography (SD-OCT, Cirrus OCT) images were evaluated with baseline and Month 18 data of fellow (non-study) eyes for this exploratory analysis. Area of GA was automatically computed using the OCT instrument software and segmentation errors were manually corrected. The change in GA area between baseline and Month 18 was computed. In addition, baseline OCT volume scans were inspected for the presence of ORT. The GA growth rate (with and without square root transformation (SQRT)) was compared between eyes with and without ORT.

Results: 103 fellow eyes with GA secondary to AMD, and OCT data at baseline and M18 were included in this study. 24 eyes showed evidence of ORT; in these eyes with ORT, the mean and median total area of GA was 7.94 and 7.75 mm² at baseline, and increased to 9.62 and 9.85 mm² at M18. The 79 eyes without evidence of ORT had a mean and median total area of GA was 6.27 and 6.10 mm² at baseline, and increased to 8.67 and 9.30 mm² at M18. Despite a larger baseline GA size, eyes with evidence of ORT showed a lower growth rate than eyes without ORT (1.68 ± 1.54 v 2.40 ± 1.54, P=0.003). This effect of ORT was observed regardless of whether the GA lesion was unifocal or multifocal (Table 1).

Conclusions: The growth rate of GA is slower in eyes with evidence of outer retinal tubulation on OCT compared to those without this finding.

Table 1: Comparison of the growth rate of geographic atrophy and the square root transformation (SQRT) of GA area in eyes with and without detectable outer retinal tubulation.

<table>
<thead>
<tr>
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<th>Eyes with multifocal GA (63 eyes)</th>
<th>Eyes with single GA lesion (40 eyes)</th>
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<tr>
<td></td>
<td>No ORT (47 eyes)</td>
<td>ORT (16 eyes)</td>
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<td></td>
<td>Mean total area of GA at Baseline</td>
<td>6.28 ± 0.52</td>
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<td></td>
<td>Median total area of GA at Baseline</td>
<td>6.10 ± 0.93</td>
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<tr>
<td></td>
<td>Mean total area of GA at Month 18</td>
<td>8.71 ± 10.41</td>
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<td>Median total area of GA at Month 18</td>
<td>8.6 ± 9.85</td>
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<td></td>
<td>18 Month Change in GA area</td>
<td>2.49 ± 1.58</td>
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<td></td>
<td>18 Month Change in SQRT of GA area</td>
<td>0.58 ± 0.37</td>
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<td>0.002</td>
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Commercial Relationships: Amirhossein Hariri, None; Muneeswar G. Nittala, None; Srinivas R. Sadda, None; Eric C. Strauss, Phillip Lai, Erin Henry. Doheny Eye Institute, Los Angeles, CA; Genentech Inc., South San Francisco, CA.

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Choroidal thickness in geographic atrophy associated with age-related macular degeneration

Moritz Lindner¹, Joana Czauderna¹, Athanasios Bezatis¹, Eva Becker¹, Christian K. Brinkmann¹, Rolf Finnes², Steffen Schmitz-Valckenberg¹, Frank G. Holz³, Monika Fleckenstein¹. ¹Department of Ophthalmology, University of Bonn, Bonn, Germany; 2Institute for Medical Biometry, Informatics and Epidemiology, University of Bonn, Bonn, Germany.

Purpose: To compare choroidal thickness (CT) in different subtypes of geographic atrophy (GA) secondary to age-related macular degeneration (AMD) with normal controls.

Methods: A total of 42 eyes of 42 patients (mean age 76.2±6.5 y) with GA and 31 eyes of 31 healthy controls (mean age 75.6±6.4 y) were examined by confocal scanning-laser-ophthalmoscopy (cSLO) and EDI (enhanced depth imaging) SD-OCT (Spectralis, Heidelberg Engineering, Germany). CT was measured at 26 defined points in horizontal and vertical EDI-OCT scans for each patient. GA subtypes were classified based on abnormal FAF patterns surrounding the atrophic lesions as previously published (Holz et al.; Am J Ophthalmol 2007).

Results: Mean CT was significantly thinner in eyes with GA (168.47±88 µm) as compared to control eyes (215.5±56.6 µm, p=0.011). In the GA group, patients with the ‘diffuse trickling’ subtype (n=7, 108.7±31.9 µm) exhibited a significantly thinner CT as compared to other GA subtypes (‘non-diffuse trickling’ GA, n=35, 180.7±91.0 µm, p=0.047). Difference in CT between the ‘non-diffuse trickling’ GA eyes and control eyes were substantially less pronounced.

Conclusions: The results indicate that the choroid in eyes with GA is thinner compared to normal eyes of similar age. However, this effect appears to be mainly driven by a specific GA subtype (‘diffuse trickling’). Refined phenotypic classification of eyes with advanced dry AMD appears prudent when choroidal thickness is assessed and compared. GA-subtype related differences in choroidal thickness may reflect a heterogenous underlying pathogenesis.

Commercial Relationships: Moritz Lindner, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (F), Optos, UK (F); Joana Czauderna, Carl Zeiss MediTec, Germany (F), Heidelberg Engineering, Germany (F), Optos, UK (F); Athanasios Bezatis, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (F), Optos, UK (F); Eva Becker, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (F), Optos, UK (F); Christian K. Brinkmann, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (F), Optos, UK (F); Rolf Finnes, None; Steffen Schmitz-Valckenberg, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (F), Heidelberg Engineering, Germany (R), Optos, UK (F), Optos, UK (R); Frank G. Holz, Acucela, USA (C), Acucela, USA (F), Allergan, USA (C), Allergan, USA (F), Bayer, Germany (C), Bayer, Germany (F), Boehringer Ingelheim (C), Carl Zeiss Meditec, Germany (F), Genentech; USA (C), Genentech; USA (F), Heidelberg Engineering, Germany (C), Heidelberg Engineering, Germany (F), Merz, Germany (C), Novartis, Switzerland (C), Novartis, Switzerland (F), Optos, UK (F), Roche; Switzerland (C); Monika Fleckenstein, Carl Zeiss Meditec, Germany (F), Heidelberg Engineering, Germany (C), Heidelberg Engineering, Germany (F), Heidelberg Engineering, Germany (R), Optos, UK (C), Optos, UK (F)

Support: DFG Grant No. Ho1926/3-1 and FL 658/4-1

Clinical Trial: NCT00393692

Long-term natural history of geographic atrophy in age-related macular degeneration

Steffen Schmitz-Valckenberg, Monika Fleckenstein, Moritz Lindner, Arno P. Goebel, Frank G. Holz. Ophthalmology, University of Bonn, Bonn, Germany.

Purpose: To investigate the natural history of eyes with geographic atrophy (GA) secondary to age-related macular degeneration (AMD) with ≥ 4 years review period.

Methods: Fifty-seven eyes of 42 patients (median age at baseline 70.5 years, range 60.9–84.4; median follow-up; 5.2 years, range 4.1 – 10.8) were identified in the FAM (Fundus autofluorescence in AMD)-study database for subjects with unilateral or bilateral GA at baseline in absence of any exudative AMD manifestation and with at least four years of serial standardized examinations. Data assessment included best-corrected central visual acuity (VA) measurements, routine ophthalmological examination and confocal scanning laser ophthalmoscopy including fundus autofluorescence. Total size of atrophy was determined using semi-automated image analysis software.

Results: For all 57 eyes at baseline, the median VA was 0.4 logMAR (0 – 1.8) and the total GA size was 3.82 mm2 (0.13 – 15.14). During the entire observation period, the change of VA and the absolute enlargement of total GA size varied between -0.5 to 1.3 logMAR and 0.44 to 21.85 mm2, respectively. Change of VA and GA progression per year was 0.05 logMAR/year (-0.11 – 0.27) and 1.47 mm2/year (0.09 to 4.21). A ≥ 3 line visual acuity loss occurred in 27 eyes (47 %). In 4 patients with bilateral GA at baseline, development of secondary choroidal neovascularization during the review period was noted in one eye.

Conclusions: These findings are in accordance with a continuous enlargement of atrophic patches over time in patients with GA. A high variability in VA changes was noted partly reflecting foveal involvement over time. Long-term natural history data may be not only important for the design of novel therapeutic strategies, but also for interpretation of study outcomes in order to estimate possible benefits in future patient management.

Commercial Relationships: Steffen Schmitz-Valckenberg, Allergan (C), Allergan (F), Bayer (R), Heidelberg Engineering (F), Heidelberg Engineering (R), Novartis (C), Novartis (F), Novartis (R), Optos (F), Optos (R), Roche (F), Zeiss MediTec (F); Monika Fleckenstein, Heidelberg Engineering (C), Heidelberg Engineering (F), Heidelberg Engineering (R), Optos (C), Optos (F), Zeiss Meditec (F); Moritz Lindner, Heidelberg Engineering (F), Optos (F), Zeiss Meditec (F); Arno P. Goebel, Heidelberg Engineering (F), Optos (F), Zeiss Meditec (F); Frank G. Holz, Acucela (F), Accuela (C), Allergan (C), Allergan (F), Bayer (C), Bayer (F), Boehringer Ingelheim (C), Genentech (C), Genentech (F), Heidelberg Engineering (C), Heidelberg Engineering (C), Merz (C), Novartis (C), Novartis (F), Optos (F), Roche (C), Zeiss (F)

Clinical Trial: NCT00393692

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Purpose: To analyze, on a long term basis, choroidal thickness changes in patients with geographic atrophy (GA) secondary to age-related macular degeneration, with or without choroidal neovascularization (CNV) in the fellow eye.

Methods: In this prospective study, nineteen consecutive patients (27 eyes) affected by GA at least in one eye were enrolled. All eyes were studied, every 6 months, by means of: enhanced depth imaging spectral-domain optical coherence tomography to measure choroidal thickness; microperimetry to assess retinal sensitivity; blue (B-FAF) and near infrared-wavelength fundus autofluorescence (NIR-FAF) to measure choroidal thickness; microperimetry to assess retinal sensitivity; blue (B-FAF) and near infrared-wavelength fundus autofluorescence (NIR-FAF) to measure choroidal thickness; and reading center, S.I. Medico University of Padova, Padova, Italy; ‘G.B. Bietti Foundation, IRCCS, Rome, Italy.

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eye CNV group). In the fellow eye CNV group, CNV was present at baseline or developed during follow-up.

**Results:** Mean follow-up was 1.6 ± 0.76 years, without difference between the two study groups (p = 0.6766). Choroid was significantly thicker in the bilateral GA group eyes compared to the fellow eye CNV group eyes at baseline (mean choroidal thickness: 170.5 ± 78.5 μm vs 129.1 ± 36.1 μm, p = 0.0371) and during follow-up (mean choroidal thickness: 173.2 ± 86.1 μm vs 123 ± 32.1 μm, p = 0.0340). Mean choroidal thickness significantly decreased during follow-up only in the fellow eye CNV group (p = 0.0276 in the fellow eye CNV group vs p = 0.4137 in the bilateral GA group). Mean GA area was not significantly different in the two groups neither at baseline nor at follow-up (p = 0.4118 in B-FAF and p = 0.6806 in NIR-FAF at baseline, p = 0.5734 in B-FAF and p = 0.8945 in NIR-FAF at follow-up) even if mean GA area significantly increased in both groups during follow-up. Mean retinal sensitivity significantly decreased during follow-up only in the bilateral GA group (p = 0.0405 in the bilateral GA group vs p = 0.5634 in the fellow eye CNV group).

**Conclusions:** The choroid shows different changes in GA, probably reflecting different GA phenotypes. These results should be taken into consideration when planning clinical trials to treat GA, because the effect varies depending on the individual phenotype.

**Commercial Relationships:** Elisabetta Pilotto, None; Francesca Guidolin, None; Enrica Convento, None; Francesco Giuseppe Stefanoff, None; Longhin Evelyn, None; Raffaele Parrozzani, None; Edoardo Midena, None

**Program Number:** 5892 **Poster Board Number:** C0078 **Presentation Time:** 8:30 AM–10:15 AM **Intravitreal Sirolimus for the Treatment of Bilateral Geographic Atrophy Associated with Age-Related Macular Degeneration: Results of a Phase II/II Trial**

**Philip A. Petrou, None; Katherine Shimmel, None; Catherine A. Cukras, None; Frederick L. Ferris, None; Emily Y. Chew, None; Wai T. Wong, None**

**Support:** NEI Intramural Research Program, and PP is supported by the National Institutes of Health (NIH) Medical Research Scholars Program, a public-private partnership supported jointly by the NIH and generous contributions to the Foundation for the NIH from Pfizer Inc, The Doris Duke Charitable Foundation, The Alexandria Real Estate Equities, Inc. and Mr. and Mrs. Joel S. Marcus, and the Howard Hughes Medical Institute, as well as other private donors.

**Clinical Trial:** NCT01445548

**Program Number:** 5893 **Poster Board Number:** C0079 **Presentation Time:** 8:30 AM–10:15 AM **Retinal oximetry in eyes with geographic atrophy due to age-related macular degeneration**

Andreas Pollreisz, Magdalena Baratstis, Katharina Kefer, Christoph Mitsch, Stefan Sacu, Ursula Schmidt-Erfurth, Ophthalmology, Medical University Vienna, Vienna, Austria.

**Purpose:** To analyze oxygen saturation in retinal vessels of patients with geographic atrophy (GA) due to age-related macular degeneration (AMD).

**Methods:** Retinal oximetry was performed in retinal vessels with Oxymap T1 oximeter (Oxymap ehf., Reykjavik, Iceland), which is based on a fundus camera using spectrophotometric oxygen measurement. Two images with a wavelength of 600 nm (oxygen saturation sensitivity value) and 570 nm (oxygen-insensitive value) of the same fundus area were taken. 14 eyes of 10 patients with GA due to AMD were compared to 20 age-matched eyes of 10 patients with incipient AMD (Drusen only) or 20 eyes of 10 patients with no retinal diseases present (healthy controls). For each study participant the retinal arterial oxygen saturation, venous oxygen saturation and the arteriovenous (A-V) difference combined with the measurement of each vessel diameter were analyzed within a ring area concentric to the optic disc. Data are presented as mean ± standard deviation and significance calculated based on a paired t-test (p<0.05 considered statistically significant).

**Results:** The age of study participants ranged between 70 and 79 years, with no statistical significance observed between study cohorts. Mean oxygen saturation values of retinal venous vessels in patients with GA were significantly higher compared to healthy subjects or patients with incipient AMD (p = 0.012; p = 0.019). No statistical significance could be observed in the oxygen saturation of arterial vessels between the 3 study groups. Similarly, A-V difference showed no statistical significance between the study cohorts. The mean retinal vessel diameter of both venules and arterioles were not significantly different in patients with GA compared to eyes with incipient AMD or healthy controls.

**Conclusions:** Our results show that the oxygen saturation in retinal vessels was increased in venules of eyes with GA compared to healthy controls or eyes with early AMD. These data suggest that the oxygen delivery/consumption from the retinal circulation to the inner retina may be impaired in patients with GA.
Commercial Relationships: None; Magdalena Baratis, None; Katharina Kefer, None; Christoph Mitsch, None; Stefan Sacu, None; Ursula Schmidt-Erfurth, None

Program Number: 5894 Poster Board Number: C0080
Presentation Time: 8:30 AM–10:15 AM
Rates of Vision Loss in Patients with Geographic Atrophy in AREDS and AREDS 2
David Valent1, Emily Y. Chew1, Elvira Agron1, Frederick L. Ferris1, Philip J. Rosenfeld1, Traci E. Clemons2, Wai T. Wong2. Age Related Eye Disease Study Research Group2.

Purpose: To evaluate the rates of vision loss compared with baseline in participants with geographic atrophy (GA) at baseline and those that developed GA in two major clinical trials.

Methods: The Age Related Eye Disease Study (AREDS) was a multi-center, double masked randomized clinical trial that enrolled 4757 participants with varying degrees of macular degeneration. The AREDS 2 was a multi-center, double masked phase 3 study which enrolled 4203 participants who were at risk for progression to advanced age related macular degeneration. In both studies, best-corrected visual acuity was obtained at baseline and at yearly intervals using the standard protocol from the Early Treatment of Diabetic Retinopathy Study (ETDRS).

Results: In AREDS, 259 eyes of 217 participants were identified as having GA at baseline. Of these, 79 had central GA. By the 5 year follow-up, 1267 eyes of 908 participants developed GA, 259 eyes were defined as having central GA. For those with GA at baseline, 48.7% of participants lost more than 10 letters and 36.8% lost more than 15 letters at 5 years compared with baseline. For those that developed GA during follow up, 47.1% of eyes lost more than 10 letters of vision, while 36.8% lost more than 15 letters at 5 years. Participants that developed GA during the study that had better initial visual acuity (20/80 or better), on average lost more letters than those with worse visual acuity when diagnosed with GA at 5 years (20 letters vs. 5.7 letters). In AREDS 2, 524 eyes of 418 participants were identified as having GA at baseline, of which 170 eyes had central GA. By 5 years of follow-up, an additional 868 eyes of 791 participants developed GA, 291 of which had central GA. For those with GA at baseline, 44.2% of participants lost more than 10 letters, and 33.5% lost more than 15 letters at 5 years follow up. For those that developed GA during follow up, 50.0% of participants lost more than 10 letters, and 35.0% lost more than 15 letters at 5 years.

Conclusions: Participants in the AREDS and AREDS2 study with geographic atrophy trended toward progressive visual loss. As expected, those participants with better initial visual acuity tended to lose more letters than those with worse initial visual acuity. This data may guide other investigators in planning for future studies of GA associated with AMD.

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Conclusions: Regions of increased AF in the junctional zone of GA lesions appear to correspond to thickening of the RPE band on OCT. Longitudinal assessments will be crucial to determine if these OCT findings predict GA progression.

Commercial Relationships: Yan Lu, None; Amirhossein Hariri, None; Muneeswar G. Nittala, None; Eric C. Strauss, Genentech (E); Erin Henry, Genentech (E); Phillip Lai, Genentech (E); Srinivas R. Sadda, Allergan (C); Allergan (F); Carl Zeiss Meditec (C), Carl Zeiss Meditec (F), Genentech (C), Genentech (F); Optos (C), Optos (F), Regeneron (C)

Program Number: 5896 Poster Board Number: C0082
Presentation Time: 8:30 AM–10:15 AM

Correlation between Fundus Autofluorescence and Spectral Domain Optical Coherence Tomography Measurements in Geographic Atrophy


Purpose: To evaluate the correlation between fundus autofluorescence (FAF) and spectral domain optical coherence tomography (SD-OCT) measurements in subjects with geographic atrophy (GA).

Methods: The MAHALO study (NCT01229215) enrolled 143 eyes of 143 subjects into a Phase Ib/Ii multicenter, randomized, sham-injection controlled clinical trial of intravitreal lamaipalium for the treatment of GA secondary to age related macular degeneration (AMD). FAF (Heidelberg HRA or Spectralis) and SDOCT (Cirrus) imaging was obtained at multiple time points, including the baseline visit which is the subject of this analysis. The borders of all areas of definite decreased autofluorescence (DDAF) corresponding to GA were manually outlined on FAF images by certified graders at the Doheny Image Reading Center (DIRC) using validated planimetric grading tools. GA was also delineated automatically from SDOCT images using instrument software (Cirrus v.6.2), Carl Zeiss Meditec inc., Dublin, CA, and segmentation errors were manually corrected prior to computation of GA area. FAF- and SDOCT-derived measurements were correlated.

Results: The mean baseline GA area measured from FAF images was 8.63 ± 4.22 (range: 2.53 – 17.45) mm², compared with an automated, uncorrected SDOCT GA area of 7.40 ± 3.53 (range: 0.06 – 15.70) mm². Despite the presence of apparent OCT segmentation errors, there was significant correlation between FAF and uncorrected SDOCT measurements (r = 0.81; P < 0.001). Following manual correction of SDOCT GA segmentation, the measured GA area increased to 7.92 ± 3.60 (SD; range: 2.20 – 15.70), and the correlation with FAF-determined GA area significantly improved (r = 0.97; P < 0.001).

Conclusions: SDOCT-derived measurements of GA correlate well with areas of DDAF obtained from FAF images. Manual correction of SDOCT segmentation errors can further improve this correlation.

Commercial Relationships: Muneeswar Gupta Nittala, None; Amirhossein Hariri, None; Erin Henry, Genentech (E); Eric C. Strauss, Genentech (E); Phillip Lai, Genentech (E); Srinivas R. Sadda, Allergan (C), Allergan (F), Carl Zeiss Meditec (C), Carl Zeiss Meditec (F), Genentech (C), Genentech (F), Optos (C), Optos (F)

Program Number: 5897 Poster Board Number: C0083
Presentation Time: 8:30 AM–10:15 AM

The Autofluorescence in the Detection and Monitoring of Behavior Patterns Age-Related Macular Disease (ARM) Dry Type

milagros velazco, Jose Luis Rodriguez. RETINA, Conde de Valenciana, Mexico DF, Mexico.

Purpose: Assess Autofluorescence technique, fundus lesions and their evolution over time in patients with Age-Related Macular Disease (ARM) Dry Type

Methods: Standardized digital FAF images were obtained from 26 eyes of 17 patients with GA using confocal scanning laser ophthalmoscopy (excitation = 488 nm, emission >500 nm). Areas of GA were quantified and patterns of abnormal FAF in the junctional zone were classified. With follow-up 6/26 eyes in six months.

Results: Alterations in FAF were classified into seven phenotypic patterns including, minimal change, none, banded, reticular, Branching, Fine Granular and Trikling. Geographic Atrophy at six months could be assessed in four eyes, two eyes were classified as minimal changes without modifications apparent to FAF. Four eyes with A showed different patterns of FAF from None, Banded and Branching. The None pattern size increased atrophy in 5% of their initial size in the 6 month follow-up, Banded pattern increased 10% and 30% in the left and right eye respectively, finally Branching pattern increased 6%. Areas of GA showed a median enlargement of 7296.97 pixels²/6 months, ED 10608.571. Atrophy enlargement was the slowest in eye with “None” FAF pattern (376,58 pixels²/6 months), followed by eye with the “Branching” FAF pattern (524,71 pixels²/6 months) and by eyes with the “Banded” FAF pattern (5479,44 pixels²/6 meses, and 22807,18/6 meses).

Conclusions: The results suggest that different patterns of FAF have an impact on disease progression of atrophy in ARM and may become a pronostic factor. Although the molecular mechanisms in the pathophysiology of this disease are not understood completely, the Retinal Pigment Epithelium and lipofuscin plays an important role, will need future studies to identify potential risk factors to prevent growth of geographic atrophy

Commercial Relationships: milagros velazco, None; Jose Luis Rodriguez, None

Clinical Trial: No

Program Number: 5898 Poster Board Number: C0084
Presentation Time: 8:30 AM–10:15 AM

MultiColor imaging in the evaluation of geographic atrophy due to age-related macular degeneration


Purpose: To investigate the ability of MultiColor imaging to evaluate geographic atrophy (GA) due to age-related macular degeneration.

Methods: Twenty-two consecutive patients with GA underwent MultiColor imaging, color fundus photography (CFP), blue light fundus autofluorescence (FAF) (excitation = 488 nm; emission > 500 nm), near-infrared fundus autofluorescence (NIR-FAF) (excitation = 787 nm; emission > 800 nm), and spectral-domain optical coherence tomography (SD-OCT) (Spectralis HRA + OCT; Heidelberg Engineering. Two readers independently made manually two measures at two different times of the size (area)and the width of GA (largest horizontal diameter through the fovea), and evaluated the foveal involvement in each exam.

Results: A total of 32 eyes (22 patients; 15 women, 7 men, mean age 79.2±8 years) with GA were included. Interindividual agreement according to the evaluation of the size and width of GA was high for...
all the exams. MultiColor and FAF showed the greatest interobserver agreement for GA area measure (ICC = 0.99, 95% confidence interval [CI], 0.98–0.99; ICC = 0.998, 95% confidence interval [CI], 0.996–0.999, respectively). The inter class correlation was equivalent between MutiColor, CFP and SD-OCT images in the evaluation of the width of GA on simultaneous SD-OCT scan passing through the fovea (ICC = 0.94, 95% confidence interval [CI], 0.88–0.9). SD-OCT showed the highest intergrader agreement of foveal involvement (k = 1) followed by MultiColor (k = 0.87).

**Conclusions:** All the modalities were reliable for measuring GA area and evaluating the presence of foveal sparing. MultiColor is an excellent imaging modality for the detection of foveal sparing and is very appropriate to the measure of GA area and width.

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