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GEOGRAPHIC ATROPHY:

Imaging Guide for Early Detection and Monitoring

astellas

Taking a closer look at geographic atrophy

In addition to taking a clinical history and examination, multi-modal imaging may help with early detection, diagnosis, and monitoring of the progression of age-related macular degeneration (AMD) to geographic atrophy (GA).[1,2]

The following imaging modalities may be used to detect and monitor progression of AMD to GA: optical coherence tomography (OCT), fundus autofluorescence (FAF), and colour fundus photography (CFP).[1]

Timely detection and subsequent monitoring of AMD in patients may be an important clinical consideration.[2] This guide focuses on intermediate and late AMD, which are more likely to be symptomatic than earlier stages of the disease.[3]

DIAGNOSTIC HALLMARKS

Early AMD

Multiple small (<63 µm) and few intermediate (63-124 µm) drusen, or retinal pigment epithelium (RPE) abnormalities.[4]

Intermediate AMD

Extensive intermediate drusen (63-124 µm) or more than 1 large drusen (≥125 µm). May also be accompanied by degenerative changes in the choriocapillaris, RPE, and photoreceptors.[2,4,5]

Advanced AMD (GA)

Progressive atrophy of choriocapillaris, RPE, and photoreceptors; new and/or growing atrophic lesions.[2,6,7]

Optical coherence tomography (OCT)

OCT is the standard of care for assessing patients in their initial AMD diagnosis.[8,9]

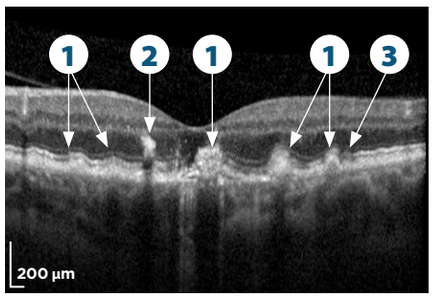


Image courtesy of Dr. Arshad Khanani

Intermediate AMD

1. Intermediate (63-124 µm) and large (≥125 µm) drusen[4]
2. Hyperreflective foci correspond to disruption of the RPE[10]
3. Photoreceptor degradation[8]

The transition from intermediate AMD to GA may be clinically important; timely recognition of new imaging signs may be helpful in informing the clinical management of patients.[11]

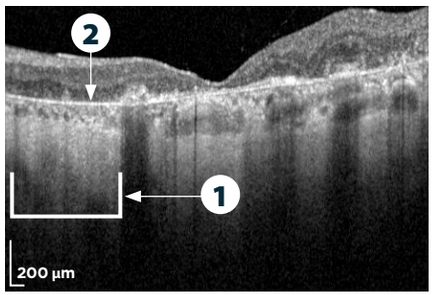


Image courtesy of Dr. Arshad Khanani

Advanced AMD (GA)

1. Choroidal hypertransmission[4]
2. RPE, photoreceptor, and choriocapillaris layer loss[9]

Fundus autofluorescence (FAF)

FAF may be used to diagnose and monitor disease progression in GA; it measures the full retinal area.[12] FAF may be a helpful modality in patient education.

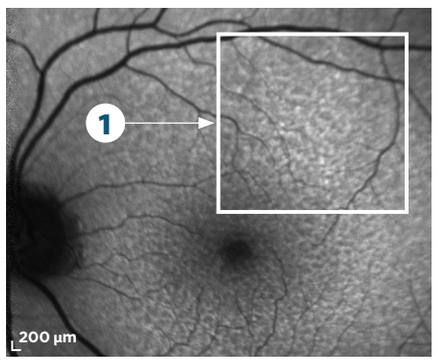


Image courtesy of Dr. Arshad Khanani

Intermediate AMD

1. Reticular pseudodrusen appearing as multiple, clustered, regularly networked, round areas of low-contrast hypoautofluorescence and may be prognostic of advancing GA[12,13]

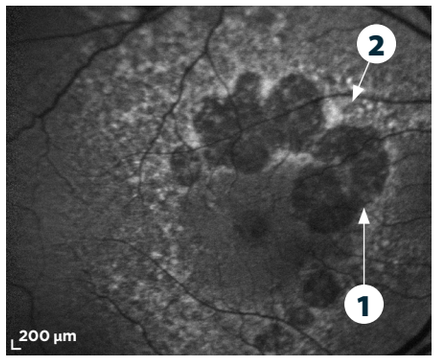


Image courtesy of Dr. David Lally

Advanced AMD (GA)

1. An area of hypoautofluorescence with a sharply demarcated border indicative of atrophic lesions[4]
2. Abnormal patterns of hyperautofluorescence surrounding atrophic lesions can indicate excessive lipofuscin accumulation that may reflect cellular dysfunction and may be prognostic of GA progression[4]

Colour fundus photography (CFP)

Can be used to establish a baseline and detect pigmentary changes throughout disease progression.[1]

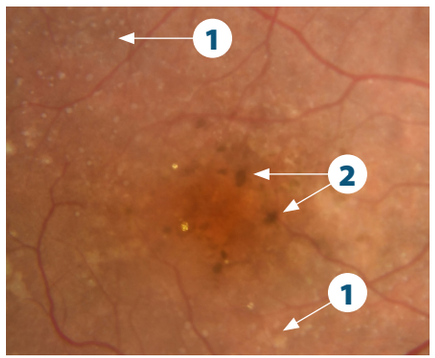


Image courtesy of Dr. Arshad Khanani

Intermediate AMD

1. Increase in number of intermediate (63-124 µm) drusen[4]
2. Areas of pigmentary change associated with RPE abnormalities[14]

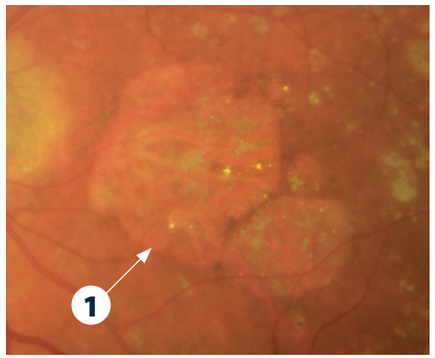


Image courtesy of Dr. Arshad Khanani

Advanced AMD (GA)

1. GA lesion border is sharply demarcated with increased choroidal vessel visibility[1]

TIP: A red-free filter on CFP can help to delineate retinal abnormalities.[15]

iRORA vs cRORA

Incomplete RPE and outer retinal atrophy (iRORA), also known as nascent GA in the absence of choroidal neovascularisation, represents an earlier phase of disease progression before advancing to complete RPE and outer retinal atrophy (cRORA).[8]

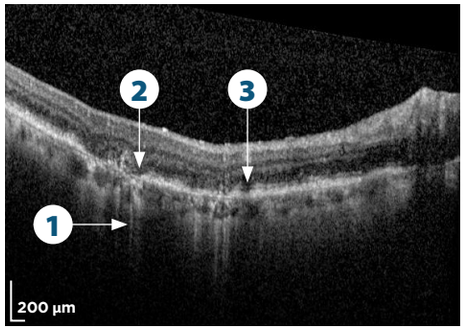


Image courtesy of Dr. Carl Danzig

iRORA[16]

1. Some hypertransmission present in the choroid, but it is discontinuous
2. A corresponding zone of attenuation and disruption of RPE with persistence of basal laminar deposits
3. Photoreceptor degeneration

cRORA is a more advanced stage of atrophy.[8]

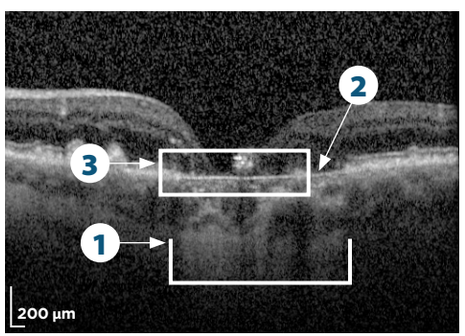


Image courtesy of Dr. Arshad Khanani

cRORA[8,*]

1. Area of choroidal hypertransmission ≥250 µm
2. Zone of attenuation/disruption of RPE ≥250 µm
3. Evidence of overlying photoreceptor degeneration, which includes ONL thinning, ELM loss, and EZ/IZ loss

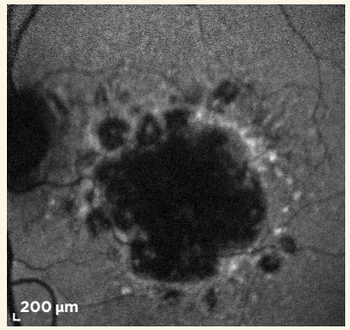
*Absence of scrolled RPE or other signs of an RPE tear.

TIP: Optimisation of instrumentation can minimise artefacts and improve the quality of imaging.[17] Work with your imaging partner to configure your instrument to your needs and specifications.

Lesion characteristics can predict rate of progression

Hyperautofluorescent FAF patterns can be predictive of the rate of GA progression. Rate of progression is slowest with no hyperautofluorescence or a focal pattern, and highest with banded or diffuse patterns. Eyes with diffuse-trickling patterns may also progress relatively quickly.[4]

Banded pattern



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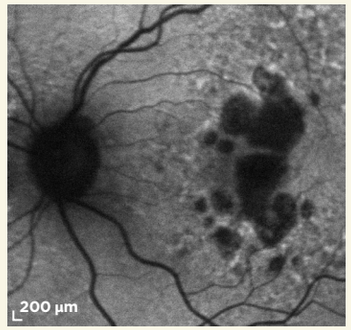
Diffuse pattern



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Diffuse-trickling pattern

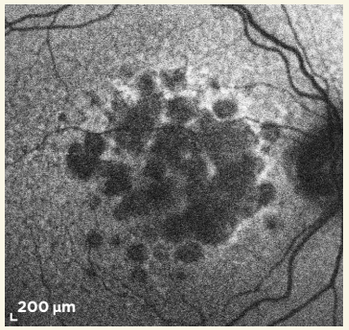

Image courtesy of Dr. Carl Danzig

Clinical imaging may be helpful in the early detection of geographic atrophy and minimising the impact of the disease.[11]

ELM=external limiting membrane; EZ=ellipsoid zone; IZ=interdigitation zone; ONL=outer nuclear layer.

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